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of science and research

14

2024
issue 2

AD ALTA

Journal of Interdisciplinary Research

AD ALTA: Journal of Interdisciplinary Research

Double-Blind Peer-Reviewed

Volume 14, Issue 2, 2024

Number of issues per year: 2

© The Authors (December, 2024)

MAGNANIMITAS Assn.

AD ALTA: JOURNAL OF INTERDISCIPLINARY RESEARCH

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JOURNAL NO.: 14/02 (VOLUME 14, ISSUE 2), DECEMBER, 2024

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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.

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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

THE INTERPLAY OF SILENCE AND THE UNCONSCIOUS MIND IN YUKIO MISHIMA'S "THIRST FOR LOVE"

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This original manuscript received no external funding from any organization or institute.

Abstract: Abstract: This research article examines the multifaceted role of silence through Etsuko, the protagonist in Yukio Mishima's *Thirst for Love*, explicitly exploring its connection to the unconscious mind. This research aims to investigate (1) how themes of silence and the unconscious are portrayed in *Thirst for Love*. (2) In what ways do these themes reveal Etsuko's repressed desires and psychological conflicts? (3) How does Mishima use silence as a narrative device to explore the complexities of love, desire, and the position of women in post-World War II Japan? This research aims to contribute a deeper understanding of the interplay between silence, the unconscious, and human relationships in literature through a detailed textual analysis and psychoanalytical theories.

Keywords: passion; psychoanalysis theory; repression; silence; unconscious desire

1 Introduction

In Yukio Mishima's *Thirst for Love*, the theme of silence is recurrent. Silence and the unconscious mind are intertwined in this story. They allow for a glimpse into the character's psychology. Silence is rarely just the absence of speech. Silence is present in questionable circumstances and dubious relationships to the self and the other. It is always related to silences that remain unsaid in the text of the narrative itself. It is a humus for the unconscious, an emergence zone of representations always cut, dislocated, and overflowing with meaning, sensation, and effects the subject cannot control. A silence analysed from this angle is a speech about unsaid words, and silence is interpreted as a positive speech, as the unveiling of a thought that could not take the shape of a determined thought in words.

Silence can be a metaphor for an unconscious fight. We can even assume that silence means unconscious insight. We think this silence cannot be said, nor can it be explained, because "the individual has never succeeded in withdrawing from the impressions of the external world" and "in all cases, the result always remains in the unconscious." The concept of psychoanalytic theory of the unconscious. According to Freud, pressure and repression show remarkable contradictions, in which a person can experience the life of the soul, the unconscious mind, and everyday behaviour.

Yukio Mishima's profound exploration of human psychology mainly focuses on the themes of silence and the unconscious. The novel is set in post-war Japan and follows the life of Etsuko, a widow living with her father-in-law, Yakichi, and his household. Silence in the book often represents the characters' unspoken tension and hidden desires. Etsuko, the protagonist, is trapped in a web of silence imposed by societal expectations and self-imposed by her internal struggles. This silence becomes a medium through which her unconscious mind manifests repressed emotions and desires. The unconscious plays a significant role in shaping the character's actions and interactions. Etsuko's repressed love for Saburo, the young gardener and her unfulfilled desires emerge through her dreams, fantasies, and silent contemplations. The novel explores the unconscious's dark and often disturbing aspects, highlighting how it drives human behaviour in ways that are not always rational or conscious. This research paper examines how these elements are employed to convey the complexities of Etsuko's inner world and the broader existential themes of the novel.

1.1 Background of Yukio Mishima

Thirst for Love is a novel published in Japan in 1950 and set right after WWII. It details the story of Etsuko and explores her motivations as someone living in post-war Japan. Etsuko was a character who had tried to take on a different façade in society – one that appealed to the masses – but still held deep desires that poked through. In this way, the novel can be seen as one that looks to veil a psychoanalysis of Etsuko. The depiction of Etsuko represents the conflict that all women face in what is often a society's unrealistic expectations of womanhood. Focusing on motivations, in a psychoanalytic reading, we can see that it is believed that we are all servants of our unconscious mind. There was an influence from psychoanalysis and a particular draw to the idea of socialisation as something that influenced the desires that poke through the façade. It is believed that the character was being repressed, living a life of silence to seal off the unconscious – 'the other scene'. The act of repression, as opposed to enjoying desire, causes dissatisfaction (Mihai 2021).

Yukio Mishima (1925–1971) is arguably one of the most important Japanese novelists of the 20th century, and his works have been the subject of much critical discussion. *Thirst for Love* (1950) is a sociopsychological novel that narrates, in third-person dialogic mode, the story of the married young widow, Etsuko, who is entwined in complex relationships.

The constant theme explored in Yukio Mishima's books is the revelation of consciousness's intricate and profound nature. Through presenting individuals from diverse perspectives, Mishima delves into the manifold possibilities of the inner spirit, inviting readers to introspect and contemplate. He aims to comprehend the desires, contradictions, troubles, and impurities beneath the surface of ethics, rituals, and social conventions. Novels now serve as a disguise for revealing people's hidden secrets and tragic events. The author's deliberate desire is to disregard the diligent and more virtuous essence within his heart. The final objective is to assert itself, to transform into a superior, consequential, or extraordinary state, or to present itself as its true self.

In *Thirst for Love*, Mishima broke the traditional narrative constraints of realism and aimed to reveal the complexity and silent depth of the feminine consciousness through a spirited novel and to present people from different positions to explore various possibilities of inner spirit and to try to understand the desires, contradictions, troubles, and impurities of the inner being behind the ethics, rituals, and social forms.

1.2 Research Objectives

Despite the importance of silence and the unconscious in modern literature, a unified theoretical corpus has yet to be developed to understand this literary mode. The main aim of this study is to exhibit the value of silence and the unconscious mind in literature by analysing *Thirst for Love* (1950) by Yukio Mishima. There are three subsidiary objectives to achieve the main aim. The first objective is to establish a theoretical foundation to enhance the understanding of an unconscious and silent mode of writing. Psychoanalysis and theoretical frameworks based on silence will be employed to achieve this objective. The second objective is to conduct an in-depth analysis of *Thirst for Love*, considering the theoretical frameworks. The analysis will exhibit how the novel silences the social and mental machinery of desire and how its dream contributes to forming the narrative of the unconscious. The third objective is to elaborate on the notion of the literary unconscious. This social, historical, and cultural unconsciousness can be traced across narratives without becoming the unconscious of a subject.

1.3 Significance of the Study

The term ‘archetype’ refers to the fundamental elements of the human psyche. These archetypes, such as the shadow and the child, are universal since they are imprinted onto the unconscious of every person, regardless of where they are from or what period they were born in. These symbols can be observed in the myths, religions, and art of different societies, and they also populate individuals’ unconscious dreams. Archetypes are especially relevant in literature, as they tend to insert themselves into the culture more broadly, influencing the interpretation of themes and symbols (Roesler, 2021).

The collective unconscious consists of these universal, shared symbols. The unconscious was like a floating sphere, and the deeper and inward you went, the greater the unconscious became. Deeper than the personal unconscious, or the personal memories and experiences we have, grows the collective unconscious. Even though the images in the collective unconscious are universal, they can combine differently in each person. If an image from the collective unconscious is charged with enough psychic energy, it can become complex, influencing how we perceive, think, or make decisions. In literature, exploring the collective unconscious can allow deeper connections between characters, symbols, and the universal human experience. Themes of facing the shadow, achieving individuation, or bowing to a higher power can enliven a text, revealing the darker or lighter side of the human experience.

In the novel, one of the key themes is ‘silence,’ it is clear that the story is marked by prolonged silence left by the characters without any words. This paper analyses this theme from the point of view of psychoanalysis. First, it explains the use of silence in the novel and its significance, elaborating on how the characters consciously or unconsciously remain silent and how this operates regarding thematic progression in the narrative. Second, the study describes the mechanisms of repression and sublimation to demonstrate how silence in the individual speaking subjects can indicate the operation of their unconscious mind.

The theme of silence functions significantly and becomes an imploded energy; as a result, the unspeakable, unpardonable guilt, intermingled with sensuality, is silenced. People usually try to express their inner emotions or thoughts in words. However, part of the psychic interiority that must be filled in with words cannot be adequately conveyed. The narrator chooses to remain silent at a point where words can hardly be connected to confine the inner feelings and thoughts. Through these silences – unspeakable or deadly silences – in the narrative, the characters’ hesitant, dissolving feelings are unravelled toward melodramatic catastrophic ends. These features in the sequences take the strategy of dialogical silence as a function of a sublimation act and give the reader hints to look into the realm of the unconscious. Such silent journeys through the story function psychologically, indicating the termination of the flocks of repressed thoughts released from the interiority.

The novel represents an essential moment in Japan’s postwar literature when the country was seeking a new direction for itself as a nation, and the heart was redefined. Mishima is one writer who made this shift through his characters’ struggles to redefine life. *Thirst for Love* is a novel in which speech becomes silent.

1.4 Scope and Limitations

In psychoanalytic terms, the unconscious indicates everything that humans try not to think about directly, which is always with them as a hidden and unspoken matter. In the novel *Thirst for Love*, the unconscious is reflected in the characters’ “yes and no” behaviours and silence. The scope of this study is to investigate and examine this silence. When silence is present in written language, the factors determining verbal texts naturally restrict how silence can be expressed, limiting its investigation. The theory’s limitations arise from its inability to accurately measure the level of silence and participation, which it fosters both

outside of awareness and within texts. While the author’s selection and the recognition that silence is noticeable only in the presence of something, such as text, address this issue, the extent of its pervasiveness remains unexplored.

The novel *Thirst for Love* by Yukio Mishima explores the role of silence in the pursuit and experience of love, which may be both constructive and destructive. This work provides a clear understanding of how silence is widespread and can be considered concerning social or geopolitical matters, even if they are not the focus. In Mishima’s narrative, the main character, Etsuko, frequently experiences quiet moments while attempting to gain insight into her identity, desires, and emotions. Critiques of silence analyse the simultaneous understanding of desires and the emotions linked to them that arise from expressing oneself. These critiques examine how internal desires are either fulfilled or not. Comprehending the extent to which one wants to prompt their reconstruction enables one to engage with them. Similarly, silence can manifest in several forms with a wide range of connotations, the analysis of which can be daunting when considering its purpose.

Silence and the unconscious – two central concepts concerning the narrator’s inner monologue—Silence is not a state that contributes to nothingness but signifies a complex and meaningful mental state with self-reflection and self-awareness, reminiscent of Sartre’s nothingness, which is consciousness. Sartre’s central philosophy, existentialism, is concerned about nothingness, and nothing is the fundamental metaphysical category in Heidegger, so nothingness itself should never be interpreted simplistically. According to Freudian psychoanalysis, the unconscious is concerned with awareness of thoughts, feelings, and memories. It is the primary source of human actions and behaviours that are usually incompatible with the conscious mind’s desires. It serves as a basis for forming the self, which cannot be completely aware of its existence and formulation. It employs symbolism and hermeneutic methodologies to investigate human thoughts, emotions, instincts, and superego phenomenology to elucidate the spiritual world.

2 Types of Silence

The sound of silence is as varied as the sound of words. Silence in literature is more effective, varied, and potent than the spoken word. On the one hand, silence may lull us into receptivity, but on the other, it may be used to speak much more eloquently than words do. Silence may result from shock, too much dignity, various psychological processes, communication difficulties, powerlessness, loneliness, and social repulsion. It may be total or partial, very small or overwhelming. Literary silence may be absolute, pathetic, ponderous, still, or loud due to its intensity and significance. Silence may be active or passive, voluntary or obligatory. When it is planned and meant to be articulate, it is called a ‘strategy of silence’. It often serves the purpose of self-defence and protecting interests. Silence thus appears to be cunning and insincere; it may disguise hidden interests, restrain the reader, and engage them in a silent duel. Thwarting the reader’s curiosity, the character testifies to their power. This is an intelligent kind of silence that extends to all involved. Those ambitions, desires, and moments of unofficial, subversive silence speak of inarticulate shame or resignation. The effect of fear and mental and verbal silence opens pretexts that seem inexhaustible in literature.

2.1 Postwar Japan and the Silent Generation

The early aftermath of World War II significantly influenced Japan’s cultural, emotional, and psychological landscape. Japanese residents faced immense challenges in the aftermath of the war as they grappled with the physical, psychological, and societal devastation caused by the conflict. Although the new constitution and occupation brought about substantial socio-political changes, many of these changes remained incomprehensible to the average Japanese. Additional transformations, such as the rise of mass media and the school

system's growth, were superficial. As a result, throughout the ten years following the war, a cohort of Japanese individuals maintained silence as they endeavoured to comprehend the events that had transpired, the global context in which they found themselves, and, most significantly, their identities.

Numerous traumas and problems resulting from the cessation of war, colonialism, forced westernisation, and national defeat were left unexpressed and disregarded. In other regions of the post-colonial world, comparable processes of confronting silence and inexpressiveness occurred. In Japan, the prevailing silence and refusal to acknowledge the situation was made worse by the ineffectiveness of traditional forms of communication, such as conversation, language, and words. Regrettably, the gloom was further intensified by typical aspects of modernity, such as hurry, economic growth, industrialisation, and westernisation. The entire trajectory of societal advancement was in opposition to reconciling with the devastation, disorder, individual ruptures, and divisions caused by war. The quiet profoundly impacted the Japanese perception of artistic potential and the psychological fear that needed to be expelled.

The contemporary phenomenon of silence and the inability to express oneself, as well as the act of suppressing and denying emotions, channelling them into other forms, and the subsequent resurgence of these repressed feelings, can also be explored as significant motifs in literature, cinema, painting, and other artistic mediums. Nevertheless, the lack of historical evidence and the absence of coherent discourse surrounding this huge global phenomenon provide a formidable challenge. The tragedy, magnitude, and brutality of victims and their suffering, even if made public and recognised, must be silently borne and cannot be fully understood through theoretical explanations. It surpasses the limitations of speech, artificiality, or intentional design. It is classified as indescribable and unspeakable. It must be faced and dealt with in a voyeuristic way that frequently includes involvement in slaughter, violence, and terror.

Mishima's work serves as a literary examination of the themes of silence and the unconscious. It depicts the challenging and unattainable endeavour of reconciling forgotten and marginalised history, memory, experience, desire, and pleasure. Simultaneously, disruptive and distressing remnants or recurring outbreaks of trauma-suppressed desires, obsessions, and intense pleasure derived from idealistic potential and fulfilment constantly occur. These elements risk unravelling and annihilating any story that attempts to establish control and containment.

2.2 Use of Psychoanalytic Theory

Psychoanalytic theory, invented by Sigmund Freud in the late 1890s after his initial discoveries of the 'unconscious' and 'resistances' in pathology and the early development of 'free Association' in therapeutic practice, plays a crucial role in understanding the hidden psychic structures of the unconscious and the dynamic conflicts with them in the heads of civilised human beings. Since problems of interests, desires, intuition, thoughts, sentiments, and judgments predominate in the activities of human beings, psychoanalysis attempts to elucidate the psychosomatic systems that cause those phenomena and to help clients understand them.

Repressed desires and fears have a way of finding their expression in the unconscious, paradoxically perhaps because that is a site for speech acts that the individual's conscious mind has not thoroughly censored. Dreams and the unconscious are closely related because the former seems to express the latter in a state where repression from the conscious mind occurs.

The Freudian psychoanalytic perspective is based on the premise that unconscious desires drive the narrative flow of an individual's conscious desires. According to the psychic model of Freud's psychoanalytic theory, consciousness, referring to the area containing the person's current thoughts and perceptions, is the smallest area. The second area, the pre-conscious, refers to

the sensations located in the periphery of consciousness. The unconscious, the most significant area, refers to the parts of the human mind that are repressed. It is in these parts that painful, sexual, and aggressive desires are flushed throughout the entire life of a person (Heller 1988, 354).

Jungian analysis focuses on the study of archetypes that form the fundamental basis of a person's psychology. These archetypes are innate universal psychic dispositions that form the substrate supporting the unique personas as they develop. In *Thirst for Love*, several collective unconscious archetypes exist in the shadowy realm of the characters' unconscious. These archetypes are the Shadow, the Anima (aspects of repressed feminine character traits), and the Persona (the public face, or mask, we present to the onlookers). These figures offer insight into the text to help elucidate the idea of 'silence' as "the last room in the house of love," an idea that could indicate both an end of the line and a potential beginning for the characters (Rees & Whitney, 2020).

These archetypes provide a fascinating lens into the psychoanalytic exploration of 'silence' as being productive of unconscious activity. This unconscious mind has been patterned in line with psychoanalysis due to the natural world circumscribing the expression of the character's internal lives. The journey towards interment into the unconscious mind begins with careful attention to the underlying connections in the surrounding text.

This paper is an attempt to bring psychoanalysis to literary studies. It explores the validity of psychoanalytic concepts in understanding the significance of silence and the unconscious in literature, hoping this illustration will incite further studies using this framework. Silence is the consummative or communicative state of a character in the narrative. It enables exploration into the hidden realms of a character's psyche. Most often, it involves subconscious references, particularly those to childhood memories. Such references can reveal essential components of a character's personality, motivations, and desires.

2.3 Research Approach

Qualitative content analysis is undertaken to analyse and understand the research aims and objectives. An in-depth examination of the connection between the unconscious mind and silence is being pursued in the novel *Thirst for Love*.

The concept of silence in *Thirst for Love* is examined in terms of its acknowledgement as a state of absence or as a response to the absence of others. From another standpoint, the idea highlights the need to protect innocence and embrace fantasy within a limited timeframe. This fantasy revolves around the themes of ownership and loss. The absence of awareness and the silence of thought create an external reality devoid of the burden of thought. This allows for an in-depth examination of the profound connection between silence and thought, as observed from the perspective of consciousness perceived as absence.

Examining the connection between the unconscious mind and silence in the novel aims to understand the state of silence that renders thought consciousness "theoretically dead", the silence of memory, and the cognitive aspect of this relationship with silence.

3 Silence as a reflection of Unconscious and Repressed Desires

"When silence is prolonged over a certain period, it takes on new meaning" (Mishima 138). Silence in *Thirst for Love* is multifaceted, representing both the external societal constraints and the internal psychological struggles of the characters. Etsuko's silence is particularly significant, as it is both a refuge and prison. Her inability to articulate her desires and emotions stems from deep-seated repression enforced by the rigid societal norms of her environment. This silence becomes a medium through which Mishima explores Etsuko's unconscious mind.

Etsuko's relationship with Yakichi and Saburo, a young gardener, is marked by a profound lack of communication. Her unspoken love for Saburo is a central aspect of the narrative, and her silence around this emotion intensifies her sense of isolation and despair. The silence between characters often reflects their emotional distance and the unbridgeable gaps in their relationships.

By examining Etsuko's repressed desires and the manifestation of her unconscious mind, we uncover the broader themes of love, loss, and psychological conflict that permeate the novel. Mishima's exploration of these themes reflects the character's internal struggles and critiques the societal norms and expectations contributing to their repression. *Thirst for Love* thus represents Mishima's mastery of portraying the human psyche's intricacies. It offers readers a compelling and psychologically rich narrative that continues to resonate with contemporary audiences. Through its exploration of silence and the unconscious, the novel invites us to reflect on our desires, repression, and the silent battles we wage within ourselves.

In extensive psychoanalytic theory and literature, silence often implies the unspoken and unacknowledged. The protagonist Etsuko's silence in the novel redirects the flow and shape of obscurity, melancholy, and confinement within man's existential terrain, like the silence before the storm. This study investigates the nature of silence employed by Etsuko to express the unconscious through psychoanalytic theory.

Psychologically, the characters possess repressed desires and emotions. Etsuko's silence implies her lack, anguish, dilemma, fears, and subconscious suppression. The protagonist's silence implies her incapability, inactivity, denial, rejection, hesitation, displeasure, and feeling of something not belonging to her due to her excessive want for contentment and satisfaction in the existence of the world, and she fails to subscribe to a character. When she does not want to be found by anyone, including herself, due to others, it implies her fear, nakedness, fragility, and energy discharge. Her desire to shelter within herself is a denotation of escapism from the horrific world of existence. The novel shows the suffocation and emptiness of life, reflecting the motive of silence.

Through Etsuko's dreams, fantasies, and silent contemplations, Mishima delves into the unconscious. These elements reveal her repressed desires and the dark aspects of her psyche. Etsuko's unconscious mind is a landscape of suppressed emotions, primarily her unresolved grief for her deceased husband and her unspoken love for Saburo. These unconscious drives manifest in her obsessive thoughts and anomic behaviour, illustrating the tension between her inner world and outward demeanour. The unconscious also surfaces through Etsuko's fragmented memories and intrusive thoughts. Her recollections of past trauma and unfulfilled desires are interwoven with her present experiences, creating a narrative that blurs the lines between reality and fantasy. This narrative technique emphasises the pervasive influence of the unconscious on Etsuko's actions and decisions.

"The initial is the same, but nobody will know since I've changed him to a woman. The name S comes up too much, but I don't have to worry about that. After all, there's no proof. To me, this is a false diary, though no human being can be honest as to become completely false" (Mishima 17).

The manifestation of these obsessions, unrequited love and unconscious desires manifests Etsuko's actions and relationships, revealing her deep-seated psychological conflicts and hidden longings. Her obsessive love for Saburo, the servant, can be seen as a projection of her unconscious desires. This relationship is fraught with power dynamics and unexpressed emotions, highlighting the complexities of Etsuko's life.

Freud's concept of the unconscious is crucial in interpreting these hidden desires. According to Freud, the unconscious mind is a reservoir of feelings, thoughts, urges, and memories outside of conscious awareness. Etsuko's intense and often contradictory

feelings towards Saburo reflect the tumultuous nature of her unconscious desires. Throughout the novel, her dreams, fantasies, and symbolic actions provide further insight into her repressed emotions and psychological conflicts.

3.1 Silence as emotional repression

Repressed desires and fears have a way of finding their expression in the unconscious, paradoxically perhaps because that is a site for speech acts that the individual's conscious mind has not thoroughly censored. The dream and unconscious are closely related because the former seems to express the latter in a state where repression from the conscious mind occurs (Akhtar, 2020)

"Nobody even imagines how well one can lie about the state of one's own heart" (Mishima 16). In *Thirst for Love*, silence symbolises repressed desires and unspoken emotions, showcasing it as a manifestation of emotional repression. Set in post-World War II Japan, it is next to impossible for Etsuko, the young widow who returns to her father-in-law's home and finds herself trapped within a patriarchal society and entangled in a complex web of unexpressed love and unfulfilled longing to express her thoughts and feelings. Her silence reflects her internal struggle and reveals the depths of her repressed emotions. She embodies this theme through her quiet suffering and emotional withdrawal, as her silence reflects her struggle and the suppression of her desires, particularly her longing for affection and intimacy.

Initially, Etsuko's silence in the text can be approached as revealing her repressed desires. Through psychoanalytic interpretation, the protagonist's silent mouth suggests she is holding back her unsatisfied emotional experience of the world. If she utters something from her suppressed self, she risks destroying the harmony of the family and even the listeners' lives. Deeper than hurting others, however, unconscious of her daily consciousness, she is frustrated enough to destroy herself.

Sigmund Freud's theory of repression is instrumental in understanding Etsuko's silence. According to Freud, repression is a defence mechanism the ego employs to keep disturbing or threatening thoughts from becoming conscious. In Etsuko's case, her silence serves as a means to manage her psychological pain and cope with her unfulfilled desires. An underlying tension marks her interactions with others as she continually suppresses her emotions and desires, leading to a sense of isolation and despair.

"She opened the sliding door. Yakichi was sitting at the desk, engrossed in reading something. He seemed flustered when he looked up and saw his daughter-in-law. Etsuko realised that the red, leather-backed book he had been reading was her diary" (Mishima 14).

Etsuko was surprised to discover her father-in-law reading her diary but pretended not to notice. "Father doesn't know this is my false diary. Nobody knows that it is a false diary" (Mishima 16). Etsuko's silence is her way of responding to her intense feelings of grief, desire, and frustration. Because of social constraints and psychological barriers, she cannot openly express her longing for Saburo, the servant, or how disgusted she feels about Yakichi, her father-in-law. Instead, her silence becomes a way to manage and conceal her emotions, allowing her to navigate the oppressive environment in which she finds herself. This use of silence aligns with Sigmund Freud's concept of repression, where unacknowledged desires are pushed into the unconscious mind, often resurfacing in indirect ways.

Etsuko, embodies this theme through her quiet suffering and emotional withdrawal. Her silence reflects her internal struggle and the suppression of her desires, particularly her longing for affection and intimacy with Saburo. "Love is a thirst that can never be quenched" (Mishima 167). This expression encapsulates the unfulfilled yearning and insatiable nature of love that Etsuko possessed for Saburo. It suggests that love is an

eternal longing that can never be fully satisfied, always leaving us desiring more.

Sigmund Freud's theory of repression is the ego's defence mechanism to keep disturbing or threatening thoughts from becoming conscious. In Etsuko's case, her silence serves as a means to manage her psychological pain and cope with her unfulfilled desires. An underlying tension marks her interactions with others as she continually suppresses her emotions and desires, leading to a sense of isolation and despair.

3.2 Silence as power and control

"To Etsuko, the nightcap had a strange significance. She knew she was not needed that evening when he crawled into bed with it on his head; when he didn't wear it, she was wanted" (Mishima 183).

Etsuko understands Yakichi's desires and advances without him having to speak. Silence in *Thirst for Love* also functions as a tool of power and control. A complex interplay of silence and speech marks the dynamics between Etsuko and the other characters. Etsuko's father-in-law, Yakichi, exerts authority through spoken words and strategic silences. His control over the household and Etsuko is partly maintained by the unspoken rules and expectations he enforces, creating an atmosphere where silence signifies dominance and submission.

Another example is Etsuko's silence about her feelings for Saburo, a personal struggle and a poignant reflection of the broader cultural constraints that limit her ability to act on her desires. This societal silence is also evident in how the characters interact with one another. Politeness and formality often mask true feelings and intentions, creating a veneer of harmony that conceals underlying tensions. Mishima's portrayal of this societal silence exposes the gap between appearance and reality, revealing the emotional and psychological costs of adhering to social expectations.

A tension-filled silence characterises Etsuko's interactions with Saburo. Her inability to voice her feelings towards him grants her a degree of control over her emotions, even as it heightens her inner turmoil. The silence between them is laden with unspoken desires and power struggles, highlighting the psychological complexity of their relationships. Freud's concept of repression suggests that what is unsaid or silent in a text can be as revealing as what is expressed. The unconscious mind communicates through slips, gaps, and silences, making these moments rich for psychoanalytical interpretations.

One essential category in Freud's psychoanalytical theory is the structural model of the mind. According to this model, the unconscious areas of the mind are full of unknown forces and practices. Freud states that the structure of the mind consists of three layers: the conscious mind, the pre-conscious mind, and the unconscious mind. The one we see in our deeds and talks is the conscious mind. It appears as a small part of reality, with logical comparisons, reasonable outcomes, and problem-solving thinking. The second layer is the pre-conscious. The pre-conscious draws from the conscious mind. Both turn to each other, and the contents can become steam. The last part is a part that has no connection with logical comparisons, revealing its greatest secret and never reaching consciousness (Allison, 2023). Mishima's masterful use of silence is a poignant critique of post-war Japanese society's rigid social norms and expectations. The characters' silences, which often reflect the societal pressures that dictate their behaviour and relationships, evoke empathy. At the surface of its narrative, Etsuko's silence may seem to symbolise her negative will, her fear of the emerging time of self-help, or a sign of her silent "will forget." Yet, given criticism of what silence can mean in every daily fight for self-involvement and authenticity, the consequences of silence must be investigated more deeply.

3.3 Silence as a symbolic and narrative device

Mishima uses the character of Etsuko to demonstrate how silence can indicate a mysterious and intricate range of emotions that cannot be effectively expressed by speech, making them seem plain or believable. Etsuko's romantic desires, sensory experiences, vivid imagination, and other subconscious longings remain concealed from her mental and verbal awareness. Repressing underlying urges leads to a compulsive desire to express them symbolically in a flamboyant way. Life becomes a monotonous struggle to balance honesty in quick speech, submissive behaviour, and deliberate avoidance of self-expression. An explosive maelstrom of uncontrollable delirious outbursts, characterised by grotesquely indiscreet directness, fills the melancholic accumulation, eagerly awaiting an opportunity to manifest. However, this type of quiet is deliberately preserved and socially accepted only in a repressive manner. It clarifies the moral inferiority and abnormality of an unfulfilled, socially unqualified hypocrite. The true nature of what is unknowingly disguised is painfully exposed.

"Etsuko's entire body was still swathed in the groping of Yakichi's dry, gnarled fingers. Even an hour or two of sleep had not wiped it off. A woman who has been caressed by a skeleton can never forget that caress. It was a new skin added to her skin-transparent, damp, thinner than the chrysalis a butterfly is about to shed" (Mishima 27).

From a narrative standpoint, Mishima's use of silence instils tension and suspense throughout the novel and actively involves readers in interpreting the narrative. Rather than being passive, pauses and gaps in dialogue encourage readers to delve into the characters' unspoken thoughts and emotions, fostering a deeper connection with the text. This narrative silence paves the way for a more reflective and contemplative reading experience, as readers are drawn into the characters' inner worlds and actively participate in interpreting the narrative. Moreover, the silence in the narrative structure poignantly reflects the theme of unfulfilled longing that permeates the novel.

"What if I am the one Saburo has loved? I will have to be bold and try to find out. I must not even think that what I anticipate will not come true. If my hopes are true, I shall be happy! It's that simple" (Mishima 191).

Just as Etsuko's desires remain unspoken and unfulfilled, the narrative often leaves questions unanswered and emotions unexpressed, mirroring the character's experiences of incompleteness and dissatisfaction. Beyond its symbolic and thematic roles, silence functions as a powerful narrative device. It creates suspense and focuses attention on moments.

Mishima's symbolic use of silence in the novel enhances its thematic depth. The physical setting of the book, particularly the house, serves as a symbol of Etsuko's psychological state. The house, with its silent rooms and empty spaces, mirrors her emotional isolation and the unspoken grief that haunts her. The house's silence is a backdrop for Etsuko's internal monologues and silent suffering, emphasising the novel's exploration of solitude and insight. The decaying condition of the house mirrors Etsuko's emotional desolation and repressed desires. Once a place of familial warmth, the house has become a site of entrapment and unfulfilled longing, symbolising Etsuko's internal world.

Nature imagery in the novel plays a significant role in reflecting the characters' inner transformations. The changing seasons, for instance, parallel Etsuko's shift in emotional states and the cyclical nature of her desires. The cherry blossoms, a recurring motif in the novel, symbolise both the fleeting beauty of life and the inevitability of decay, mirroring Etsuko's transient moments of hope and her eventual return to despair. According to Carl Jung, the collective unconscious contains universal experiences and archetypes all humans share. In *Thirst for Love*, the house and nature imagery are archetypal symbols representing Etsuko's journey through love, loss, and self-discovery.

4 Conclusion

Yukio Mishima's *Thirst for Love* is a poignant exploration of silence and the unconscious, illustrating how these themes shape the characters' lives and relationships. Through Etsuko's silence and the manifestation of her repressed desires, Mishima delves into his protagonist's psychological depths, revealing the unconscious's profound impact on human behaviour. This study highlights the significance of silence as both a narrative device and a reflection of existential angst.

By examining Etsuko's repressed desires and the manifestation of her unconscious mind, we uncover the broader themes of love, loss, and psychological conflict that permeate the novel. Mishima's exploration of these themes reflects the character's internal struggles and critiques the societal norms and expectations contributing to their repression. *Thirst for Love* is a testament to Mishima's mastery of portraying the human psyche's intricacies, offering readers a compelling and psychologically rich narrative that continues to resonate with contemporary audiences. Through its exploration of silence and the unconscious, the novel invites us to reflect on our desires, repression, and the silent battles we wage within ourselves.

4.1 Key Findings

The research uncovers a clash between masculinity's allure of silence and its incapacity to surpass its gendered identity, mirroring the friction in Mishima's personal life between his outward image and inner longings.

Love functions as a dual power, both constructive and destructive, stimulating an internal conversation, arousing a need for the hidden desires of the feminine subconscious, and ultimately resulting in feelings of dread, loss, envy, and mortality. However, this harmful affection cultivates a novel sense of self and other, a need that brings about the unattainable creation of desire between oneself and another, embedded in both long-lasting periods and the everlasting instant of the aggressive deed. Therefore, it does not occur as a loss but rather as a new addition, a worrisome repetition or unwelcome intrusion that increases the lack and division, making the want for love impossible to comprehend.

Thirst for Love can be interpreted as a cautionary narrative that exposes the inherent impossibility of love and desire while simultaneously recounting the catastrophic outcomes of engaging in forbidden yearnings for affection. The research shows that new desires and wants can emerge from submerged unconsciousness.

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Primary Paper Section: A

Secondary Paper Section: AJ

TERTULLIAN ON WAR FROM AN ETHICAL PERSPECTIVE

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This paper is supported by the international project The war in Ukraine – a challenge for Euro-Atlantic civilizational values IG-KSV-MP-01-2023.

Abstract: The paper deals with the mapping of Tertullian's views on war, the appropriateness and permissibility of military service and combat with arms in the military sense. The authors attempt to map the various texts that, in more compact units, but sometimes scatteredly, discuss Tertullian's views on the topics. Sometimes we do not even know whether Tertullian revealed an actual opinion on the subject he was writing about. The aim of this study is to grasp Tertullian's views on the army, war, and military service in the context of the appropriateness of such a connection for Christians. We will focus, firstly, on texts that comment on the subject at some considerable length. Next, we will discuss various scattered references that are closely related to the topic. One can speak here of positive and negative statements on the relationship between Christians and service in the military. Finally, we seek to answer the question of whether there is continuity within Tertullian's work on the subject, or whether we can say that Tertullian changed positions during different periods of his work.

Keywords: army, Christianity, Tertullian, weapon, war.

1 Introduction

Tertullian is considered one of the most important church fathers of the West. Of the Latin writers, he is currently second in interest to scholars after Augustinus Aurelius, who are concerned with patristics. This is testimony to the high interest of the scholarly community in this thinker. The period of activity of this ecclesiastical writer is not exceptionally long. What is exceptional is the frequency of the production of writings, as well as the influence he had on other Church Fathers. This is all the more remarkable when we consider the fact that Tertullian was later on the list of undesirable authors, or rather his influence was weakened in view of the later identification of his positions with various heresies. The question to what extent we can speak of the validity of this identification I will not address in this study, as it is an issue that is complex and requires extensive space to elaborate - compare (McGowan 2006). In any case, Tertullian remains one of the most influential representatives of both patristic and early Christian philosophy. This statement stands given the breadth of his theological and philosophical range, the scope of his original work, and his continuing influence, despite his later diminution.

2 More compact testimonies

The issue that resonates in this study is devoted to the grasp of war and peace in the works of our author. It is an issue often grasped by philosophers - cf. (Švāňa 2023). Its relation to pacifism also resonates in the works of contemporary ethicists (Conley 2013). In his extensive work, the theologian and philosopher has also commented on these issues. This is all the more interesting because the relevant Christian authorities, popes and ecclesiastical writers were silent on the subject until Tertullian's time. "Justin Martyr wrote in 150 C. E. that Christians do not wage war, but he meant that statement in the sense that Christians do not rebel against their persecutors (First Apology 39.2-3)" (Mercurio 2014, p. 64). Since wars are ever present in the world, it is timely to know the compact views of a major representative of Christian thought. As we know, Tertullian was an inhabitant of the Roman Empire, and his African ancestry did not change that. It is where he was born that Wilhite considers to have influenced his views (Wilhite 2007). This researcher argues that Tertullian's African identity determined his attitudes towards the Romans. Wilhite writes of antagonism towards Romans, including Christian Romans. Wilhite considers African influence as a determining factor in a political sense. Perkins makes a similar point (Perkins 2020). In any case, Christianity in antiquity must be seen as politically independent - compare (Wang 2024).

Tertullian's political thought has been mapped by several researchers – compare (Dunn 2015). A thorough description of our author's political thought has been made in an extensive study by Petr Kitzler. He considers the situation under Septimius Severus to be more peaceful than under his predecessors, among whom stands out, for example, the eccentric ruler Nero, a well-known opponent of Christians. Already Traianus, as Kitzler documents, was somewhat milder, not accepting anonymous denunciations and not inclined to mass executions of Christians. Septimius Severus was also not one of the outright enemies of Christians, at least in the area of persecution. Kitzler seeks to correct the distorted historical view that only Nero and Domitianus were among the persecutors of Christians. While this comes from the writings of early apologists, it is not historically accurate. Kitzler refers to Paulus Orosius as having left a more realistic account of ecclesiastical persecutions (Kitzler 2011, pp. 50-54). There are views about the connection between the persecution of Christians and the problems of the Roman Empire's economy (Caldas 2013). Tertullian himself writes of Septimius Severus as an emperor in a favourable vein. According to him, his reign was a period of peace and he even attributes to him a favorable attitude towards Christians - compare (Kitzler 2011, p. 55). Kitzler attempts to argue against the view that Tertullian's political stance is Christian isolationism towards Roman society and state - compare (Wilhite 2007); (Isichei 1964).

Tertullian's *Apologeticum* was not the first apologia, it may have built on earlier predecessors. Kitzler characterizes it as more confident than similar writings of the apologists who had been active earlier. Tertullian, according to Kitzler, wants to show that Christians are not enemies of Rome, but its loyal subjects (Kitzler 2011, p. 61). The real intention is unmasked by this researcher as giving the Christians courage and self-confidence. This is a writing situated in the image of a divine courtroom with the expectation of divine judgment, an imagery typical of Tertullian (Kensky 2015, p. 95). The core of the dossier is a refutation of the accusations, rejecting the charges of atheism, of disloyalty to the sovereign. Kitzler points out the contradictions between the position in the *Apologeticum* and other writings in relation to the Roman state, not on a general level, but, for example, in the prayer for the delay of the end of the world, as well as in the possibility of serving in the Roman army. These contradictions, in his view, are not explained by an adherence to Montanism. Kitzler points out that Tertullian often used arguments purposively, which is characteristic of his rhetorical style of writing. In the *Apologeticum* Tertullian, according to Kitzler, abstracts from his own opinion and speaks for the whole Christian church. In the matter of the attitude towards the Roman state and its ruler, Tertullian nowhere falsifies its legitimacy or the claim to power of its ruler. He appeals to the religious freedom which the Romans practiced in the various provinces (Tertullian 1890, pp. 83-85). Finally, the true God pleads for prosperity for the Roman monarch. He is ordained by God, but he is not himself.

Apologeticum is a work in which our author has expressed himself, among other things, on the subject of war and peace. Let us therefore take a closer look at what views he expressed. The dating of this writing is shifted by Minelli from 197 to a slightly later date within a few years (Minelli 2000). This text in question contains many layers, and there are not many passages where the author deals with the military. Much of it contains polemics with traditional Roman religion. Human laws are considered by Tertullian to be ones that can be improved. He refers to the written testimony of Marcus Aurelius, which speaks in favor of Christian soldiers in the Roman army. "Emperor Marcus Aurelius be searched, in which he testifies that the well-known Germanic drought was dispelled by the shower obtained through the prayers of Christians who happened to be in the army" (Tertullian 1890, pp. 18-19). He also mentions the above event elsewhere. "However, he also mentions the rain miracle in *Ad Scapulam* 4.6, maintaining that it is a famous incident."

(Huttunen 2020, p. 211). Mercurio considers the letter of Marcus Aurelius purporting to document this event to be a forgery (Mercurio 2014). Nota bene, this very event was used by later Christian authors to manifest their difference from Montanist pacifism (Ramelli 2002). Tertullian values the defenders of the laws, which could also be interpreted in terms of their protection by arms. He warns that Christians are intransigent in a situation where they would have to sacrifice their beliefs at the cost of their physical salvation (Tertullian 1890, p. 92). Here he does not take an a priori antagonistic position towards the relationship of the army and soldiers towards Christians. "Whence come those who burst into a palace armed, bolder than all Sigerii or Parthenii" (Tertullian 1890, p. 106). Christians are not allowed to kill, though they may be killed. Only Christians can be considered innocent according to the lines of this text (Villani 2012). In doing so, he recognised the natural right to religious freedom (Tănăsescu and Dăneci-Pătrău 2023).

Christians are involved in services that are useful to society. Their worldview is not a philosophy. Tertullian gives the metaphor of the Christian's lifelong struggle with the soldier's struggle. Even the soldier does not like to suffer, but in necessity he ventures into danger with fear. The Christian's summons to trial is a struggle where he fights even when death threatens. "But we are overwhelmed; yet only when we have won our cause; therefore we conquer, when we are slain; and in fact we escape, even when we are overwhelmed" (Tertullian 1890, p. 144). He does not regard suffering for God's sake as illicit, but on the contrary as a good struggle, comparing it with the similar suffering of non-Christian victims of torture.

As was evident, Tertullian, while nowhere glorifying the cult of the Christian soldier, did point to an example where it was Christian soldiers in the army of the home country who had distinguished themselves in a particular way. Although he did not say so *expressis verbis*, yet in this work he did not even speak out against the service of Christians in the army. He mentions combat as a common activity that Christians perform in the service of the state: "We sail and fight with you; we till the ground and engage in trade just as you do; likewise we join crafts, and throw our workmanship open to the public to your profit" (Tertullian 1890, p. 123). On the other hand, he reminds us that a Christian must not kill, only be killed. Kitzler says that this is merely an argument in favor of defending Christians. His view is supported by the fact that Tertullian does not write directly that such service to the state is worthy of emulation, that it is the standard for a Christian, he merely tacitly accepts service in the army by describing a well-known anecdote without comment. He is also supported by the austerity of Tertullian's language, which speaks of a common "militamus". Conversely, it can be said that Tertullian does not distance himself from the possibility of service in the army in this writing. Whether he personally shares a different position on the matter of military service at this time (also taking into account the possible time-shift in dating according to Minelli) is open to conjecture. Mercurio, too, comments that Tertullian writes without moral judgment about military service (Mercurio 2014, p. 66). I suggest that he made minimal use of military service in the argument, leaving two other possibilities. Either, as Kitzler says, Tertullian has simply tactically glossed over his personal (different and negative) opinion, or he also accepts this service to the state in this work, although he does not claim it as a model of Christian behaviour and nowhere glorifies it. He condemns killing outright; a Christian must not kill, even though he may be killed, which seems to be a reference to the acceptance of possible martyrdom. Mercurio interprets this as a message to the emperor not to worry about Christian rebellion (Mercurio 2014, p. 70), which is contradicted by Kitzler's view, according to whom the addressees of the writings are Christian readers (Kitzler 2011). Mercurio considers the addressee of the writings to be the emperor Septimius Severus, as well as the Roman magistrates. Slight criticism can be seen in the allusions to the standard of worship in the Roman army, which worshipped in the manner of a deity. To Tertullian, this represented an unacceptable model of Christian behaviour.

According to Mercurio, Tertullian radically changed this view in later years. "Tertullian switched his position radically in the 14 years between writing the *Apologeticum* (197 C. E.) - an apology directed to Roman magistrates to defend Christians from persecution - and *De Idololatria* and *De Corona Militis* (both 211 C. E.) - treatises directed to Christians about the dangers of idolatry and the idolatrous military crown" (Mercurio 2014, p. 60). It is possible that in reality there was a somewhat smaller time gap, since the time of the writing of the *Apologeticum* has been shifted by some scholars to a few years later. He must have acted inventively, since the biblical position is ambivalent on this issue. The number of soldiers of the Christian faith was increasing in our writer's time. According to Mercurio, this occurred under Septimius Severus.

As many scholars have argued, the impact of Tertullian's transition on Montanist positions cannot be absolutized (Braun 1985), in various aspects. Nor can it be argued that he may have edited the *Passio Perpetuae* in a Montanist spirit, which is not even a Montanist text after all - compare (Kitzler 2007a); (Kitzler 2007b). Several authors have argued that it was Montanism that inhibited Tertullian's changes in the area of his relationship to the army and the possibility of a Christian being a soldier. This is not entirely universally accepted, as it is not entirely clear to what extent it was Montanist views that determined Tertullian. Indeed, his rigorism is present throughout the whole range of his work.

On the subject of the permissibility for a Christian to serve in the army, Tertullian also speaks in *De Idololatria*, which is a writing of a younger date than the *Apologeticum*. It is a presentation of the ways in which, under the conditions of necessity of life in the Roman Empire, daily life can be lived in accordance with patterns of behavior that are compatible with Christian beliefs (Binder 2023). It is dated 211. The text is in many ways aimed at criticizing the worship of idols. "Speaking about idolatry, Tertullian's thinking focuses not on the idol but on the demons" (Van Winden 1982, p. 113). Here he turns his attention to idolatry in the military. He regards idolatry as a crime. He describes its various forms and condemns it as a grave sin, incompatible with the life of a Christian. In terms of the topic of the study, Tertullian does not begin to report extensively until chapter 19. No mention of Christian soldiers appears in this writing. Our author postulates the goal: "now inquiry is made about this point, whether a believer may turn himself unto military service, and whether the military may be admitted unto the faith, even the rank and file, or each inferior grade, to whom there is nonessence for taking part in sacrifices or capital punishments" (Tertullian 2009, p. 146). One soul cannot serve two masters. Tertullian argues that Christ took Peter's sword when he defended him from the soldiers. His answer is in the negative. "The *De idolatria* rigidly rejects any service in the army" (Huttunen 2020, p. 222). Our author identifies the connection with idolatry as the reason. The ornaments and dress that should be used by a public figure are not for Christians. Here, perhaps, according to the lines of this book, an ordinary soldier might not participate in idolatry. Tertullian fails to refute the testimony of Scripture as to how a centurion who believed in Christianity persisted in his, as Huttunen argues. Here we see the dichotomous division into two worlds that is so characteristic of Augustine Aurelius. "There is no agreement between the divine and the human sacrament, the standard of Christ and the standard of the devil, the camp of light and the camp of darkness" (Tertullian 2009, p. 146). It is thus a clothing that is associated with idolatry. Simply put, the Christian writer is bothered by army symbolism (Mercurio 2014). This is not the only reason for the incompatibility of military employment and Christian beliefs. Tertullian's reference to Peter's disarming is apparently about pointing to combat and killing itself as an activity that is forbidden for the Christian. Our author admits that the Old Testament points to warfare, which he does not condemn. The New World Order simply forbade the shedding of blood (Rordorf 1969, p. 111). Such a categorical view was not the voice of contemporaries who would have proclaimed the same views in unison. For example, the *Traditio apostolica* of

Hippolytus accepts some conditional, limited involvement of Christians in the military.

The subject of the permissibility of Christian service in the army is also addressed in the work of De Corona. The very first chapter touches on the relationship between the military and the Christian religion. Tertullian describes a soldier who refused to wear a laurel crown even in the face of ridicule and possible punishment. According to our author, "the laurel-crowned Christians" (Tertullian 2009, p. 191) are to be refuted. He means that those Christians who do not object to wearing laurel wreaths do not have a right relationship to the thing that is the offense.

Wearing a laurel crown on one's head is considered by Tertullian to be incompatible with the status of belonging to Christianity. The ecclesiastical writer seeks to problematize the subject. As he writes, Scripture does not directly forbid it. Here he tries to argue that it is also true that wearing it is not commanded by Scripture. He postulates another argument that it is against nature, since flowers are meant to please the eye and not to be placed on the head. Tertullian argues that there is an association of such a crown with Bacchus, and hence the roots of this custom are idolatrous. The crown of Christ by the Roman wicked was a presumptuous temerity, hence there is no argument that Christ also was crowned. This adornment is worthy, according to our author, of an idol. A Christian, in the words of Tertullian, ought not to dishonour his gate with a crown of laurel. Christ wore a crown of thorns and thistles on his head (Tertullian 2009, p. 209).

He poses the question in the way he used in De Idololatria. "I think we must first inquire whether warfare is proper at all for Christians" (Tertullian 2009, p. 204). It is lawful warfare if Christ says he who fights with the sword shall perish with the sword. So will service for others be more than service for Christ? "Then how many other offences there are involved in the performances of camp offices, which we must hold to involve a transgression of God's law, you may see by a slight survey" (Tertullian 2009, p. 204). If a soldier believes in the God of the Bible, he must leave the army immediately. For military service cannot be an argument, an excuse for sins that a Christian may commit in direct causal relation to it, nor does it exempt one from martyrdom. Tertullian considers it an excuse, "there is a higher necessity to dread denying and to undergo martyrdom" (Tertullian 2009, p. 205). Martyrdom is hugely valued by our author, although it is probably a misinterpretation that Tertullian assumes that only martyrs will receive immediate access to heaven (Wilhite 2020).

We can discern a rather significant difference in Tertullian's approach to state power. "While Tertullian seems willing to reconcile Christianity with the Roman state in the Apologeticum, he is absolutely unwilling to do so in De Idololatria and De Corona" (Mercurio 2014, p. 77). Serving in the army is considered by our author to be inconsistent with the duties of a Christian. De Corona in particular is an extension of the reasons why a Christian should have nothing to do with the military. Idolatry connected with the wearing of a crown, various pagan rites, the unnaturalness of a crown of flowers on the head, a crown of flowers for a follower of Christ crowned with a crown of thorns, the avoidance of martyrdom for the sake of army duties, the adoration of human sacraments, fighting with arms directed against the life and health of man, these are the set of causes for which, according to Tertullian, a Christian must not exercise the profession of a soldier. He mentions idolatry more than killing. "He mentioned killing only in Chapter 11 where he argued that the army was idolatrous because it demanded the oath, the sword, inflicting torture and guarding pagan sanctuaries" (Helgeland 1974, p. 172). De Corona, early in his writings, shows himself as a model of the Christian soldier who would rather undergo martyrdom than defile himself with the symbols associated with idolatry. The military practice of the army is incompatible with self-identification as a Christian. The armor of the apostles and the crown of martyrdom are considered by Tertullian to be worthy of choice for a Christian, not military symbols and weapons. The inclination to

Christianity, according to Tertullian, is to be loud, conspicuous, even in the context of attempts by the Roman ruling power to involve individual Christians in its military services.

If we are to characterize Tertullian's attitude towards the army, it can be described as escalating in a negative relationship. In the Apologeticum Tertullian tolerates the service of the Christian in the army, though he does not extol its virtues, nor does he postulate models of Christian soldierly conduct worthy of emulation. In De Idololatria he already rejects military service, mainly because of idolatry in the army; he is equally bothered by participation in combat and the possibility of killing another person. Here he switches to a position of antimilitarism. He enunciates his position in De corona, where he also points out that a Christian should differ from a non-Christian and manifest his negative attitude towards the army and weapons. The reasons remain virtually the same as in De Idololatria, except that Tertullian stresses the need for the Christian's attitude to be made manifest in a demonstrative way.

How to explain the shift in Tertullian's views regarding the participation of the Christian population in the army? Recall that it is not many years between the texts written, and the difference may be even less than the general assumptions indicate. The scholar Wilhite (2007) argues that the Apologeticum was written by Tertullian from the position of a native African, the audience for which the text is intended being the Romans themselves. There are other views; Zilling (Zilling 2004) considers the audience of this text to be the Christian community. Eckert (Eckert and Tertullianus 1993) makes a similar point. Kitzler (Kitzler 2008) also shares this view. The Czech scholar Kitzler finds such a position more impressive. We are thus inclined to the view that speaks of a Christian addressee of the Apologeticum, we believe that it would be tactless to attack the state in which Tertullian was active in the Apologeticum, as this would have the opposite effect to its purpose. The intent was (among other goals) to show Christians in a loyal light to the state.

Wilhite (2007) points out that the leaning towards Montanism did not have any major impact on Tertullian's change of opinion. After all, he was a convert from a pagan religion - compare (Balfour 2017). "Interest in philosophical questions often irreversibly and fundamentally changes the life of those who are interested in them" (Marchevsky and Sucharek 2023, p. 33). The spirit of his writings throughout his oeuvre is one of inclination towards moral rigorism. In the field of moral theology he was and remained a rigorist, for example, he considered human impatience as one of the causes of sin (Steenberg 2008). His moral rigorism did not stray from the framework of the complementarity of soul and body (Bogatay 2022). It is fairly well known that after the resurrection in a glorified body that will be different from the body present in the earthly world, according to Tertullian, there will be no sexuality (Forrester Church 1975, p. 99). If he has tightened his view in anything, it is his rejection of a second repentance after the conversion to Montanism; selected views on partial issues, such as the Sabbath (Pakpahan and Hasiholan 2024), may have changed, as well as his rejection of flight from persecution and remarriage after the death of a spouse. Even higher than marriage, he values abstinence - compare (Wysocki 2011). However, these are not radical changes in the field of moral theology.

Dunn notes that Tertullian adapts his arguments like a skilled rhetorician. In De Corona, for example, he hardly mentions the veiling of virgins, as in De Virginibus Velandis, because it did not suit his argument. "For the sake of argument, Tertullian could exaggerate or downplay or even contradict what he actually believed" (Dunn 2005, p. 29).

3 Other scattered short mentions

In addition to the three above-mentioned works, we find references to military service or combat in Tertullian's other writings. It must be admitted that some of these treat the subject more latently. Their wording, however, at least entitles us to

mention them and to attempt an analysis, especially in the context in which Tertullian mentions and uses them. We have divided the passages we have found into those that connote the subject positively and those that are negative to the connection between military weapons and Christianity.

3.1 Positive connotations

A latent form of a positive view of the issue under study is found in Tertullian on the question of his attitude to the use of violence by the sovereign (state, government ...). From the question he asks in *De Anima* (c. 210), ch. 33, which reads: "Who would not prefer the justice of the world, which, as the apostle himself testifies, 'beareth not the sword in vain,' and which is an institute of religion when it severely avenges in defence of human life? (Tertullian 2009, p. 444)" we can directly infer his positive attitude towards the above-mentioned action of the sovereign by referring to the Apostle Paul and his letter to the Romans (13:4). Tertullian does not speak directly of sanctioning violence, but in the question posed he directly guides Christians to have no problem with such (necessary and, of course, lawful) violence.

For the purposes of this study, mention should also be made of the *Ad Martyras* (Kitzler gives the year 197 unambiguously). In ch. 3 we find the metaphysics: "We have been called to the military service of the living God since the moment when we responded to the words of the Sacrament" (Tertullian 1900, p. 55). After this statement, Tertullian further explains the reasons for this example. He mentions the rather brutal life of a soldier because of the harshness, discomfort, drudgery, hardships, constant training, etc., their training leads them to composure, endurance, and adaptability. Finally, he urges Christians to regard all hardships experienced as exercises of mind and body. In the context of the above, he compares the Holy Spirit to a coach, the victor's garland to the Beatitudes, and Christ as the one who brings Christians to this wrestling ground. All of this also refers to Paul's words in 1 Corinthians.

For the sake of balance, we need to cite here the view of Carlson (1948, p. 94), who evaluated the use of examples by ancient Christian authors by feeling that by using examples to illustrate their arguments, Christian authors would gain some argumentative superiority over pagan authors and help them to refute the errors of their pagan opponents.

Here, however, we do not see the use of a special example, as this is a common human practice and thus an effort to ensure, if nothing else (military strikes), at least the defence of the state or society.

In this context, I think we can concede here that if someone is giving advice to another and referring to an example, he himself considers that example to be appropriate and worthy of following. From such reasoning, we can concede that Tertullian here does not have any particular objection to the practice of military service, indeed, he regards it as necessary for human functioning.

3.2 Negative connotations

Tertullian presents his opposition to war and to defence by violence in several writings. We begin chronologically with the writings of *De Spectaculis* (197 and 202). In it our author states that God forbids all killing. "God puts his prohibition on every sort of man-killing by that one summary precept: 'Thou shalt not kill'" (Tertullian 2009c, p. 157). "... (God certainly forbids us to hate even with a reason for our hating; for he commands us to love our enemies" (2, Tertullian 2009c, p. 174). This strict reasoning entitles us to conclude that it also applies to the issue of military service in its various manifestations.

Another indirect reference to something connected with combat or the soldier's service and its perception by Christians is in his writing *Ad Nationes* (Summer 197). In this writing Tertullian mentions, among other things, Christians as those who have

become famous and won admiration because of their unwavering strength in the face of death. The pagans, though possessed of many instances of heroic resistance and associated heroic deeds in their past, were apt to accuse Christians of stubbornness because of their heroism. To emphasize the contrast, Tertullian cites several examples of pagan heroism in the face of death. But all of this takes place in the context of the fact that what the pagans consider glorious in their own practices, they condemn as vanity and stubbornness in the case of the Christian.

If we consider the contents of ch. 18, we can see that Tertullian is speaking here of conviction. Of the convictions of pagans (because of the glorious past of their ancestors) and of the similar convictions of Christians (we assume for gospel reasons) to act in such a way as to gain glory and to act as they see fit. Specifically, he states, "Since, forsooth, the sword through their contempt of death produced stories of heroism amongst your ancestors, it is not, of course," (it sounds a bit ironic) „from love of life that you go to the trainers sword in hand and offer yourselves as gladiators, (nor) through fear of death do you enrol your names in the army (Tertullian 2009d, p. 263)".

What Tertullian argues here for clarification toward the Gentiles could be transferred by analogy to the actions of Christians. It could read as follows: but if contempt for death and the glorious death by the sword created the traditions about our ancestors (the Christian martyrs), then one thing is clear, it is not the love of life that leads us to be recruited as warriors, nor is it the fear of death that leads us to enter into military service.

It is more than that, it is a Christian vision of glory. It lies not in physical struggle but in the struggle for the values that Christians profess. Implicit here, then, is Tertullian's disapproval of physical struggle, reminiscent of the soldier's struggle, for the sake of the Christian's action.

A similar negative reasoning where Tertullian draws on the prophet Isaiah, where in verses we hear of swords being crossed into ploughshares and peace among the nations, is found in the work *Adversus Iudaeos* (c. 200), where (chap. 3, verse 10) speaks of the custom of the New Testament being to call attention to forbearance, and to convert the former fury of "swords" and "spears" into peace, and thus to rebuild the former waging of "war" against the rivals and enemies of the law into peaceful acts of ploughing and tilling the soil.

We find statements of a similar type in other writings. In his work *De Patientia* (c. 200-203) we find such statements about the illegality of retribution in four places. In ch. 3 he states that God would send him hosts of angels, but he does not approve, he does not want to, in spite of being aware of the fact, and further on Tertullian notes that He (Jesus) for the time to come has cursed all the works of the sword... In ch. 6 he also highlights the general rule of patience, which he clarifies by saying that we must not do evil, even though it may seem justifiable. Also noteworthy is the text (ch. 7, vv. 11-13) „To exhibit impatience at all losses is the Gentiles' business, who give money the precedence perhaps over their soul; ... when, in their cupidities of lucre, they encounter the gainful perils of commerce on the sea; when, for money's sake, even in the forum, there is nothing which damnation (itself) would fear which they hesitate to essay; when they hire themselves for sport and the camp (military)...“ (Tertullian 2009e, p. 1574). Tertullian here, as a recommendation to Christians, puts forward the idea that Christians are different from them, which leads to the Christian not laying down his soul for money, neither in the forum, nor in trade at sea, nor in the service of the army, but on the contrary giving money for his soul, whether spontaneously in the giving of it to others, or even in patience if it is lost. Finally, in the above work, ch. 8, he warns Christians against allowing themselves to be provoked to violence. On the contrary, they are to adhere to the Gospel whoever strikes you on one cheek, turn the other also. He explains this by patience and protection from God, who will avenge the patient against the aggressor. Vicastillo (2018, p. 16) explains the attitude found in *De Patientia* in the sense that impatience is the matrix of all sin.

Even the sins of Israel are caused by impatience. The contrast here is Abraham, with faith and patience being intimately connected; and Christ and his teaching, which abrogates the law of retribution, which promotes impatience and fulfills the Law by commanding love to one's enemies.

Tertullian presents the opposition to war and to defence by violence in his *Adversus Marcionem* (c. 207-208). He does this directly and indirectly in three places. In the third book he states. "Truth, and meekness, and righteousness." But who shall produce these results with the sword, and not their opposites rather—deceit, and harshness, and injury—which, it must be confessed, are the proper business of battles?" (Tertullian 2009f, p. 713). This is a statement that is directly directed against the use of violence in the form of the sword, and therefore against war. Moreover, Huxley (1936) remarks very aptly on this that it is an excellent statement of the almost always neglected truth that good ends cannot be achieved by bad or even inappropriate means.

Later in the same book we read another statement "Christ is promised not as one who is powerful in war, but as a bringer of peace" (Tertullian 2009f, p. 523). Tertullian here reflects again from the prophet Isaiah ch. 2, where in the first verses we hear of the swords being turned into ploughshares and peace among the nations, and it is there that he finds the answer to what attitude the Christian is to take when he emphasizes Christ as the bringer of peace, not as a warrior prince.

Finally, in this work, in the fourth book, he presents his argument, which is also telling of his rejection of it. He draws on ch. 9 of the prophet Zechariah, namely, "... And the Lord their God shall save them in that day as the flock of his people: for they *shall be as* the stones of a crown, lifted up as an ensign upon his land." (Zechariah 9:16). There is a wholly anti-war attitude felt in this reasoning when he speaks of "No one gives the name of sheep to those who fall in battle with arms in hand, and while repelling force with force ..." (Tertullian 2009f, p. 898), which is his vision of the above prophecy. God's people are those who prefer to surrender with patience and refuse to fight even in self-defense.

Here we can say that Tertullian goes to the extreme, so to speak, of rejecting the use of violence even if it were a necessary form of defence. As mentioned above, his leaning towards Montanism is evident here. In this vein, perhaps too harshly, Popov (2005) says that in Tertullian there was more love for the principle, for Christianity as a doctrine, for the triumph of which he was prepared to sacrifice everything, than for the people with whom he was surrounded. ... Tertullian's rigorism was manifested not only in demands that were often excessive but also in his lack of indulgence for the weaknesses of others and his disregard for extenuating circumstances.

The last writing in which we find a very brief mention of military service is that of *De Pallio*. In view of the ambiguity of the dating, and the ambiguity of the writing in general in the context of Christian teaching, we conclude. "Non milito" (Tertullian 2005, p. 58) - "I do not engage in military service" - is the stark statement we find in ch. 5 (4,2). Thus Minn (1941) writes briefly in his study focusing on the issue of war in Tertullian, without adding anything more. To attempt to present something more about this statement here will require a brief excursus into the issue of the writ as such. As Hunink states this writing is "... one of the strangest texts ever written in Latin. It is a speech about the need to change clothing from the standard Roman toga to the philosophers' pallium, composed in an outrageously difficult style, confronting its readers with questions at every possible level" (Hunink 2005, p. 9). It should be added here that it is debatable in terms of dating and authorship, in terms of its intended audience, and in terms of whether it should be considered a Christian writing or perhaps a writing of late Latin sophistry. Similar questions are posed by McKechnie (1992), who comments on the introduction with the wonderful phrase: "The *De pallio* is an enigma".

In view of the above, we will limit ourselves to our vision of the issues in the selected text. We do not think it can be untrue to say that in the case of the *De Pallio* writings this is a "personal" apologia by Tertullian for the use of a garment called the Pallium instead of the toga which he chose to wear. From this position the text: "I owe nothing to the forum," it says, 'nothing to the Campus Martius, nothing to the Senate-house. I do not watch for a magistrate's function, do not occupy any platform for speakers, do not attend to the governor's office; ... I do not act as a judge, a soldier, or a king: I have withdrawn from public life. My only activity concerns myself; I do not have any care, except for this: to have no care. A better life can be enjoyed in seclusion than out in the open' (Hunink 2005, p. 259) appears quite clear. Tertullian himself says in *De Pallio*. We are to take it that Tertullian is here speaking of independence from the outside world, whether or not there is a connection with Christianity. Hunink comments on this: "a final clause sums up what the pallium claims to have done, namely to have withdrawn from public life, as Christians tended to" (Hunink 2005, p. 262). Of course, in view of the problems mentioned above, we dare not claim that this is a recommendation for Christians to shun expressions of public life, including military service, but neither can we deny the inner sentiments of Tertullian, who in the words of this text, whether for Christians or just for himself, prefers a life of seclusion.

4 Discussion

From our findings, we venture to formulate a final summary statement. Tertullian was a convert who very likely never left the ranks of the Christian Church, never separated from it. He certainly should not be seen as a schismatic. It should be remembered that he held rigorist positions virtually throughout his entire period of work. Already in his early works one can perceive different views on the matter. While in the *Apologeticum* he shows an example of how Christian soldiers begged for rain, he does not distance himself from the service of Christians in the army, already in the *Ad Nationem* of the same period one can perceive our author's disapproval of struggle, such as struggle in the military sense. In *Ad Martyres*, on the other hand, he cites the peaceful soldier as an example. In the *De Spectaculis* of the same period he is opposed to killing. Finally, he had already spoken out against killing in the *Apologeticum*. In *De Idololatria*, what bothers Tertullian is primarily symbolism. Again, he rails against fighting. But in *De Anima*, which is from a similar time period, our thinker has no reservations that lawful violence and its toleration should not be a problem for the Christian. In *De Patientia*, *Adversus Iudaeos*, as well as *Adversus Marcionem*, *De Pallio*, but especially in *De Corona*, he takes a negative position on military activity, which he funds with several arguments. What is behind these contradictions? How are we to explain them?

First of all, it is important to realize that Tertullian was a brilliant polemicist who often did not write out all of his positions, but simply tailored his arguments to whatever the purpose of the writing was. He did not write for one audience all the time; the purpose of the text was not always scholarly debate. This may explain the seemingly contradictory viewpoints. The second argument is that nowhere does Tertullian call for Christians to become soldiers, nor does he hold up for admiration the activities of the soldier. Even the most oblique references to the army are merely an endurance of the status quo, that some Christians also fight, and not an explicit endorsement of their temporary or permanent association with the army. The more positive references are very far from the *Miles Christi* motif, which only developed in the fifth century at the earliest (Iwanczak 2012). It has been suggested that Tertullian was inclined to Montanism around 207. Negative statements towards the army, combat, and weapons are found in his work even before this date. It is true that the most strident statements come from the period when he was inclined towards Montanism. However, even before that, there were statements that merely accepted the participation of Christians in the military. Nowhere does Tertullian recommend, promote, or glorify this. He escalates his criticism slightly, but it is not a radical shift. Apart

from the actual text he left behind, there is no other source documenting the views of Tertullian himself on this matter. The texts he left relatively soon after his conversion are too poor to give us an exhaustive account of Tertullian's attitude towards war, the army and combat. Moreover, even in this period there are equally references that express themselves negatively. We can also take into account the fact that Tertullian very often tactfully subordinated the text in his writings to the purpose to the extent that he did not write mutually consistent literary works. Mutual incompatibility can thus be perceived even in works of the same time period. Tertullian's attitude towards the army was demonstrably not positive throughout the period following his adoption of Christianity. Although in the *Apologeticum* he writes conciliatorily about soldiers, already in *De Spectaculis*, in *Ad nationem*, as well as in *Adversus Iudaeos* and in *De Patientia* he demonstrably writes negative comments on fighting, killing, and military symbolism. In doing so, these are texts from the period before Tertullian's leaning towards Montanism. On the contrary, in the times where he was already sympathetic to Montanism, he is sympathetic to legitimate military violence on the part of the sovereign. Thus, we believe that Tertullian's attitude towards the army did not change in a fundamental way; if it did, we admit a slight radicalization in his Montanist opinion, which, however, with the relatively modest extent of the extant texts on the subject, cannot be considered confirmed. For we do not know whether Tertullian did not really hold similar views from the time of his conversion to Christianity, except that in selected texts he used more moderate expressions in view of their purpose and their intended readers. Insofar as he radicalized his position on this matter, it is still not a diametrically opposed approach to the army and warfare, since he was demonstrably negative about these things in the period immediately following his adoption of Christianity.

5 Conclusion

The present study is the result of a textual analysis of Tertullian's works, which focused on his texts dealing with war, weapons, combat and their relation to Christianity. We have studied Tertullian's texts and in selected ones we have found references to the subject matter. Most of the references were tinged with negativity. In addition, we were also able to find more ethically neutral passages that had a more conciliatory attitude towards the union of the military and Christians. We also took into account the timeline, specifically the beginning of the inclination towards Montanism. We compared the given findings with each other. Through comparative analysis, we found that the mixed statements are found in the period before the inclination towards Montanism. After this period, Tertullian's statements on the matter are overwhelmingly negative. Thus, we cannot speak of any clear change of attitude. If there was such a change, which we do not consider to have been demonstrated, it consisted only in a slight radicalisation of the attitude towards the army. However, this possibility is only hypothetical, given the austerity of the separated passages, and especially the fact that in the same periods we can find parallel more neutral and negative allusions to the army, combat and the use of weapons. Rather, we are inclined to think that there was a constant attitude that was never friendly towards the military, military service, weapons and killing.

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Primary Paper Section: A

Secondary Paper Section: AA

A COMPARISON OF THE CONCEPTS OF MC AND BRAND EQUITY IN ASSESSING COMPANIES' APPROACH TO BRAND DEVELOPMENT AND AN EVALUATION OF THEIR COMBINED USE FOR BRAND DEVELOPMENT OF START-UP COMPANIES

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This paper was supported by the Specific project "Analysis of Approaches to Achieving Synergistic Effects in Management and Marketing with Emphasis on Efficiency and Social Responsibility", registration number FP-S-12-1764 at the Faculty of Business and Management, Brno University of Technology.

Abstract: The following article discusses the newly proposed concept of magical chain and its application to the strategic development of small brands. The concept is compared with Keller's brand equity model CBBE. Subsequently, the magical chain concept is validated on selected chocolate brands. The results suggest a possible application of the magical chain concept for the brand strategy development of both large international brands and small start-up brands.

Keywords: Brand equity, CBBE model, magical chain, start-up.

1 Introduction

The Czech and European business environment is experiencing a trend of a growing number of startups and new companies that are developing rapidly and contributing significantly to the Czech and European economy (Tomanka, 2024). One of the areas that these companies are involved in is the area of brand management, which plays a much larger role today than it did a few years ago. This is due to the increasing competition, the development of social networks where all information about the product and its substitutes can be found (Jones, 2024), and the growing innovation that supports the development of the brand and its value (Steffl & Emes, 2023).

These reasons and the need for rapid company development lead start-up companies to consider brand strategy at an early stage, practically at the stage of company strategy development, because company and brand strategy must be in harmony with each other (Bresciani & Eppler, 2010). The objectives of brand management in the early stages of brand development focus mainly on developing brand awareness, creating credibility (Wijayasinha, 2023).

For these emerging companies, the selection of appropriate brand management tools is important. These tools should be simple, resource-light (both time and financial) (Wijayasinha, 2023). In their development, start-up brands try to take advantage of associations that are already embedded in the customer's mind in a certain way and evoke certain attitudes (Petkova et al., 2008). One source of these associations is the country associated with the brand (Keller, 2020). A start-up brand has the opportunity to link its perception to the desired country of origin by aligning its own image and the country image (Oduro et al., 2023).

Pilot research in the area of branding of small companies and startups in the context of the Customer Based Brand Equity (CBBE) model indicated that the concept would be too complex for companies and would be useful during their development rather than at the beginning of branding. Which proves Bresciani & Eppler's (2010) assertion that not all brand strategy models and practices used by multinational companies are suitable for startups. The CBBE model is based on customer response to brand marketing campaigns (Keller & Swaminathan, 2020), which is a major barrier to use for a small company that does not have a large enough customer base. Related to this is the problem of absent or low brand awareness and brand associations (Petkova et al., 2008), which according to Keller, are essential resources for creating brand equity. At the same time, the concept of CBBE is resource intensive both in terms of time and money (Keller & Swaminathan, 2020).

For these reasons, the magical chain concept was tested, which, although developed in the area of large companies, is easier to grasp in the environment of small and start-up companies. The question is whether the use of such a basic, simple concept can replace the concept of brand equity. Another possibility is that the magical chain could serve as a complement to the concept of brand equity or even as a tool to better understand equity in a small company environment.

2 Literature review

One of the areas that startups need to address at their inception is brand strategy, which should be based on the overall strategy of the company (Bresciani & Eppler, 2010). There are several reasons why startups should ideally address brand strategy before entering the market (Petkova et al., 2008). These are building consistent brand awareness (Awad & Abdel Fatah, 2015) among both customers and potential employees, establishing positioning and communication with investors which is important to gain funding for the startup development. It is important to focus on communication with investors before going to market because it is necessary to create the desired brand image that is presented to investors and other stakeholders (Wiesenberg et al., 2020). Not only the content is important for building brand awareness, but also the intensity of the content is important because customers nowadays have a lot of information about brands due to the influence of royal media (Awad & Abdel Fatah, 2015).

In the beginning, it is important to choose tools for brand building that will achieve the desired result but will not be a burden on the limited budget of the startup. This is one reason why not all models and approaches used by large multinational companies and brands are suitable for startups (Bresciani & Eppler, 2010).

2.1 Magical chain

Magical chain is an approach that identifies the interdependence of factors in the development of a company's brand and strategy. These factors were identified by examining perception, image and country of origin. The basic view includes the standard company-brand-product linkage. (Svobodová & Zich, 2020; Veselá & Zich, 2013; Mráček et al., 2012) When considering customer perception of value built on four levels, i.e. functional, financial, social and individual value (Ciornea et al., 2011), it appears that these factors need to be expanded (Svobodová & Zich, 2020; Veselá & Zich, 2013; Mráček et al., 2012) Magical chain thus defines six links that need to be evaluated for the desired brand and strategy development:

- Country of origin - represents a factor that is, in principle, completely outside the scope of the company (Oduro et al., 2023). Factor of country of origin can be understood as some location typically country of production origin or specific location of product or company. Positive attributes linked with specific location can potentially related to product, company or brand (Witek-Hajduk & Grudecka, 2019). Possible problems with "bad location" are usually based on bad reputation of country, misunderstanding of some aspect of country or bad association (Pušić et al., 2024).
- Company - this is a factor entering the magical chain from the perspective of the traditional hierarchical perception of strategy. A fundamental link can also be found in theories concerning strategic brand development, where different brand hierarchies are defined (Kapferer, 2008; Carolino Sousa Santos Junior, 2018) Company aspect is critical when brand name is not the same as company name because many people do not see the difference. Brand portfolio can help to develop various business strategies in

one company. "Bad company" can generate negative impact on good brand and vice versa (Brexendorf & Keller, 2017).

- Brand - theories dealing with brand development can be seen as an essential tool for developing and assessing companies' competitive behaviour (Porto et al., 2024). Their use can link in a very fundamental way the concepts of business strategy (Hitt et al. 2016), competitive strategy (Porter, 2004) and the issue of customer perceived value (Jensolin Abitha Kumari J. & Gotmare, 2022). Although brand is the central part of magical chain, it does not specifically define any brand framework as the best one. Brand is considered the possible way how to develop marketing or communication of the company (Kotler & Keller, 2013).
- Product - the product aspect plays a crucial role both in terms of product category and, above all, with regard to the perceived functional value of the product (Ciornea et al., 2011). The importance of this element often leads to the incorrect assumption that strategic brand development is only linked to product attributes. The product within the magical chain provides a clear understanding of positioning, customer needs, customer value, possible competitors and helps to understand unique selling proposition and brand promise.
- Substitute - in line with the so-called success-ability concept, this aspect defines from the customer's point of view the breadth of products that satisfy a given need, which for the company in real terms also means the extent of competition to be considered in strategic development (Zich, 2012). The definition of substitute is another key part for positioning (principle With whom? Against whom?), understanding of customer, understanding of customer values and needs (Kotler & Keller, 2013).
- Place - this article offers several perspectives. In its narrowest definition, this part can be understood as a point of sale, or a type of store. In a broader context, it is a comprehensive view of the manner and nature of selling, or in the broadest view, it may include the definition of market segments and target market (Kotler & Armstrong, 2018). Thus, in this part we talk about, for example, distribution channels, store organization, in-store placement, store design, store location, E-shop concept etc (Floor, 2006).

Although it can be assumed that the importance of these factors and their linkages is of general validity, it is clear that certain industries and products naturally have more significant potential for their exploitation, or their specificities need to be taken into account as follows: (Švobodová & Zich, 2020; Veselá & Zich, 2013; Mráček et al., 2012)

- The article country is generally replaced by the term the roots. This is linked to the specifics of different business areas. Although country of origin represents potentially the strongest base of the of magical chain, there might by some other roots like specific production aspect, product features or principles which can be similarly strong.
- In particular cases, it is possible to define specific links for different links of the chain. These relate, for example, to the brand architecture (company - brand), the stereotypical association of a quality product and the country of origin (country - product), brands based on the shopping experience (brand - store), etc.
- When evaluating the magical chain, it is necessary to clearly work with the range according to the customer's perception. This is defined from maximum positive perception - "bright side", to maximum negative perception - "dark side" The range of "bright and dark side" helps to understand both the scope of the market and the perception from the customer's point of view. At the same time, it is possible to identify weaknesses in one's own chain and eliminate them by 'replacing' the link. A typical approach here may be the entry of Chinese car companies into the European market, which they do

through purchased, often defunct brands, which are of European origin.

- It is not always necessary to build on all links in the chain and it is necessary to define which links are the strongest. At the same time, the target market must be taken into account, as customer perceptions often differ fundamentally. In other words, while in one country a particular reason is an advantage, in another it will be a weakness. The magical chain can thus be adjusted appropriately for each target market.

2.2 Brand equity

In the field of brand equity, there is no consensus on its definition among individual authors. One of the first authors to define brand equity was Farquhar (1989), who defined brand equity as the value that a brand adds to a product and is measured by the incremental revenue derived from the association of the brand with the product. Another definition was provided by Aaker (1991) who defined brand equity as the set of assets and liabilities associated with a brand that the product brings to the company or customer. Keller & Swaminathan (2020) defined brand equity as the difference between a brand's marketing activities and customer response. A similar view of brand equity is also encountered in Raggio and Leone (2007) who define brand equity as the strength of customer attitudes and decision-making processes towards a brand. The comparison of brand equity theories was addressed by Davcik et al. (2015) in their article, who compared them in 2 dimensions, which were customer focus vs. company focus and marketing vs. financial approach.

Just as there is no consensus on the definition of brand equity, there is also no consensus on how to create brand equity, what its sources are or how to measure it. For this reason, the literature also offers several basic conceptualizations of brand equity, which are divided into theoretical ones developed from research and applied ones developed by the remaining brand equity companies (Leone et al., 2006).

The main theoretical models are Aaker's brand equity model and Keller's CBBE model. According to Aaker's model, brand equity consists of the components brand awareness, perceived quality, brand associations, brand loyalty, proprietary assets. In the author's original model, all 5 components contribute to brand equity simultaneously (Aaker, 1991). This concept has been modified by Yoo et al. (2001), who argue that brand awareness, perceived quality, brand associations are the source of brand loyalty, which in turn contributes to brand equity.

Keller's CBBE model is based on a step-by-step process of creating brand equity, where the goal of several consecutive steps is to achieve brand resonance. The steps are represented as a pyramid called the brand resonance model. Keller's approach could be described as sequential because it is not possible to advance to the next level in the creation of brand equity unless the previous level is met (Keller & Swaminathan, 2020).

The basic level of brand equity is salience, which aims to create a brand identity and achieve the desired breadth and depth of awareness. At the same time, the hierarchy of products and brands within the portfolio offered is decided at this stage. The second level of brand equity defines brand meaning through imagery and performance. Performance is defined as how the consumer's needs are met by the brand's product and imagery is based on the customer's perception of the brand and its rather intangible added values. The third level of brand equity building is brand response, which consist of judgments about the brand and feelings evoked by the brand. Judgments are formed on the basis of the quality, credibility, consideration and super-priority of the brand. Brand feelings are emotions in the mind of the consumer. The final step and goal of creating brand equity is to achieve brand resonance, which is a state where the consumer has formed a psychological relationship with the brand and lives in harmony with the brand (Keller & Swaminathan, 2020).

The common feature of all the definitions is that it is a complex set of several aspects and approaches of brand management. The reason for choosing Keller's model for comparison with the magical chain concept is the presence of all elements of magical chain in the CBBE model (see Figure 1). Furthermore, it was also chosen for its gradual introduction and creation, which is a more suitable concept for start-up companies (Keller & Swaminathan, 2020).

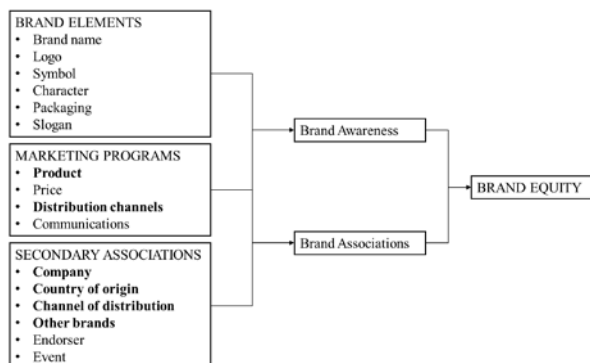


Figure 1: Sources of brand equity, based on (Keller & Swaminathan, 2020).

The Figure 1 shows the sources of brand awareness and brand associations that make up brand equity according to CBBE theory. These are the areas of brand elements, marketing programs and secondary associations. Apart from the brand element, which can be considered as the overarching element of the whole diagram, all elements of the magical chain are present in the sources of brand equity. Product occurs as part of marketing programmes where it is a means of satisfying customer needs. Distribution channels occur in the sources both in marketing programs in the context of how the product is transported to the customer and in secondary associations as a way to influence brand image (Keller & Swaminathan, 2020). Company and country of origin are also part of indirect associations with the brand, influencing it through their own associations. The last element of magical chain appears in brand equity sources in the association of other brands, which can refer to both competing brands and brands with which the brand is associated (e.g., co-branding) (Keller, 2020).

2.3. Comparison matrix of magical chain and CBBE

The magical chain CBBE comparison table defines the deeper context in which the various elements of the magical chain appear in different parts of the CBBE model. The first column defines the elements of the magical chain, the second column contains the connection of the magical chain elements to the CBBE model, whose structure is described by the remaining 3 columns.

Table 1: Comparison matrix of magical chain and CBBE

Magical chain	Connection	Parts of CBBE model	Stage of brand development	Source of brand equity
COUNTRY	Countries create secondary associations that influence brand image	Resonance	Relationship	Brand awareness: Brand recognition Brand recall
	What happens in a country affects both the country perception and the brand perception			
	Associations are formed on the basis of a stereotypical country perception			
	For the creation of brand equity it is important to reckon with specific behaviours and experiences in different countries			
	Different country perception on foreign and domestic markets (influence of patriotism)	Feelings	Response	Brand image (associations) Strength associations Uniqueness of associations
	Different brand perceptions and brand associations in different countries due to different cultures and languages			
	Brand strategy suitable for one country may not be suitable for another country			
	The country may also influence the brand historically (e.g. the product was previously produced there)			
COMPANY	Today it is difficult to link a brand to one country (linking a brand to a country through strategy, manufacturing the product and having the company headquartered in other countries)	Judgments		
	Company is one of the secondary brand associations			
	The first step in building brand equity is the definition of a corporate view of the brand equity and strategy of a given brand			
	Branding strategy should reflect corporate interests			
	The brand borrows some of the company's values, relationships and common product characteristics from the company			
	The brand is an important determinant of the strength of associations towards society			
	Provided that the company is developed, it offers the brand a large number of advantages for its development			
	To maximize brand equity, it is necessary to choose an appropriate brand architecture that achieves high brand awareness and creates a brand image for each brand			
	Maximum brand equity is achieved if all brands in the portfolio maximise their brand equity and do not reduce the brand equity of other brands			
	Brand architecture allows to communicate the differences between brands and thus improve their brand image			
	A larger number of brands (brand portfolio) allows the company to implement different branding strategies			

	If the name of the brand and the company are the same, then here is more influence of the company and brand equity			
	It is not always profitable to create a link between a company and a brand (often multinational companies own a large number of brands)			
	The company perception also depends on the industry in which it operates			
BRAND	A prerequisite for brand equity is the differences between brands as perceived by the customer	Imagery	Meaning	
	The brand is an important factor in the purchase decision, especially for products whose parameters cannot be assessed before purchase			
	Brand may borrow associations from other entities			
	The brand gives the product associations that help differentiate it from competitors			
	Different associations are evoked by the brand of a product, company, store			
	Marketing programs are often the biggest source of brand equity			
PRODUCT	Product attributes are one of the sources of brand recall	Performance		
	The product is one way to differentiate the brand from the competition			
	Product attributes should give the customer a certain advantage			
	Product features should evoke certain associations in the customer's mind			
	Ensuring brand association is the first step in future brand resonance and brand equity			
	Customer perception changes over time			
	Some of the most important attitudes towards a brand are formed by perceived quality, customer value and satisfaction with the product			
	Perceived quality is often at the heart of brand equity			
	Every product of a given brand should meet its brand promise			
SUBSTITUTE	Competition should not be defined narrowly to competitors with whom the brand shares certain attributes, but also to competitors with whom it shares associations in the mind of the customer	Salience	Identity	
	Unique associations that differentiate from competitors are one of the sources of brand equity			
	One source of competitive advantage is the physical attributes and design of the product			
PLACE	Brand associations are formed based on distribution channels, store location, sales method, ease of purchase			
	Distribution channels have an indirect influence on brand equity by creating their own image through store environment, assortment, pricing policy, accompanying services			
	From the customer's point of view, the distribution channel is also perceived as a source of information, experience and entertainment			
	Retail often forms the most intense contact between the customer and the brand and thus has great power to influence brand equity			
	The customer transfers the image of the store to the image of the brands sold in the store			
	Associations with the store vary according to the type of store			
	A great source of brand equity are own stores or a combination of sales methods (e-shop + brick-and-mortar store)			
	For corporate stores, the brand has control over their image and, as a result, the brand image			

As can be seen from the table 1, all parts of the magical chain concept have links to CBBE theory:

- In the area of country, both approaches agree that brand perception is influenced by the country with which either the brand itself, the company's headquarters or the place where the products are manufactured are associated. At the same time, Keller also argues that it is not easy today to identify a single country of origin in a brand-product-company context. Furthermore, there is a consensus that country can influence a brand both negatively and positively and that a company has little ability to influence brand perception. The CBBE model extends the domain of

country perception to brand perception to include the destination of the brand in which it operates, where it argues that brand perception may be different in different countries due to different culture and language.

- The area of the magical chain most frequently mentioned in the context of the CBBE model is the company, which confirms the close link between the company-brand and their strategies. The congruence between the two approaches is in the interaction of company image on corporate image and vice versa, both in a positive and negative direction. However, this interaction is expected to be stronger in a situation where the brand and company names coincide, as the customer will form associations

with both the company and the brand at the same time. At the same time, the CBBE model also confirms the close interdependence of company and brand strategies, where the brand strategy should be based on the company strategy, as the brand borrows some of its values and associations from the company. Consistency also occurs in the brand portfolio, where different brand hierarchy strategies allow for the creation of different brand strategies and different degrees of brand-company linkage. The CBBE model extends this view by relating the contribution of individual brands to the brand equity of the portfolio. The CBBE model further extends the influence of the company on the brand to include the indirect influence of the industry in which it operates, where it assumes that the industry itself creates a certain perception of the company which is further transferred to the brand.

- The magical chain concept and the CBBE model coincide on brand as a way of communicating the company and creating marketing. The CBBE model looks at the brand as a factor that gives the product associations that differentiate it from competitors and influences the customer's purchase decision. The magical chain concept looks at the brand more in terms of its place in the corporate hierarchy and the competitive behaviour of companies. A common brand parameter of both concepts is the emphasis on differentiating oneself from competitors, which contributes to the creation of brand and company value.
- Both the magical chain concept and CBBE see the product as an element of positioning and one of the ways to differentiate themselves from the competition. Similarly, the product is seen as an element that gives the customer a certain advantage over customer needs.
- Both the MC concept and the CBBE model understand the substitute view as a way of defining competition, which in their view should include all brands satisfying the same need based on customer values and needs, or in the words of the CBBE model, brands with which they share associations. In order for a brand to generate brand equity, brand associations should be uniquely different from competitors.
- The last area of place is understood by both concepts in relation to distribution channels and point of sale. The magical chain concept also looks at place in terms of the possibility of defining a target market, whereas the CBBE model examines the influence of the image of the distribution channel on brand image and equity. Furthermore, it views the store as the place of most intense brand-customer contact, which is also seen as a source of information and thus has a great opportunity to influence brand equity.

Although there are minor differences between the different concepts, there is agreement in the main areas, so we can test the use of the magical chain concept as a simpler alternative to the CBBE model.

3 Methodology

The aim of the research part is to test the application of the magical chain concept on a selected sample of chocolate brands. Chocolate was chosen because the magical chain concept was developed on this sector.

The research sample consists of 3 chocolate brands, 2 of which were the result of focus groups used to define and validate the concept. These brands are Lindt representing the bright side of the magical chain and Milka representing the dark side of the magical chain. Both of these brands have been on the market for more than 100 years and form certain associations in the mind of the consumer. To test the suitability of the magical chain concept for small start-up brands, these 2 brands were complemented by a small start-up brand from the Czech Republic, Čokoládovna Janek.

The research was conducted using a desk research method combined with observation of the manifestation of brand

elements at the point of sale. Data collection was conducted between November 2023 and May 2024, as the period before Christmas and Easter and Valentine's Day is the main period for chocolate sales and marketing drips of chocolate brands.

The main source of data for desk research was the websites of Lindt and Milka brands in both Czech and English versions, the Czech version of the Janek website. In addition, the social networks of all the brands were used. At the same time, the research was also extended to other websites on the Internet remaining with the brands under study. These were to a large extent interviews provided by the individual brands, product reviews and marketing campaigns. Observations were conducted 4 times during the data collection period, namely in late November, early February, early March and May. The main part of the Christmas marketing programmes took place at the end of November, with campaigns targeting Valentine's Day shopping at the beginning of February and Easter campaigns at the beginning of March. May was chosen as a month when brand communications are not tied to an event. The observation was carried out in Tesco Uherské Hradiště supermarkets, Albert Staré Město, Lindt store in Vaňkovka shopping gallery, Janek store in Uherský Brod.

4 Results of the desk research and observation

4.1 Lindt

The first brand analysed was Lindt as a representative of the bright side magical chain. In the country area, Lindt is strongly associated with Switzerland which is one of the countries traditionally associated with chocolate (Huszno, 2023). Lindt is associated with Switzerland both by its history, brand and partly by its production (*The Lindt & Sprüngli factory - A history on the Lake of Zurich*, c2024). Even though it is a global brand, it still maintains a link to its Swiss roots and values, which mainly include quality production, attention to detail and precision (*The Difference Between Swiss Made And Made In Switzerland: A Guide To Quality And Craftsmanship*, 2023). All these values are applied across the brand strategy. In the brand communication, the connection with Switzerland is very much part of the logo itself, which includes a direct reference to the country (*Vítejte ve světě čokolády Lindt*, c2024). Another manifestation is their slogan "developed by Swiss chocolate masters" (*Poznejte naše mistry čokolády*, c2024), which refers to the country both directly and indirectly through the quality of production.

Further communication of the country of origin is in the context of where the product was manufactured, where the exact address of the factory is given on each one. One of these factories is located in Kilchberg, Switzerland, which is also the company's headquarters and historically one of the first production sites (*Lindt & Sprüngli offices*, c2024). At the same time, products made in this factory bear the label 'Swiss made', which is a protected label for products made at least 50% in Switzerland and is a mark of prestige referring to high quality and craftsmanship (*The Difference Between Swiss Made And Made In Switzerland: A Guide To Quality And Craftsmanship*, 2023). This label can create a feeling of expectation of a higher quality product. Other factories are located in Aachen in Germany, Induno Olona in Italy, Oloron-Sainte-Marie in France, as well as in Austria and the US (*Lindt & Sprüngli offices*, c2024).

Overall, the link between the country of Switzerland and the brand's strategy and other activities is very strong and consistent. The link with Switzerland is present throughout the brand's lifetime (*The Lindt & Sprüngli factory - A history on the Lake of Zurich*, c2024), which adds to the consistency of its perception. Combining the Swiss chocolate tradition with the high quality of Swiss products gives the Lindt brand an expectation of high quality in its products.

The last link to the country of origin is from the source region of the main cocoa raw material, which is Ghana, Ecuador, Madagascar, Papua New Guinea, the Dominican Republic, and

Peru (*Lindt - Premium chocolate, Exceptional taste*, c2024). The Swiss values of high quality are also reflected in the sourcing and use of the finest raw materials. In line with the Swiss approach to sustainability and ecology, the Lindt brand sources cocoa beans only from farmers participating in the Lindt and Sprüngli Farming Program, which helps them to create dignified growing and living conditions (*The Lindt & Sprüngli Farming Program*, c2024).

In the company area, the close association of the Lindt brand with its parent company Lindt & Sprüngli can be seen, where they share part of their name, which can lead to brand associations being transferred to perceptions of the whole company. There are also other brands under Lindt & Sprüngli, which are Ghiraldelli, Russel Stover, Whitman's, Caffarel, Hofbauer and Küfferle (*The Lindt & Sprüngli Brands*, c2024), but they do not share part of their name with the company. However, the use of the same name can also mean that the brand and the company are more easily confused in the mind of the consumer.

Lindt's product portfolio consists exclusively of chocolate products (*Obchod*, c2024). The main significant and most popular product are Lindor truffles with different fillings (*The LINDOR Truffle - One of our Best Kept Secrets*, c2024). In addition, there are table chocolates of various types and flavours and the EXCELLENCE range of table chocolates with high cocoa content (up to 100%) and flavours. NUXOR luxury chocolates and Creation table chocolates (*Obchod*, c2024) round off the permanent product range. Another part of the product portfolio is adapted to the time of year, with a Christmas collection of pralines and a golden Teddy bear on sale before Christmas. Before Easter, a traditional golden bunny with a red ribbon and jingle bells is offered, the golden wrapper of which is protected in Germany because customers associate the golden wrapper with the Lindt bunny (*Čokoládový zajiček Lindt si doskáká pro výhru. Firma vyhrála spor o obal*, 2021). Seasonal chocolate flavours complete the portfolio of seasonal products (*Letní čokolády*, c2024).

In terms of the competition of the products offered, observations in Albert and Tesco stores revealed that Lindt is the only brand selling high percentage chocolates with a cocoa content above 85%. It can therefore be argued that there is no competitor for the EXCELLENCE range of chocolates in terms of sales in supermarket chains.

Lindt's products are sold in supermarkets, both brick-and-mortar stores and e-shops, specialty chocolate stores in its own network of brick-and-mortar stores (*Store locations*, c2024), where the full breadth of the range is available, including high quality chocolates with high cocoa content that are not usually available in supermarkets.

4.2 Milka

The second analysed brand was Milka, which was identified by focus group participants as the dark side magical chain of the chocolate market. Milka is traditionally associated with the Alpine countries (Austria, Switzerland, Italy, Germany, France, Liechtenstein, Slovenia). The idea for Milka chocolate originated in Switzerland, but the first bar was made in Germany by a Swiss chocolatier (York, 2022). The name Milka was created by combining the 2 German words Milch + Kakao, referring to the German-Swiss origin (*Historie čokolády Milka*, c2024). In the context of Milka, it would therefore be more appropriate to consider only Austria, Germany and Switzerland as Alpine countries.

Milka works strongly in its brand strategy with the motif of Alpine milk and the Alps. This motif is most evident in the brand communication, with the phrase '100% Alpine milk' appearing in both marketing campaigns and the visual style of product packaging (*Milka - nezaměnitelně lahodná chuť*, c2024). On these, milk is represented by a white milk jug and the words '100% Alpine milk'. The visual style of most product packaging

also includes the Alpine motif with a grazing cow. The combination of the Alps, the milk jug and the grazing cow is intended to give the customer the impression that the milk used is of high quality, healthier and comes only from the area. The brand also uses the phrase 'Alpine milk' to describe the ingredients of most of its products (*Produkty*, c2024). Although it is still a motif used in most of Milka's communications, in earlier years the link to Alpine nature was stronger. This is evidenced by the advertising campaigns that took place in the Alps in earlier years ('Milka - old ad from 2002 / Werbung / Commercial (c. 2002) @ Staré Reklamy', 2012; 'Milka - Werbung / old ad / old TV commercial (1994) @ Staré Reklamy', 2011).

The connection between Milka and Switzerland can be found in the area of communication of quality chocolate and quality milk and in the area of environmental support *The Difference Between Swiss Made And Made In Switzerland: A Guide To Quality And Craftsmanship*, 2023) in the form of a partnership with the Hohe Tauern National Park, where they support the development of biodiversity (*Lila liebt Grün - unsere Partnerschaft mit dem Nationalpark Hohe Tauern*, c2024).

Unlike Lindt, Milka does not mention the country of production of its product, which may be due to the ownership of the multinational company Mondelez. Milka products are manufactured in plants in Bludenz, Austria, Lörrach, Germany, which is the original Milka manufacturing plant (*Germany & Austria*, c2024), Bratislava, Slovakia, Opava, Czech Republic and Székesfehérvár, Hungary (*Czechia & Slovakia & Hungary*, c2024). This expansion of production outside the Alpine countries demonstrates the influence of the brand owner, the multinational Mondelez. The countries of origin of the other main cocoa raw materials are Ghana, Côte d'Ivoire, Indonesia, Dominican Republic, India and Brazil (*MORE SUSTAINABLE INGREDIENTS*, c2024).

Although the Milka brand is now considered international, it still retains its links to the original Alpine countries. The Milka brand is owned by the multinational company Mondelez (formerly Kraft foods) (*Our Brands*, c2024), which has given the Milka brand its international significance.

The Milka brand works with other Mondelez brands as part of a co-branding strategy to find and build new customer segments. One of the strongest alliances is with the Oreo brand, which crosses across most of the product portfolio and sometimes shares joint marketing campaigns. Other brands that are part of Milka's co-branding are Daim, Tuc, Philadelphia, Tassimo, Crispello (*Produkty*, c2024).

Milka's product portfolio includes both chocolate products and products where chocolate is just a flavour or a complementary ingredient. All of Milka's chocolate production is concentrated on milk or white chocolate, which are products containing milk (*Produkty*, c2024). The production of dark chocolate would not fit in with Milka's concept of emphasising the use of Alpine milk. This demonstrates the link and consistency between the product portfolio, brand strategy and country. If the brand also offered milk-free chocolate products, then it would lose its main brand aspect - 100% Alpine milk and the Alpine theme in its communication.

The typical product is therefore milk chocolate in various sizes and flavours. In addition, heart-shaped and four-leaf clover pralines are often promoted before special events such as Valentine's Day as a gifting option (*Produkty*, c2024). A minor exception in the portfolio of milk and white chocolates is the Darkmilk range, which is a combination of milk and dark chocolate, or in other words milk chocolate with a higher cocoa content (*Dark Milk*, c2024).

The second group of products are sweets containing Milka chocolate as one of the ingredients. This includes biscuits, cookies, chocolate and nut spreads and cocoa powder. Although

they are not chocolates, all Milka products use the Alpine motif and combine it with 100% Alpine milk (*Produkty*, c2024).

Milka products can be bought mainly supermarkets and their online stores. Another point of sale is specialist chocolate shops. The targeting of these point of sale indicates a mass production distribution strategy to sell as many products as possible.

4.3 Janek

The Janek chocolate brand is a small brand founded in 2015 with the aim of building a purely Czech chocolate factory (*Příběh JANKA z Uherského Brodu*, 2023). This may also be the reason why brands do not associate themselves in their identity with countries typical for chocolate such as Belgium, Switzerland. The connection of the name Janek is both with Czech culture, where Janek is a colloquial version of Jan one of the most common names (*Jan má svátek 24. 6.*, c2000-2024), and with the place of production and birth of the brand, Uherský Brod. Black Janek is a figure from legend and his statue is located on the tower of the town hall (*Pověsti*, c2003-2024). The combination of name and origin thus created a connection that is partly used in the communication of the brand "Janek from Uherský Brod". The risk of this link is that consumers who are familiar with the legend are more likely to associate it with the legend than with the Janek chocolate factory brand. The link with the Czech history of production and traditional crafts (*České tradice: Řemesla*) is in the use of the motif of honest Czech production.

In the visual communication of the brand, the name Janek is directly part of the logo and the presented name. However, what can be seen as an element of incongruity between the typically Czech name and the reference to Czech culture with the aim of becoming a Czech honest and domestic chocolate factory is the presence of the English word "chocolate" as part of the logo (*Čokoládovna JANEK*, c2024).

From the production point of view, the entire chocolate production process takes place in one place in the production plant in Uherský Brod, which is in line with the built image of the Czech brand. At the same time, this image is supported by the maximum use of local and seasonal ingredients. The countries of origin of the basic raw material for cocoa are, for example, the Dominican Republic, Madagascar, Papua New Guinea and Peru (Hurábová, c2024). In the case of the bean-to-bar product, there is a direct indication of the origin of the cocoa beans, as these chocolates are always made from points from one country only (*Co je to Bean to bar čokoláda?*, c2024).

The owner of the chocolate factory Janek is the company Kakaovník (*Kontakty*, c2024). The use of a different brand name and the company removes the developing brand association with the company, which it could use to develop itself. On the other hand, the company name only appears on product packaging in association with the manufacturer's name.

In the area of corporate cooperation, it cooperates closely with the coffee roastery Coffeespot, which currently has the same owner as Kakaovník (*Exkurze do pražírny: Výroba kávy a čokolády mají ledacos společného*, 2023), and with the Lihovar Žufánek (*JANEK hostem Lucie Výborné: Děláme jen to, co nám doopravdy chutná*, 2021).

The products offered by the Janek brand consist mainly of handmade pralines of various types, which are the most popular product (Hurábová, c2024), and table chocolates of various types, cocoa content, flavours and fillings (*Čokoládovna e-shop*, c2024). Another edition of chocolates are bean-to-bar chocolates with cocoa content up to 100%, which are made from cocoa beans from a well-defined geographical area (*Co je to Bean to bar čokoláda?*, c2024). Untypical are their tables of chocolates with fruit or nuts on the reverse side. The range of products can be supplemented by chocolate specialties such as chocolate lollies, chocolate creams, onion chutney or chocolate-covered nuts, and by cocoa products such as cocoa beans, cocoa butter, chocolate drinks and other products. Like other brands, Janek

has seasonal products, which include Easter and Christmas figurines, pralines and Valentine's Day editions of pralines, and seasonal chocolate flavours. In terms of the portfolio here, we can say that most of the products are associated with chocolate in the mind of the customer. Nevertheless, there are some products that break the consistency. One such product is onion chutney, which, although it contains chocolate, is not generally associated with chocolate (*Čokoládovna e-shop*, c2024).

A large number of products carry the brand name in their label, which reinforces the brand's association with the product type. An example of a label is 'Jankův nugát' (*Čokoládovna e-shop*, c2024). All the products are packaged very simply to show off their quality and workmanship. They have a simple label with the Janek's logo and the ingredients. In the area of products, they strive to combine traditional Czech and international ingredients (*JANEK hostem Lucie Výborné: Děláme jen to, co nám doopravdy chutná*, 2021).

In terms of substitute and competition, the brand claims to be the only chocolate factory in the country producing handmade chocolate along with the breadth of the range offered (Hurábová, c2024).

Janek products can only be purchased in a limited number of stores offering their limited range. The main points of sale are a shop in Uherský Brod at the place of production, own brick-and-mortar shops in Prague and a branded e-shop. It is also possible to buy the products in Coffeespot store, in selected cafés across the Czech Republic, and in selected small (often local) stores in the Czech Republic and at chocolate festivals (Hurábová, c2024; *Kde ochutnat JANKA*, c2024). In terms of distribution, Janek opts for a strategy of fewer small outlets that focus on selling local quality products

5 Discussion

Table 2: Example of magical chain

Country	Switzerland	Alpine countries	The Czech Republic
Company	Lindt & Sprüngli AG	Mondeléz international	Kakaovník s.r.o.
Brand	Lindt	Milka	Čokoládovna JANEK
Product	Typical product: chocolate truffles	Typical product: milk chocolate bars of different flavours	Typical product: chocolate pralines
Substitute	The only brand selling high cocoa content chocolates in supermarket chains	Co-branding	
Place	Supermarkets + own stores	Supermarkets	Own stores + stores of local products

The table 2 above summarises the results of the observations and desk research and demonstrates how the different elements of the magical chain concept occur in brand communication. The product area was conceived in terms of a typical product as presented by the brand itself. The substitute article shows in a table the brand from the perspective of its competitors, where its biggest advantage is, or what part of its offer it is the only one to offer.

It is clear from the Table 2 that the big international brands put emphasis on the country part of the magical chain link, with both Milka and Lindt referring to the country of origin of the brand. At the same time, these brands sell large volumes through

supermarket distribution. In the area of distribution, a link can also be found between increasing product quality and the preference for own stores, which is confirmed by the results of the focus groups carried out in setting up the magical chain, which showed that supermarkets are not associated in the mind of the customer with the place of sale of quality chocolate.

The results prove the assumption that different brands focus on different parts of the magical chain in their brand strategy, with Milka and Lindt focusing on the country part of the chain, whereas Janek focuses on the product communication part of the chain with exceptional quality and handcrafted products (Hurábová, c2024). This finding also supports the assumption that the missing link in the chain can be suppressed or outsourced in communication (e.g. the example of Milka and its association with other brands to create different associations).

6 Conclusion

The issue of the development of startups is currently very topical, as there is both an increase in their number and an increase in their share in GDP (Tomanka, 2024). One of the important parts of creating a startup strategy is branding, which is important to focus on from the beginning when creating a strategy (Bresciani & Eppler, 2010) as it helps to create brand awareness (Awad & Abdel Fatah, 2015) of the new business, differentiate from competitors from the beginning, ensure consistency in communication, which helps in brand recognition, building trust in the brand, which is important for building a customer base as well as convincing investors (Wijayasinha, 2023; Wiesenberg et al., 2020).

Brand equity is a holistic approach that offers a wide range of brand development areas to achieve maximum connection in the form of brand resonance (Keller & Swaminathan, 2020). For this reason, it is complicated for startups and early-stage brands to take advantage of it. The proposed magical chain concept can serve as a tool for initial brand setup and development.

A comparison of the magical chain concept and the CBBE model on both a theoretical and research level showed that they overlap in many areas and work with the same basic ideas. For startups, this offers the opportunity to work with the magical chain concept in the beginning of brand development to create a foundation for the subsequent application of brand equity theory and the CBBE model.

The simplicity of the concept was proven by the fact that secondary sources of data from publicly available sources such as websites and social networks were sufficient to build the brand's magical chain. In this way, any brand can create a profile of itself as well as any competitor, creating a market spread from the bright side to the dark side.

7 Research limitation

The main limitation of the research is the sample of brands on which the magical chain concept was tested. Therefore, to further research and validate the concept, it is recommended to expand the sample to other brands and sectors outside the chocolate market and food industry. Another limitation is the use of mainly secondary data sources in the form of websites and social networks. Therefore, it is recommended to validate the research by collecting primary data, for example by interviewing customers of the industry or through a questionnaire survey. The last limitation is the implementation time, which was 7 months. A longer time period is recommended for further research, during which time the market evolves.

More in-depth research on the brands of startups and start-ups is planned for late 2024 and during 2025.

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Primary Paper Section: A

Secondary Paper Section: AE, AH, GM

THE IMPACTS OF NEW TECHNICAL AND TECHNOLOGICAL POSSIBILITIES ON CONTEMPORARY ARTISTS AND FORMS OF PAINTING

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The paper is one of the outputs of the project KEGA 036UK-4/2024 Challenges of new technological possibilities in the medium of painting and graphics in the field of art pedagogy.

Abstract: This paper explores the most current forms and artists working within the medium of painting, examining how the vision and perception of visually have evolved over recent decades under the significant influence of new technological and technical advancements. It draws heavily on the so-called new or digital media. The analysis primarily focuses on artists, works, and developments within Slovakia and the Czech Republic, while engaging with and critically reflecting on the perspectives and studies of contemporary art theorists.

Keywords: education, conceptualism, iconoclasm, medium, painting, technology, visual art.

1 Introduction

Freedom? I fear that true freedom exists only as a metaphor—essentially, only within the realm of art. All other activities are constrained and provide only a limited sense of freedom, reduced to a utilitarian form. It's not just politicians and religions that make promises about this. As experimental psychologist, cognitive scientist, and linguist Steven Pinker poses the question: "How much art can the brain take?" (Pinker, 1999, p. 105). The question posed certainly doesn't come from an engineer, astronomer, or painter. Pinker briefly explores the landscape of American universities, noting that the arts faculties often serve a more ornamental purpose, primarily aimed at influencing the public. In this context, they appear to engage not only with the psychology of aesthetics but also with the psychology of status, much like how opera once fulfilled a similar role. So-called high art, as well as avant-garde art, tends to appeal to more sophisticated individuals. The crossing of boundaries and displays of virtuosity often overshadow the previously mentioned psychology of aesthetics. In today's reality, it's widely accepted that a work of art—be it a painting or a sculpture—primarily captivates us through its external features and inherent originality, with new media and technological advancements playing a crucial role. "Artistic language reflects the state of a particular historical period, as well as the mindset and attitude of society" (Valachová, 2024, p. 146).

2 The question of the resurgence of painting in the technological age

Every medium involves a specific technical procedure or process that shapes the final artistic product, influencing its expression, form, appearance, and overall character. Therefore, each technical process is inherently linked to its medium (Biarincová, 2024, p. 35). We are now in an era marked by the highly problematic and contradictory concept of the resurgence of painting, following a series of even more challenging attempts at new iconoclasm, accompanied by clear signs of significant dissonance. Somewhere within this situation lies the root of various negative dynamics—elements of predation or arrogance, along with the stresses and rampant insecurities experienced by both creators and viewers, regardless of generational differences. As we might say, this "forgiveness" painting is repaying several historical debts—not only to itself but also to those who, during its unwelcomed yet misleading absence, attempted to fill, replace, or even occupy the space traditionally held by painting.

Art theorists and historians, through their research and long-term observations, often view the state of painting in a way that resonates with Fila's assertion. There will probably never be an end to rehabilitation in art, which is why the idea of rehabilitation as the main agent of tradition seems heretical to

me. Unless we view art as a reflection of the human spirit—encompassing both aesthetic and ethical values—we risk allowing certain cultures or individuals to languish on the margins, seen as exotic, outsider, or incomprehensible. For me, painting embodies this interplay between matter and spirit more than any other medium. It occupies a unique position, situated between the spiritual heights of poetry and music (Fila, 2003, p. 17, 18).

Research in contemporary painting indicates that the medium is reclaiming its prominence and gaining momentum, to the point where one might say it is proliferating. However, the question of quality remains paramount. Art inherently retains an element of mystery, and it appears that the time has arrived for discussions about the effects of the cultural pandemic that has acted as a catalyst for this resurgence. This discussion addresses the attitudes and perspectives of artists, theorists, critics, and art historians regarding the impact of negative thinking and the prevalence of problematic experiments in the art world. It highlights the phenomenon of theoretical superiority, which often overlooks the practice and presence of the artist as a sensitive human being. These individuals may struggle to engage in the games of words that dominate theoretical discourse, particularly when it comes to the perception and state of visually.

In October 2010, a Czech-Slovak symposium titled "Painting in Contexts, Contexts of Painting" was organized by the Research Centre at the Academy of Fine Arts in Bratislava. In the introduction to the published anthology, the art theorist Jana Geržová highlights that painting has garnered significant interest over the past decade, encompassing a wide range of approaches. This includes a return to classical hanging paintings, which Geržová describes as a renaissance of traditional genres, as well as manifestations of postmodern pluralism, eclecticism, and hybrid combinations (Geržová, 2012, p. 8).

To address the themes of the announced anthology, it is essential to outline what has transpired in our cultural and artistic community over the past twenty years, particularly within the artistic and academic spheres. During this period, a predominantly young generation of artists emerged. The post-revolutionary art education program at the Academy of Fine Arts and Design (AFAD), established in Slovakia in 1949, underwent a fundamental transformation, adopting entirely new contours in every respect. The most significant change that soon exposed the essence of the transformations, along with their shortcomings, was the abolition of the relatively comprehensive two-year training program for students. This was replaced by short-term and often fleeting courses intended to provide a more versatile artistic foundation. As stated, "Where else but on campus can there be the appropriate time and space to build a reservoir of material from which the personal world of the painter is gradually constructed and shaped?" The aim is to occasionally be surprised by the spontaneous emergence of one's own illusions and contradictions. I realized that a contemporary recommendation from so-called opinion experts and outsiders was the insistence on transcending boundaries at all costs. However, no one specified how to achieve this transcendence or what it should entail, leaving us in a state of uncertainty about what would truly be beneficial... (Berger, 2017, p. 98). Similar vague and imprecise recommendations can be found in the scientific proceedings of the aforementioned symposium. Consequently, we are often taken aback by certain problematic formulations at first glance. For instance, in T. Pospiszyl's lecture titled *The End of Painting*, the introductory abstract cites R. Krauss's perspective on painting's futile attempts to achieve hegemony. Although Pospiszyl defends painting by asserting that there are still great painters and remarkable works, he acknowledges that the situation has changed and that painting no longer holds the monopoly it once did before the rise of technical art. Authors of reflections, lectures, and discussion

papers, like Pospiszyl, emphasize the significance of photography's invention, noting that it "highlights not just the miraculous qualities of this medium but also the crisis that painting faced at that time" (Pospiszyl, 2012, p. 25).

The question arises: are we not currently experiencing a crisis, not only in painting but in the broader artistic landscape? The theorist's statement seems to significantly understate this reality: "Painters of the past did not have to grapple with defining painting or its function. They simply painted, and everything they created was considered painting. In contrast, during the modernist era, the painter not only creates a work but also reflects on the medium of painting itself." Painting evolved beyond a mere artistic technique; it became a universal language through which new interpretations and understandings were developed. Modernism was often viewed as a destructive process that ultimately led to a dead end. This truncated discourse reveals a noticeable limitation in theoretical reasoning, as participants often conflate the historically defined significance of painting as a medium with a universal attribution that applies to all techniques. This type of simplistic theoretical conflation occasionally resembles political discussions. It involves speculating on the relevance or searching for the nuanced value of an ever-expanding array of other media, particularly those dominated by technical elements. In his lecture, Pospiszyl lists the still incomplete range of these "other" media... In the ongoing struggle against painting, photography remains favored, a trend that the author believes has diminished painting's authenticity, reducing it to a mere aesthetic phenomenon. Pospiszyl argues that conceptual artists have supplanted the pictorial codes of painting with a photographic message that lacks a definitive code (Pospiszyl, 2012, p. 26).

3 Vitality and metamorphosis of painting

Fila (2003) notes that what captivates him about painting is its phoenix-like ability to renew itself. Despite being buried many times, it consistently demonstrates that it has not yet run out of vitality. It seems that iconoclasm has merely washed over it. The strength of this atavism is remarkable, as it can not only overcome modern adversaries but also absorb them. New evidence continually emerges that anything can indeed be painted. Only disoriented individuals believe that everything has already been painted. They fail to recognize a crucial detail: painting is merely a medium. While humanity has expressed much through it in the past, the constant evolution of both people and the world means that not everything will ever be painted. Any new medium that does not acknowledge this truth is destined to merely embellish the world without capturing its essence.

In the past, art was closely linked to everyday life and the activities necessary to fulfill people's needs (Kováčová, 2023, p. 13). Humanity has shifted from merely meeting basic needs to recognizing and appreciating talent (Valachová, Benčíč, Kováčová, 2019). Now, as we advance further into the digital age, even the concept of talent is starting to waver in its significance.

What about Dali, Mantegna, Turner, Seurat, El Greco, Dürer, Piero della Francesca, or Ernst, Ensor, Delacroix, and Renoir? And what about the colorists like Bonnard, Matisse, and even Rothko? What about Kiefer or Gerhard Richter? What of the depths of Leonardo's caves? There's a mystery in these images, an intuition that leads us to ponder the question of beauty, yet it seems there is no definitive answer. Alongside the concepts mentioned above, the elements of beauty certainly encompass the rare quality of captivation. An exceptional work of art stands out because it is created in moments of rapture, and this sense of rapture is often experienced by those who perceive it (Bergerová, 2022, p. 28). Thus, its exceptional nature extends to the way it is perceived as well. Repiská contends that perceiving a work of art is a multifaceted process shaped by numerous factors. Beyond information about the artist, the context in which the artwork is displayed, as well as the viewer's personal experiences, emotional state, and current mood, can significantly

impact perception (Repiská, 2024, p. 267). Collectively, these elements influence how viewers interpret the artwork, ultimately shaping their overall aesthetic experience.

Arnheim (2022), a psychologist specializing in vision and visual art, suggests that in a mature work of art, all elements appear to share a fundamental similarity. The sky, the sea, the land, the trees, and even human figures seem to be crafted from the same material. There is nothing false; instead, everything is transformed through the unifying vision of the great artist. Each great artist begins anew, creating a world where familiar objects appear as if they have never been seen before. This fresh perspective is neither a distortion nor a betrayal; it reinterprets age-old truths in a dazzling and exciting manner.

4 The medium of painting and its specificity

Fila's (2006) Apologetics suggests that the discussions and lectures often resemble a futile struggle. This approach tends to sidestep the truth of reality, neglecting the living artist with their unique talents, mental capabilities, manual skills, imagination, and the diverse range of possibilities that enable them to think continuously, both now and into the future. An individual becomes a painter, sculptor, musician, composer, or instrumentalist through an inner calling. Since ancient times, painting has served as a medium—a language crafted for our personal expression, not merely for depicting the visible world. Thus, even today, a painter is not required to embrace alternative methods or approaches; this has always been the case. Painting is inherently adventurous; each stroke and every touch of the canvas carries its own unique significance, as it is a handmade process. It demands a long-term commitment and comes without guarantees. This, perhaps, highlights a fundamental difference between contemporary media and painting. Traditional media like painting do not offer the quick, often less labor-intensive, and more visually striking options found in digital processes. Instead, they rely on practical skills that demand dedicated practice to achieve mastery. Concentration and time, both of which are increasingly valuable today, are essential in this process (Bergerová, 2022; Bergerová, Ševčovič 2022).

The diversity and complexity of contemporary artistic directions, particularly in the visual realm, are on the rise and becoming increasingly dynamic, largely due to the vast array of communication options available. Some creative approaches evolve naturally, with individual phases of the artistic process responding to technological challenges in painting, sometimes even resulting in a form of destruction. Additionally, there are foundational strategies that may involve speculative or manipulative techniques.

5 Painting versus digital image

A century ago, in the 1920s, the philosopher Ortega y Gasset cautioned about the risks associated with the unrestricted flow and transmission of information. As a perceptive observer, he identified various unconventional developments in art and culture as forms of extremism. He expressed concerns about dehumanization, suggesting that art was becoming merely a product of 'art for art's sake'—a form of entertainment that, in his view, was ultimately losing its significance. A century later, it can be said that Gasset's intuition about art being on the edge has been validated. In our discussion, we refer to Arnheim, the noted connoisseur and psychologist of vision and visual art, whose early work is associated with the moving image of film. He expresses his enthusiasm and fascination for something that often becomes largely inaccessible or incomprehensible to adults: the imagination of a child. Visual imagination likely shares a significant trait with children: their inherent mobility. Arnheim (2022) held a strongly critical view of modern art, arguing that it distorts perception and undermines the foundational axes of the image, as seen in cubism, while also disrupting local color. He points out that the stark differentiation between the external and internal worlds, as well as between consciousness and the unconscious, is fundamentally unnatural. A deeply insightful expert on the human psyche, as well as on

vision and visual arts, would likely have significant reservations about many of the methods and often superficial experiments present in art pedagogy and didactics today. In numerous instances of contemporary art education, we can observe contradictions and attempts to align with current trends, such as the shift towards digital imagery. Art educator and artist Sládek (2018) poses intriguing questions regarding this topic: "Is it possible to cultivate pictorial language and creativity without students having developed skills in traditional manual techniques of image production?" Additionally, she asks, "Can artistic talent be recognized based solely on the ability to create images using new aesthetic forms of contemporary art? Will traditional imaging techniques continue to dominate art education, or will new subjects focused on digital outputs take their place?" (Sládek, 2018). Sládek also points out that there is a lack of discussion regarding the concept and role of the digital image in education.

The past can seem boundless, partly due to the separation of profane and sacred art. What captivates us in art—the sublime and the mysterious—gradually transitions into a discourse that forms the foundation of art history and aesthetics. Among the numerous quotations, renowned names, and various facts and impressions, the unique reflections of Adorno (2004) stand out. Adorno asserts that all works of art, as well as art itself, embody a mystery that challenges art theory. This notion is echoed in our partially annotated texts within the collection *Painting in Contexts - Contexts of Painting*. Furthermore, the lack of a harmonious atmosphere among communities of artists, theorists, and critics can be traced to differing vocabularies, which we find inadequate and unconvincing. Today's painting is increasingly liberated from traditional ideas and constraints, with its malleability and reliance on contemporary trends becoming more evident. Initially, various influences intertwine in ways that are difficult to define, leaving us uncertain whether this is a subliminal process or a market-driven phenomenon. Amidst this, schemes, analogies, interpretations, and reinterpretations emerge with enthusiasm, often embraced out of a desire to conform to societal expectations. In dynamic processes, cultural boundaries are often transcended, as was the case during the era of the French Cubists. Even before that time, artistic designs from different parts of the world were sources of admiration and imitation. The notion of artistic direction can be seen as an emanation, yet it remains elusive and difficult to capture.

It is not the first time we have sifted through the aforementioned collection on the contexts of painting, seeking essential insights and ideas. However, at times, the relentless pursuit of scholarship or curiosity feels almost hurtful, if not somewhat perfidious. Many authors of lectures and papers in the discussion appear to be competing with one another, somewhat neglecting the essence of living creation and the artwork itself. They compete for the most perfect form of expression, often prioritizing performance over the artistic artifact itself. Unintentionally, we are reminded of the so-called post-revolutionary period, a time when freedom and absolute pluralism were emphasized daily. During this era, many essential terms, such as tradition, fell out of the contemporary vocabulary.

Our perception and interpretation of a work of art are influenced by our personal experiences. In this context, I would like to mention our trip to Prague to visit the exhibition of the world-renowned artist Gerhard Richter. The exhibition at the Kinsky Palace was undeniably beautiful, showcasing a clarity built on two pillars: one featuring monochromatic abstractions and the other a series of small still lifes in a vibrant chromatic palette. However, this seemingly meticulously calculated contrast failed to leave a lasting impression. A short time later, we found ourselves immersed in an unpredictable experience at the Waldstein Riding School that eclipsed the classic two-faced painting. At first glance, we were enveloped by a serene variety of artifacts—impressive ensembles, meaningful objects, and thematically rich materializations that exuded a sense of logical museum quality. This exhibition showcased the work of the significant Czech artist and pilgrim, František Skála (born 1956). His natural versatility and liberated artistic sensibility overlap

with contemporary art's terminological notions. Despite the clear present, Skála does not succumb to trends; he rarely confines himself to his findings and experiences, which he narrates. Why Skála - the Pilgrim? This artist, truly deserving of the title, walked the 45th Biennale in Venice (1993), carrying in his backpack many treasures he found along the way, perhaps even re-created. Skála moves silently, imbuing his indescribable art with the delicate weight of a dragonfly (Skála, 2012; Bergerová, 2023).

Slovakia also boasts parallel figures in its art scene, such as the painter Peter Bartoš (born 1938), a student of the classical painting school led by Professor Mudroch. "If we want to invent something truly great, it is the happiness of man" (Gažovičová, 2018, p. 9). According to his contemporary, the painter Vladimír Popovič, Bartoš is a central figure in domestic art: "He is a living legend of the Czechoslovak neo-avant-garde, one of the last eyewitnesses to the key events of visual culture in the last century". Nina Gažovičová, curator of the Petr Bartoš 80th anniversary exhibition, observes: "Bartoš's endeavors can seem absurd in some ways, almost reminiscent of Sisyphus's fate. It's as if he believes that a repeated gesture might one day overturn the impossibility of the task. For him, this task represents an informational experiment with the system of communication—a prolonged and fragmented effort toward reproducibility, contrasted with a resolute refusal to display his work. This lifelong task appears to exist at the intersection of the profane—serving as an active instrument of criticism with an instructional subtext—and the sacred, where actions aim to resonate in the viewer's consciousness. In some respects, it occupies the threshold between the iconoclastic movement and the Catholic desire for opulence" (Gažovičová, 2018, p. 17).

6 Conclusion

The French phenomenologist Merleau-Ponty 'conjured up' the idea of the eye as a kind of seeing body. According to the author, our vision is 'infected' by thought. He suggests that painting embodies a magical theory of seeing, where the painter transforms the world into a painting. In this sense, seeing becomes a convergence of all aspects of Being. What are we to make of this? Perhaps it represents a reversal of roles, where objects observe the painter, and the painter, in turn, observes what is seen through the lens of his own experience. Every visible element carries its layer of the invisible—a kind of nothingness. This aligns with Ingarden's clear notion that the abstract image is embedded within the painting, highlighting the polarity between the definite and the indefinite. (Bergerová, 2024).

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Primary Paper Section: A

Secondary Paper Section: AL, AM

RELATIONSHIPS BETWEEN PSYCHOLOGICAL WELL-BEING, THE LEVEL OF LIFE SATISFACTION, AND THEIR PREDICTIVE VALUE OF ACADEMIC SUCCESS IN THE CONTEXT OF A SPECIFIC EDUCATIONAL ENVIRONMENT OF SECONDARY VOCATIONAL SCHOOLS IN SLOVAKIA

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Abstract: The objective of the presented paper is to find out if there are correlations between psychological well-being of secondary vocational school students, their life satisfaction, and academic success. The research file consisted of 880 secondary vocational school students from Slovakia, where we determined the level of these variables and the correlations between them using quantitative research (Psychological Well-Being Scale, Satisfaction with Life Scale, GPA values, descriptive statistical analysis). We found that there is a moderately strong and statistically significant correlation between psychological well-being and life satisfaction, there is a weak correlation between psychological well-being and academic success, and the same is relevant for the correlation between life satisfaction and academic success.

Keywords: psychological well-being; life satisfaction; academic success; school performance.

1 Introduction

In today's society, there is a lot of emphasis on performance, and schools are no exception. Children and young people often assume that their grades and performance at school are more important than how they feel, than the quality of their interpersonal relationships, than their life satisfaction. The feeling of psychological well-being of students is influenced by many factors, such as, for example, their ability to cope with stress, their level of resilience, that is, psychological resistance, and what coping strategies they have adopted. In the school environment, students create new interpersonal relationships with their classmates and teachers, which also affect how they feel at school. If a person experiences an unfavourable or even traumatic situation (at school, in the family, or somewhere else), if she/he does not receive enough love, support, and understanding in her/his life, then this affects her/his level of psychological well-being and life satisfaction. In the same way, her/his school performance and the associated academic success rate may be low as a result of the given person's potential.

The well-being of secondary school students is a complex and multifaceted issue that encompasses various aspects of their physical, mental, emotional, and social health. Research on the well-being of secondary school students, for example, Mubiala and Mwenzi (2024) or Saxer et al. (2024) has highlighted the importance of addressing both internal and external factors that can impact their overall well-being.

One key factor that influences the well-being of secondary school students is their mental health. Bartholomew et al. (2024), Kuyken et al. (2024) and Cuppen (2024) have shown that high levels of stress, anxiety, depression, and other mental health problems are common among secondary school students. Schools must provide adequate mental health support and resources, such as counselling services and mental health education, to help students cope with these challenges.

Physical health is another important aspect of well-being for secondary school students (Denny et al., 2014). Encouraging healthy habits such as regular exercise, balanced nutrition, and adequate sleep can enhance students' overall well-being (Luzano, 2024). Williams and Smith (2018) examined the relationship between physical activity and the well-being of secondary school students. The authors found that regular physical activity has a positive impact on the overall well-being of students and can reduce levels of stress and anxiety.

Schools definitely play an important role in promoting physical health by providing access to sports and recreational activities, as well as nutritious meals options.

Social and emotional well-being are also critical for secondary school students (Barry et al., 2017). Building positive relationships with peers and adults, developing emotional intelligence, and cultivating resilience are all important factors that contribute to overall student well-being (Strahan et al. 2019). Schools can support students in these areas by fostering a positive and inclusive school culture, providing social and emotional learning programmes, and offering opportunities for students to participate in extracurricular activities and community service.

Rapley et al. (2024) explored the relationship between the school environment and the well-being of secondary school students. They found that a positive and supportive school environment significantly influences the well-being and mental health of students. Jones et al. (2020) focused on identifying factors that influence the well-being of secondary school students. They found that factors such as socioeconomic status, family relationships, and peer support can have a significant impact on overall well-being of students.

Studies on the well-being of secondary school students are important to understand and improve the overall health and happiness of these students. These studies highlight the importance and complexity of the well-being of secondary school students and underscore the need for further research and interventions aimed at supporting their overall health and happiness. Promoting the well-being of secondary school students requires a holistic approach that addresses their physical, mental, emotional, and social needs. By creating a supportive and nurturing environment that prioritises student well-being, schools can help students thrive academically, socially, and personally.

The issue of well-being appears to be relatively well researched and described, even in the context of secondary vocational school students. An example could be the scientific publications from the last three years, of which there are countless, with the most interesting findings in the context of our research being brought, for example, by Putri and Dewi (2023), Gierczyk et al. (2022), Tommasi et al. (2020), Yam (2022), Özhan and Yüksel (2021), Farnicka et al. (2023), Nováková and Orosová (2023), Skura and Steinhagen (2022), Pavicevic and Zivkovic (2021), Careemdeen et al. (2021), Gałazka and Jarosz (2021), Farooq Shah et al. (2021), Bhat (2021).

Life satisfaction of secondary school students refers to their subjective evaluation of their general well-being and happiness in various areas of their lives (Yáñez-Cancino et al., 2024). It reflects how contented and fulfilled students feel about their academic, social, emotional, and personal experiences during their time in secondary education (Motal-Garcia, 2021). Life satisfaction encompasses factors such as academic achievement, social relationships, extracurricular activities, mental health, self-esteem, and overall quality of life (Wahlström et al., 2021). Higher levels of life satisfaction are often associated with positive experiences, feelings of belonging and connection, a sense of purpose and achievement, and overall well-being (Lodi et al., 2019).

The issue of satisfaction with life of the secondary vocational school students presents the same detail of the research outputs as well-being research; these studies are especially worth mentioning, for example Wu and Becker (2023), Wahlström et al. (2021), de Matos et al. (2023), Đuricová (2020), Pidbutska

and Shapolova (2021), Markiewicz et al. (2022), Kariková and Valent (2020). Next, for example Fonberg and Smith (2020) found that secondary vocational school students reported lower levels of life satisfaction compared to their peers in traditional academic settings. This could be attributed to a variety of factors, such as perceived lack of opportunities to advance, lower self-esteem, and increased stress levels due to the demands of vocational training. Furthermore, Mosley-Johnson et al. (2019) highlighted the importance of social support and mentorship in improving the life satisfaction of secondary vocational school students. This suggests that interventions aimed at providing students with the necessary support systems could potentially improve their overall well-being and life satisfaction.

Understanding and promoting life satisfaction among secondary school students is important for their academic success, mental health, and overall development. It plays a significant role in shaping students' motivation, engagement, and resilience during their first years of school (Bajtoš et al., 2020). Educators, parents, and policy makers can help students improve their life satisfaction by creating a positive and inclusive school environment, providing mental health resources, promoting healthy relationships, and fostering opportunities for personal growth and fulfilment (Pasternáková et al., 2023).

However, not as many scientists have yet identified the mutual correlation of at least two of the parameters mentioned above, let alone all three of the parameters we analysed. These are rather older studies, for example Diseth and Samdal (2014), Shek and Li (2016), Ng et al. (2015). In addition, in the Slovak environment, the correlations between students' life satisfaction and academic success, which would be based on the theory of self-determination, have not yet been investigated, i.e., how students' life satisfaction is influenced by their school results. Data from the PISA 2018 survey (OECD, 2018) only allow one to compare the correlations of the comprehensive test and individual results with the average school or the grade obtained in the given subject, as this is the indicator that students probably perceive most intensively as an indicator of the success achieved at school.

In our research, we are based on the understanding of psychological well-being of Ryff and Keyes on the Psychological Well-Being Scale (PWBS) published in Ryff and Keyes (1995), which distinguishes the dimensions of self-acceptance, independence, coping with the environment, personal growth, meaning of life, and positive relationships with others.

Furthermore, we are based on the understanding of life satisfaction according to Diener et al. on the Satisfaction with Life Scale (SWLS) published in Diener et al. (1985) and on the GPA values, i.e. the grade point average on the end-of-year assessment through the secondary vocational school students report certification.

The objective of the research is to find out if there are correlations between mental well-being of secondary vocational school students (positive relationships with others, self-acceptance, independence, personal growth, coping with the environment, meaning in life), life satisfaction and academic success.

We perceive the correlation between life satisfaction, well-being, and academic success among secondary school students as a complex and multidimensional relationship that involves various interrelated factors. Here is a breakdown of how these aspects are related:

- Life satisfaction and well-being: Cavarvalho et al. (2024) has shown that there is a positive correlation between life satisfaction, overall well-being, and academic success among secondary school students. Higher levels of happiness and well-being are associated with greater motivation, engagement, and resilience, which can positively impact students' academic performance. When

students feel happy, content, and fulfilled in different aspects of their lives, they are more likely to approach their academic studies with a positive mindset and a sense of purpose.

- Academic success and well-being: Academic success, such as high grades, academic engagement, and achievement, can also contribute to students' overall well-being and life satisfaction. When students feel competent, recognised for their efforts, and successful in their academic pursuits, they can increase their self-esteem, motivation, and sense of achievement, leading to increased well-being and life satisfaction (Widlund et al., 2018).
- Life satisfaction, well-being, and academic success as a positive cycle: The relationship between life satisfaction, well-being, and academic success can form a positive cycle. When students experience high levels of life satisfaction and well-being, they are more likely to perform well academically. In turn, academic success can further enhance their well-being and life satisfaction, creating a strengthening cycle of positive outcomes (Izaguirre et al., 2023), (Khaleghinezhad et al., 2016).
- Factors influencing the relationship: Various factors, such as social support, mental health, extracurricular activities, and a positive school environment, can influence the correlation between life satisfaction, well-being, and academic success among secondary school students (Mark and Lajčin, 2017). Interventions that promote well-being, such as mental health programmes, stress management techniques, and positive school climate initiatives, can improve student overall satisfaction with life and contribute to their academic success (Lajčin, 2021).

In connection with the above-mentioned facts and the stated objective of the research, we formulate the following assumptions:

- Assumption A1: We assume that there is a correlation between psychological well-being and life satisfaction of secondary vocational school students (Guney, 2009), (Mehmood and Shaikat, 2014).
- Assumption A2: We assume that there is a correlation between psychological well-being and academic success of secondary vocational school students (Duncan et al., 2021).
- Assumption A3: We assume that there is a correlation between life satisfaction and academic success of secondary vocational school students (Ng et al., 2019), (Rode et al., 2005).

It is our research that can narrow this gap in the theory of a secondary vocational school students well-being, life satisfaction, and academic success correlations. And we are also convinced that the results of our research can help to better create and adapt the school psychologists' programmes for managing the challenging situations for secondary vocational school students that result from their school failure, life dissatisfaction, or experienced trauma; they can inform university students of pedagogy and psychology in the form of educational case studies about the pitfalls of the profession of pedagogue or school psychologist.

2 Materials and Methods

2.1 Research File

880 students between the ages of 16 and 18 ($M=16.8$; $SD=0.67$) participated in the research, of which 558 boys (63% of the research group) and 322 girls (37% of the research group) of 10 Slovakian secondary vocational schools, these were schools focused on teaching technical subjects. They were second- and third-year students.

The data collection was intentional and was carried out in October 2023 always in the premises of the analysed secondary vocational schools. Data collection took 2 days in each school.

In the research, we investigated sociodemographic characteristics: age and gender.

2.2 Instruments and Procedures

The indicator of psychological well-being is the summation index of positive relationships with others, the summation index of self-acceptance, another indicator of psychological well-being is the summation index of independence, the summation index of personal growth, also the summation index of coping with the environment and the summation index of the meaning of life on the Psychological Well-Being Scale (Ryff, 1989).

The indicator of life satisfaction is the summation index of life satisfaction in the Satisfaction with Life Scale (SWLS) (Diener et al., 1985).

The indicator of academic success is the GPA value, that is, the average grades in the end-of-year evaluation through report certifications.

Psychological well-being was analysed using the Psychological Well-Being Scale described in Ryff (1989). It is a scale consisting of 18 items with six indicators or six subscales:

- positive relationships with others,
- self-acceptance,
- independence,
- personal growth,
- coping with the environment,
- meaning of life.

The participants had the opportunity to answer the items using a Likert scale on a scale from 1 to 7, where 1=strongly disagree, 2=disagree, 3=rather disagree, 4=cannot decide, 5=rather agree, 6=agree, 7=strongly agree. The theoretical range of the scale is a total score of minimum 18, maximum 126, while the higher the score, the higher the level of psychological well-being.

The original study with 20 items reports the value of Cronbach's alpha coefficient for the indicator of self-acceptance indicator $\alpha = .93$; for positive relationships with others $\alpha = .91$; for independence $\alpha = .86$; for coping with the environment $\alpha = .90$; for the meaning of life $\alpha = .90$; and for personality growth $\alpha = .87$ (Ryff, 1989).

The test-retest reliability value for self-acceptance was $r = .85$; for positive relationships with others $r = .83$; for autonomy $r = .88$; for managing the environment $r = .81$; for the meaning of life $r = .82$ and for personal growth $r = .81$ (Ryff, 1989).

In our research, we used the shortest version of the questionnaire, which contains a total of 18 items, each of the dimensions, or each indicator is loaded with three items (Ryff, Keyes, 1995).

We used the Satisfaction with Life Scale described by Diener et al. in Diener et al. (1985) to measure life satisfaction.

The Satisfaction with Life Scale is made up of five items, to which the participants answer using a seven-point Likert scale, where they indicate how much they agree with the item, 1=strongly disagree, 2=disagree, 3=rather disagree, 4=can't decide, 5 = substantially agree, 6=agree, 7=strongly agree.

The theoretical range of the scale is a minimum total score of 5 and a maximum of 35, while the higher the score, the higher the level of life satisfaction.

The original study notes that the reliability value of the test-retest was $r = .82$ and the internal consistency was Cronbach's alpha $\alpha = .87$ (Diener et al., 1985).

We determined the academic success of the participants using GPA values, that is, the average of the grades the participants

received in the end-of-year evaluation through report certifications. The academic average of each participant was provided by the class teachers, while they were anonymously assigned to the individual questionnaires.

2.3 Data Analysis

The research had a quantitative, non-experimental, verification design, is correlational. Data collected were evaluated and processed using the SPSS statistical program SPSS and the JMP Pro 14.3. First, we determined the frequency of participants' responses to individual scales items, then we calculated the mode, median, quartiles, IQR interquartile range, coefficient of skewness and kurtosis, empirical range, variation range and standard deviation as a part of univariate analysis.

As part of the bivariate analysis, we determined the strength of the correlations between the variables using the Pearson's correlation coefficient (that is, the product correlation coefficient) and the Spearman correlation coefficient, while it is true that if $r = 0-0.3$, the correlation is weak, if $r = 0.3-0.5$, the correlation is moderately strong, and if $r = 0.5-1$, it is a strong correlation. The same rules also apply to negative values of r , which express a negative correlation, i.e. indirect correlation. However, a positive or negative correlation does not mean that it is a causal correlation, that is, an influence cannot be established. The internal consistency of the scales was determined using the Cronbach's alpha coefficient, where the coefficient should have a value of at least $\alpha > .7$.

3 Results

3.1 Psychological Well-being

In the psychological well-being scale, 43.2% of the participants stated that they rather agree that they like most of their personality traits and abilities, only 1.1% of the participants strongly disagreed with this statement. The most prominent indicator in the subscale of positive relationships with others was the item expressing a feeling of frustration about maintaining close relationships, where 43.2% of the participants strongly agreed with this item.

In the self-acceptance subscale, the most significant indicator was the item in which 43.2% of the participants stated that they agree that they like most of their personality traits. However, 30.7% of the participants also said that they agree that they are disappointed in several ways with what they have achieved in their lives so far.

A significant indicator on the independence subscale was the item that expressed that a person trusts his opinions even when they differ from the opinions of the other people, and 38.6% of the participants strongly agreed with this item.

Within personal growth, 61.4% of participants strongly agreed with the item that expresses that it is important to have new experiences, because of which a person thinks about himself and the world around him.

The value of the Cronbach's alpha coefficient of internal consistency for the Psychological Well-Being Scale was $\alpha = .78$, on the basis of which it can be considered reliable.

In the subscale, positive relationships with others, self-acceptance, and coping with the environment, there were no outlier or extreme values.

There was an outlier in the independence subscale, where the participant scored lower than the rest of the research group, the same situation is replicated in the personal growth and the meaning of life subscale.

In the positive relationships with others, the independence and self-acceptance subscale, the data distribution was non-Gaussian,

left-skewed, and platykurtic. The other subscales show signs of a normal data distribution.

The statistical description of the individual dimensions of the psychological well-being scale is shown in Table 1.

Table 1. Descriptive statistics of the subscales of the Psychological Well-being Scale (own processing).

	positive relations	self-acceptance	independence	personal growth	coping with the environment	meaning of life
E	14,6	15,0	15,5	17,5	13,3	15,2
Median	15	16	16	18	14	15
Modus	14	16	16	21	16	15
Standard deviation	3,67	3,94	3,72	3,04	3,71	3,39
Variance	13,49	15,56	13,82	9,26	13,75	11,50
Kurtosis	-0,42	0,11	0,23	-0,02	-0,70	-0,09
Skewness	-0,44	-0,79	-0,60	-0,84	-0,23	-0,26
Minimum	6	3	5	9	5	5
Maximum	21	21	21	21	21	21
Variability	15	18	16	12	16	16
Percentiles	25	12	12	13	16	10,75
	50	15	16	18	14	15
	75	17,25	18	18	16	18
IQR	5,25	6	5	4	5,25	5

The correlation between the positive relationships with others and the self-acceptance subscale is positive, moderately strong, and statistically significant ($r_s=.45$; $p<.01$), between the positive relationships with others and the independence subscale there is a positive, weak, and statistically significant correlation ($r_s=.24$; $p<.05$).

The correlation between personal growth and the positive relationships with others subscale is positive, moderately strong, and statistically significant ($r_s=.37$; $p<.01$), between the environment and the positive relationships with others subscale there is a positive, moderately strong, and statistically significant correlation ($r_s=.44$; $p<.01$). There is a positive and negligible correlation between positive relationships with others and the meaning of life subscale, which is not statistically significant ($r_s=.07$).

There is a positive, weak and statistically significant correlation between self-acceptance and the independence subscale ($r_s=.28$; $p<.01$), and a strong and statistically significant positive correlation between the self-acceptance and the personal growth subscale ($r_s=.50$; $p<.01$).

There is a positive, strong and statistically significant correlation between self-acceptance and coping with the environment subscale ($r_s=.54$; $p<.01$). The correlation between self-acceptance and the meaning of life subscale is positive, weak, and statistically significant ($r_s=.23$; $p<.05$).

The correlation between independence and the personal growth subscale is positive and weak ($r_s=.20$), there is a weak positive correlation between the independence and the coping with the environment subscale ($r_s=.12$).

There is a positive, moderately strong and statistically significant correlation between personal growth and the coping with the environment subscale ($r_s=.43$; $p<.01$), there is a positive, weak and statistically significant correlation between the personal growth and the meaning of life subscale ($r_s=.27$; $p<.05$).

There is a positive, weak and statistically significant correlation between the coping with the environment and the meaning of life subscale ($r_s=.30$; $p<.01$).

3.2 Life Satisfaction

The most prominent indicator in the Satisfaction with Life Scale is the item that expresses satisfaction with one's life, where 44.3% of participants agree with this statement. The second most prominent indicator is the item that contains the statement that the participant's living conditions are excellent, with which 37.5% of the participants agreed.

Strong disagreement with the statement that the participant would not change anything in his life if he could live it over again, said 21.6% of the participants. 19.3% of the participants disagreed with the fact that the participant's life almost completely matches his ideal.

The value of Cronbach's alpha, which expresses the internal consistency of the Satisfaction with Life Scale, acquired a value of $\alpha=.75$, which means that the Satisfaction with Life Scale proved to be reliable.

In the satisfaction with life scale there is one outlier who had a lower score than the rest of the participants in the research file.

The data in the Satisfaction with Life Scale were distributed normally, respectively, they had a Gaussian distribution. The normal distribution of the data was also confirmed by the Shapiro-Wilk normality test, where the values are $W=.98$; $p=.12$. The statistical description of the Satisfaction with Life Scale is shown in Table 2.

Table 2. Descriptive statistics of Satisfaction with Life Scale (own processing).

E	22,2
Median	23
Modus	26
Standard deviation	5,59
Variance	31,22
Kurtosis	-0,20
Skewness	-0,43
Minimum	6
Maximum	33
Variability	27
Percentiles	25
	50
	75
IQR	7

3.3 Academic Success

Academic success was represented by GPA values, that is, academic average, or average values of marks on the end-of-year report certification of the participants.

There were no outliers or extreme values in the case of GPA in the research file. The distribution of the data within the GPA values was Gaussian, so it had a normal distribution. The normal distribution of the data was also confirmed by the Shapiro-Wilk normality test, where the values are $W=.97$; $p=.06$. The statistical description of the GPA values is shown in Table 3.

Table 3. Descriptive statistics of GPA (own processing).

E	2,0
Median	2,07
Modus	2,07
Standard deviation	0,553
Variance	0,306
Kurtosis	-0,828
Skewness	0,126
Minimum	1
Maximum	3,31
Variability	2,31
Percentiles	25
	50
	75
IQR	0,86

4 Discussion

4.1 Psychological well-being and Life Satisfaction

There is a positive, moderately strong, and statistically significant correlation between positive relationships with others and life satisfaction ($r_s=.36$; $p<.01$), we found a positive, strong and statistically significant correlation between the self-acceptance and life satisfaction ($r_s=.66$; $p<.01$). Independence

was positively correlated with life satisfaction, when it was a moderately strong and statistically significant correlation ($r_s=30$; $p<.01$). We found a positive, weak, and statistically significant correlation between personal growth and life satisfaction ($r_s=.26$; $p<.05$), we found a moderately strong, positive, and statistically significant correlation between the coping with the environment and life satisfaction ($r=.45$; $p<.01$). We found a positive and negligible correlation between the meaning of life and life satisfaction ($r=.05$).

4.2 Psychological Well-being and Academic Success

In our research, we also focused on determining the relationship between the psychological well-being and the academic success expressed by GPA values.

We found a weak negative correlation between the positive relationships with others and the academic success ($r_s=-.03$), between the self-acceptance and the academic success we found a positive weak relationship ($r_s=.09$), correlation between the independence and the academic success we found a positively weak ($r_s=.11$).

Personal growth was negatively and weakly with the academic success ($r_s=-.04$), we found a negligible positive negligible correlation between coping with the environment and academic success ($r=.01$). The correlation between the meaning of life and academic success was also negligible ($r=.14$).

4.3 Life Satisfaction and School Success

We also focused on the correlation between life satisfaction and the academic success. In our investigation, the correlation between life satisfaction as a one-dimensional construct and academic success was weak and not statistically significant ($r=.09$).

5 Conclusions

In our research, we examined the correlations between various variables and discovered that the correlations between academic success and psychological well-being, as well as academic success and life satisfaction, were predominantly negligible or weak. However, a notable finding was the significant correlation ranging from weak to strong between psychological well-being and life satisfaction, with the exception of the meaning of life subscale which did not show a significant correlation.

Additionally, we observed weak correlations between psychological well-being and academic success, as well as between life satisfaction and academic success. It is crucial to emphasize that while these correlations exist, they do not establish a causal relationship. Therefore, further research is imperative to delve deeper into the underlying mechanisms that drive these correlations.

Our study underscores the correlation between academic success, psychological well-being, and life satisfaction, emphasizing the need to address all dimensions of an individual's well-being to enhance overall success and happiness. It is evident that a holistic approach to well-being, encompassing academic achievements, mental health, and life satisfaction, is essential for promoting a fulfilling and prosperous life.

As we navigate the complexities of human experiences and well-being, it becomes increasingly clear that a comprehensive understanding of these factors is paramount in cultivating a harmonious and thriving society.

The findings of our research serve as a reminder of the interconnectedness of various aspects of well-being, urging us to prioritize a holistic approach towards personal growth and fulfilment.

5.1 Assumption evaluation

In assumption A1, we assumed that there were the secondary vocational school students' psychological well-being and life satisfaction correlations (positive relationships with others, self-acceptance, independence, personal growth, coping with the environment, meaning in life). This assumption was confirmed, with the strongest correlation being a positive and strong correlation between the self-acceptance subscale and life satisfaction.

The relationship between self-acceptance and life satisfaction is a vital aspect of overall well-being. Numerous studies, e.g. G81 et al. (2022) or Wilson and Somhlaba (2016) have emphasized the importance of self-acceptance in promoting positive mental health and satisfaction with life. Research consistently shows that individuals who possess higher levels of self-acceptance tend to experience greater life satisfaction and happiness.

In exploring the correlation between the self-acceptance subscale and life satisfaction, studies by Zipagan and Galvez Tan (2023) or by Sharbafshaaer (2019) have consistently revealed a positive and strong association. This suggests that individuals who have a healthy self-concept, are comfortable with themselves, and accept their strengths and weaknesses tend to report higher levels of satisfaction with their lives. Self-acceptance plays a crucial role in fostering resilience, building positive relationships, and enhancing overall psychological well-being.

Understanding the strength of this correlation underscores the significance of promoting self-acceptance as a key component of interventions aimed at enhancing life satisfaction and overall well-being. Encouraging individuals to cultivate self-acceptance can have far-reaching benefits for their mental and emotional health, leading to a more fulfilling and satisfying life.

Based on the results, it can be said that students who like most of their personality traits are satisfied with their lives. It can also be argued that if students perceive their own control over the situations in which they find themselves, then they feel that their way of life matches their ideal. If the students feel that they are managing their daily responsibilities well, they express greater satisfaction with their lives.

The results of our research coincide with the results of Mehmood and Shaikat (2014), where they also found that self-esteem as a component of psychological well-being is strongly related to life satisfaction, or students with higher levels of self-esteem and low levels of depression had higher life satisfaction. Based on the results, the authors of the research claim that high self-esteem is a strong predictor of life satisfaction among young people, especially among women, who were the focus of their research.

Within the assumption A2, in examining the correlations between secondary vocational school students' psychological well-being and academic success, it was observed that correlations existed, although they were weak and lacked statistical significance. However, the most prominent correlation identified in the study was a weak relationship between the meaning in life subscale and academic success.

This correlation suggests that students who possess a clear sense of purpose and direction in life, as reflected in the meaning they derive from their experiences, tend to perform better academically. Those who are able to navigate the daily challenges of school and maintain a sense of purpose are more likely to achieve higher levels of academic success.

The findings underscore the importance of intrinsic motivation and personal meaning in driving academic achievement among secondary vocational school students. Having a goal or sense of purpose can provide students with the drive and determination needed to excel in their academic endeavours. By fostering a strong sense of purpose and meaning, educators and policymakers can potentially enhance students' academic

performance and overall well-being within the educational setting. Further research is warranted to explore the underlying mechanisms and implications of these correlations in the context of secondary vocational school education.

The correlation between psychological well-being and academic success has been a topic of interest in research and literature. Studies by Alarcon et al. (2016) and Suldo and Shaffer (2008) have shown that there is a significant relationship between these two factors, with psychological well-being playing a crucial role in determining academic performance.

Amholt et al. (2020) indicates that individuals with higher levels of psychological well-being, including aspects such as positive emotions, self-esteem, resilience, and a sense of purpose, are more likely to achieve academic success. Students who experience lower levels of stress, anxiety, and depression tend to perform better in school, as they can focus their attention and energy on learning and academic tasks.

Additionally, psychological well-being has been linked to factors such as motivation, self-regulation, and cognitive functioning, all of which are important contributors to academic success. Students who have a positive mindset, good emotional health, and effective coping strategies are better equipped to handle the demands of school and achieve their academic goals.

Overall, the correlation between psychological well-being and academic success is complex and multifaceted, with various psychological factors influencing educational outcomes. By prioritizing mental health and well-being, students can enhance their academic performance and overall success in school.

In comparison to the findings from our own research, a study by Droppa et al. (2018) highlighted that the correlation between psychological well-being and academic success can evolve as a child matures. This suggests that the relationship between these factors may vary over time, potentially influenced by factors such as changes in a child's school environment, transition from primary to secondary school, and increased academic expectations.

As children progress in their academic journey, they may shift their focus towards academic achievements, dedicating more time to studying, completing homework, and striving to excel in their educational pursuits, particularly during crucial transitions like preparing for high school. The intensification of academic competition among classmates during this period could result in divergent developments in psychological well-being and academic success.

The evolving nature of this relationship underscores the dynamic interplay between psychological well-being and academic outcomes, emphasizing the importance of considering developmental stages and transitions when exploring the impact of mental health on educational achievement. Further research is needed to comprehensively understand how these factors interact over time and influence a child's overall well-being and academic performance.

In assessing Assumption A3 regarding correlations between life satisfaction and academic success among secondary vocational school students, our research revealed a weak correlation between these variables, as measured by grade point average (GPA). Although this correlation did not reach statistical significance, it confirmed the presence of a relationship between life satisfaction and academic success, albeit weak.

Contrastingly, a study by Rode et al. (2005) and Droppa et al. (2018) identified a significant association between life satisfaction and academic achievement. Its findings indicated that individuals with higher life satisfaction levels tended to perform better academically, achieving higher school results compared to those with lower life satisfaction levels.

Moreover, other studies by Birknerová et al. (2013) and Ng. et al. (2015) highlighted a reciprocal relationship between academic success and life satisfaction. It suggested that academic achievements can influence future life satisfaction levels, while higher life satisfaction can positively impact subsequent academic success.

The contrasting results from various studies emphasize the complex and dynamic nature of the relationship between life satisfaction and academic success among students. While our research demonstrated a weak correlation, other studies have shown significant associations and bidirectional influences between these variables, underscoring the importance of considering multiple factors when exploring the interplay between well-being and educational outcomes.

Further research is necessary to elucidate the mechanisms driving these relationships and their implications for student well-being and academic performance.

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Primary Paper Section: A

Secondary Paper Section: AN, AO, AM

METACOMPREHENSION OF THE TEXT IN THE EDUCATIONAL PROCESS

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The article was prepared thanks to the support of the University Grant Agency (reg. no. V/17/2024).

Abstract: The aim of the presented paper is to analyse the issue of development of reading comprehension in the educational process, through the application of reading strategies that have a metacognitive character.

Keywords: Reading literacy, reading comprehension, metacognitive strategies.

1 Introduction

If our education system wants to keep up with a continuously changing society, progress and increase the efficiency in the education of learners, it is essential that it also innovates and modifies the approach to learning and teaching in the educational process. Emphasizing metacognition in education guarantees a high-quality and goal-oriented approach, to the development of learners' competences, which leads to gradually taken responsibility for their own learning, problem solving, including the use of appropriate learning strategies and the development of their critical thinking. It is unequivocally proven that metacognitive strategies are of great benefit to the learner, as they influence the development of both lower and higher cognitive processes, and metacognitively oriented teaching also determines the quality of reading comprehension and aids its development, which subsequently influences the level of reading literacy, that is necessary for the functioning of an individual in a society.

2 Reading Literacy and Reading Comprehension

Although we come across a number of definitions for the term literacy, in professional literature, they are relatively ambiguous. The reason is a different view of the skills that are generally associated with literacy. They do however have a common basis, forming reading, writing and thinking. Without them, literacy cannot develop under any circumstances.

We are convinced that every person should have such knowledge, skills and abilities, thanks to which he/she can communicate effectively (socially and technically), think critically and work creatively with the amount of information that consumes the contemporary world. He/she should be able to navigate in a complex environment, be flexible, able to accept changes, know how to work in a team and also use his/her time effectively.

We identify with the opinion of O. Zápotočná (2012), who states that if we want to talk about literacy as the ability to read and write, we must think of reading as a certain level of human thinking, its subsequent conscious "metacognitive" control and of writing as the meaning of a certain composition or structure of a meaningful whole.

Reading literacy is perceived by several authors identically (Kašiarová, N., 2011; Džáčovská, S., 2016; Geske, A. – Ozola, A., 2008; Kendeou, P. et al. 2016;) as the competence to understand written text, which is applied within written and linguistic forms with a discourse value for the individual as well as for the society. This competence includes understanding the expressed information, searching for it, integrating and interpreting it, as well as drawing conclusions, examining and evaluating the content, language and individual elements of the text.

The authors A. Muličáková - T. Ustohalová (2015) understand the term reading literacy as the complex development of reading

skills necessary for effective work with text. If the reader consciously handles and uses the acquired reading competences (which enable him/her to work with different types of texts), he/she can progressively develop his/her own reading literacy. The term reading literacy is also defined in the National Strategy, specifically in the PIRLS and PISA literacy studies - international measurements of the educational results of OECD countries. They place particular emphasis on the functional nature of reading, the purpose of which is the rapid acquisition and efficient processing of information from various texts.

According to the PIRLS literacy study, which focuses on the reading literacy assessment of 10-year-old learners, reading literacy is "*the ability to understand the forms of written language required by society and/or individuals and to use them. Young readers can derive meaning from a wide variety of texts.*" The study examines three aspects of reading literacy, namely *comprehension processes, reading goals, and reading habits and attitudes.*

A higher form of reading literacy presents the PISA programme, which is aimed at evaluating 15-year-old learners. In this definition, it is not only a matter of deciphering or understanding the text, but it also includes the understanding and subsequent use of the obtained information for functional purposes. Reading literacy is understood here as "*the ability to understand the text read, think about it and use it to achieve one's own goals, to develop one's own knowledge and potential, and to actively participate in society.*"

In the stated definitions, the investigated components are measurable and can generally be tested. This testable area implies three aspects of reading literacy, namely *information acquisition, information production, and text evaluation.* However, reading literacy generally includes non-testable components that are no less important in the process of its development. These are social and affective elements, the attitudes and values of the individual (National Education Strategic, 2016).

On the basis of the studied professional literature, we conclude that the main goal of developing reading literacy should be primarily a reader who can effectively work with the acquired reading skills to such an extent that he/she can decipher diverse texts used for different purposes. In order to achieve these complex skills and the expected level of reading literacy, it is not enough to practice and develop them only in Slovak language classes. It is necessary that they be systematically developed in all other classes as well.

There is no doubt that reading literacy has an irreplaceable position within the educational process. It is through this literacy that learners gain, acquire and remember information from various fields of education, which can subsequently develop other types of functional literacy. Importantly a necessary condition is the activity of the learner himself/herself, who becomes a processor of textual information.

According to K. Tyson (In Sigmundová, A., 2019), reading comprehension is a process in which the reader creates the meaning of the text based on the interaction of information from the text and their own knowledge, during the reading itself, as well as before and after reading. The given definition corresponds to the construction-integration model of the text comprehension process developed by T. A. van Dijk (2012), according to whom it takes place in two phases:

1. *constructive* (the reader constructs the meaning of the text based on information from the text);
2. *integrative* (the reader integrates this meaning into his/her own knowledge and internal knowledge structure).

Since we lean towards the constructivist paradigm within the educational process, we consider it necessary to develop reading literacy among learners of younger school age, precisely through higher levels of understanding in all subjects in which learners work with textual information.

2.1 Metacognition in the Educational Process

Metacognition generally represents a certain extension of human thinking, it is knowledge about how we think, what we know and don't know. The word meta represents a higher way of thinking, reasoning and a certain perspective, the term *cognition* denotes comprehension (Říčan, J., 2017). Metacognitive thinking in itself implies thought processes related to a person's own cognitive processes, but at the same time planned, controlled, consciously used and evaluated thinking (learning, knowing).

The goal of *metacognitively oriented teaching* is to bring learners closer to the content and process of their own thinking, to support them in thinking about how and why they think in this way, in order to adjust their thoughts and actions to achieve a goal (be it their own or within learning). V. Lokajíčková (2014) talks about the principles of the metacognitive approach in the form of the WWW&H rule (What to do, When, Why, How). On the basis of the above, we conclude that *metacognitively designed teaching* should focus more attention on the course and processes of learning and thinking rather than only on the results of thought activities.

H. Haywood (In Kovalčíková, I., 2018) into the cognitive output of education includes in addition to the acquisition of certain educational content, the internalization of higher forms of thinking and metacognitive strategies, as well as the streamlining of elementary cognitive functions that participate in cognitive processes.

Metacognition also plays a big role in individual reading processes. By working with the text, learners can develop their *metacognitive skills*, improve their ability to understand the text, which helps them to remember better. In the course of reading, it is necessary that the reader perceives the content of the text all the time and monitors whether he/she understands the text. He/she should evaluate, reflect on his/her actions and use procedures that ensure his/her own understanding. As part of the development of reading literacy through the practice and application of metacognitive strategies in the educational process learners become excellent readers who are able to work with any text in all subjects. They think about their own way of thinking, learning and can:

- *develop a deeper understanding of the text* (use different methods in relation to problem areas, choose the right ways to solve the problem);
- *solve tasks requiring higher thought operations* (offering opportunities to present one's own opinion, requires learners to argue, to use creativity, to think critically and to participate in group learning);
- *connect topics in school assignments with real-life problems* (guide learners to use the acquired knowledge in their personal lives).

According to V. Najvarová (2010), a skilled reader with developed metacomprehension manifests himself/herself by isolating information, possibly marking it in the text, expressing relationships between information, arranging information according to criteria, graphically representing, reproducing and interpreting the text, creating questions about the text and answers them, evaluates the content of the text, using previous knowledge. In case of confusion, he/she stops reading and thinks about what has been read so far. He/she then reads the text again and looks for answers to his/her questions about the given text. All the time, he/she reevaluates and checks the information, forms his/her own opinion about the text. A weak reader, a reader who does not have a developed meta-understanding,

cannot regulate his/her own reading and is often dependent on the trial and error method.

In connection with the above we must unfortunately point to the results of research that confirm deficiencies in the field of processing information from the text, e.g. lack of orientation in the text, inability to work with the text as a meaningful source of knowledge, etc. Metacognitively oriented reading strategies serve to eliminate these deficiencies, which help the learner to orientate himself/herself in the content of the text, mobilize and organize his/her own cognitive activity. When reading and understanding the text, as part of the educational process, it initially involves the systematic support of the teacher, who acts as a facilitator. It is he/she who creates the conditions for the choice of adequate, effective and preferred strategies, presents current, model situations - motivating learners to practice the necessary strategies. In order for metacognitive reading strategies to become an effective means of reading comprehension for the learner, it requires the teacher to have certain knowledge about strategies (Magulová, J., 2008).

According to L. Whitcroft (2010) but also H. Kūčukoğlu (2013) reading strategies are specific procedures that the reader consciously uses when reading and are helpful to better understanding the text. The authors point out that teachers often mistakenly believe that learners will acquire strategies (like reading skills) automatically. In some cases, with more skilled readers, this can happen, but there are also learners who need guidance on acquiring the appropriate strategy.

Reading strategy can become a skill over time, after correct, sufficient and systematic practice. The goal of developing metacognitively oriented strategies is their automation and proper use in various reading and learning situations.

The most frequently used *reading strategies* with a focus on improving the level of metacomprehension of the read text in the educational process, and at the same time the most frequently published in professional publications, are: SQ3R, SQ4R, PQRS, MURDER, KWL, think-along strategy, T. E. Scruggs procedures, cognitive activity pattern method, 3-2-1 Procedure, 5-4-3-2-1 Procedure, Look - Ask - Read - Answer - Repeat, Cinquain, Read - Imagine - Paraphrase - Slow/Speed Up, Concept Map, Create a Text Summary, PRAISE, RISE, EUR strategy, PLAN, RAP, INSERT.

In conclusion we add that in order for learners to learn to work independently with the text (using metacognitive reading strategies), they must go through a certain process, the essence of which is based on the procedural aspects of reading - as a strategic and mental activity that can be purposefully managed, monitored and regulated. Unfortunately, we have to state that this particular area penetrates into our education system only sporadically.

3 Empirical Part

Learning from texts and reading with comprehension is a very common teaching and learning situation, which is an irreplaceable component in the educational process, as well as in everyday life. Despite this, we think that the school does not fully utilize its potential and possibilities in this issue. We still dominantly encounter frontal work with texts (primarily with the textbook), literal reproduction of the text - regardless of the learners' reading level, disrespect for learners' experience with reading and working with texts, insufficient development and use of reading strategies, absence of development of learners' critical thinking...

Authors S. Nash-Ditzel (2010), Y.-F. Yang (2006), M.-R. Ahmadi et al. (2013) unequivocally prove that it is much more effective if learners are guided explicitly, purposefully, and especially systematically to acquire reading skills in the educational process. We believe that by the systematic practice of selected metacognitively oriented reading strategies, we will

support the development of individual cognitive processes that affect the level of understanding of the read text.

When determining the relational research problem *how will applied reading strategies with a metacognitive character affect the level of text comprehension among learners* - we begin with the current educational conditions in which learners are not systematically guided to use individual reading strategies that develop metacognitive processes, aimed at increasing level of comprehension of the read text. On the basis of the implementation of metacognitively oriented reading strategies within the educational process, this strategy can be used to develop understanding of the text within the reading process. We established the following research hypothesis:

H: We assume that learners who have worked with metacognitively oriented reading strategies as part of the educational process will achieve a statistically significantly higher level of understanding of the text than learners who have not worked with metacognitive reading strategies.

The sample consisted of learners of the secondary level at the elementary school in Nitra. There were two classes of the 6th grade, with a total number of 30 learners (there were 15 learners in each class).

Since we implemented a quasi-experiment with the learners, by the pretest and posttest we developed a cloze test (of our own construction). In the *experimental group*, as part of the educational process, we implemented reading activities with the application of reading strategies with a metacognitive character. In the *control group*, teaching was carried out in the traditional manner, in a so-called transmissive way (working with the textbook, working out standard exercises from the textbook, discussing the read text). This means that metacognitive reading strategies were not applied in the control group and the educational process took place without intentionally implemented changes. The research was carried out during *English language and literature* lessons. At the beginning of the experiment, both groups participating in the research were equal in terms of age, method of teaching, achievement, etc.

To determine the level of understanding of the read text, we chose the *cloze test* battery within the control and experimental groups (its essence lies in the cognitive effort that the reader must make to understand the context of the read text). To achieve understanding by completing individual words, it is necessary to know the meaning of the surrounding words, to understand the meaning of the whole sentence and the relationships between them. For the needs of the conducted research, we constructed our own cloze test, while complying with all the required criteria, considering the age group of our respondents. The test consisted of 250 words of natural text, with 35 words omitted. Every fifth word was omitted. The maximum number of points achieved in the final test was therefore 35 points. The time limit for preparing the pretest was 40 minutes. When evaluating the learner's performance in the cloze test, we took into account the number of correctly completed words from the total number of omitted words in the text (it had to make sense in the sentence, so it had to be appropriate in terms of meaning and grammar). In order for the assessment to be objective, we prepared in advance the criteria, a list of words - synonyms, with which learners could fill in the missing words in the test.

In our research, we used the quasi-experiment method, aimed at verification of the effectiveness of reading strategies with a metacognitive nature in connection with improving the level of comprehension of the read text. Individual activities in the experimental group with the application of reading strategies with a metacognitive character (in reading, they represent individual steps taken by the reader in order to really understand the read text, e.g.: determine the purpose of reading; anticipate what the text will be about; remember what he/she knows about the topic; he/she goes back to a certain passage in the text or slows down the reading; he/she looks for the answers,

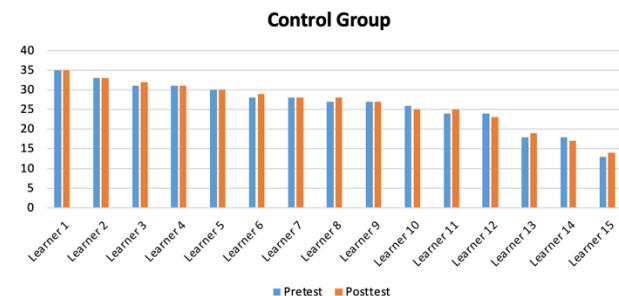
etc.) were planned for ten lessons in the English language and literature.

Our main intention within the framework of applying reading strategies, was to explicitly explain and teach learners the procedure, how to think about the read text, what to emphasize in the reading process. Since the purpose of training reading strategies with a metacognitive character in the experimental group was to gradually transfer the responsibility for working with the text to the learner, we tried to thoroughly explain learners *what* the chosen strategy *is about*, *why* is it important to master the strategy, *how* is it specifically used and *when* is it appropriate to use it. We used *the think-along strategy* and *the cognitive activity pattern method* to describe individual steps of the metacognitive processes.

During the lessons we focused our attention *on work with the text and application of reading strategies* that are proven in practice. We have selected those strategies that appear to be effective, especially in the initial stages of practicing strategies before, during and after reading. These were strategies of *prevision* (making predictions about the next part of the text), *orientation in the text* (3-2-1 reading strategy, text with mixed sentences, creating headings for parts of the text), *summary* (clarifying unclear parts of the text, unknown words), *visualization* (using a concept map to the story). At the same time, we used *questions* in every lesson, during the entire reading. So, in different stages of reading, with different goals (for levels of understanding), as well as for verifying and activating the learners' previous knowledge or experience.

3.1 Data Interpretation

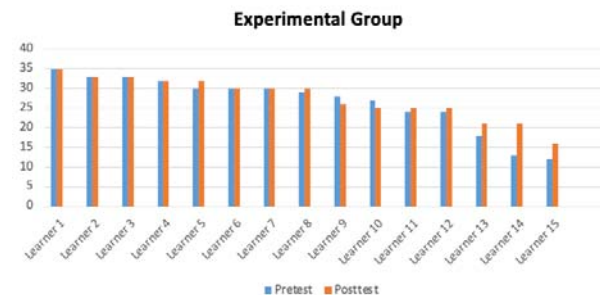
In graph 1 we present the total score of the control group respondents, which was achieved in the pretest and posttest by working out the cloze test.



Graph 1. Pretest and Posttest – Control Group

In graph 2 we present the total point score of the experimental group respondents, which they achieved by completing the cloze test.

Graph 2 Pretest and Posttest – Experimental Group



By evaluation and comparison the results of the pretest of the experimental and control groups, we found that both groups performed approximately equally well in the pretest. The

average value of the correct answers of the experimental group was 26.53 points and the control group 26.20 points. The difference between them was therefore 0.33 points, which represents 0.95% of the total number of points in the final test. This result is not statistically significant. Because of this it was determined that the experimental and control groups were equal at the beginning of the experimental investigation.

By evaluating the results obtained by developing the posttest in the experimental and control group, we found that the experimental group achieved statistically significantly better results, compared to the control group. The average value of correct answers in the point evaluation of the experimental group in the post-test increased from 26.53 points to 27.60 points. We also noticed a shift in the control group, from 26.20 points to 26.40 points. It follows from the above that even though there was a partial shift in the posttest in both groups, this shift was more significant in the experimental group, i.e. up to 1.07 points, while in the control group it was only 0.20 points. The difference between them was 1.2 points, which represents an improvement from 0.95% to 3.43% of the total number of points in the posttest. We conclude that the practice of reading strategies with a metacognitive character within the educational process led to significant changes, i.e. in the shift in understanding in the area of reading, after the completion of the cloze test by the experimental group. The differences and comparison of the results of individual groups are presented more clearly in Table 1.

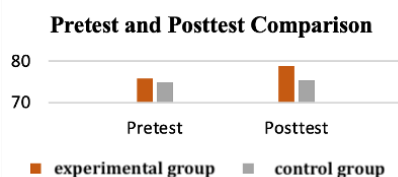
Table 1: Pretest and Posttest - Cloze Test Comparison

	<i>Experimental group</i>	<i>Control group</i>	<i>Difference EG-CG</i>
<i>Pretest</i>	75.81	74.86	0.95
<i>Posttest</i>	78.86	75.43	3.43
<i>Pretest - posttest difference</i>	3.05	0.57	

The results we achieved through research prove that by applying and practicing reading strategies as part of the educational process, the experimental group achieved better results in the posttest – cloze test than the control group. The average point difference between the groups was 1.2 points, which represents 3.43% of the total number of points. Based on the comparison of the input and output values of the pretest and posttest in the cloze test of individual groups, we noted a shift of the experimental group by 3.05% compared to the control group, which improved by only 0.57% compared to the pretest. Based on these results, we can conclude that the application and systematic training of reading strategies in the educational process, developing metacognitive processes in reading, influence the understanding of the read text.

The results obtained in the pretest and posttest (by means of the cloze test of both groups) were also shown in graph 3 for a better orientation, where we can clearly see the shift of the experimental group compared to the control group. It is a percentage expression of the results of both groups.

Graph 3: Pretest and Posttest Comparison - Cloze Test



Based on the above results, we can conclude that the experimental group improved the understanding of the read text. We attribute the stated results and positive impact to the application of reading strategies with a metacognitive nature into the educational process, which involve planning, tracking, monitoring and managing one's own cognitive processes while

reading. In the posttest, learners among whom we applied reading strategies with a metacognitive nature to the learning process achieved a statistically significantly higher level of understanding than learners for whom reading strategies with a metacognitive nature were not applied, which confirmed the established hypothesis.

4 Conclusion

The development of metacognition and the implementation of metacognitive strategies into the educational process guarantees a simpler, better quality and more effective way of teaching. From the metacomprehension point of view and the use of metacognitive strategies in reading, it is within the competence of the teacher not only to teach learners to read, but also to understand what they read. The teacher should turn the lessons into opportunities for learners to think about what they have read, in what way, if and how they understood the text, which includes all stages of reading and learning.

We are convinced that it is necessary to focus (while working with the text) not only on the mechanical practice of reading, but on the systematic use of new reading strategies in each subject. Thanks to them, learners think about what they have read, i.e. about how to process the received information, what to do when they do not understand the information. We believe that by knowing and applying various metacognitively oriented reading strategies, learners can critically evaluate the information they receive, adopt their own attitude and opinion on any text, and use the information they receive appropriately in real life.

Literature:

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Primary Paper Section: A

Secondary Paper Section: AM

THE IMPACT OF THE NUMBER OF DOCTORS ON HEALTH INDICATORS AND THE SUSTAINABILITY OF THE HEALTHCARE SYSTEM

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This research was funded by the Slovak Ministry of Education's Scientific grant agency VEGA: VEGA 1/0691/22 Economic aspects of emigration of university graduates in health care departments in the context of the sustainability of staffing of health care facilities in the Slovak Republic.

Abstract: Health workforce shortages, particularly in the profession doctor, affect the availability and quality of health care, which has a direct impact on population health indicators. The main aim of the study is to determine the impact of workforce in the profession of doctor in the healthcare sector on selected indicators of the health of the population. At the same time, evaluate the state and structure of human resources in the healthcare sector. By collecting secondary data from the OECD and NCZI statistical databases on the number and structure of doctors, followed by mathematical and statistical processing and interpretation of the results, the aim is to propose a model of the relationship between the availability of doctors and indicators such as preventable and avoidable mortality, life expectancy, healthy life years, years of life lost, number of consultations with a doctor, capacity of health care beds, and health expenditure as a share of GDP. We then evaluate the state and structure of human resources in the healthcare sector in Slovakia, Czech Republic, Austria, Germany, the UK and Norway. The results of the study show that the number of doctors strongly influences health indicators such as healthy life years or health expenditure, and is closely linked to migration and the number of graduates. The study provides evidence for policies aimed at retaining doctors in the country, improving working conditions and systematic human resource planning in the healthcare sector.

Keywords: Doctors, Health Indicator, Healthcare Capacity, Human Resource in Healthcare, Migration of Doctors, Systematic Human Resource Planning

1 Introduction

The global shortage of health workers is one of the major challenges facing health systems worldwide (Oda et al. 2018; Scheffler et al. 2019; Jin & Chen, 2023; Giraldo-Santiago et al. 2024; Ulupinar et al. 2024). The solution to this crisis lies in finding new sources of workforce, while two main sources are education and training of graduates of health professions and migration of already prepared workers from abroad. Health workforce planning is a key task, complicated by the increasing demand for health services (Oda et al. 2018; Stokes et al. 2021) in the context of demographic changes, rising living standards or migration flows dynamics (Calenda et al. 2019; Kamau et al. 2023).

Within the European Union, the free movement of labour is regulated by Directive 2005/36/EC, which guarantees the recognition of professional qualifications between Member States (Domagała et al., 2022). However, this mechanism creates a paradoxical tension between Eastern and Western European countries, as migration flows of health professionals are mainly directed from countries with lower per capita income in the East to countries with higher income in the West. As a result, inequalities increase. Inadequate numbers of health workers needed to ensure the provision of quality health care lead to a reduction in the quality of health services provided, reduced accessibility and increased costs of health services, which has a negative impact on the overall health of the population (Chikanda, 2024). At the same time, countries of origin face a significant loss of financial resources invested in the education and training of potential health workers (Quamruzzaman, 2020). If they decide to migrate to work abroad after completing their training, the investment becomes a loss (Poku et al., 2023; Bezuidenhout et al., 2009). At first glance, it may seem that host countries only benefit from the acquisition of skilled personnel without incurring the costs of their education, but their successful integration and adaptation to a new professional and cultural environment requires additional investments (Popescu et al., 2024), which are considerably lower.

Despite these challenges, there has been a dramatic increase in the recruitment of health professionals from Eastern European countries to Western European countries, suggesting the need to develop comprehensive strategies to mitigate the negative

consequences of migration. The exploration of this issue has attracted the attention of the professional community for more than three decades (Brommels & Jaaskelainen, 1984; Dubois et al., 2006; Ono et al., 2013; Malgieri et al., 2015).

This study focuses on the analysis of the consequences of the migration of health workers in the medical profession, who represent key human resources in terms of performance in the context of health care delivery. After defining the research problem and its background, the article describes a general model of the consequences of understaffing in health care facilities, paying attention to the objective and the methods used to achieve the stated goal. The final section presents the results, discussion, some limitations and possibilities for further research into the problem.

2 Literature review

The health workforce can be considered central to the performance of the health care system (Dussault & Dubois, 2003) and thus to the overall health of the population, as the available range and quality of health services depends to a large extent on the number, skills, knowledge, competencies and attitudes of the workforce (Domagała & Klich, 2018; EC, 2019; Róž, 2020). According to the World Health Organization, one of the essential functions of health care is to invest systematically and strategically in the creation of human resources (WHO, 2000). Human resources in healthcare can be defined as the clinical workforce. Their education and training are key investment tools to create human resources in the right numbers and structure, with emphasis on the required knowledge and skills, according to current needs, but also within the range of future needs. This is the responsibility of public policy makers because, in the short term, the health sector can only use the human resources that have been created in the past. And because investments in education are long-term, they must be carefully planned and systematically implemented (Róž, 2020).

The determinants of the healthcare workforce are divided into external: ageing population, changing healthcare needs, migration patterns, technological innovation, and internal: ageing workforce, recruitment and retention, regional redistribution and underdeveloped skills (EC, 2019). The workforce, and in particular the clinical part of human resources, is central to the performance of the health system. The number and structure of its knowledge, skills, abilities and competences determine the availability and quality of healthcare provided, which overlaps with the overall health of the population (Domagała & Klich, 2018; Folland et al., 1993). Almost all countries in the European Union are facing a shortage of health workers (Crisp, 2017; Kroezen et al., 2015). The shortage of health workers is cumulative with the problem of inadequate competencies in the face of changing population health needs (Sarkis & Mwanri, 2013), as demonstrated by the Covid-19 pandemic. Both the World Health Organization and the Organisation for Economic Co-operation and Development provide evidence that improved access to high-quality, efficiently delivered health services that meet the needs of the population can lead to improved health indicators and sustainable economic development (WHO, 2014; OECD, 2016).

Health workforce planning is therefore a key element in addressing the problem. Migration of workers from abroad is one source of labour, as evidenced by the global increase in recruitment of health workers from abroad (Eaton et al., 2002). The outflow of health workers has far-reaching consequences for the country of origin, in the form of worsening population health indicators, reduced sustainability of the workforce, increased migration of health graduates, or loss of funds invested in education and training for the profession. Research has been mapping the consequences of health worker brain drain for several decades (Beine et al., 2008; Mills et al., 2008;

Bezuidenhout et al., 2009; Malgieri et al., 2015; Quamruzzaman, 2020; Poku et al., 2023). Countries of origin should focus on retaining workers and building resources through graduates.

3 Materials and Methods

The main aim of the study is to determine the impact of workforce in the profession of doctor in the health sector on selected indicators of the health of the population. At the same time, evaluate the state and structure of human resources in the healthcare sector.

Based on the analysis of relevant scientific studies registered in the Web of Science and Scopus databases to identify the research problem and the current state of issue. Collect secondary data from the OECD and NCZI statistical databases on the number and structure of doctors and then process them using mathematical and statistical methods, interpret the results and propose a model of the impact of doctors workforce on selected population health indicators (preventable mortality, avoidable mortality, life expectancy at birth, healthy life years, years of life lost, consultations with a doctors per capita per year, number of beds in health facilities, health expenditure as a percentage of GDP).

Descriptive statistical methods were used in the study, and correlation analysis, regression analysis and multi-criteria logistic regression were used to examine the relationships identified. In the next step, the potential resources of the workforce in the profession of doctor are analyzed with the calculation of losses on state expenditures for education and training for the profession of doctors in the Slovak Republic.

4 Results

Based on the results of the analysis of the current state of the issue, it was found that the inadequate workforce of the health sector has an impact on the quality of health services provided and thus the overall health of the population. In particular, clinical human resources, especially in the profession doctor and other health professions, have a direct impact on the performance of health services. According to the system of professions, the role of a doctor is health promotion, prevention, early and rapid diagnosis, differential diagnosis, comprehensive treatment, dispensary care and other care (National System of Professions of the Slovak Republic).

The study identifies doctors as the clinical human resources with the most significant impact on health service delivery in the context of population health. It can then be reasoned that the number and structure of doctors employed in health facilities in a country has an impact on performance as measured through health indicators: Avoidable and preventable mortality, years of life lost (the number of years that a person would have been active if their health or death had not been impaired), life expectancy at birth and number of years lived in health (perception of the health of people aged 65 and over), number of consultations with a doctor per year per capita, number of beds in institutional health facilities, and the health system: health expenditure measured in purchasing power parity in Euros per year as a share of gross domestic product. In the case of human resources, the potential workforce is also considered, which can be included in the workforce planning for the health sector, which is measured not only by the number of doctors practicing their profession, but also by the number of graduates and migrated doctors who can return to their country of origin. We also include in this category doctors employed in medical facilities whose country of origin is different.

In the first step, a correlation and regression analysis of human resources - doctors and graduates - was carried out, with the dependent variable being the number of doctors employed in health care institutions in Slovakia and the independent variables being the number of doctors who left for work abroad and the number of graduates of general medicine. As a deeper analysis of the number of graduates revealed that the year-on-year

increase was driven by the number of graduates of foreign nationality, this variable was supplemented by the number of graduates with Slovak citizenship. After conducting a normality test using the Shapiro-Wilk test, it was found that the data in all categories had a normal distribution. Table 1 shows the results of the correlation analysis carried out on the basis of Pearson's coefficient.

Table 1 Correlation analysis (Pearson's coefficient) for the period 2004-2022

Variable	Number of doctors		Statement
	Correlation coefficient - r	P - value	
Number of doctors, who left - migrants	0,925	< 0.001	strong positive correlation
Number of general medical graduates	0,820	< 0.001	strong positive correlation
Number of general medical graduates with Slovak citizenship	0,582	0,009	moderately strong positive correlation

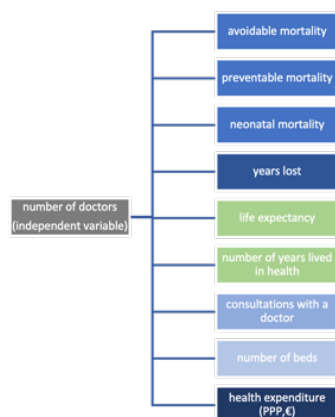
Source: authors' own processing based on OECD and NCZI data

85.6% of the variability in doctor migration is explained by the number of doctors, with a p-value of less than 0.001, showing that the greater the number of doctors in the health system, the more migration increases. The above is confirmed by the results of the research on migration of Slovak doctors to work abroad carried out within the APVV 19-0579 project Setting.... (Tupá, 2024). The causes reveal doctors' job dissatisfaction with material and technical equipment, with the management and performance of personnel activities, but also with the situation in the country or the prestige of the doctor's profession.

The variability of general medical graduates shows an explainability level of 67.2%, with a p-value of less than 0.001. Although there should be an almost perfect correlation between general medical graduates and the number of doctors, the results suggest that this is not the case. This is consistent with the results of a survey of medical universities, which suggest that the propensity for graduates to migrate is greatest among medical graduates. Indeed, they say that one in ten graduates go abroad for work after completing their education and training. Based on NCZI data from 2004 to 2022, the latest year available, the number of graduates with Slovak citizenship is declining very rapidly. In 2004, one out of ten graduates was a foreigner, while in 2022 it was already four out of ten. For this indicator, the variability of explainability is only 33.8% at a p-level of 0.009. The relationship is statistically significant, but with only a moderately strong correlation, suggesting a significant role of graduates in migration, but other factors such as legislation, the setup of the education system or the demand for education in foreign universities are also important.

In the next step, the impact of the number of doctors (clinical human resources) on selected indicators of health and the healthcare system was investigated.

Figure 1 Impact of clinical human resources (number of doctors) on performance through selected health and healthcare system indicators



Source: authors' own processing

Multicriteria logistic regression was used to examine the impact of clinical human resources on selected health and healthcare system indicators. The number and structure of dependent variables were adjusted. Avoidable mortality, preventable mortality and neonatal mortality, these indicators are highly correlated with the indicator of years lost, which is based on them. Similarly, the perception of the number of years lived in health is reflected in life expectancy. The life expectancy variable enters the model because employees working in the health sector do not feel healthy but continue to work. The other variables remained unchanged and showed no multicollinearity. After adjusting for the composition of the variables, the VIF values ranged from 1 to 9. Subsequently, the normality of the data distribution was verified through histograms, which indicated that the residuals were normally distributed. Another test was used to examine the variance of the residuals, verification was done using the Breusch-Pagan test for homoskedasticity. The results say that the residuals are homoskedastic, which means that the error variance is constant and the assumption of homoskedasticity is satisfied. After verifying the conditions for using multicriteria linear regression, we subjected the data to the actual analysis.

Table 2 Results of multicriteria logistic regression of the impact of clinical human resources on selected performance indicators for the period 2004 to 2022

	Coefficient	Intercept	R-squared	Statement
The lost years	-0.413303	14876.599485	0.330	moderately strong relationship
Average life expectancy	0.007040	63.049590	0.429	moderately strong relationship
Consultation with a doctor	-0.000080	12.612209	0.063	weak relationship
Number of beds	-0.000330	12.186028	0.699	strong relationship
Health expenditure	0.000143	4.517351	0.148	weak relationship

Source: authors' own processing based on OECD and NCZI data

The results presented in Table 2 show that the number of doctors has the strongest effect on the number of beds in health facilities ($R^2 = 0.699$), implying that the greater the number of doctors working in a country's health system, the fewer the number of beds that will be operated by health facilities. We can assume that a higher number of doctors will result in better access to health services, which will positively affect the health status of patients, and therefore there will not be a need for as much inpatient health care as is currently the case.

There is a moderate positive effect of the number of doctors in relation to life expectancy at birth ($R^2 = 0.429$), which implies

that a larger number of doctors will translate into an increasing life expectancy at birth. The number of doctors is also moderately but negatively related to the years lost ($R^2 = 0.330$) due to deteriorating health status and increased mortality (preventable, avoidable and neonatal), i.e., that if the number of doctors increases, the number of years of potential economic activity lost will decrease. Weakly related to the number of doctors are the indicators of consultations with a doctor ($R^2 = 0.063$) and government spending on health measured in purchasing power parity in Euros ($R^2 = 0.148$).

Multicriteria linear regression equation:

$$\text{Number of doctors} = -29130 + 0.007 \times \text{Life expectancy} - 0.4133 \times \text{Years lost} - 0.00033 \times \text{Number of beds} + 0.00014 \times \text{Health expenditure}$$

The equation states that:

- for life expectancy at birth to increase by one year, the number of doctors needs to increase by **0.007 units**,
- if the number of years lost increases by 1 unit, the number of doctors is expected to decrease by about **0.4133 units**,
- if the number of beds increases by 1 unit, the number of doctors is expected to decrease by about **0.00033 units**,
- if health expenditure increases by 1 unit, the number of doctors is expected to increase by **0.00014 units**.

The third step was to recalculate the lost training costs of doctors who migrate abroad for work after graduation. We rely on the available OECD data presented in Table 3. The expenditures are reported not only for Slovakia, but also for the destination countries of the outgoing doctors and general medical graduates. The aim is to show the differences in the cost of study and thus the differences in the loss of public resources invested in the education of medical students, but also the benefits of the destination countries.

Table 3 Annual expenditure per student from primary to tertiary education in Euros, converted in purchasing power parity to GDP

	Pre-primary pupil/year	Primary pupil/year	Secondary pupil/year	Tertiary pupil/year
Slovakia	7 348,42	9 251,58	8 647,06	15 567,42
Czech Republic	8 378,28	7 998,19	12 814,48	16 320,36
Austria	11 676,02	13 950,23	17 238,91	22 419
Germany	12 991,86	11 609,95	15 454,3	19 904,98
United Kingdom	8 265,16	12 485,97	13 270,59	30 608,14
Norway	18 103,17	16 323,08	17 946,61	23 920,36

Source: OECD Education at Glate

Education in Slovakia lasts three years as part of pre-primary education, four years of primary education itself, five years of secondary education at the 2nd level of primary school and two years of secondary education at high school. Completion of secondary school is a prerequisite for university studies in the field of general medicine, which takes at least 6 years in Slovakia. Table 4 shows the recalculation of state expenditures on education at individual levels.

Table 4 Recalculation of state expenditure on medical education at each level

Education	Pre-primary	Primarily	Secondary	Tertiary		
				B. Sc. (in Slovakia Bc.)	M. Sc. (in Slovakia Mgr.)	M. D. (in Slovakia MUDr.)
Slovakia	22 045,25	83 264,25	43 235,29	46 702,26	77 837,1	93 404,52

Source: authors' own processing

It costs the country 267 354 € to educate a doctor with a doctorate degree, which represents a direct loss. Assuming a graduate age of 24-26 years, with a retirement age of 64-66 years, each graduate will work for a minimum of 40 years and add value. The gross value added created in the health sector in 2023 was 4252.2 million € for 118,363 persons working in the health sector. The average value added created in the health sector per person per year was 35 925 €. Then, the return on funds spent on education from the state is 7.44 years of work of

a doctor after completing education and training for the profession.

5 Discussion

The findings of the study show that inadequate workforce of the health sector has a significant impact on the quality of services provided and the overall health of the population. The correlation between the number of doctors and selected indicators of health and the health care system suggests that a greater number of doctors leads to improvements in key health parameters such as life expectancy, healthy years of life and a reduction in years of life lost with spillovers to preventable, avoidable and neonatal mortality. This trend is consistent with previous research, which suggests that the presence of more doctors in the health care system has a positive impact on the health of the population (Rój, 2020; Dussault & Dubois, 2003). The findings are consistent with work that identifies medical personnel as a key factor in achieving higher quality health care. According to WHO (2000) and OECD (2016), systematic planning of human resources is a key tool for improving health care systems, because the effective use of these resources contributes to improving the availability and quality of health care services. On the contrary, the shortage of medical personnel has led to limited availability of services, reduced quality of care and increased costs of the health care sector (Chikanda, 2024).

This study also confirmed the strong impact of doctor migration on the availability of medical staff. The positive correlation between the number of doctors employed in Slovakia and the number of doctors who left Slovakia to work abroad indicates that countries with more doctors face a higher outflow of these specialists abroad. The finding is supported by works that point to factors such as low salaries, job dissatisfaction, poor working conditions and the prestige of the medical profession as the main drivers of migration (Beine et al., 2008; Malgieri et al., 2015). This trend is consistent with previous research on the migration of healthcare workers from lower-income countries to higher-wage countries, leading to widening inequalities between Eastern and Western Europe (Domagała et al., 2022).

On the other hand, the analysis shows that even if a higher number of doctors improves some indicators, not all independent variables show a strong correlation with the number of doctors. For example, indicators such as doctor's consultations and health care expenditures show a weaker relationship with the independent variable under investigation. The above indicates that these indicators are influenced by other factors, such as political decisions, technological development or the quality of public policies (Kamau et al., 2023; Stokes & Iskander, 2021; Tupá, 2024).

The influence of the number of doctors on health indicators is closely linked to other factors, such as the number of beds in medical facilities and health care expenditures. The strong negative correlation between the number of doctors and the number of beds suggests that an increased number of doctors can improve the efficiency of the system, thereby reducing the need for more hospital beds. Here, it is possible to observe the agreement with previous findings on the efficiency of the use of health resources (Folland et al., 1993).

6 Conclusion

The results of the study suggest that the number of doctors has a significant impact on various indicators of population health and health system. An increase in the number of doctors is associated with an increase in healthy life years and health expenditures, while an increase in the number of beds and years lost lead to a decrease in the number of doctors. This model provides valuable tools for analyzing the factors influencing doctors numbers in different regions and time periods, showing how the availability of doctors capacity directly affects effective health care. The analysis of the number of doctors in the context of migration and general medical graduates has shown a close correlation, with the identified relationships providing important evidence for the

development of strategies to improve conditions in the Slovak health sector and reduce the outflow of professionals abroad. Based on the findings, policies can be designed to improve working conditions for doctors, to increase incentives for retention, and also to systematically plan human resources in the health sector with an emphasis on maintaining a long-term balance between supply and demand for health professionals.

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Primary Paper Section: A

Secondary Paper Section: AE, FQ

THE EMERGENCE OF POSTMODERN TRENDS IN THE LITERATURE OF SOCIALIST REALISM (EARLY ANDREY BITOV)

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The study was supported by a grant from the Russian Science Foundation № 23-18-01007, <https://rscf.ru/en/project/23-18-01007/>; F. M. Dostoevsky Russian Christian Humanitarian Academy

Abstract: The purpose of the article is to examine the beginning of the emergence of postmodern trends in Russian literature in the 1960s and 1980s and, using the example of Andrei Bitov's short story "Penelope", to show how the traditional theme of love underwent a gradual transformation at the end of the twentieth century. The article shows how the theme of love, which previously served as a condition for revealing the moral and ethical potential of the male protagonist in Russian and world literature, began to lose its distinct real features in postmodern prose and turn into love-mirage, love-illusion. The analysis revealed that Andrei Bitov was one of the first Russian postmodern writers in modern prose who identified and demonstrated new components of the love theme.

Keywords: Andrei Bitov; postmodernism; the theme of love; tradition and innovation; the short story "Penelope".

1 Introduction

When starting to analyze the figurative and motional constants of the love theme in the Russian postmodern short story of the 1980s and 2000s, it would be correct to turn primarily to women's prose, since it is the gender attribute that largely affects the concentration of certain themes in the work of various writers. It is enough to look at the works of L. Petrushevskaya (Petrushevskaya 1999), L. Ulitskaya (Ulitskaya 2021), V. Tokareva (Tokareva 2023), T. Tolstaya (Tolstaya 1999), D. Rubina (Rubina 2010), etc., as it becomes clear how powerfully the theme of love, its variants and motivational components are presented in their stories. Meanwhile, in our case, it is more correct to turn to men's stories, to the early stories of Andrei Bitov, since it is this writer that critics and literary theorists refer to the three pillars on which Russian postmodernism stands at the end of the twentieth century. "*Pushkin's House* by Andrei Bitov, along with *Walks with Pushkin* by A. Terts and *Moscow — Cockerels* by Ven. Yerofeyev is considered to be a text that opens up new postmodern trends in the modern literary process" (Bogdanova 2002, 3).

Indeed, if we turn to the criticism of the 1980s, it becomes obvious that the name of Andrei Bitov invariably appears among those writers who laid the foundations for a postmodern vision of new literature (it is enough to refer to the works of N. Leiderman (Leiderman 2003), M. Lipovetsky (Lipovetsky 1997), M. Epstein (Epstein 2000), I. Skoropanova (Skoropanova 2002), O. Bogdanova (Bogdanova 2004), etc.). A. Bol'shev writes: "Bitov, if I may say so, initially has a postmodern worldview, in the coordinates of which the world is a text, a game and a transcoding of signs" (Bol'shev 2009, 39).

And although there is another judgment in literary criticism — that Bitov does not belong to postmodern writers, but such a point of view has begun to gain strength only in recent decades. In our opinion, at the present time, when the trends of postmodernism have (almost) disappeared, almost every Russian postmodernist writer can be said that the avant-garde experimental trends in his work were local, not basic. However, during the rise and heyday of

postmodern trends, Andrei Bitov's work turned out to be one that vividly demonstrated thematic, motivational, and stylistic originality, which at that time qualified as postmodern.

2 Literature Review

Bearing in mind the constitutive features of postmodern literature — the imaginary reality, the lack of integrity of the hero, the "zero" (according to R. Barth) position of the author, etc. — it is easy to detect all these signs already in Bitov's early work (Bogdanova 2002; Benevolenskaya 2008; Levental' 2009, Sukhih 2009, Bol'shev 2013). As noted by critics, the hero of Bitov's very first stories is "not equal to himself", "not coinciding with himself" (Bogdanova 2002, 5). It is enough to recall the 1961 Bitov's story "The Loafer", where the hero himself talks about himself: "I am no longer me..." (Bitov 1996, 61) or "I make many different impressions..." (Bitov 1996, 46). And these impressions are not external, for example, professional or social, but internal, psychological, when not only strangers, but also the hero himself does not see himself as stable, even with certain facial features — he is low, then tall, or his eyes appear to him either brown or gray (Bitov 1996, 47). The hero seems to be living not his own, but someone else's, "stolen" (Bitov 1996, 60) life. As the text of the story "The Loafer" reveals, the narrative of the hero's life is permeated with motives of "invisibility of existence" (Bitov 1996, 48, 65), untruthfulness, ghostliness, pretense, shadows and reflections (Bitov 1996, 50, 55, 61, 63, 65, etc.). Recall that it is these constants that define postmodern literature and become constitutive signs of a postmodern type of worldview.

In this context, it is important to understand how the theme of love manifests itself in Bitov's early stories and how it is interpreted by the writer. Did Bitov's perception of the theme of love influence the further development of Russian postmodern literature? What is the peculiarity of the figurative-motional components of the theme of love in the works of new literature?

Critics have already written quite a lot and in detail about the theme of love, its motivational variation, and the diversity of female images in Bitov's novel "Pushkin's House" (Bogdanova 2002; Benevolenskaya 2008; Levental' 2009, Sukhih 2009; Bol'shev 2013), however, in the prose writer's stories, the theme of love, the motives of a love interest, independently and purposefully, were practically not touched upon. That is why it is necessary to take for analysis one of the earliest stories by Bitov — "Penelope" (1962) — and trace how the young novelist began to shape the future (postmodern) perception of the theme of love, what features of its manifestation the author paid attention to.

3 The image of the narrator and the ego-hero of Bitov's story

It is quite obvious that in the center of Bitov's story "Penelope" there is a male ego-character, a young hero, about whom the narrative is being conducted. His thoughts, mood, well-being and introspection are reproduced in the smallest nuances by the narrator. Meanwhile, the *I*-narrator is contoured in the text of the story only sporadically, only a few times, mostly the narrative is conducted as if from a third person (*he*), but borders on the form of presentation in inappropriate direct speech. Thus, the hero and the author are placed in a relationship of the "second self": hero = alter ego of the author. The subjectivity and personality of the narrative seem to double, saturating the story with internal, hidden from outsider fluctuations of the "unequal" hero. The character appears as if from different angles: he looks at himself from the inside and at the same time "corrects" his impression through the eyes of others. The stereoscopy of the image increases, the "isolation" of the character in the space of the story is intentionally enhanced.

However, the isolation of the hero, carried out by the narrator, relative to the hero himself indicates something else. The need to evaluate oneself not only from within, but also from others allows us to talk about the character's uncertainty, about his orientation to the assessment of outsiders. If the hero himself thinks of himself as an adult, confident, established man, then an appeal to the assessments of others puts him in the position of a person unsure of himself, unable to make a choice and make a decision on his own. The author puts him in a position where the character's behavior is actually mediated not by himself, but by the world around him. It is the outside world that dictates to him the norms of actions and behavior. The principle of freedom, which brings Bitov's hero to the fore, turns out to be leveled, equal to zero. There is a motive for the imaginary independence, the imaginary freedom of opinion and behavior. A free hero turns out to be unfree, an independent one turns out to be independent. The principle of postmodernity is distinctly explicated in the text.

Just as it was in "The Loafer", the character of "Penelope" is not really independent, he only creates impressions. The proof of this is the versions and variants of those circumstances that could be happening to the hero at the moment (they could, but they are not happening). However, unlike "The Loafer", the sphere of manifestation of the hero's lack of independence is not the professional sphere, not the surrounding society, but love. Bitov draws out the many faces of his hero in new circumstances — through a relationship with a girl. The motive of love in the story "Penelope" becomes a litmus test for the identification and self-identification of the character.

The main character of the story is a young man named Lobyshev, he is "not seventeen", he perceives himself as an "adult" (Bitov 1996, 69, 70). A Leningrader, he works, holds a very responsible position — foreman, "head of the detachment ... on the expedition" (Bitov 1996, 75).

Finding himself in conditions of forced "downtime", when he had 2–3 hours of free time in the middle of the working day, waiting for a delayed expedition salary — "money has not yet been brought from the bank" (Bitov 1996, 68), he is looking for a way to pass the time. "In general, he felt very good when he walked along Nevsky Prospekt, along his beloved autumn Nevsky, and looked around — what kind of air! He felt free and spacious when he walked like that" (Bitov 1996, 68). The feeling of freedom and spaciousness that engulfed the hero is maintained in a simple rational way — not to think or, in his definition, to think casually (Bitov 1996, 69).

Like the slacker hero from the early story, Lobyshev sees options in everything: he can go to the Summer Garden or Mikhailovsky Garden and, sitting on a bench surrounded by autumn trees, devote hours to thinking about himself and life, or not think about anything. The hero imagines various options, but chooses the most lightweight option — he decides to go to a session of a picture in the nearest Leningrad cinema on Nevsky Prospekt. "...he will still enjoy it, no matter how much he spits later..." (Bitov 1996, 71).

4 The sourdough image is the image of the heroine Penelope

It has already been said above that the story is entirely devoted to the hero and the reproduction of the mechanism of his introspection and self-perception. However, the author specifically emphasizes the moment when the hero "passes into the dark alley of the cinema" (Bitov 1996, 71). The novelist highlights this circumstance, thereby further events — meeting and getting to know the girl — are brought to the fore by him. The love motive, according to the will of the author, occupies a central position. Next, it is the love affair that organizes the plot of the story.

In the system of the heroes of the story, a second character appears — a female, an unnamed heroine—a girl, a random stranger. Critics have already drawn attention to the fact that the heroine is not named in any way. If the hero is represented by his

last name (Lobyshev), then the heroine is not. She does not introduce herself to the hero, he does not ask her name. However, this is not entirely true. The fact is that the hero is sent by the author to a movie theater with the non-coincidental name "Colosseum" and the film is not coincidentally called "Odyssey". The precedent names of the film and the cinema evoke ancient Greek allusions and generate parallels to the events taking place in today's reality. The title of the story "Penelope" seems to be transferred to the heroine of the story — the unnamed girl-heroine gets a significant name. The ancient story of Odysseus and Penelope comes to life in the realities of the modern world.

Ready for a love adventure, finding himself in a crowd in the doorway of a cinema and hearing "a woman's voice, young" (Bitov 1996, 72), the hero instantly reacts to it. "Lobyshev turned around and, without looking too closely, saw a small sturdy figure, a short light-colored hairstyle and a young, wow face" (Bitov 1996, 72).

All the details accompanying an acquaintance are benevolent, endearing, promising. A young girl has a hero to herself, she does not hesitate to find a definition for a young stranger — "cute" (Bitov 1996, 73). She looked "at him both devotedly and admiringly, one might say lovingly, or invitingly..." (Bitov 1996, 73). The beginning of the love story took place.

Meanwhile, the author placed the hero and heroine in such a situation that, in the conditions of a *dark* archway, "he [Lobyshev] could not particularly look at her; however, he has not yet found anything unpleasant in her" (Bitov 1996, 72). There are distinct and recognizable signs of love motives in the text, the romantic metaphor "the light of conversation" flashes. It seems that Bitov consciously builds up the realities of events in such a way that the reader should freeze in anticipation of a future love and romantic story familiar from the stamps of literature or according to the laws of cinema.

But the plot of the Bitov story takes a different and decisive turn. In the perception of a love story, the effect of deceived expectation is triggered. The heroes (already almost in love) "came out of the doorway into the light", and "here something in his companion seemed unusual or indecent to Lobyshev <...> what he saw in the light and did not understand yet, already began to alarm him" (Bitov 1996, 73).

In bright light, the heroine appeared before the hero in a completely different image. "And he saw that her short hairstyle was not like a hairstyle, but recently grown hair, moreover, dyed to breakage, <...> a shabby, tight-fitting, like a man's jacket <...> there was something impossible on her feet: worn, shapeless, and there were no stockings" (Bitov 1996, 74).

The charm of a young face, a slender figure and a warm voice, which charmed the character in the semi-darkness of the arch, was destroyed by the girl's beggarly outer attire. Bitov (and after him the hero) insistently emphasizes the squalor of the heroine's appearance. A character, represented as a thinking, understanding hero, suddenly finds himself in front of the materiality of the world and the poverty of his companion. However, the familiar love story — the Cinderella plot — does not work in Bitov's story: the hero is ashamed of the poor appearance of a stranger and tries to retreat in every possible way.

Note that the appearance of the hero is also not the most ceremonial, not for visits. Earlier, thinking about himself, the hero reflected that his current attire — a work sweatshirt and boots — were not suitable for a walk along Nevsky Prospekt and for going to the cinema. "...you should have been better dressed" (Bitov 1996, 70). However, he rejects the idea of going home and changing clothes — out of pragmatic expediency and the need to return to work soon — and goes to the cinema dressed like a worker. The heroine-girl is not confused by the appearance of the hero, but the hero himself is defeated by the sight of an old jacket, skirt and shoes.

But, anyway, it can be assumed that the novelist intentionally and consciously (in the tradition of world literature) subjects his hero to a love test. Moreover, his hero passes (in the conditions of modern reality) in a fabulous way three times.

5 The psychological world of heroes: illusion and ghostliness

Once in the cinema, the heroine finally explains what caused her exclamation on the street: "A very poor woman, an old lady, in line, and her money was stolen, twenty rubles. If only they knew who they were stealing from... And then the poor old lady is in line..." (Bitov 1996, 74). The heroine shows sympathy for the poor old woman, whereas the hero is gripped by completely different feelings towards the poor girl. The beggarly appearance of the heroine causes him rejection, shame, embarrassment, a desire to get rid of his companion as soon as possible and in any way. The test has not been passed.

However, the author does not limit himself to this: the tests continue. The girl suggests going to the buffet before the session, since, according to her, she has not had breakfast yet. The hero almost happily admits that he has "no money" (Bitov 1996, 75). And in this situation, the begging heroine turns out to be on top — she admits that she has enough money for a sandwich and she generously offers the hero — "we'll eat in half" (Bitov 1996, 76).

The hero does not deceive the heroine, he really only has "a ruble" (Bitov 1996, 76), but the situation is built by Bitov in such a way that the immaturity of a "non-seventeen-year-old boy" becomes visible and tangible. False (as it is obvious to the reader) shame and embarrassment expose weakness and lack of freedom in the character of the hero, which previously he seemed to have so confidently and convincingly refused. And in this mini-scene, the central character is doomed to fail.

Finally, the author gives the heroine the opportunity to demonstrate taste and intelligence: during the demonstration of a newsreel, the girl asks the question: "How do you feel about abstract painting?" (Bitov 1996, 77), making it clear that she is familiar with this kind of art. The hero does not believe in the depth of the heroine's knowledge, so he walks away from the conversation, making it clear that the heroine does not reach the level where an intelligent and educated hero could talk about painting with her on equal terms. The heroine did not get the opportunity to speak out, she was forced to remain silent.

Meanwhile, the hero is afraid to enter into a dialogue with the girl and not only because he does not trust the knowledge of the heroine. He is scared of the people around him, the audience, who, as it seems to him, are all looking at them. And, most likely, they look at it with condemnation. The hero is afraid of public opinion. The moral principles of the hero are questioned by the writer.

6 Ways to self-identification of the hero

As mentioned earlier, the random film that the hero got to was chosen by the writer for a reason. The projection of the love line of the ancient hero Odysseus and faithful Penelope intersects with the love vicissitudes of Lobyshev and his companion. Note that while watching a movie session and most importantly — in the dark, without light — the confused and upset hero feels very comfortable, even cozy. The shame and embarrassment (almost fear) that he felt in the light disappear. The principle of postmodern perception of life comes into force — ghostliness, artful artificiality (= cinema), shadows and reflections. The light scares the modern hero, the darkness turns out to be saving. The people around do not give strength, but generate fear and doubt. Love and fidelity are perceived as true only within the framework of (cinema-)illusion and the darkness that hides the real outlines.

Lobyshev even liked the girl in the dark of the auditorium: "In general, he was pleased with the way she treated him in the dark" (Bitov 1996, 77). "The girl put Lobyshev's hand on her

lap <...> The girl stroked herself with Lobyshev's hand" (Bitov 1996, 78). For the hero, twilight is more desirable than lighting, illusion is more desirable than reality. With the lights out in the hall, "Lobyshev felt better again. It became almost good again" (Bitov 1996, 78).

It is not a random film, which the characters find themselves watching, that brings new accents to the narrative, which complement the narrative. The reality in which the hero finds himself now, his shame and embarrassment, is replaced by a lively interest in on-screen events. The film is fascinating, the hero even feels like "a little Odyssey" (Bitov 1996, 79).

Lobyshev sees the ingenious Odyssey as "a completely <...> modern guy", in which, according to the central character, "thirst for thrills and pleasure" dominates (Bitov 1996, 79). Lobyshev sees "something strangely similar between himself and the Homeric hero" (Bitov 1996, 79). The duality of the character of the hero of the story is projected onto the image of an ancient Greek character. Lobyshev seems to find an excuse for himself in the fact that strength and weakness were interchangeable in the Odyssey. Moreover, the hero generalizes, transfers this observation to all people: "... the best thing about people is their strength. Weaklings, in fact, they are extraordinary" (Bitov 1996, 79). Plus easily changes to minus, minus to plus.

In the eyes of the modern hero, Odysseus with his strength and weakness is "justified" (Bitov 1996, 80), and after him Lobyshev himself is justified. Now the film is perceived by the character as reality, and the random "pathetic" companion is a "strange shadow", a "bad dream" (Bitov 1996, 80). The hero's postmodern world turned upside down and found its own logical validity. As it turns out, in today's world, as in the world of Ancient Greece, in the atmosphere of myth and fairy tale, you can choose a point of view, find a special position that will provide justification and explanation for everything.

7 Resolution and non-resolution of the conflict in the story

In later works, Bitov and other postmodern writers will end the narrative at such a "crossroads", when the finale will invariably offer a multiplicity of options and variations for the further development of the (poly-)plot, and most importantly, it will demonstrate a variety of axiological assessments, or rather, lack of evaluation (Those who overcame socialist realism 2023). The dominants of the author's presence will be leveled, the author's position will be "zero", the clarity of the views of the central character will not be detectable. However, so far, in 1962, Bitov is still looking for a moral outcome in the story and trying to point to a moral assessment of what has been accomplished. His hero realizes that he has committed meanness, another thing is that he finds an explanation and justification for this. The value hierarchy still exists, but it has already been broken.

The polysemantism of the hero — inequality to himself — is brought to the fore by Bitov in the pre-postmodern character. He is good and bad, honest and mean, thinking and thoughtless, ashamed of his actions and finding excuses for them. But the only thing is that Bitov's hero thinks about shame, about sin, about guilt: "How ... how am I going to live with this? — he thought painfully..." (Bitov 1996, 83) — does not yet fit him into the framework of a postmodern hero. The hero is only close to the postmodern vision, but he is not yet quite a postmodernist. But he is already close to it. He is simulated.

It is no coincidence that the answer to the sacred and painful question of the Bitov's hero ("How to live?") turns out to be a simple "disappearance" of the heroine — "suddenly disappeared, gone" (Bitov 1996, 83). The hero demonstrates an almost pseudo-idealistic perception of reality: it does not exist, because I do not see it. Getting rid of the pangs of conscience happens in the hero instantly — postmodernistically, without requiring time or realistic motivation.

Love, which in classical Russian and world literature became a measure of humanity, loses its axiological evaluative function

in Bitov's story. The hero is not looking for true love and fidelity on the model of Homer's Odyssey and Penelope. It is enough for him to realize that in ancient times there was shame, betrayal, treason in the world. He is comforted by the thought that in the past a person was bad, weak, capable of meanness. Bitov's hero is comforted by the illusion of love — something invisible, hidden by darkness, hidden in the darkness of the auditorium.

8 Results and prospects

Thus, drawing conclusions from the analysis of the story "Penelope", we can conclude that Andrei Bitov is indeed one of the founders of postmodern trends in Russian literature of the 1980s — 2000s. Already in the early stories of the 1960s, Bitov portrayed in his work the type of a new — *another* — hero who went beyond the usual literary canons. The hero of Bitov's early stories was characterized by ambivalence, a willingness to easily change his point of view, radically transform not only the moral and ethical, but also the objectively existing laws of the universe. The world of such a hero was de-hierarchical, the part supplanted the whole, but in turn it could easily be replaced by something else.

Love in the world of postmodern heroes has ceased to be one of the highest values. In the text «Penelope», Bitov showed how illusion displaces reality, how deceptive appearances can become a substitute for real and genuine feelings. If Bitov's heroine — the faithful Penelope — is still objectively real, she exists, then very soon in postmodern literature the subject of love will disappear, move into the world of the unreal and mystical. In postmodern prose, the most familiar embodiment of love will be fiction, an illusion that acquires the status of reality and imaginary authenticity. The object of love of postmodern heroes will be a voice, a letter, a memory, a movie character, their own fiction, even a cat. Love, which has received a traditional reflection in Russian and world literature, will cease to exist, giving way to the illusion of love.

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Primary Paper Section: A

Secondary Paper Section: AJ

ACCIDENT RATE OF THE INTEGRATED RESCUE SYSTEM IN THE KARLOVY VARY REGION IN 2011-2022

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This article was supported by the Student Grant Competition CTU SGS24/071/OHK5/1T/17.

Abstract: The study analyzes the frequency and causes of traffic accidents involving vehicles of the Integrated Rescue System (IRS) in the Karlovy Vary Region from 2011 to 2022. It primarily focuses on accidents that occurred during rides with priority rights. Data from the Fire Rescue Service, the Police of the Czech Republic, and the Emergency Medical Services of the Karlovy Vary Region were analyzed. The research aimed to identify patterns, causes of accidents, and outcomes such as injuries and property damage. The results show that insufficient attention to driving and incorrect maneuvers are common causes of accidents across all components of the Integrated Rescue System, with the highest risk observed in urban areas during afternoon and evening hours at a significance level of $p=0.05$. These findings emphasize the need for targeted safety training and preventive measures to reduce accident rates among rescue workers.

Keywords: traffic accidents; integrated rescue system; fire rescue service; police; emergency medical service; Karlovy Vary region.

1 Introduction

Traffic accidents have been part of road traffic since the beginning. The first traffic accidents happened while riding horses or stagecoaches. With the development of automobiles and their widespread use, traffic accidents are becoming more frequent and have more serious consequences due to higher design speeds, traffic patterns, pedestrian inattention and many other reasons (Pecherkova and Nagy, 2017).

To deal with a traffic accident at all levels, there is an integrated rescue system (IRS). In the Czech Republic, it includes three key components, which include the Fire Rescue Service of the Czech Republic, the Police of the Czech Republic and the Medical Rescue Service. These units work together to deal with emergencies such as traffic accidents, fires, natural disasters and other situations that endanger the health, lives and property of the general public. Although the main role of the IRS is to provide assistance and ensure safety, its members can also become victims of accidents or risky situations while performing their work.

Accidents involving members of the IRS may include various types of incidents, such as accidents and injuries in intervention, equipment failure, or service vehicle accidents. These accidents have significant consequences not only for the rescuers themselves but also for their ability to intervene quickly and effectively to protect the public. The analysis of these accidents is key to improving safety and providing better protection for members rescue services, but also for the citizens for whom the IRS is intended.

1.1 Reasons for traffic accidents

Traffic accidents have a variety of causes, which are important in preventing and understanding their occurrence. The main recurring factors include driver inattention, speeding, alcohol and the drivers' experience.

Driver inattention is one of the most frequent causes of road accidents, especially due to the use of mobile phones behind the wheel. This factor leads to impaired driver reaction times and a reduction in their ability to react to traffic situations in a timely manner. Distracted driving due to mobile phone use is a significantly increasing trend, especially among younger drivers. (Cai, 2020; Ortega et al., 2021)

Speeding is another of the most common factors affecting not only the number of accidents but also their severity. On average, statistics show that almost 1/3 of the fatalities in traffic accidents were related to high speed accidents. This factor is often related to young drivers who tend to underestimate the risk (Ortega et al., 2021; Macurova et al., 2024).

Driver intoxication with alcohol or other addictive substance is another major cause of accidents. Under the influence of alcohol, reactions are significantly slowed and decision-making is impaired. Even small amounts of alcohol can increase the likelihood of an accident, while the use of stimulants such as amphetamines can increase the risk of a fatal accident by up to five times. These factors have different impacts in different regions, with the highest number of fatal crashes in low - and middle-income countries facing limited resources to improve road safety (Shestan et al., 2017; Bary et al., 2022).

The experience and age of the driver are related to the previous factors and/or causes. Young and inexperienced drivers are a risk group. Although they make up only a small proportion of all drivers, their involvement in accidents is disproportionately high. Young drivers with up to two years of experience are involved in ~10% of road accidents. This is often due to a combination of speeding, underestimation of risk and lack of experience in driving in more challenging situations (Chen et al., 2021).

These figures illustrate how different factors contribute to road accidents and the importance of focusing on prevention through awareness campaigns and stricter enforcement of road rules.

1.2 Traffic accident of the integrated rescue system

A traffic accident is always a sudden, unexpected and stressful experience for all involved and for the witnesses. It can be even more stressful for a driver who was driving in the right-of-way to help another person in need. The experience can be so intense that it is not uncommon for a person to exhibit an acute stress reaction or post-traumatic stress disorder (PTSD). In both cases, it is a disorder in a person's psyche in response to a traumatic or stressful event. Symptoms include changes in emotional perception (e.g. drowsiness, inability to experience joy), sleep problems, conscious avoidance of situations that remind one of the event, anxiety and flashbacks, which are not controlled by the person's consciousness and occur randomly. Other symptoms include anxiety, attention disorders or hypervigilance. (Ralbovská and Otrisal, 2022)

PTSD can occur in or after any situation that is outside of a person's normal experience, so it can lead not only to a car accident but also, for example, an assault while on duty, intervention at a mass casualty incident, or even a general encounter with death. All EMS units have a system of psychological support, whether it is a system of collegial support or a system of professional psychological support. However, this system has its limitations, usually the fear of employees and officers of possible reprisals by the employer (e.g. removal from service), disclosure of information or mockery. In this case, it seems appropriate to use debriefing immediately after a difficult event, either with the whole team or just with a few colleagues in the vehicle on the way back from an assignment (Brecka, 2009; Andršová, 2012).

A lesser-known "sirene syndrome" is described in the literature. It describes a situation in which the driver of a vehicle with the right of way with a special audible and light warning signal (SAWS) on tends to drive more aggressively and quickly and more often overestimates his/her abilities. The situation can lead to a large amount of adrenaline being released and a feeling of invincibility. This style of driving usually works until one of the other drivers fails to react adequately and the driver of the

vehicle with the right of way (ROW) no longer has time to react to the situation and a serious accident can result. "Siren syndrome" is a risk for every driver. It can be minimised by effective practical driving training and psychological intervention. It is recommended by authorities that emergency services drivers should undergo training with their sirens on when possible (U.S. Fire Administration, 2014).

The aim of this thesis is to analyse the frequency of traffic accidents of the integrated rescue system in the Karlovy Vary Region (Czech Republic) with a focus on traffic accidents that occurred while driving vehicles with right of way in the years 2011 to 2022 inclusive. Based on the analysis of available data from the integrated rescue system units on traffic accidents, the following will be determined: frequency, consequence (injuries/material damage), type of accident, cause, and culprit of the accident.

2 Materials and Methods

The research focused on the accident rate of the integrated rescue system in the Karlovy Vary Region (Czech Republic). Quantitative research was created by means of retrospective analysis of accident data of individual units. The cohort study included only the basic components of the integrated rescue system according to the Czech Act 239/2011 Sb., on the Integrated Rescue System - the Fire Rescue Service of the Czech Republic, the Medical Rescue Service and the Police of the Czech Republic in the territory of the Karlovy Vary Region. Requests for access to data were sent to individual units on 11 November 2022 (namely the Directorate of the Emergency Medical Service of the Karlovy Vary Region p.o., the Directorate of the Fire Rescue Corps of the Karlovy Vary Region and the Traffic Inspectorate of the Police of the Karlovy Vary Region. The request concerned the provision of data on traffic accidents involving the vehicles of the given unit for the years 2011 to 2022.

Traffic accidents included in the research were subject to the established criteria based on the Decree of the Ministry of Transport and Communications No. 32/2001 Sb., on the registration of traffic accidents. The criteria that were subsequently analysed, revised and established in the research were as follows: time of the accident, district, location of the accident, GPS coordinates of the accident site, specific identification of the location of the accident (city, intersection, out of town), whether or not the vehicle was driving under the right of way regime, consequences of the accident, cause, culprit, quantified damage and type of accident.

2.1 The Data Obtained

Data from the Karlovy Vary Region Health Emergency Service (hereinafter referred to as the Health Emergency Service) were obtained from 24 January 2016. Previously, no records were kept. The obtained data contained in Table 1 include all damages to vehicles of the Karlovy Vary Emergency Medical Service, including damage caused by vandalism. The data analyzed included what type of call group it was (RRV or Ambulance), whether the damage to the vehicle was caused by an EMS driver or another driver, whether the accident was with injury or just property damage, and what the damage was to. Some accidents could be found in a publicly available accident database to add additional information. The research did not include the reference vehicles of the Ambulance Service as they are not equipped with a CPR or CPR - these vehicles were excluded from the lists.

The Fire Rescue Service of the Karlovy Vary Region (HZS) provided data including accident rates of fire protection units of volunteer fire department included in the area coverage plan of the region (JPO SDH). Applications were received on 17 April 2023, the last file for the year 2021 was received on 10 May 2023. The Fire Department records traffic accidents in a file called *Fire Vehicles Accident Report*, in great detail. To preserve anonymity, the files were supplied without the names of the

driver and crew. The DN report includes vehicle details, location of the accident, date, time and day of the week, details of injuries to the parties involved, fault, total damage, cause of the accident and a multi-sentence description of the accident. The Fire Department also records the measures taken in relation to the accidents in question; this information was not the subject of the investigation.

The Regional Directorate of the Police of the Czech Republic of the Karlovy Vary Region (Department of Traffic Police Services) sent a reply to the request on 27 December 2022, stating that they do not record the requested data in their statistics, due to the fact that for all traffic accidents involving service vehicles of the Police of the Czech Republic, police officers are obliged to call a traffic accident investigation group from the traffic inspectorate, which will register the accident according to normal practice. Further information was obtained by analysing the public database of the Centre for Traffic Research, which records general statistics of traffic accidents in the Czech Republic and it is also possible to search for data of individual traffic accidents with specific identification of place, date, time. It is also possible to search for traffic accidents by vehicle owner - where the Police of the Czech Republic is the only one of the IRS units registered under its own name.

All analysed traffic accidents were verified with the given IZS unit and in a publicly available database.

In the third phase of the research (running from April 2023 to May 2024), the Fire and Rescue Service was contacted with a request to supply data on traffic accidents for the year 2022. The Health and Rescue Service was contacted with a request to complete the overall information supplied. At the same time, a request was sent to the statistics staff at the Police Department requesting clarification of the information, with further questions, and a request for the provision of "Police President's Instruction No. 50 dated March 8, 2019, on the policy on the use of the ZVS and radio equipment," which was granted. Additional data was provided from the ZZS by the damage committee, which contains information from 2012, but also includes data on refueling of the wrong fuel and damage to vehicles not caused by the accident. The information was supplemented with the date, a brief description of the event and the total amount of damage. The data obtained were analysed in the statistical program R (free license).

3 Results

In the Karlovy Vary Region, from 1 January 2011 to 31 December 2022, a total of $n = 26,825$ traffic accidents occurred that were under investigation by the Police of the Czech Republic. According to the data obtained, $n = 1,029$ traffic accidents involving the involvement of the emergency services took place, of which only $n = 829$ are recorded in the official statistics of the Centre for Traffic Research, which amounts to 3.09% of the total number of traffic accidents that occurred in the Karlovy Vary Region.

Table 1: Traffic accidents of all vehicles of the integrated rescue system in the Karlovy Vary Region (2011-2022)

RTC in KV region	Total (n)	RTC with consequences to life or health (n)	RTC with consequences to life or health (%)	RTC without consequences to health or lives (n)
	26.825	6.362	23,71 %	20.463
Fire	85	4	4,70 %	81
Police	700	35	5,00 %	665
EMS	244	10	4,09 %	225

Process: own; source: nehody.cdv.cz, ZZS KVK, HZS KVK

During the same period of time, $n_x=177$ people died in the Karlovy Vary Region¹. Two persons died in traffic accidents

¹ Statistics on the website nehody.cdv.cz report 176 deaths. The number 177 is based on the finding of one traffic accident of the KVK Health Centre from 2015 with a

involving an EMS vehicle, in both cases it was an ambulance vehicle. In the first case from 2012, it was a cyclist and besides that another woman (pedestrian) was seriously injured. In the second case from 2015, a pedestrian was killed and two other people were slightly injured on the pavement. No personal injuries were recorded in the ambulance vehicle or in the other vehicle involved in these two accidents. In both cases, the ambulance vehicle was travelling with the SAWS switched on. There were a total of four serious injury accidents between 2011 and 2022, two involving an EMS vehicle and two involving police vehicles. In the case of the EMS vehicle, both serious injury accidents occurred in 2022 and both resulted in 1 person being injured who was also found to be at the cause of the accident. Both accidents occurred while driving with the SAWS on. One police officer-passenger was seriously injured in a traffic accident with the police vehicle driver determined to be responsible. In the second case it was a pedestrian who entered the roadway in front of a passing Police of the Czech Republic vehicle, which was driving with the SAWS switched on. A total of $n_{\text{sx}}=90$ persons were slightly injured in $n=43$ traffic accidents with vehicles of the IRS, which is 1.17% of the total number of slightly injured persons in the territory of the Karlovy Vary Region. The highest number of injured persons, 9 in total, was reported in a traffic accident between a vehicle of the Police of the Czech Republic and a bus of public transport.

Table 2: Number of persons injured in traffic accidents involving Integrated Rescue System vehicles (2011-2022)

	Deaths (n_x)		severe injuries (n_y)		minor injuries (n_z)	
	IRS	others	IRS	others	IRS	others
Fire	0	0	0	0	3	1
Police	0	0	1	1	39	30
EMS	0	2	0	2	8	8

Process: own; source: nehody.cdv.cz, ZZS KVK, HZS KVK

Another category examined was whether the vehicles of the IRS forces were travelling with the SAWS switched on during the accident. In the following Table 3 only the accidents for which this information is available will be used, also for percentage calculations.

Table 1 Traffic accidents of integrated rescue system vehicles in the Karlovy Vary Region with and without right of way (2011-2022)

	with RoW (n)	% of total (%)	without RoW (n)	% of total (%)
Fire	35	41,17 %	50	58,82 %
Police	135	19,28 %	565	80,71 %
EMS	34	56,67 %	26	43,33 %

Process: own; source: nehody.cdv.cz, ZZS KVK, HZS KVK

The most reliable statistics in this respect can be considered to be those of the Fire and Rescue Service of the Karlovy Vary Region, because they are based on their own "Traffic Accident Reports," which are written by drivers after a traffic accident has occurred.

It is difficult to put anything into a broader context from the perspective of the EMS unless we know this figure for all traffic accidents. The police, who are the only ones who also carry out patrol work and do not just go out from base on reports received, logically have a much higher mileage in normal operation.

In terms of the location where the accident occurred, traffic accidents were classified according to three aspects, namely whether the accident occurred in a built-up area, outside the city or at an intersection (regardless of the location within or outside the built-up area).

Table 4: Localization of traffic accidents involving Integrated Rescue System vehicles in the Karlovy Vary Region (2011-2022)

	Build up areas (n)		outside the town (n)		Intersection (n)	
	with RoW	without RoW	with RoW	without RoW	with RoW	without RoW
Fire	15	31	13	12	7	7
Police	81	383	28	119	26	63
EMS	15	13	10	9	9	4
total	111	427	51	140	42	74

Process: own; source: nehody.cdv.cz, ZZS KVK, HZS KVK

It was found that the largest number of traffic accidents (total $n=538$) occurred in built-up areas, i.e. in towns and villages or in cottage settlements. Of these, $n=111$ were accidents involving vehicles driving with the right of way. For the EMS, only $n=60$ accidents were traced with location designation and use of a special warning light. The remaining accidents did not contain these data and cannot be assessed in this respect. Outside the city, there were a total of $n=51$ accidents with the SAWS switched on and $n=140$ without the SAWS switched on. At intersections, there were a total of $n=116$ accidents, of which 36.21% were with the SAWS on.

Table 5: Localization of traffic accidents of integrated rescue system vehicles by districts in the Karlovy Vary Region (2011-2022)

	Karlovy Vary (n)	Cheb (n)	Sokolov (n)
Fire	33	26	26
Police	314	197	189
EMS	111	62	58
total	458	285	247

Process: own; source: nehody.cdv.cz, ZZS KVK, HZS KVK

From the EMS data we were able to determine the location of the traffic accident by district in $n=231$ cases out of a total of $n=245$ found traffic accidents.

The frequency of traffic accidents in individual districts of the Karlovy Vary Region was analysed and marked in Table 5. The Karlovy Vary district has the highest number of accidents, which has the largest area and the largest population, with a total of $n_{\text{zy}}=23$ and both light and severe injuries. The accident rate for IZS units was the second highest in the Cheb district and the lowest in the Sokolov district. The only two traffic accidents that are registered with death of the participant happened in the Cheb district and directly in the town of Cheb.

The highest number of traffic accidents with serious injuries and deaths is registered in the Cheb district, specifically in the town of Cheb. Other traffic accidents with minor injuries occurred in the town of Mariánské Lázně (both by the Police of the Czech Republic), one in Františkovy Lázně (also by the Police of the Czech Republic) and two near Aš (one by the Police of the Czech Republic and one by the Fire Department). One traffic accident is located on the D6 motorway near Cheb, where the driver of another vehicle was slightly injured when he crashed into a parked Fire Department vehicle during intervention.

In the Sokolov district, one traffic accident with serious injuries occurred on the D6 motorway where, at exit 136, the driver of a single-track vehicle overlooked a KVK ambulance travelling with right of way. Following the accident, this driver was seriously injured. Traffic accidents with minor injuries are also located in the town of Sokolov, in Kraslice and near Chodov.

The total number of traffic accidents registered in front of buildings belonging to the Police of the Czech Republic in the whole Karlovy Vary Region was $n=61$ (8.70%) of all traffic accidents involving a Police vehicle. The Fire Department reported one traffic accident in front of a fire station and the Emergency Medical Services managed to trace a total of $n=12$ traffic accidents (4.92% of all accidents involving the

death that was not registered with GPS or with the indication of the region, thus it does not appear in the statistics of deaths in the Karlovy Vary Region.

Emergency Medical Services) that were proven to have occurred at the dispatch bases. The real number of these accidents is likely to be much higher.

Most accidents involving vehicles of the IRS forces are caused by drivers themselves. Firefighters caused a total of $n=56$ accidents, 42.86% of which were caused by vehicles using the right of way. Of the $n=28$ accidents caused by other drivers, 35.71% were caused by a Fire Service vehicle that was driving with the SAWS switched on. Police officers were at fault in a total of $n=346$ accidents, of which $n=3$ were not found to be the culprit, although it must have been a police officer. Under the right of way regime, police officers were at fault in 19.36% of accidents and other drivers were at fault in 20.88% of accidents with a Police vehicle that was driving with the SAWS on. In total, other drivers were at fault in $n=273$ accidents involving police vehicles and in $n=29$ of these accidents the driver was not found at fault. In $n=67$ cases, the accident occurred after a collision with wildlife and $n=14$ accidents were caused by another road user such as a pedestrian or road defect and other causes. The drivers of the EMS caused $n=107$ accidents and other drivers caused $n=33$ accidents. For a total of $n=22$ accidents, there was a note of unknown, but no indication of whether the other driver or the EMS driver was unknown. In 13.08% of the accidents caused by the drivers of the Emergency Medical Services (EMS) happened in the right-of-way mode, but this figure is recorded only for $n=60$ of the total $n=246$ accidents. Other drivers caused 39.40% of accidents with an EMS vehicle driving in the right of way. Wildlife was the cause of RTC in $n=28$ cases and in $n=76$ cases other culpability is recorded, most frequently "stone" culpability in $n=49$ cases.

The most frequent causes of accidents for all drivers of the IRS services overall were not paying attention to driving and incorrect turning or reversing, which were the cause of $n=245$ accidents out of $n=509$ accidents caused by all drivers of the IRS services together. Not paying attention to driving was the most frequent cause for both the Police ($n=105$) and the Emergency Medical Services ($n=15$). For the Fire and Rescue Service, improper turning was the most frequent cause of accidents caused by Fire and Rescue Service drivers in 10 cases. For the Czech Police and Fire Department, the third most common cause was failure to adjust speed (to road conditions, weather conditions, etc.). In the case of the Police Department it was $n=39$ cases (11.27%) and in the case of the Fire Department it was $n=5$ cases (8.92%). The third most frequent cause of accidents caused by the drivers of the Fire Department was in $n=6$ cases failure to yield the right of way, which included running a red 3-colour traffic light and failure to yield the right of way at traffic signs "Stop, yield" and "Yield."

Other drivers caused a total of $n=334$ accidents with vehicles of the IRS forces. The most frequent cause was improper turning, in a total of $n=69$ cases, which is 20.66%. The second most frequent cause was not paying attention to driving, in a total of $n=67$ cases. Traffic accidents caused by failure to keep a safe distance between vehicles and failure to yield the right of way were caused by other drivers in $n=37$ cases. The results vary for the individual components. With the Fire Department vehicles, the most frequent accident was caused by drivers who did not give way ($n=5$). The most frequent accident caused by another driver with the Police Department vehicles was due to improper turning ($n=67$), and with the Emergency Medical Services the most frequent cause was not paying attention to driving ($n=6$). Other causes include e.g. avoidance without sufficient lateral clearance or spontaneous starting of an uninsured vehicle, which was the cause of accidents with the Police Department vehicles caused by other drivers in ten cases.

The most frequent type of traffic accident was a collision with a moving non-rail vehicle at the Fire Department ($n=29$) and the Police Department ($n=246$). The most frequent collision with a fixed obstacle was with the Emergency Medical Service ($n=32$). The EMS records in its statistics $n=51$ cases in which the windshield was damaged (probably due to a flying stone from a vehicle travelling in front of the EMS vehicle). Official statistics

do not record this type of traffic accident, so it is not possible to distinguish this accident from other traffic accidents in other components of the EMS. For the Fire Department, the second most frequent type of traffic accident is a collision with a parked or parked vehicle in $n=28$ cases. For police, the second most common type is collision with a fixed obstacle, in $n=182$ cases. The second most frequent type of accident recorded by the ambulance was collision with wildlife ($n=25$). In the case of the ambulance, the type of accident was identified in 142 cases, partly thanks to the descriptions in the supplied data, which indicated, for example, damage to a garage or another vehicle, and so it was possible to identify the type of accident.

When driving vehicles with the right of way, the most frequent type of traffic accident overall is a collision with a moving vehicle, which happened in $n=61$ cases in the case of the Police and in $n=16$ cases in the case of the Emergency Medical Service. For the Fire Department, the most frequent type of traffic accident was a collision with a parked or parked vehicle in $n=13$ cases. Police officers were at fault in the highest number of collisions with a fixed obstacle while driving vehicles with right of way, in $n=29$ cases out of $n=34$. The remaining five cases were caused by other persons or other drivers. Drivers of emergency medical services vehicles were at fault for the most collisions with fixed obstacles (7 out of 7). Other drivers were most often at fault in "collision with a moving non-vehicle" that was traveling with the right-of-way. Thus, overall, other drivers are most likely to crash into a moving IRV with the right-of-way, whereas drivers of these vehicles are more likely to crash into a parked vehicle or other fixed obstacle.

Table 6: Total damage caused by traffic accidents involving vehicles of the Integrated Rescue System in the Karlovy Vary Region (2011-2022)

	total (v EUR)	Average per 1 RTC (in EUR)	Highest single damage (in EUR)
Fire	545 525	6 418	356 435
Police	708 127	1 012	27 723
EMS ²	129 437	1 681	19 802
Total	1 383 089		

Process: own; source: nehody.cdv.cz, ZZS KVK, HZS KVK

Another data examined was the total damage to the vehicles of the IRS forces due to traffic accidents. Most of the damages are covered by the obligatory liability insurance of the guilty party or the accident insurance of the vehicles of the IRS units, for which the individual units only pay the co-payment. The figures are therefore only indicative, as it has not been possible to ascertain exactly whether the amounts mentioned were paid in full by the IRS or by insurance. For the regional Fire Department, the figures are fairly accurate as they are based on their own records. In the case of the Police of the Czech Republic, the data was based on the public database of traffic accidents, where the data is written only by the estimate of the police officer on the spot. In reality, therefore, they may be different. In the case of the Emergency Medical Services, only partial information could be analysed. The Police of the Czech Republic recorded the highest damages for all years, totalling EUR 1 383 089, while having the lowest average. The highest damage to a single vehicle was recorded by the Fire and Rescue Service in 2021, when a firefighting engine rolled over onto its roof after a traffic accident.

Traffic accidents were divided according to the time of fault into five categories. The categories were morning (6-8am), mid-morning (8-12am), afternoon (12-6pm), evening (6-10pm) and night (10-6pm). The normal shift length varies from one IRS unit to another. In the Fire Department (on-call staff), they usually start work at 6 a.m. and the shift is 24 hours long, including sleeping time if there is no call-out. In the Police Department, both the length of individual shifts and the time of

² The average and total damage are calculated from only 76 accidents for which an indication of damage to the vehicle was found.

starting work vary, which is usually between six and eight in the morning. As a rule, if it is a riot police service, the start time is 7:30 a.m. or 7:30 p.m. and the shift lasts 12 hours. In certain cases, the shift may last up to 24 hours (e.g. guard duty). The EMS has a maximum shift length of 12 hours for all drivers and the start time is 7:00 a.m. or 7:00 p.m. In rare cases during a coronavirus epidemic, the shift length has been extended to 24 hours. Time data could be obtained for accidents involving ambulances in a total of $n=61$ cases. The statistical differences between the times of day are statistically significant, the level is less than $p=0.05$ for all the IRS units. Overall, the models show that the highest accident rate is in the afternoon and the lowest in the morning. The coefficients for the EMS were calculated as follows. A coefficient of -1.7918 was determined for the morning category, indicating a significantly lower frequency of events in this category compared to the reference category night. This means that there is very strong evidence to suggest that the expected number of accidents that happened in the morning is much lower than those that happened at night. In the other categories, the coefficient was not statistically significant.

A closer look at traffic accidents involving vehicles of the IRS services in the Karlovy Vary Region that were driving with right of way shows that the time of day with the highest number of accidents is different. The most risky time of day for the Fire Department is afternoon and evening. The police report the highest number of accidents when driving with right of way in the morning, however, accidents are also frequent in the afternoon and at night. Emergency Medical Services has the highest number of traffic accidents in the evening.

4 Discussion

The aim of the study was to analyse the frequency of traffic accidents of the basic components of the integrated rescue system in the Karlovy Vary Region between 2011 and 2022. The data sources were internal documents of the Health and Rescue Service, the Fire Department, the Police of the Czech Republic and the traffic accident statistics maintained by the Centre for Traffic Research. From the analysed internal documents of the IRS units in the Karlovy Vary Region, a total of $n=1029$ traffic accidents involving IRS vehicles occurred in the period 2011 - 2022. However, a total of $n=829$ (81%) were found in official databases, which is also 3.09% of all traffic accidents that occurred in the Karlovy Vary Region and were recorded in official statistics. This difference may be due to accidents that were caused, for example, by leaving the garage and damaging the car, i.e. there was a claim by the insurance company, but the situation had no impact on the health and life of the crew or patients.

Stratton (2020) draws attention to the space given to death in the media and particularly on social media. The aim is to arouse emotions or outright shock the reader, thereby increasing viewership. However, the presented research shows that the majority of accidents involving vehicles of the IRS forces ($n = 971$, 94.36%) are injury-free. The reason for this phenomenon may be due to the fact that a relatively common type of traffic accident is a collision with a parked or parked vehicle. This raises the question as to how many of these vehicles were parked or parked in places where it is prohibited by law, thus preventing the safe passage of the vehicles of the emergency services. It is not possible to trace this figure.

The assumption that the EMS will have the highest number of traffic accidents in the right of way mode of all IRS units in the Karlovy Vary Region could not be confirmed or denied due to insufficient data. The assumption of the highest accident rate was based on the data when the EMS has the highest number of kilometres travelled of all IRS units in the right of way mode. Neither mileage nor relevant accident data could be obtained. Of the total $n=244$ accidents, it was possible to determine when the vehicle was or was not driving in the right of way in 60 cases. If the conclusions were based only on these 60 accidents, it can be concluded that 56.67% of the accidents involving the EMS vehicles occurred when the vehicle was driving with the right of

way. The trend is reversed for the Police and Fire Department, i.e. a greater number of accidents happen without the use of the Light warning system and SAWS.

The assumption that most accidents involving EMS vehicles happen between 6am and 8am due to more vehicles on the roads on the way to work was not proven. Most of the accidents involving EMS vehicles happened consistently in the afternoon (12-6 pm) and evening (6-10 pm). When driving with the right of way, most accidents happened between 6 pm and 10 pm. Abdelwanis (2013) conducted retrospective research in South Carolina between 2001 and 2010. His research included a total of 11531 traffic accidents involving vehicles of the integrated emergency services (known as emergency vehicles in the USA). For comparison, South Carolina has an area of 82,931 km², and Carlsbad County occupies 3,310 km². South Carolina also has 17 times the population of Carlsbad County. Abdelwanis (2013) reports that 79.7% of traffic crashes involved police vehicles, 11.7% involved emergency vehicles, and 8.4% involved fire department vehicles. The results of the presented research are practically minimal in percentage and differ for police (68.02%) and ambulance (23.71%). The percentage is practically identical for firefighter vehicle accidents (8.25%). For fatal accidents, a comparison can only be made for ambulance vehicles, where Abdelwanis (2013) calculated that ambulance vehicles were responsible for 20.25% of fatal accidents (compared to accidents involving integrated rescue system vehicles). In the present research, if we use the percentage, it was 100% ($n=2$) of accidents involving ambulance vehicles in which the participant was killed. Overall, there were 79 (0.69%) fatal traffic crashes in South Carolina, whereas there were two (0.19%) in the Carolinas involving IRS vehicles. Abdelwanis (2013) identified intersections, curves, crash time between 12-18 hours, and high speed as the most significant factors for the occurrence of crashes with integrated emergency services vehicles. In contrast, in the present research, urban environments can be identified as the most critical locations. There is agreement in the time of the crashes and this is between 12-18 pm (for all crashes and those without RoW). The risk causes are already diverging, in the presented research the causes were found to be: not paying attention to driving and improper turning or reversing.

In Illinois (USA) in 2014, a retrospective research of traffic accidents involving emergency vehicles in 2012 was conducted by the Illinois Department of Transportation. The state of Illinois is 45 times larger than Carlsbad County. Since my research included 2012, only data for that year will be compared. From the ZZS, the 2012 data is likely not complete, yet usable. In Carlsbad County, there were $n=57$ crashes involving emergency medical services vehicles (4.08% of all crashes in Carlsbad County). In Illinois, there were 2,376 crashes involving emergency medical services vehicles, 0.9% of the total. While the number of traffic fatalities in Illinois was 0.4%, Carlsbad County accounted for 9.9% of the total number of traffic fatalities. Police officers were involved in RTCs in Illinois 79.16% of the time, while in Carlsbad County they were involved in 87.72% of the time. It is also interesting to compare the location of the accident, as in Illinois 36.2% of the accidents occurred at intersections, while in Carlsbad County only 22.81% of the time. The number of accidents in Illinois with on-call (loosely translated as on-ramp) was 312, which is 13.13%, while in Carlsbad County it was more, a full 21.05%. In 84 cases, a police vehicle was involved in a vehicle pursuit accident in Illinois, 4.51% of all police-involved accidents. In Carlsbad County, according to official statistics, there was one traffic accident while conducting official business in 2012, which is 1.75% of the total number of traffic accidents. The question is how often this cause is used by traffic officers in the accident investigation group or if it is confused with other causes such as "other improper driving style" (Illinois Department of Transportation, 2014).

Symmons et al. (2005), looked at ambulance accidents in New South Wales, Australia, between 1996 and 2000 inclusive. New South Wales covers 801,150 km² and is therefore approximately 242 times the size of the Carolinas. Over this period, Symmons

et al. (2005) included 1027 emergency vehicle accidents in their research of which 51% involved injury and 1% involved fatality. In the present research, a smaller number of accidents with injuries was found, only 4.57%. With such a difference, one may wonder whether Symmons et al. (2005) do not count among injuries also minor abrasions and scratches, e.g. from broken glass, which are not recorded in the databases in the Czech Republic. The present research also has a lower percentage of road accidents with death of the participant, only 0.19%. In their research, Symmons et al. (2005) also focused on high speed as a cause of road accidents, finding that the most frequent cause of road accidents is by the emergency medical vehicles (21%), followed by police vehicles (16%) and the Fire Department only 6%. In terms of fire department vehicles, Symmons et al. believe that the lower percentage of accidents caused by high speeds may be related to fire department vehicles not being capable of higher speeds due to their weight and size. In the present research, the most common cause of accidents caused by drivers of IRS vehicles was inattention to driving and improper turning or reversing. Despite the fact that the cause of the accident could only be determined in $n=30$ cases for the EMS vehicles, speeding was proven to be the cause of the accident by the driver of the EMS vehicle in one case (3.34%); overall, out of $n=85$ accidents; the remaining $n=55$ were not caused by the driver but by animals or other objects. Nor do police officers in the Carlsbad region cause traffic accidents due to high speed more often or at least as often as in the research of Symmons et al. (2005). Out of a total of $n=346$ traffic accidents caused by police officers, $n=42$ (12.14%) were due to high speed. Thus, firefighters who caused a total of $n=56$ traffic accidents were at fault due to high speed in $n=4$ cases (7.14%), which is relatively the same in percentage with the result of Symmons et al. (2005). Muir et. al. al. (2020) investigated road traffic accidents in an unspecified organisation with approximately 2,000 employees and 55,000 volunteers in Australia. Rather than systematically treating traffic accidents, they focused on identifying challenges in reducing traffic accidents overall. The most common traffic accident he recorded was a crash while reversing into a garage at the end of a shift. This sounds logical given the potential driver fatigue after a twelve hour shift and often due to the lack of support systems such as reversing cameras. In the Karlovy Vary Region, it is not possible to say the exact number of accidents when reversing into a garage, as not all IRS units have a garage. When analysing the traffic accidents that happened at the firefighters' and rescue workers' outposts or at the district police departments, it was found that these are not the most frequent places of traffic accidents.

More experienced drivers tend to have better adaptation to stress and time pressure, better focus of attention, and are better able to anticipate situations and make quicker decisions, as confirmed by Hsiao (2018). He also points out that drivers with overconfidence are more prone to drive in a risky manner while driving a vehicle with the right of way, which can lead to an accident. Hsiao (2018) reports that drivers with less than three years of driving experience are more likely to be involved in a road accident. Based on the analysis of the data collected from the various emergency services, we can only draw conclusions for the police who collect the data. It shows that police officers with 0 to 3 years of driving experience inclusive caused $n=31$ accidents out of $n=346$ accidents caused by police officers (8.96%). Police officers in the category of 4 to 7 years of age inclusive caused a total of $n=88$ traffic accidents (25.43%) and police officers with driving experience of 8 to 11 years inclusive caused $n=77$ traffic accidents (22.25%). For an adequate assessment, it is necessary to know the exact numbers of police officers in each category, which is not possible to analyse from publicly available sources.

The American study by Graham et. al. (2023) states that for safer driving of ambulances, certain rules need to be followed, which include at the institutional level setting an internal policy on when to use both the Emergency Lights system and the SAWS. At the driver level, it then recommends that drivers limit the use of both ELS and SAWS and use these devices particularly in situations where there is clearly a greater benefit to the patient if

they get to the hospital sooner, and also that even if they are driving with ELS and SAWS, they should come to a full stop at a 'Stop, Yield' traffic sign or a red 3-colour traffic light. It also encourages drivers to observe the maximum speed limit at the location even if they are driving in right of way mode, not to use any phones or other electronic devices while driving ambulances. The study also recommends that drivers think about the route they want to take before they start driving. In other respects, they recommend adjusting the shift to a maximum of 24 hours, sufficient training for employees and educating them in the potential risks. Drivers should also, ideally, receive training in safe driving in the vehicles they normally drive. An analysis of the internal regulations of the EMS regarding the use of the ELS nas SAWS did not find any guidance that directly specifies under which circumstances it is appropriate to use the audible signal. A practical problem may be the inconsistent operation of the special audible warning signal by drivers of the EMS vehicles in different types of vehicles, thus reducing concentration on driving. (ZZS KVK, 2022)

4.1 Limits of research

The work did not deal with the distinction whether the vehicle with the right of way was driving with only the special warning light on or also with the special warning sound signal. This information is neither in public databases nor in the records of the individual IRS units. In the case of the emergency medical service, there was insufficient recording of accidents in the materials provided and it was often not possible to distinguish from the materials provided whether or not the accident was a road traffic accident within the meaning of Act No 361/2000 Sb. The work also included traffic accidents in which the windscreen was broken (e.g. by a flying pebble), as they meet the definition of a traffic accident. At the same time, the date of the accident was found to be incorrectly recorded in at least one case. For the police, it is likely that some accidents are also just windscreen breakages but cannot be distinguished from others. The thesis did not deal with specific accidents and their detailed analysis. Another limitation of the research was the actual recording of traffic accidents in public databases. Until January 1, 2023, the records did not distinguish police, fire and ambulance accidents from other owners. As a result, accidents involving EMS vehicles were recorded as belonging to a private company, sometimes as freight vehicles (despite the fact that all vehicles in the EMS are up to 3.5 tonnes), or vehicles that were different and without any indication of the make. It is not possible to distinguish whether these were vehicles of the Emergency Medical Services or of the Medical Transport Service. Police vehicles were in most cases entered correctly, as this data existed before 2023. Fire department vehicles were most often entered as Ministry of Interior vehicles, and unless complete internal data were provided by the Fire Department, it would be impossible to distinguish their accidents from those of, for example, the Czech Post (also under the Ministry of Interior).

5 Conclusion

The research dealt with the analysis of traffic accidents of the Fire Rescue Service of the Karlovy Vary Region, the Karlovy Vary Region Emergency Medical Service p.o. and the Police of the Karlovy Vary Region. The data were obtained from individual components of the integrated rescue system and from public databases. A total of $n=1029$ traffic accidents involving vehicles of the emergency services were included in the research. The assumption that the EMS would have the most accidents was not confirmed. A significant relationship at the $p=0.05$ level of increased accident frequency of the EMS was revealed, the established coefficient of -1.7918 indicates a significantly lower frequency of events in the reference category "night". This means that there is very strong evidence to suggest that the expected number of accidents that happened in the morning is different compared to those that happened at night. In the other categories, the coefficient was not statistically significant.

From the analysis of the data, the most common causes of crashes for the drivers of the emergency services were determined to be a lack of attention to driving and for other drivers, improper turning or reversing. The results of the research then indicate that the most frequent type of traffic accident is a collision with a moving non-road vehicle.

Working in the integrated rescue system requires constantly developing your skills and abilities and learning new things. Responsibility and humility are essential elements of accident prevention and can be reduced by adequate driver training.

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Primary Paper Section: A

Secondary Paper Section: AQ

DEVELOPMENT OF THE IMPORTANCE OF SELECTED MARKETING COMMUNICATION TOOLS OF MICROBREWERIES WITH REGARD TO THEIR COMPETITIVENESS – A CASE STUDY FROM THE CZECH REPUBLIC

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This article was created at AMBIS University within the project “Marketing communication tools of microbreweries” number SVV/2024/6102 supported by funding for Specific University Research provided by the Ministry of Education, Youth and Sports in 2024 and 2025.

Abstract: Czech Republic is first in beer consumption per capita worldwide. In 2023, this consumption was 128 litres per capita, beer culture is deeply rooted here. A significant increase in the number of microbreweries and popularization of at-home beer brewing has been taking place since 2010. Production volume of microbreweries makes up 2.5% of the overall production volume of beer in the Czech Republic. With the number of microbreweries increasing, so does the competitive pressure in this market. What tools of marketing communication are important to the owners of microbreweries considering their competitive ability is a question that we will deal with in this paper. The research took place in 2016 and 2023, the data were acquired using a questionnaire and controlled interviews. The research sample constitutes of 30 microbreweries. The selected marketing communication tools were divided into three groups. The results of the first and second group (tools of targeted marketing communication and tools of marketing communication used at the sales site) are presented in this paper. The results show that only a few of the marketing communication tools have undergone a shift in their importance. However, a significant change can be seen in a number of microbreweries which deem these tools as important.

Keywords: Microbreweries, marketing communication, competitiveness.

1 Introduction

Beer is the national product of Czech Republic, and even though its consumption has been decreasing worldwide, Czech Republic is still leading in this area. Czech Republic also takes the lead since 2015 is the number of microbreweries per capita. Beer is an inseparable part of Czech culture; this fact is mirrored in a significant increase in the number of both established and operating microbreweries in recent years. Microbreweries usually produce between 500 and 3 000 hl of beer per year (maximum production volume being 10 000 hl/year) where most of the beer is meant for immediate consumption in the microbreweries' own pubs. There are also microbreweries with a larger production volume, where the beer is distributed mainly to restaurants and establishments located in immediate vicinity of the microbrewery. This is caused by the traditional way of brewing unpasteurised and unfiltered beer, which has a positive impact on taste, colour and flavour profile, but a negative impact on its expiration date, which is rather short.

2 Theoretical overview

A brand-new type of brewery has established itself on the Czech market – microbreweries. Their increase in recent years is steady and constitutes of approximately 20 new microbreweries per year. There were 350 microbreweries in the Czech Republic in 2016, in 2023 this number rose up to 508. Some of them are already well established on the market, steadily increasing their production volume, activities and number of employees. Others do not attempt to increase their production volume, either because their production capacity has been met, or because of the intent of their establishment. According to research results in this area, there are two main reasons for establishing a microbrewery (Cabras, 2016). The first one is pure enthusiasm for beer and an effort to brew one's own, with regards to personal requirements for taste and quality. The second one is a business plan. Like other quickly growing markets (more than 10% per year), microbreweries are also attractive for investors who are seeing a significant momentum in this industry.

The overall production volume (meaning production volume of the brewing industry) in the Czech Republic was 18 million hl of beer in 2023, where microbreweries (breweries with a production volume of up to 10,000 hl per year) contributed

roughly 2.5% (Tvořimeevropu.cz). Other sources state that it was up to 2.8% (Czech Association of Breweries and Malthouses, 2022). It is likely that microbreweries' share on the overall production volume is going to keep increasing as their numbers rise, just like in other European countries which are also experiencing this boom. Although it most likely won't ever exceed tens of percent (Pokrivčák, 2019). As stated above, the number of microbreweries in the Czech Republic keeps increasing, which creates a competitiveness within the industry.

Competitiveness in this specific segment is therefore a pressing question these days. Some sources state that it does not exist (Pivovary, 2020). On the contrary, others speak of the beginning of competitiveness, taking the number of microbreweries and current trends into account (Ekonom, 2023). One of the tools enhancing competitive abilities of microbreweries is marketing communication, which they use aside from communicating via their product itself (Březinová, 2019).

Marketing communication includes all visual, written, spoken and sensory aspects of interaction between a company and its target market (Haris, 2024; Ilwoo, 2018). This communication is mostly of commercial nature and aims to influence cognitive, motivational and decision-making processes of those we want to influence according to our intentions. This is done by utilizing the information that is being shared (Hamizar, 2023; Zein, 2023).

Few theoretical approaches can be used to systematically divide the rather large scope of marketing communication techniques and tools. For example, a part of 4P communication mix used by Kotler (1998) where the author puts the following: advertisement, direct sales, personal sales, PR and sales support. Or Peslmacker's (2003) communication mix, which constitutes of: advertisement, sales support, sponsorship, public relations, communication at the sales site, exhibitions and fairs, direct marketing communication, personal sales and interactive marketing.

All of the abovementioned techniques and tools are being used within the brewing industry. One of the most prominent factors influencing the communication mix is the size of a brewery, or rather its financial strength and also the specifics of its customer base (Vacl, 2013). From this angle, we can categorize marketing communication as either mass-focused, which uses mass communication tools and aims for as many potential customers as possible; this is mostly used by industrial breweries (production volume of up to 500K hl per year), or as targeted, which uses personal communication channels to target a specific group of customers; this is mostly used by microbreweries (Djuric, 2016; Camilleri, 2017).

Microbreweries on the Czech beer market usually use their product – beer – to communicate with their customers. Their core value is uniqueness and locality (Cortese, 2017; Kincl, 2022). Their promotion is therefore secured by the so-called *word of mouth* technique, meaning verbally transmitted information that satisfied customers and craft beer enthusiasts share (Lars, 2014; Boyer, 2015; Brewer, 2023). This phenomenon has another effect for microbreweries – beer tourism, which is very similar to wine tourism (Vacl, 2014; Colleen, 2018; Slocum, 2018; Bachman, 2021).

The most crucial factor affecting the choice of marketing tools for microbreweries and SMEs in general is finance (Ahmed, 2019). For this reason, mass communication channels are not being utilized (these means would be rather ineffective for microbreweries' target group), but personal, targeted marketing channels are. These are social media and others, which are cheaper and better suited for reaching regional or even local markets; this business practice is called “around the chimney” in Czech brewing industry jargon (Březinová, 2019).

Communication mixes of microbreweries usually consist of marketing communication tools used at the sales site and tools bearing the microbrewery's logo, for example glasses, coasters, signboards and so on. Another significant group consists of tools targeting the local community, such as sponsoring local associations and clubs, organizing cultural events and more (Březinová, 2021).

The question that the authors answer in this paper is: Which marketing communication tools do selected microbreweries' owners in the Czech Republic deem as important, with regard to their competitive ability.

3 Methodology

The data was acquired in 2016 and 2023. During those years, both quantitative and qualitative research method was used, as well as a questionnaire and a guided interview. In 2016, 30 microbreweries were selected using the method of random selection and asked to participate (all of the microbreweries have agreed). First, an electronic questionnaire was sent out to the microbreweries. A personal visit and the interview followed, which served to supplement and verify the data from the questionnaire. This process was carried out both during the 2016 and the 2023 data collection. Here, we would like to thank all the owners for their helpfulness and willingness to participate in this project. In this paper, we therefore analyse and compare data from the same microbreweries in a 7-year range, which illustrates a development of importance of marketing communication tools used by specific microbreweries in the Czech Republic.

According to (Kotler, 1998; Pelsmecker, 2003) theory, 26 tools of marketing communication, which were used in this project, were established. In the questionnaire, the respondents (owners or operators of microbreweries) determined the importance of each marketing communication tool using a 4-level scaling system as follows: very important (4), important (3), less important (2), not important (1). Each marketing communication tool was assigned into one of three groups (mass communication tools, targeted communication tools and communication tools used at the sales site) by analysing the data from the questionnaires and interviews to make the results clearer. In this paper, development results of two of the marketing communication tools are discussed. The first group focuses on tools of targeted marketing communication, which contains: social networks, renown, organising cultural events, sponsoring local clubs, having their own website, recommendations of current customers and customer competitions. The second group focuses on marketing communication tools used at the sales site, which includes: labels, beer coasters, beer glasses, tablecloths, signboards, paid and free tastings, sales and excursions.

Regarding the research question "Are marketing communication tools in the same group equally important to microbreweries, taking their competitive ability into account?", two alternate hypotheses were established,

H0 – All marketing tools in the group are of equal importance.

H1 – At least one marketing tool in the group has either higher or lower level of importance than the rest.

The differences between frequency of answers were tested using Pearson's chi-squared test using χ^2 (chi-square), assuming that all tools of marketing communication in a group are equally important to microbreweries, considering their competitive abilities. Histograms were also used.

For a clearer percentual evaluation of each tools' importance, the answers very important (4) and important (3) were grouped together, same as less important (2) and not important (1).

4 Results and discussion

The data was subjected to such a statistical research so that we could either confirm or refute one of the hypotheses. The importance of a specific group of marketing communication tools to the owners or operators of microbreweries considering their competitive abilities is shown in the following results: Just as is stated in the methodology, these are specific groups of marketing communication tools; tools of targeted marketing communication and tools used at the sales site.

The results of Kendall's coefficient of concordance are based on the 2016 data and represented in tables 1 and 2. They refute H0 – all marketing tools in the group are of equal importance. Importance level of $p < 0.5$, which happens if p is less than 0.5; in our case, $p = 0.00000$ for both groups. H0 is therefore refuted for both groups. Some marketing communication tools from selected groups have thereby been more important to microbreweries in 2016 than others. Results from 2023 also refute H0 as $p = 0.00002$ for both groups. It is therefore confirmed that in 2023, some marketing communication tools within the same group are more or less important to microbreweries considering their competitive abilities, as is shown in tables 3 and 4.

Table 1 Kendall's coefficient of concordance for tools of targeted marketing communication of microbreweries in 2016.

Marketing communication tools	Friedmanova ANOVA a Kendallův coefficient of sameness (M_tools 1) ANOVA chí-kv. (N=30, sv=8)=448,9607 p=0,00000 Coefficient of sameness =,38704 Average. R=,38278			
	Average rank	Rank sum	Average	Deter. diverg.
Consumer competitions	1,685217	254,0000	1,759817	0,792587
Recommendation of current customers	5,462817	789,5000	3,982439	0,499217
Own website	4,498951	672,0000	3,528921	0,701124
Local clubs sponsorship	2,736841	395,0000	2,247820	1,126512
Cultural events organisation	3,487421	505,0000	2,784210	0,887504
Social networks	4,682157	670,0000	3,348276	0,807411
Brewery's renown	5,496502	783,0000	3,902069	0,517040

Source: Our research

Table 2 Kendall's coefficient of concordance for tools of marketing communication of microbreweries at the sales site in 2016.

Marketing communication tools	Friedmanova ANOVA a Kendallův coefficient of sameness (M_tools 2) ANOVA chí-kv. (N=30, sv=8)=448,9607 p=0,00000 Coefficient of sameness =,38704 Average. R=,38278			
	Average rank	Rank sum	Average	Deter. diverg.
Labels	6,831457	964,5000	3,024875	1,047428
Beer coasters	5,321112	761,0000	2,327931	1,086666
Tablecloths	2,475211	349,0000	1,021379	0,520105
Beer glass	6,982314	982,0000	3,020152	1,521423
Signboard	6,210251	888,0000	2,532276	1,025346
Tastings free	4,326742	609,0000	1,987479	0,698402
Tastings paid	3,898845	561,0000	1,358966	1,009534
Sales	3,113421	453,0000	1,394138	0,795654
Excursion	6,374581	912,5000	2,982519	1,109845

Source: Our research

Table 3 Kendall's coefficient of concordance for tools of targeted marketing communication of microbreweries in 2023.

Marketing communication tools	Friedmanova ANOVA a Kendallův coefficient of sameness (M_{tools} 1) ANOVA χ^2 -kv. ($N=30$, $sv=8$)= $448,9607$ $p=0,00002$ Coefficient of sameness = 38704 Average. $R=38278$			
	Average rank	Rank sum	Average	Deter. diverg.
Consumer competitions	1,102110	238,0000	1,526177	0,893087
Recommendation of current customers	6,289412	882,0000	3,998457	0,542187
Own website	6,891245	721,0000	3,982406	0,799784
Local clubs sponsorship	4,612492	623,0000	3,652140	1,021590
Cultural events organisation	4,982144	598,0000	3,257910	0,989504
Social networks	6,521372	723,0000	3,448276	0,857411
Brewery's renown	6,125845	801,0000	4,023197	0,603187

Source: Our research

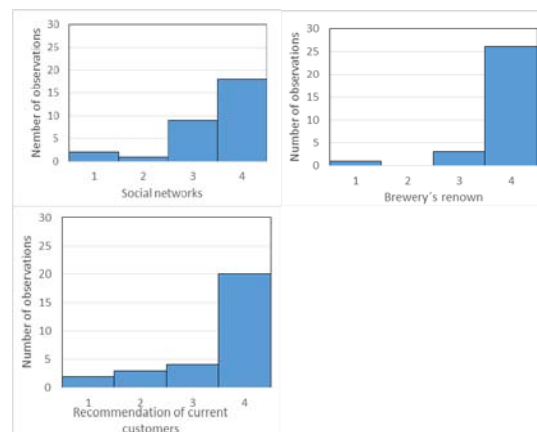
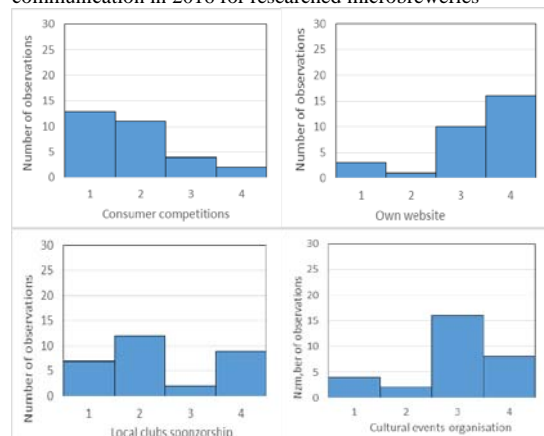
Table 4 Kendall's coefficient of concordance for tools of marketing communication of microbreweries at the sales site in 2023.

Marketing communication tools	Friedmanova ANOVA a Kendallův coefficient of sameness (M_{tools} 2) ANOVA χ^2 -kv. ($N=30$, $sv=8$)= $448,9607$ $p=0,00002$ Coefficient of sameness = 38704 Average. $R=38278$			
	Average rank	Rank sum	Average	Deter. diverg.
Labels	7,203121	998,5000	3,013793	1,042302
Beer coasters	5,685527	825,0000	2,537931	1,986521
Tablecloths	3,825412	542,0000	1,241379	0,604105
Beer glass	7,233698	975,0000	2,896552	1,122523
Signboard	7,259847	952,0000	2,848276	1,180460
Tastings free	3,685147	524,0000	2,041379	0,873020
Tastings paid	5,298412	838,0000	1,868966	1,042534
Sales	1,982547	269,0000	1,524138	0,825654
Excursion	7,125873	983,5000	3,241379	1,065076

Source: Our research

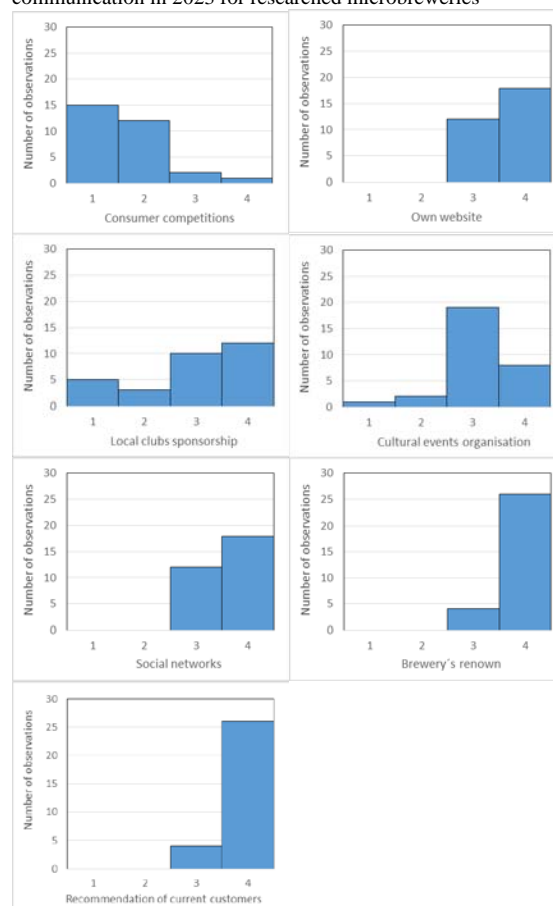
The following tools were found to be of the greatest importance in the first group: renown of the brewery, their own website and social networks. In the second group, it was: labels, beer coasters, beer glasses and signboards (graphs 1 and 2). In 2023, the most important tools of the first group were found to be the same as in 2016 - renown of the brewery, their own website and social networks, but newly also the recommendations of current customers (graphs 3 and 4). For the second group it's labels, beer coasters, beer glasses and signboards, same as in 2016. This means that between 2016 and 2023, there is no difference between the importance of specific marketing communication tools considering the competitive abilities of the microbrewery. However, according to specific results (graphs 1 to 4) it is clear that the microbrewery's owners or operators' perception of these tools' importance has shifted.

Graph 1 Histograms of specific tools of targeted marketing communication in 2016 for researched microbreweries



Source: Our research

Graph 2 Histograms of specific tools of targeted marketing communication in 2023 for researched microbreweries

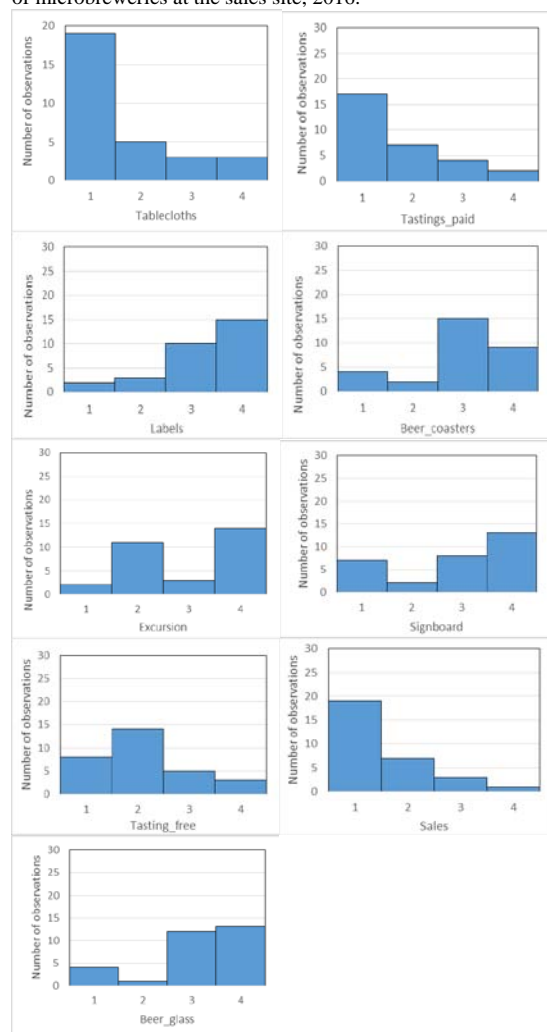


Source: Our research

In the first group of specific marketing communication tools, almost all selected tools have undergone a shift. Renown of a microbrewery was very important or important for 97% of questioned breweries in 2016, while in 2023 this number rose to 100%. Having one's own website and social networks has experienced a similar change, from 83% and 90% in 2016 respectively, to a 100% for both tools in 2023. Even the recommendation of current customers, which has been deemed as very important or important by 83% of microbreweries in 2016 has risen to a 100% in 2023. Next, the owners or operators of microbreweries see organising cultural events as more important in 2023, and the biggest difference in perception can be seen in sponsoring of local clubs. This tool has been very important or important to 37% of researched microbreweries in 2016, while in 2023 it is 73% of microbreweries. All

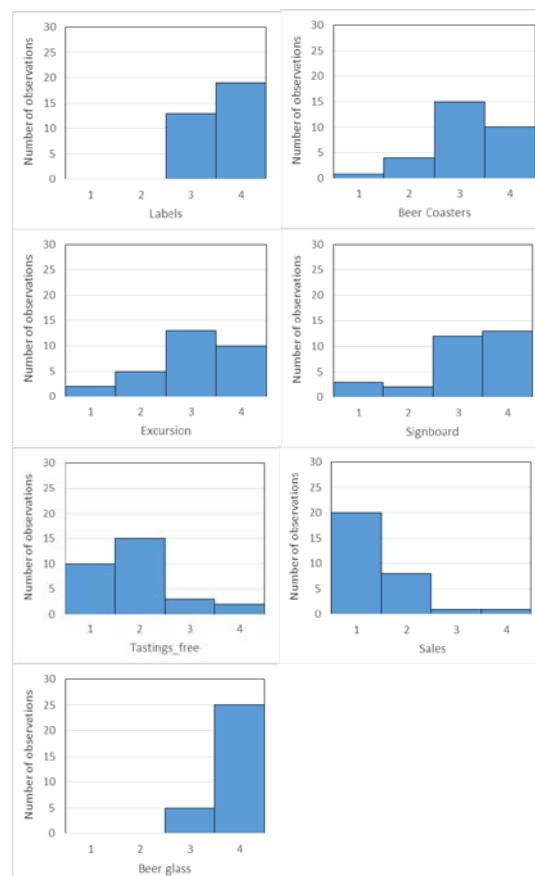
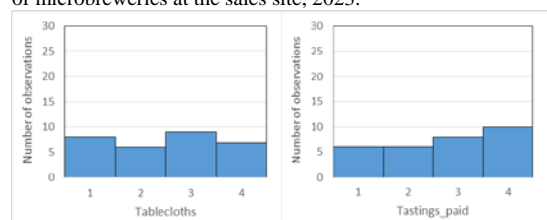
abovementioned results support the fact that microbreweries are targeting their local customers more and more and are becoming another tool of regional development. On the contrary, the last monitored tool of customer competition, which was important or very important to 20% of microbreweries in 2016 is only important to 10% of microbreweries in 2023. It is the only tool whose importance has decreased. This decrease might be caused by a temporary closure during the pandemic due to covid-19, where the microbreweries have not been reopened. In spite of this, results of our research show that microbreweries are becoming an important part of regional development. Lepič (2023) is of the same opinion. Microbreweries are also becoming cultural centres of towns and municipalities, a fact supported by the importance of hosting cultural events and sponsoring local clubs. This result is also confirmed in De Jong(2023) research.

Graph 3 Histograms of specific marketing communication tools of microbreweries at the sales site, 2016.



Source: Our research

Graph 4 Histograms of specific marketing communication tools of microbreweries at the sales site, 2023.



Source: Our research

There has also been an increase in the importance of marketing communication tools in the second researched group, except for one. This tool is sales, which were seen as important for 13% of microbreweries in 2016 (this number is already rather low in comparison to other tools) and in 2023, sales are only important to 7% of microbreweries. This development might be caused by the fact that even though there is an increasing competitiveness in this market, microbreweries do not have to undercut their products. This means that their target group is not sensitive to the product's price, which corresponds with Lerro (2020) and Rizzon (2022) research results. All other monitored tools have increased in importance, for example labels and beer coasters were important or very important to 83% of microbreweries in 2016, while in 2023 it was a 100%. The biggest difference between 2016 and 2023 can be seen in tablecloths, which have gone from 20% to 53%, and paid tastings, which were only important to 20% of microbreweries in 2016 and have since gone up to 60% in 2023. On the other hand, the importance of free tastings has decreased from 27% to 17%. A significant difference can also be seen in excursions, which shifted from 57% to 77%. Last two monitored tools have also undergone an increase in importance considering the competitive ability of the researched microbreweries. Signboards were important or very important to 70% of microbreweries in 2016, while in 2023 this number rose to 83%. Beer coasters have seen only a slight increase, from 80% to 83%. All abovementioned results support the theory that microbreweries, even though they do not have to undercut their prices by discounts and free tastings, are trying to gain new customers mostly by offering excursions and paid tastings of their products.

5 Conclusion

The results of the research have confirmed that the importance of specific marketing communication tools of selected microbreweries between 2016 and 2023 is increasing. As the number of establishments in this market rises, so does the competitive pressure and even though microbreweries mostly

communicate with their customers via their products, marketing communication tools are also important to them, as they improve their competitive ability in this area. We can see from the results that the selected microbreweries deem marketing communication tools which target the local consumer as important, such as sponsoring of local clubs or organising cultural events, but also those tools which are trying to attract new customers, such as excursions or paid tastings. Tools undercutting the price, such as sales and free tastings are not important to this segment. This might be caused by the loyalty of consumers who perceive the microbrewery's products as having added value, which is mostly created by the local production, quality ingredients and last but not least hand brewing. Next, the results imply that microbreweries are becoming a major factor in regional development, which is represented in the importance of supporting local clubs and also supporting cultural centres of municipalities, or rather becoming such cultural centres themselves. This is reflected in the importance of organising cultural events and so on. The authors are well aware of the limitations of this project, which has not been carried out on a representative sample of microbreweries. In our next research, we would like to demonstrate a positive influence of microbreweries on a sustainable development of municipalities using a representative sample of microbreweries.

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Primary Paper Section: A

Secondary Paper Section: AE

THE IMPACT OF ALTERNATIVE METHODS OF TEACHING MATHEMATICS ON THE COMPUTATIONAL THINKING OF PRIMARY SCHOOL STUDENTS

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Published within the frame of the University Palacký Faculty of Education grant
*Investigating the impact of alternative methods of mathematics instruction on the
development of levels of computational thinking and related computational concepts in
elementary school students, GFD_PdF_2023_01.*

Abstract: The article presents the findings of a research focused on the comparison of the development of computational thinking in pupils taught by an alternative method of teaching mathematics and the classical method of teaching mathematics. The research builds on the findings of previous research, which suggests a link between the development of some dimensions of students' computational thinking and the development of mathematical thinking. We built on previous published research assumptions, which suggested that students taught in a constructivist way of teaching mathematics perform better on a test of computational thinking and thus potentially have better developed computational thinking. The study presented in this article tested 741 pupils aged 10 to 13 in the Czech Republic taught using an alternative constructivist method of teaching mathematics (the so-called "Hejny method") and pupils taught using the "classical" predominantly non-constructivist method of teaching mathematics. Statistical results show that the chosen teaching method does not affect the development of pupils' computational thinking.

Keywords: CT, Computational Thinking, mathematical thinking, computer science in education, development of key skills.

1 Introduction

The targeted development of computational thinking (CT) in primary education is currently one of the great challenges of modern pedagogy (CSTA&ISTE, 2011; European Commission, 2020). In pedagogical discourse, computational thinking represents a set of cognitive abilities, skills and approaches to analyse and solve a complex problem, that is to say abilities which are important for an individual's personal development, active participation in society and future employment in life (Perlis, 1962; Wing, 2006; Zapata et al., 2021). Yet, CT is still a relatively new concept, the understanding of which is evolving almost in real time. What is certain, however, is that it is a key capability with applicability beyond the confines of computer science and digital technologies, and its development therefore cuts across many disciplines, particularly as it relates to STEM related subjects.

Nowadays, a growing number of authors (Rambally, 2016; Pérez, 2018; Wu & Yang, 2022) are focusing on the possibilities of connecting CT and mathematical thinking (MT). The targeted outcomes of the development of MT pupils and the outcomes of the development of CT pupils are in many methodologies complementary or even identical. The full use of CT in solving practical problems in many cases presupposes the application of mathematics (Kynigos & Grizioti, 2018). Thus, it is possible to speak of an underlying relationship between MT and CT, the targeted development of which in the primary education environment is most likely to be influenced by each other.

Previous testing of pupils in the Czech Republic aimed at determining the level of development of CT in fifth grade pupils suggested a possible correlation between the method of mathematics teaching and the level of development of individual CT concepts (Bryndová & Bártek & Klement, 2023). This qualitative research has shown that pupils who were taught mathematics according to a non-traditional method of teaching mathematics, performed better on the domestic CT test than their classmates who were taught using the traditional method of teaching mathematics. This alternative teaching method was a constructivist approach aimed at building a network of mental mathematical schemas known as the Hejny method.

The verification of such a tendency is particularly important for the investigation of the development of the dependence of CT on

the development of related mathematical concepts. This paper therefore focuses on examining this tendency in a broad sample of the population of fifth grade students in the Czech Republic.

2 Alternative Mathematics Teaching – Hejny method

The Hejny method of teaching mathematics focuses purely on the development of mathematical thinking and competence. On the other hand, this method cannot be classified as a method which can be applied in the educational process in isolation according to individual, specific differences in the teaching style of the teacher. It is a comprehensive system of teaching mathematics, probably the most widespread of the alternative systems at the first level of primary schools at present.

The Hejny method - as it is currently perceived, is very close to Montessori pedagogy. It is based on pedagogical constructivism (or the constructivist conception of learning, see Průcha p. 77), for which the learner's own activity is crucial in order to construct his or her own knowledge on the basis of their own (in our context mathematical) activity. In this way, both of the educational systems mentioned above seek to avoid or eliminate the formalism which is present to a greater or lesser extent in traditional forms of teaching. On the other hand, Průcha (ibid.) also mentions critical voices against the above-mentioned concept in terms of overestimating the importance of the mechanisms of knowledge construction by the learner and underestimating the role of the teacher in the educational process.

3 Hejny method of teaching mathematics

In contrast to traditional mathematics teaching focused on practicing standard problems, the Hejny method focuses on building a network of mental mathematical schemas created by each student by solving appropriate problems and discussing his or her solutions with classmates. The goal of the Hejny method of mathematics education is to make the child discover mathematics on his/her own and with pleasure. It does this by respecting the 12 key principles, which are put together in a coherent concept. These key principles will now be described in more detail (H-mat, 2024a):

■ Building Schemes

Hejny method can also be referred to as Schema-oriented teaching. A schema is a collection of interconnected knowledge related to a known environment. As the author of the teaching method himself states, "Mathematical schemas are also strongly interconnected. For example, the schema of the concept of a rational number is formed by connecting the schemas of the concepts of natural number, fraction, decimal number, and negative number."

■ Working in environments

The environment contains a series of interlocking problems with the same topic. These tasks are designed to encourage pupils to experiment, discover and interlink different mathematical phenomena.

■ Interlinking topics

By interlinking topics through different learning environments or different tasks, concepts, processes and phenomena are well understood and better consolidated.

■ Personality development

The Hejny method encourages children to think independently, teaches pupils to discuss, argue and evaluate. It encourages diversity of opinion.

■ Genuine motivation

This principle is based on the so-called intrinsic motivation of a person. A child with an intrinsic need to know knows more intensely, deeply and comprehensively.

■ Real experience

Mathematics teaching oriented towards the construction of diagrams is based primarily on children's own experience, from which the child can subsequently make general judgements.

- The joy of mathematics

Mathematical environments in textbooks are designed to allow pupils to discover. Even the difficulty of the problems is set so that each pupil can achieve the joy of success.

- Own observation

This principle is based on the belief that knowledge gained by one's own reasoning is of higher quality than knowledge which is taken in. The pupil solves problems and collects a range of experiences to discuss with classmates and the teacher. Afterwards, they test their theories on other tasks.

- The role of the teacher

The teacher becomes a mentor rather than an authority in the mathematics classroom. He is the one who organises the lesson, encourages the pupils to work, sets appropriate problems and guides their discussion.

- Working with error

Error handling plays a very important role in the Hejny method. It is used as a means of learning. Children are encouraged to identify the error themselves and to try to explain why they made it.

- Appropriate challenges

Textbooks contain tasks of all difficulties. The teacher distributes the tasks within the class according to pupils' needs in order to support their continuous motivation.

- Encouraging collaboration

Pupils are given plenty of space to work together and discuss directly in mathematics lessons.

3.1 Linking mathematics and computer science teaching through the Hejny method

The Hejny Method uses a variety of learning environments to help students understand mathematical concepts and the relationships between them in a playful and enjoyable way. One of the learning environments linking mathematics and computer science is the Flowchart environment.

"This environment is used to graphically record an algorithm or general process. From a computer science point of view, working with a condition appears in a flowchart: "If something is true, then do something, if it is not true, do something else." From a mathematical point of view, students are introduced to statements, deciding on their truth. An important part of this process is collecting the data produced by a flow chart and evaluating it" (H-mat, 2024b).

One of the first tasks through which students are introduced to the new learning environment of Flowcharts is seen in Figure 1.

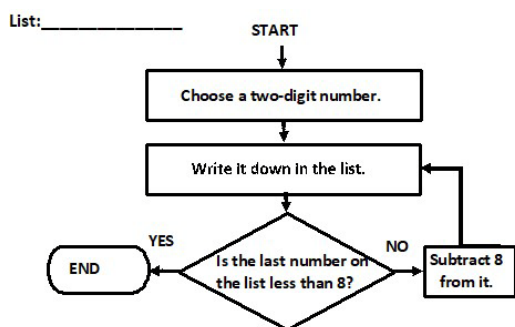


Figure 1.: Quotient with remainder (based on Hejny et al., 2021)

Students follow a series of instructions, continuously making decisions about the validity of the phenomenon, and collecting data to be evaluated later. These are recorded in a "List" item.

Let us now choose number 35. In this particular case, the "List" will contain the following numbers: 35, 27, 19, 11, 3, that means numbers obtained by repeatedly subtracting 8 from 35. The operation of division is therefore represented by this flow chart as repeated subtraction. The last number in the List is the remainder after dividing by 8. Thus, $35: 8 = 4$ (col. 3). The number 4 is called the Quotient with remainder and is given by

the number of numbers after the input number in the "List" (we subtracted the number 8 four times).

Another way in which we can use the Flowcharts environment is when introducing the concept of the greatest common divisor of two natural numbers (see Figure 2). When determining the greatest common divisor of two numbers, we look for the largest number, which divides the two given numbers without remainder.

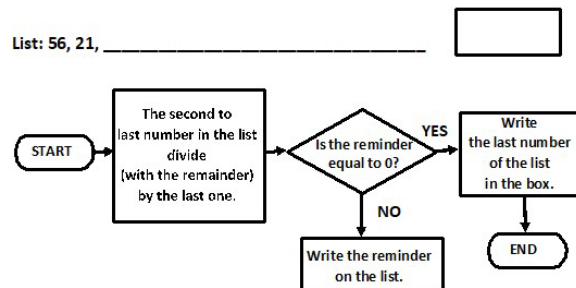


Figure 2.: Greatest common divisor (based on Hejny et al., 2021)

In this particular case, the list will contain the following numbers: 56, 21, 14, and 7, which is the largest number, which divides the first two numbers in the List.

This method of finding the greatest common divisor of two natural numbers is known as the Euclidean algorithm. Valid:

$$56 = 21 \cdot 2 + 14$$

$$21 = 14 \cdot 1 + 7$$

$$14 = 7 \cdot 1 + 0$$

3.2 The Hejny method of teaching mathematics in the context of pupils' skill development

The Institute for Research and Development of Education of the Faculty of Education of Charles University published the final report of Hejny's Method of Teaching Mathematics in International Research TIMSS in March 2022.

"This report presents the results of secondary analyses of data from the 2015 and 2019 TIMSS (Trends in International Mathematics and Science Study) international surveys in relation to the Hejny method of teaching mathematics. In addition to the commonly available TIMSS data, information on the teaching method used, collected by the Czech School Inspectorate, was used as a national supplement to the data collection for each class involved in the testing" (Greger et al., 2022, p.4). The study, among other things, addressed the question of whether there are differences in the average results of pupils using the Hejny method and pupils who do not use the Hejny method. It was found that "students taught with the Hejny method scored statistically significantly higher in mathematics in both 2015 and 2019" (Greger et al., 2022, p. 30).

Recent research suggests that the development of mathematical skills and computational thinking are closely related (Rambally, 2016; Pérez, 2018; Wu & Yang, 2022). There are links between the dimensions in computational thinking and metacognitive knowledge, experience, monitoring and mathematical modelling skills (Zhang, 2024). Our research on the development of the dimensions of computational thinking in pupils in Czech schools carried out by 2023 suggested the possibility that this development might depend on the method of teaching mathematics (Bryndová & Bártek & Klement, 2023).

The data suggested a greater development of computational thinking in pupils taught with Hejny method compared to the global sample tested (about 8%). The tested sample of pupils showed better skills in algorithmizing (6% better than the parallel sample of pupils taught with classical mathematics),

abstraction (5.8% better), and syntax (15% better) (Bryndová & Bártek & Klement, 2023).

However, this sample was not primarily selected with regard to the method of teaching mathematics and was therefore too small to yield conclusive conclusions. Therefore, we aimed to create a diagnostic tool aimed at determining the level of development of computational thinking in students, which would adequately assess the development of individual pupils' abilities depending on the method of teaching mathematics.

4 Research tool

Several types of assessment tools are currently described which can be used to determine the level of a student's computational thinking. Typically, depending on the definition of CT, these are tests, which incorporate the testing of individual computational concepts or subdomains. This division allows testing the development of the learners separately in each domain (Román-González, 2015; Chen et al., 2017; Zapata et al., 2021).

Thus, for the purpose of testing the level of CT development, we used the definition based on CT sub-dimensions, which are Syntax and Coding, Algorithmic thinking and Abstraction and Decomposition. This division has been used in the context of CT testing in previous research (Bryndová & Bártek & Klement, 2023), the results of which are being followed up. The sub-dimensions were defined as follows:

- Syntax and coding

In the context of primary school education in the Czech Republic, we include this dimension in the complex of abilities and skills which should be possessed by an IT-minded student. We define it as the ability to write solutions using an adequate programming language or code, at a level appropriate to the age of the pupil. It is further defined as the understanding of the principle of this notation, the ability to copy and emulate the code as specified, the orientation to the code and the solution procedure, the respect of the laws of notation, the ability to rewrite the solution so that it can be understood by a computer or an adequate machine, and other related computational procedures and perspectives related to the notation of the solution.

- Abstraction and Decomposition

In this category we include simplification of the problem into its basic form or into parts so that essential information is not lost, the ability to select and solve important parts of the problem and ignore irrelevant parts, rough path planning, abstract solution design, the ability to work with diagrams and schematic forms of the problem, etc.

- Algorithmic thinking

Algorithmic thinking is defined for this testing as concrete planning of a solution to a problem with steps, the ability to design a solution to a problem before it is rewritten into formal code, creating and reading flowcharts, and informal coding.

The test tasks were subsequently designed to be independent of a particular programming language or environment, which may vary depending on the individual school. At the same time, we required that the test tool could be deployed in the classroom without the need for specialized software (graphical tasks with printing and manual completion options).

Each test task consisted of a complex task, the solution of which required the use of a certain dimension of computational thinking. Specifically, we focused on the dimensions of Algorithmic Thinking, Abstraction and Decomposition, and Syntax and Coding. The constructed set of tasks was subjected to an expert review, in which 22 experts from among computer science educators and methodologists participated. The prerequisites for the selection of the evaluators were a qualification in computer science teaching, experience in the development of computational thinking and at least five years of experience. These experts evaluated the difficulty of the test question for a fifth-grade student, validity and the specific

dimension predominantly represented in the solution of the question. The following figure illustrates the design principle of the tasks created.

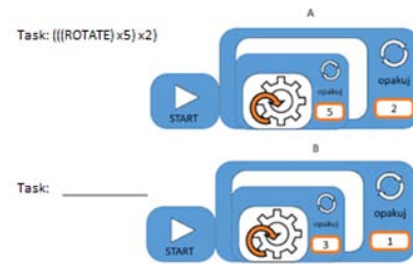


Figure 3.: Example of a test task focusing on the syntactic dimension of computational thinking

4.1 Statistical verification of the measuring instrument

Following statistical validation of the properties of the developed didactic test based on data from the universal testing of primary school pupils confirmed that the developed didactic tool meets the necessary prerequisites for a standardized test. The standard requirements for didactic test sensitivity, i.e., for $Q = 20$ to 30 and $Q = 70$ to 80 , $d \geq 0.15$ and for $Q = 30$ to 70 , $d \geq 0.25$, were required as satisfactory sensitivity values. Since none of the questions with extreme difficulty ranks scored $d < 20$ and none of the moderately difficult questions scored $d < 25$, the minimum test sensitivity requirements were met.

Table 1: Calculation of the difficulty value and ULI for the final version of the test

Question number	Value Difficulty (Q)	ULI (d)
1	20	0,28
2	24	0,24
3	37	0,3
4	32	0,32
5	30	0,38
6	44	0,26
7	53	0,35
8	55	0,25
9	60	0,35
10	57	0,4
11	72	0,33
12	64	0,33

Determining the reliability of the final set of questions according to the Spearman-Brown formula: for the final, medium version of the test, the Pearson correlation coefficient was calculated as $r = 0.432071794$. Thus, the reliability coefficient according to the Kuder-Richardson formula takes values $r_{sb} = 0,603$.

Although the reliability coefficient is close to the cut-off value typical for a test with a low number of questions (0.60), it is satisfactory for the given set of items ($n = 12$). However, to be on the safe side, given the low reliability value determined by halving the test set, we proceeded with a combined reliability check and performed a determination of the internal consistency measure of the items using Cronbach's alpha.

Thus, Cronbach's alpha for the final set of questions was determined as $\alpha = 0.602625667$. This figure is virtually identical to the reliability coefficient calculated by the Kuder-Richardson halving method, which was determined to be 0.603. Thus, the resulting coefficient is consistent for the two methods used. Consequently, it can be concluded that the set of questions, despite the relatively low value of the reliability coefficients, fulfils the minimum requirements for a reliable test with a low number of questions ($n = 12$).

Validation of the difficulty Q , sensitivity d and reliability coefficients of the set of questions therefore showed that the test meets the requirements for a standardized test. At the same time,

based on expert assessment of validity, it demonstrably measured the development of computational thinking.

4.2 Test sample

The sample of pupils tested consisted of 741 fifth grade pupils in primary schools in the Czech Republic. The majority, 60%, were aged 11 years, 31% were aged 10 years, 6% were aged 12 years and 3% reported "other age". In terms of gender representation, 53% ($n = 394$) of pupils were male and 47% ($n = 347$) were female. The final test was distributed to respondents between January 2023 and May 2023.

Table 2: Composition of the research sample of tested pupils

Criterion	Number of pupils by criterion	
Gender	Female	347
	Male	394
Age	10	253
	11	419
	12	39
	13	12
	Different age group	18

The collected data were first subjected to an analysis aimed at examining the dependencies between gender and age of the respondents. At this stage of the analysis, we set 2 research questions:

- Q1: Does the development of computational thinking differ between boys and girls?
- Q2: Does the age of students influence the development of computational thinking?

The following 2 hypotheses emerged:

H_{10} : There are no statistically significant differences between the results of boys and girls.

H_{20} : There are no statistically significant differences between the results of pupils of different ages in grade 5.

To evaluate the correlations between the data, we used Spearman's correlation coefficient processed using Statistica 12 software. Correlations were considered significant at the level of $p < 0.05$.

Table 3: Spearman's correlation coefficient processed using Statistica 12 software

Variable	Spearman correlation variable, significant at $p < 0.05$ level.		
Result	1,000000	0,12250	0,054863
Age	0,12250	1,000000	0,12250
Gender	0,054863	0,12250	1,000000

As it is clear from the table above, the differences in the success rate of the didactic test in the context of their gender and the age of the tested are statistically insignificant. Therefore, we accept both hypotheses H_{10} and H_{20} . Given that these were pupils from the same classes, i.e. with the same level of education, we had expected this condition. Nevertheless, this is a crucial finding. If pupils of different ages in the same educational level were shown to have different results in the overall development of computational thinking, it would mean that there are other psychological aspects of cognitive development which have a significant influence on the development of computational thinking. This would be necessary to consider in any pedagogical intervention. At the same time, from our point of view, the results confirm that the constructed measurement tool of computational thinking works well.

5 Analysis of the survey results

First, we analysed the summary test results using primarily the non-parametric Mann-Whitney test, which does not test the agreement of the means of two independent samples but determines the extent to which their distribution functions agree. This is a non-parametric analogue of the Student's t-test.

We set the null hypothesis:

H_{10} = There is no statistically significant difference between the test scores of students who are educated using an alternative method of teaching mathematics (Hejny method) and students who are not educated using this method.

Against the aforementioned, we set the alternative hypothesis:

H_{1A} = There is a statistically significant difference between the test results of pupils who are educated by an alternative method of teaching mathematics (Hejny method) and pupils who are not educated by this method.

N_{1} ...pupils educated using the Hejny method ($N_1=231$)

N_{2} ...pupils educated using the classical method ($N_2=510$)

Table 4: Mann-Whitney U Test showing no statistically significant difference between the test scores of students

variable	Mann-Whitney U Test (w/continuity correction)				
	By variable Hej=1 class=0				
	Marked tests are significant at $p < 0.05000$				
	Rank Sum Group 1	Rank Sum Group 2	U	Z	P-value
Suma	84411,5	190500	57615,5	-0,482	0,6330
variable	Z adjusted	p-value	Valid N Group 1	Valid N Group 2	
Suma	-0,4816	0,63	231	510	

It is clear from the table that the null hypothesis cannot be rejected, i.e. there are indeed no statistically significant differences between the overall results of the students between the two groups. A control test (using the Kolmogorov-Smirnov test) led to the same results.

We also performed a test using the parametric Student's t-test, which confirmed our findings, too.

Table 5: Student's t-test showing no statistically significant difference between the test scores of students

variable	T-tests > Grouping Hej=1; class=0				
	Group 1: 1				
	Group 2: 2				
	Mean 1	Mean 0	t-value	df	p
Suma	6,7793	6,9118	-0,73558	739	0,4622
variable	Std. Dev. 1	Std. Dev. 0	Valid N Group 1	Valid N Group 0	

Suma	2.3385	2,2413	231	510	
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In further analyses, we focused on a more detailed examination of the individual subcategories-dimensions of computational thinking, which corresponded to the division of four consecutive questions into three dimensions

Q1 to Q4 to determine the level of "Algorithmic Thinking"

Q5 to Q8 to determine the level of "Abstract thinking and decomposing"

Q9 to Q12 to determine the level of "Syntax and Coding"

We set null and alternative hypotheses for the summative test results in the sub-dimensions:

H_2O = There is no statistically significant difference between the test results in the dimension "Algorithmic thinking" of pupils who are educated by an alternative method of teaching mathematics (Hejny method) and pupils who are not educated by this method.

Against this, we have constructed an alternative hypothesis:

H_2A = There is a statistically significant difference between the test results of the "Algorithmic thinking" dimension of pupils who are educated by an alternative method of teaching mathematics (Hejny's method) and pupils who are not educated by this method.

Similarly, we set hypotheses H_3O , H_3A for the dimension "Abstract thinking and decomposing" and H_4O , H_4A for the dimension "Syntax and coding".

Table 6: Mann-Whitney U Test for the dimension "Syntax and coding"

variable	Mann-Whitney U Test (w/continuity correction)				
	By variable Hej=1 class=0				
	Marked tests are significant at $p<.05000$				
	Rank Sum Group 1	Rank Sum Group 2	U	Z	p-value
Sum Q1-Q4	85198,5	189713	58402,5	-0,186	0,85245
Sum Q5-Q8	83653	191258	56857	-0,7586	0,44808
Sum Q9-Q12	85737	189175	588670	0,01297	0,9897
	Z adjusted	p-value	ValidN Group 1	ValidN Group 2	
Sum Q1-Q4	-0,196	0,8450	231	510	
Sum Q5-Q8	-0,787	0,4313	231	510	
Sum Q9-Q12	0,0134	0,9893	231	510	

Since the p-value is greater than the significance level, we do not have enough evidence to reject the null hypothesis. This suggests that the differences between the groups are not statistically significant, and none of the hypotheses H_{2O} , H_{3O} and H_{4O} could be rejected. The results of the two treatment groups in the areas of algorithmic thinking, abstract thinking, and syntax and coding

do not show significant differences, and thus the method of mathematics instruction does not affect the test results of the treatment groups.

In the last stage of the investigation, we examined the results in even greater detail, going down to the level of the results of the individual questions designed to investigate the level of development of each dimension of computational thinking.

Table 7: Mann-Whitney U Test of each dimension of computational thinking

	Rank Sum Group 1	Rank Sum Group 2	U	Z	Rank Sum Group 1
Var6	82768,5	192142,5	55972,5	-1,0863	0,277334
Var7	86929,5	187981,5	57676,5	0,45498	0,649121
Var8	85867	189043,5	58738,5	0,0615	0,950958
Var9	82206	192705	55410	-1,2947	0,195411
Var10	85089	189882	58293	-0,2265	0,820762
New var1	89023,5	185877,5	55582,5	1,23083	0,218388
New var2	84496,5	190414,5	57700,5	-0,446	0,655531
New var3	83998,5	190912,5	57202,5	-0,6306	0,5283
Var2	84525	190386	57729	-0,4355	0,663176
Var3	85858	189052,5	58747,5	0,05817	0,953613
Var4	85716	189195	58890,5	0,00537	0,995713
Var5	84126	190785	57330,5	-0,5833	0,559648
	Z adjusted	p-value	Valid N Group 1	Valid N Group 2	
Var6	-1,6248	0,104194	231	510	
Var7	0,52938	0,596545	231	510	
Var8	0,07119	0,943248	231	510	
Var9	-1,5019	0,133112	231	510	
Var10	-0,2673	0,789179	231	510	
New var1	1,42125	0,155246	231	510	
New var2	-0,5185	0,604093	231	510	
New var3	-0,8151	0,415014	231	510	
Var2	-0,6305	0,52833	231	510	
Var3	0,07817	0,937696	231	510	
Var4	0,00642	0,994881	231	510	
Var5	-0,8078	0,1922	231	510	

Again, there were no statistically significant differences in responses between the two groups.

6 Summary and discussion of the results

As the above analysis shows, in the test of the level of development of computational thinking in fifth-grade pupils conducted by our standardized didactic test, no significant differences were found between the results of the two groups studied, neither in the overall result of the pupils nor in the subdimensions of computational thinking monitored by the test. Thus, when comparing the performance of pupils taught using the Hejny method of teaching mathematics and the global

sample of pupils taught using the classical method of teaching mathematics, there were no statistically demonstrable differences. For both groups, the development of the level of computational thinking was almost identical.

This conclusion is based on the results of the statistical tests, which showed no statistically significant differences between the groups of pupils taught by different methods, neither in individual questions nor in the broader categories of ALG (Algorithmic Thinking), ABS (Abstract Thinking and Decomposing) and SYN (Syntax and Coding).

Thus, we were unable to demonstrate the original tendency observed for pupils from schools with parallel mathematics teaching using both the Hejny and 'classical' methods, where pupils taught using the Hejny method performed significantly better, despite having the same computer science teacher. Therefore, according to our research, it is demonstrable that pupils taught using the principles of Hejny mathematics have the same developed computational thinking as pupils taught using the classical method of mathematics teaching. Within the tested global sample, the method of teaching mathematics did not influence the students' computational thinking.

There are several possible explanations why this may be the case. First, the Hejny method focuses primarily on developing mathematical thinking through discovery and group work, which may develop skills other than those directly needed for solving computer science problems. While it may promote a deeper understanding of mathematics, this understanding may not automatically translate into better performance in computer science.

Furthermore, it is possible that the computer science problems on the test did not require skills which are specific to one or the other method of teaching mathematics. The dimensions of computational thinking studied and analyzed are areas which may be more directly influenced by the computer science instruction than by the method of mathematics instruction. Also, in both groups, students could use different strategies but with similar effectiveness, leading to comparable results.

Another factor may be the homogeneity of the groups, where differences between students may be due to other variables such as individual ability or interest in computer science, and not necessarily the method of mathematics instruction. Teacher influence, a particular curriculum or level of preparation for computer science could also play a role in the results.

Overall, we can therefore conclude that the influence of the method of mathematics teaching on achievement in computing areas is not clear-cut and that other factors, such as direct teaching of computing, may be more important in influencing these skills, also depending on the teaching style of the teacher.

Determining the method of teaching mathematics understandably represents a certain limit of research. The inclusion of individual test respondents in the group taught by the Haynes method of mathematics teaching depended purely on the teacher's statement, without dealing with other phenomena such as the teacher's approbation or the application of the method in practice. Similarly, we did not examine or investigate the extent to which teachers who do not teach their students using the Hejny method use elements of constructivism in their teaching.

7 Conclusion

Computational thinking is a new and still developing concept, the nature and implications of which for education are still being researched. Currently, the attention of experts focuses on the possibility of targeted development of computational thinking in students across subject areas. One of the explored ideas is the possible interconnection of computational and mathematical thinking. In our research, which focused on the influence of alternative teaching methods of mathematics that could potentially affect pupils' development.

On the basis of our research, we have shown that the method of teaching mathematics in our sample of Czech students did not affect the development of their computational thinking. Pupils taught by the alternative teaching method achieved statistically similar results in a test focused on computational thinking as pupils taught by the classical method of teaching mathematics.

We consider this conclusion potentially useful for targeted development and evaluation of the development of computational thinking in the population as it implies that computational thinking can be developed to the same quality regardless of the teaching style or the focus of the school. In our view, this trend corresponds to the broad potential of computational thinking in various non-STEM fields. However, the specifics of developing students' computational thinking in cross-curricular areas are still a relatively unexplored area. From our point of view, it is important that different teaching styles do not potentially affect the development of the learner and are of the same quality as those teaching styles that are considered traditional.

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Primary Paper Section: A

Secondary Paper Section: AM

UNVEILING THE HIDDEN VALUE: CRITICAL DETERMINANTS OF CORPORATE INTANGIBLE ASSETS

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This research was supported by the Slovak Scientific Grant Agency as part of the research project VEGA No. 1/0638/22 Intellectual capital and productivity of the regions.

Abstract: This paper examines the key determinants of corporate intangible assets by analysing financial data from 250 publicly traded companies in Germany, France, and Switzerland over a ten-year period (2009-2018). Through panel regression analysis, we identify significant relationships between intangible asset intensity and various firm-specific characteristics. The findings reveal that while firm size positively correlates with intangible assets, higher levels of tangible assets and cash reserves are associated with a decrease in intangible asset intensity. Surprisingly, R&D expenditures and patents do not show a statistically significant impact on intangible asset value, suggesting potential limitations in how financial statements capture innovative activities.

Keywords: R&D, patents and trademarks, intangible assets intensity, panel regression, determinants of intangible assets.

1 Introduction

The rise of the knowledge economy, coupled with rapid advancements in scientific and technological progress, has necessitated a reassessment of the importance of traditional sources of economic value creation at both macroeconomic and microeconomic levels (Dosso & Vezani, 2019). As a result, over the past decades, there has been a consistent increase in investments in intangible assets and research and development initiatives (Andersson & Saiz, 2018). This trend has been marked by a rising share of intangible assets in the market capitalization of global stock indices. The global annual study Brand Finance (2023) illustrates this shift, showing that the share of intangible assets in the market value of the S&P 500 index soared to over 90% in 2023, up from just 17% in 1975. The 2023 study results reveal significant global trends in intangible asset investments, with the United States, Ireland, Denmark, the United Kingdom, and France leading in this domain. American companies like Apple, with a 74% increase in brand value to \$517 billion in 2023, and NVIDIA, with a 163% increase to \$44.5 billion, are taking the lead. European telecom giant Deutsche Telekom has also seen a 17% rise in brand value to \$73.3 billion in the same year. The key factor for these companies is their successful and intensive implementation of digital transformation initiatives in their business models, which boosts the value of their intangible assets. At the corporate level, this growth in intangible assets has become a crucial source of shareholder wealth (Masulis et al., 2023). These intangibles are crucial because they significantly enhance the companies' brand value and competitive edge in the market. This fact leads us to the following question: What are the crucial determinants of this hidden value behind intangible assets?

2 Literature review

The available literature on intellectual capital and intangible assets highlights several factors that can influence a company's motivation to invest in new knowledge. A key determinant of the value of intangible assets at the company level is the industry in which it operates. Industry characteristics shape strategic decisions about accumulating intangible assets and developing intellectual capital. In general, companies operating in technology-intensive industries tend to invest more in intangible assets and focus heavily on their intellectual capital. This is achieved through the development of human capital, the adaptation of organizational structures to new business models, and often the creation of entirely new products. Additionally, industry-specific characteristics determine how companies acquire new knowledge and expand their existing base of

intangible assets. Uppenberg & Strauss (2010) highlighted differences in how knowledge acquisition occurs between the manufacturing sector and the services sector. While companies in industrial manufacturing obtain intangible assets primarily through funding research and development (R&D) activities, firms in the services sector tend to acquire new knowledge more through direct interactions with customers, business partners, or potential competitors, rather than through financial investments in R&D.

The value of intangible assets is significantly determined by the level of industry concentration. This relationship underscores the critical role of industry dynamics in shaping companies' competitive strategies and market positioning. According to Crouzet & Eberly (2019), as industry concentration increases, there is a corresponding rise in the value of intangible assets within individual firms and across industries. Leading firms within an industry play a pivotal role in creating new intangible assets, leveraging their bargaining power to increase market share and thereby influencing industry concentration levels.

In addition to industry characteristics, the value of intangible assets is directly and indirectly influenced by the individual attributes of a given company. Policies implemented by the company's governance bodies (shareholders, board of directors, management) affect corporate decisions regarding the disclosure of information related to intangible components of intellectual capital. Consequently, these policies determine the reported value of intangible assets in the company's financial statements (Li et al., 2008; Hidalgo et al., 2011). Moreover, by capturing and disclosing more comprehensive non-financial information about intangible assets, companies can reduce information asymmetry between themselves and third parties, including potential investors and analysts. This improved transparency can lead to more favourable financing conditions, as stakeholders gain a better understanding of the company's risk profile. In this context, research has shown that compensation structures can influence executives' investment decisions in fixed intangible assets. Specifically, cash bonuses are associated with increased investment in these assets, while stock bonuses tend to have a negative impact, with effects varying based on factors such as firm growth, internal cash flow, and leverage (Adu-Ameyaw et al., 2022). Additionally, Lemmon and Lins (2003) highlighted that a company's ownership structure also plays a critical role in determining its overall value, including the value of its intangible assets. This is influenced by the decisions of majority shareholders regarding the allocation of financial resources to investment projects.

Moreover, investments in research and development are a crucial way for companies to acquire new knowledge and expand their existing base of intangible capital. This can lead to future cash flows and positively impact the company's market value (Griliches, 1981; Elsten and Hill, 2017). Given that the disclosure of information on corporate investments in R&D and the resulting creation of intangible assets is not mandatory, the value of R&D expenditures reported in company accounts provides only a partial picture of a company's innovative activities. Nevertheless, Grandi et al. (2009) emphasize that investors tend to consider the reported value of R&D expenditures when making investment decisions, indicating that the reported value of R&D investments can potentially determine a company's market value.

In discussing the impact of company characteristics on the value of its intangible assets, the growth rate of sales is often considered a proxy variable that reflects the growth opportunities utilized by a company. Continuous sales growth indicates that the company is effectively capitalizing on market opportunities to increase its overall revenues, thereby enhancing its overall value (Tsai et al., 2012). Furthermore, the past utilization of growth potential serves as an indicator of positive future growth

prospects, which in turn influences the increase in the share of intangible assets in the company's market value (Rao et al., 2004). Besides the growth rate of sales, corporate profitability also plays a crucial role in the value of intangible assets. According to Lu et al. (2010) and Rao et al. (2004), corporate profitability has a significantly positive impact on the value of intangible assets and the associated growth in market value. Investors on financial markets tend to positively evaluate companies with higher profitability, anticipating potentially higher future cash flows. For instance, Omoye & Ibadin (2013) note that achieving higher profitability motivates companies to disclose information about intangible assets in their financial statements. This increases the reported value of intangible assets, thereby encouraging potential investors to make investment decisions in favour of the company.

The company characteristics such as company size, age, and debt levels are factors that can profoundly influence the value of reported intangible assets and shape the intensity of R&D and innovation activities. According to Min and Smyth (2015), larger company size tends to positively correlate with higher levels of R&D expenditures. Conversely, high levels of debt negatively impact the relationship between R&D intensity and the company's growth opportunities. Given the fact that investments in research and development are considered risky with high uncertainty about future benefits, companies whose business models do not hinge on creating new knowledge and added value may lack sufficient motivation to allocate more funds to R&D activities and professional training for employees. Many member countries of the European Union utilize their tax systems to stimulate investments in R&D and adequate training related to R&D project execution (European Commission, 2016a). According to a study conducted by the European Commission (2016b), most EU member states employ targeted tax incentives or direct subsidies to support R&D. Becker (2015) highlighted that public sector investments in R&D can stimulate R&D intensity in the private sector at the firm level. The author underscores that enhancing the connection between science and economic practice, supporting investments in university research, and fostering highly skilled human capital can encourage companies to allocate larger financial resources to R&D.

3 Methodology and data

In this study, we analyse a dataset of financial information from publicly traded companies across various industries in selected European countries. The main goal of this study is to evaluate how different factors influence the intensity of intangible assets in companies. To achieve this, we developed a set of variables, presented in Table 1, which were then analysed using panel regression in the statistical software R.

The data, sourced from the "Orbis" database, have been cleaned to remove any missing observations. The dataset initially included 4687 European companies with available data on R&D and intangible assets expenditures over the ten-year period. After removing inaccurate and missing data, the final dataset consists of 250 companies, organized into a long, balanced panel with 2500 observations, covering the ten-year period from 2009 to 2018. Our dataset includes small, medium-sized, and large companies operating in various industries across three countries, namely: Germany, France, and Switzerland. The descriptive statistics of the data is presented in Table 2.

To examine how various variables affect the intensity of intangible assets, we initially employed a basic regression model, which was later adjusted to account for the panel data structure. Green (2002) highlights that panel models are characterized by the presence of heterogeneity among individual cross-sectional units. In this context, the basic panel data model is represented by the following equation:

$$y_{it} = \mathbf{x}'_{it}\boldsymbol{\beta} + \mathbf{z}'_{it}\boldsymbol{\alpha} + \varepsilon_{it}$$

where \mathbf{x}'_{it} denotes a vector of explanatory variables containing K regressors without a constant term. Heterogeneity and individual effects are captured by the term $\mathbf{z}'_{it}\boldsymbol{\alpha}$, where \mathbf{z}' includes a constant component and a set of individual or group-specific variables that may be either observable (e.g., geographical location) or unobservable (e.g., specific skills and individual heterogeneity), but are assumed to be constant over time. If the variable \mathbf{z}' is observable for all individual entities in the dataset, the entire panel data model can be estimated using Ordinary Least Squares (OLS). However, if \mathbf{z}' is unobservable, which is common in real-world economic data, OLS does not provide consistent estimates of the regression coefficients.

Table 1 Variables used in analysis

Dependent Variables	
IA/BV	Intangible assets intensity = book value of intangible assets/book value of total assets.
Independent Variables	
TA/BV	Tangible assets intensity = book value of tangible assets/book value of total assets.
Cash/BV	Cash holdings intensity = book value of cash holdings/book value of total assets.
EBITDA/BV	Profitability = EBITDA/book value of total assets.
SALES/BV	Sales intensity = book value of sales/book value of total assets.
Control Variables	
LEV	Leverage = long term debt/ book value of total assets.
SIZE	Firm size = natural logarithm of number of employees.
AGE	Firm age measured by the number of years since the company's incorporation.
Dummy Variables	
R&D	A dummy variable that takes a value of 0 or 1, indicating the absence (0) or presence (1) of R&D expenditures for the given year.
PATRADE	A dummy variable that takes a value of 0 or 1, indicating the absence (0) or presence (1) of patents and trademarks for the given year.

Source: own elaboration

We analysed the relationship between variables using three distinct modelling approaches: the pooled regression model, the random effects model, and the fixed effects model. To assess whether a panel model with fixed or random effects is more appropriate than the pooled regression model, we applied the F-test (pFtest) and the Honda test (Lagrange Multiplier Test). The results of the pFtest ($F = 77.481$, $df1 = 248$, $df2 = 2242$, $p\text{-value} < 0.000$) and the Honda test (normal = 93.445, $p\text{-value} < 0.000$) confirmed that the panel regression model with fixed or random effects is more suitable than the pooled regression model.

Following the Hausman test, we determined that the fixed effects model—whether time-fixed or individual-fixed—is more appropriate than the random effects model. The Hausman test ($\chi^2 = 13.039$, $df = 8$, $p\text{-value} < 0.000$) indicated that the fixed effects model provides a better fit for the data, as it accounts for unobserved heterogeneity that could bias the estimates in the random effects model. Applying the F-test (pFtest) for individual effects ($F = 1.0023$, $df1 = 8$, $df2 = 2234$, $p\text{-value} < 0.000$) led us to conclude that a time-fixed effects model is preferred for analysing the relationships between variables in our study.

$$Y = \alpha + \beta_1 TA/BV + \beta_2 Cash/BV + \beta_3 EBITDA/BV + \beta_4 SALES/BV + \beta_5 LEV + \beta_6 SIZE + \beta_7 AGE + \beta_8 R\&D + \beta_9 PATRADE + \varepsilon$$

where Y represents the dependent variable, specifically indicating the intensity of intangible assets. The $\beta_1 \dots \beta_9$ in the model denote the effects of tangible assets, cash, EBITDA, sales, leverage, firm size, age, R&D expenditure, and patent activity on the dependent variable Y .

Table 2 Descriptive statistics of the variables used in analysis

Variable	Mean	SD	Min	1Q	Median	3Q	Max
IA/BV	0.220	0.170	0.000	0.082	0.190	0.326	0.830
TA/BV	0.180	0.170	0.000	0.051	0.130	0.267	0.940
Cash/BV	0.130	0.110	0.000	0.063	0.100	0.172	0.840
EBITDA/BV	0.100	0.080	-0.860	0.064	0.100	0.135	0.470
SALES/BV	0.950	0.530	0.000	0.610	0.880	1.188	4.630
LEV	0.140	0.120	0.000	0.040	0.120	0.215	0.620
SIZE	7.880	2.180	0.690	6.240	7.670	9.140	13.700
AGE	46.420	27.330	13.000	28.000	40.000	61.000	201.000

Source: own elaboration

The final model, which incorporates fixed time effects, was subsequently subjected to a series of diagnostic tests. The Breusch-Godfrey/Wooldridge test ($\chi^2 = 1851$, $df = 10$, $p\text{-value} < 0.000$) identified the presence of serial correlation in the idiosyncratic errors, while the Breusch-Pagan LM test for cross-sectional dependence in panels also confirmed serial correlation within these errors test ($\chi^2 = 65524$, $df = 31125$, $p\text{-value} < 0.000$).

According to Wooldridge (2009), serial correlation in idiosyncratic errors ε_{it} is a common issue in panel data analysis. A recommended solution in such cases is to recalculate the standard errors using the robust variance-covariance matrix method proposed by Arellano (Arellano, 1987; Croissant & Millo, 2008). This method was applied in the estimation of the final model parameters in our study.

4 Results

The results of our analysis reveal several key trends in the relationships between intangible asset intensity and various dependent variables. Below, in Table 3, we present the key findings of our panel data analysis, which demonstrate statistically significant relationships between several independent variables and the size of firms' intangible assets.

One of the most notable findings is the strong negative relationship between the ratio of tangible assets to book value of total assets (TA/BV) and the dependent variable, with an estimate of -0.514 that is highly significant at the 0.001 level. This suggests that as a firm's tangible assets increase, there may be a corresponding decrease in its intangible assets. Similarly, the cash holdings (Cash/BV) also exhibit a significant negative relationship, with an estimate of -0.464. This indicates that firms with higher cash reserves tend to have lower levels of intangible assets.

Table 3 Results of panel regression model with time-fixed effects¹

Independent variable	Estimate	Robust Std. Error
TA/BV	-0.514***	0.055
Cash/BV	-0.464***	0.060
EBITDA/BV	0.104	0.085
SALES/BV	-0.074***	0.016
LEV	0.106	0.092
SIZE	0.017***	0.004
AGE	-0.000*	0.000
R&D	-0.014	0.026
PATRADE	-0.002	0.016
R-Squared:	0.372	
Adj. R-Squared:	0.367	

Source: own elaboration

On the other hand, the company's profitability (EBITDA/BV) does not show a significant relationship with intangible assets, as evidenced by an estimate of 0.104. However, our analysis does reveal a small but statistically significant negative effect of the higher sales (SALES/BV), with an estimate of -0.074,

suggesting that higher sales intensity may be associated with a slight decrease in intangible assets.

In contrast to these findings, firm size (SIZE) shows a positive and significant relationship with intangible assets, with an estimate of 0.017. This indicates that larger firms tend to have a more substantial base of intangible assets, which is closely linked to the value of human capital represented by their employees.

Surprisingly, variables directly related to firms' innovative activities, such as the presence of R&D expenditures (expressed as the dummy variable R&D) and the presence of trademarks and patents (indicated by the dummy variable PATRADE), did not show a statistically significant relationship with the intensity of intangible assets in our dataset.

5 Discussion

The results of our analysis contribute to the broader understanding of how various factors influence the value of intangible assets within firms, complementing existing research in the field. Our findings particularly resonate with the established literature on the role of company-specific characteristics, and R&D investments in shaping intangible asset values.

The most striking finding from our analysis is the significant negative relationship between the tangible assets' intensity and the intensity of intangible assets. A negative estimate of -0.514 indicates that as the proportion of tangible assets increases, the share of intangible assets within a firm's total asset base tends to decrease. This suggests that companies with a higher concentration of tangible assets may deprioritize the development and maintenance of intangible assets like intellectual property, brand value, or human capital.

Furthermore, the significant negative relationship between cash reserves and intangible assets in our results supports the idea that companies with larger cash reserves may be more conservative, potentially underinvesting in the creation of intangible assets. This observation is consistent with the findings of Li et al. (2008) and Hidalgo et al. (2011), who emphasize that corporate governance policies influence how firms report intangible assets, impacting their overall valuation. Firms with substantial cash reserves may prioritize financial stability over aggressive intangible asset development, leading to lower reported values of such assets.

Interestingly, while our analysis shows that the corporate profitability (EBITDA/BV) does not significantly influence intangible assets, it contrasts with studies like those of Lu et al. (2010) and Rao et al. (2004), which highlight the positive impact of corporate profitability on intangible asset value. This discrepancy may be attributed to differences in sample characteristics or industry-specific dynamics that were not fully captured in our dataset.

Additionally, our finding that sales growth has a small but significant negative effect on intangible assets contrasts with the work of Tsai et al. (2012) and Rao et al. (2004), who suggest that sales growth reflects a company's ability to capitalize on market opportunities and enhance its intangible asset base. The negative relationship in our analysis might indicate that firms experiencing rapid sales growth are focusing more on scaling

¹ Note: Model represents aggregated results for the entire dataset spanning 250 companies over a 10-years period. The stars denote level of significance. If p-value is less than 0.05 (*); if a p-value is less than 0.01 (**); and if a p-value is less than 0.001 (***).

operations and tangible asset expansion rather than on developing their intangible assets.

The positive relationship between firm size and intangible assets found in our study is in line with the findings of Min and Smyth (2015), who suggest that larger firms are more likely to invest in R&D and innovation, thereby increasing their intangible asset base. Larger firms often have more resources to allocate toward intangible asset creation, which is reflected in our results showing that size is a significant determinant of intangible asset value.

Our results also reveal that variables directly linked to innovative activities, such as R&D expenditures and the presence of patents or trademarks, did not show a statistically significant impact on the value of intangible assets. This is surprising given the extensive literature highlighting the role of R&D in enhancing firm value. For example, Griliches (1981) and Grandi et al. (2009) emphasize that R&D investments are essential for acquiring new knowledge and expanding intangible capital, which ultimately boosts future cash flows and market value. The lack of significance in our findings might indicate that financial statements do not fully reflect the breadth of innovative activities within firms or that the influence of R&D on intangible assets is more complex and mediated by other unaccounted factors. Furthermore, our analysis suggests that firm-specific characteristics have minimal impact on the intensity of intangible assets. This points to a potential issue with how companies disclose information about intangible assets in their financial statements, particularly concerning R&D expenditures and innovation activities. The findings highlight a broader challenge related to the transparency and completeness of reporting on intangible assets.

6 Conclusion

This study analyzed financial data from 250 publicly traded companies in Germany, France, and Switzerland over a ten-year period (2009–2018) to assess factors influencing the intensity of intangible assets. Panel regression analysis explored the relationship between intangible asset intensity and variables such as tangible asset intensity, sales growth, profitability, firm size, leverage, cash reserves, and R&D activities. Our findings contribute to existing literature by revealing the complex interplay between firm-specific characteristics and intangible assets, suggesting that these relationships may be more nuanced than previously understood.

A key limitation is the study's focus on three European countries, which may affect the generalizability of the results. Additionally, the sample size was limited by the exclusion of companies with incomplete or inaccurate data, impacting the analysis of R&D expenditures. Future research should expand the geographic scope to include a broader range of countries and investigate policies that encourage companies to disclose more comprehensive information about intangible assets, enhancing transparency and understanding of these critical value drivers.

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Primary Paper Section: A

Secondary Paper Section: AH

MUSIC EDUCATION: THE PATH TO SOCIAL JUSTICE

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Abstract: Music is a powerful phenomenon that constantly surprises us with its potential. This paper will present the results of our research on the effect of musical activities on individuals at risk of social exclusion and on pupils with special educational needs. We will put our findings into the theoretical framework of the El Sistema programme and the Suzuki Method, from which we have drawn. Based on our results, we will discuss the possibilities of music activities for the social field. We will conclude the paper with a call for a more intensive link between the musical and social spheres to accelerate the social justice process.

Keywords: Special Music Education, Suzuki Method, El Sistema, Social Justice, Special Educational Needs

1 Introduction

Music education aims to bring pupils to music and teach them to perceive, understand, and accept music. Music education can be seen as education about music and education through music. In a broader sense, music education can be situated in the school environment and a wide range of musical activities. Leisure music clubs, home music making, listening to music, learning to play instruments in art schools. There is a music education element everywhere. Of course, one cannot forget the musical arts practised at an elite level in concert halls and opera houses. However, the significant social potential of musical activities is often overlooked. The music presented in any form is not only pleasing to our ears, but it also has a beneficial effect on our souls.

The main aim of this paper is to present to the professional community a summary of the results of a series of qualitative research projects in which we investigated the impact of musical activities on the social and educational competencies of children and young adults involved in musical activities. We were not concerned with the quality of performance, we were not interested in agogics with dynamics, and we did not look at the quality of the violin bow grip or the fitting of the trumpet mouthpiece; we looked exclusively at the social aspects associated with musical activities. We framed the issue of the social and educational impact of music education and musical activities under three main headings. First, we explored new possibilities of special music education for students with special educational needs. We focused on the potential of the arts in the process of resocialisation into the intact population after leaving a residential childcare facility, and we concluded this research trilogy with a research project focusing on the phenomenon of the arts as a tool for social mobility.

In the first part of this paper, we describe the two musical-educational and musical-social concepts that formed the theoretical basis of our research. We will introduce the Venezuelan El Sistema program and the Suzuki method. In these world-renowned concepts linking music with the individual's social sphere, we sought to anchor in our conception of music education and activities. We will then present the most salient findings from our longitudinal investigation of the impact of musical activities on socially vulnerable individuals. We will conclude the paper with a strong plea for a more substantial inclusion of music and arts activities in the educational process.

2 El Sistema

We had the invaluable opportunity to explore the interaction of children at risk of social exclusion with the environment of a leisure music ensemble based on the El Sistema music and social programme. In 2015, we conducted intensive research on the potential of musical activities to accelerate children's educational and social competencies from residential childcare institutions. For three years, we mapped the interaction between children

from a residential facility and the environment of an orchestral ensemble. The El Sistema program's ideas helped us obtain clear evidence of the power and potential of music. We found that music is a phenomenon that does not respect any social constructs and has a positive impact on each individual (Daněk 2024).

El Sistema is a term that has become quite popular abroad in recent years. In the Czech Republic, the situation is different. The subject matter is not well developed, and the available information is not entirely accurate. The El Sistema programme originated in 1975 in Venezuela, South America. Although Venezuela has enormous wealth through substantial oil reserves, it has not escaped social problems. Social disparities were widening. The rural population moved to the cities to find work. In the cities, large-scale exclusion zones were created. Unemployment and social deprivation grew. Children, in particular, suffered from this state of society. They were threatened by pathologies such as crime, violence and prostitution. Children were often forced to neglect their schooling because they had to work. The vanishing chances of getting a promising job drove young people into the community of criminal gangs.

Into this bleak situation came José Antonio Abreu in 1975 with a novel vision. José Antonio Abreu (1939-2018) was a politician, businessman and musician. Abreu responded to the situation in society and offered children the opportunity to receive free music education. He was convinced that with the help of musical activities, it was possible to reduce social problems such as crime and violence. From the beginning, El Sistema's programme was shaped by the founder's vision that music could save children's lives and be an instrument of social change and an effective weapon in the fight against poverty. Abreu believed that music could fundamentally impact the lives of children. He saw music as a tool for social change. Abreu always emphasised the moral and ethical aspects of music. Musical activities can prevent negative social phenomena. Thus, with the support of the Venezuelan government, Abreu founded a youth orchestra program, which he named The System, or El Sistema in Spanish. The official name is FESNOJIV: Fundación del Estado para el Sistema Nacional de las Orquestas Juveniles e Infantiles de Venezuela (Tunstal 2013). In 2011, the name of FESNOJIV was changed to Fundación Musical Simón Bolívar. However, the name El Sistema is generally used.

Precise historical data on the origins of El Sistema is not available. We refer to the descriptions of the origin of El Sistema presented by the authors collaborating with the program. The story of when Abreu founded the first orchestra in a garage is presented. This ensemble is said to have had only 11 members. However, it is now a little-known fact that in the same year, another youth orchestra was formed in Venezuela that worked closely with the original El Sistema program ensemble (Carlson 2016). From a simple garage band, the El Sistema program subsequently spread throughout Venezuela. A significant media breakthrough occurred in 1976 when Abreu presented his orchestra on public television and recited the slogan "Tocar Y Luchar." This slogan became the program's motto, which began to profile itself not as musical but primarily social. El Sistema's program had considerable government support from the start. The Venezuelan government began fully funding the program after only one year of operation.

Abreu was a skilled lobbyist. He made excellent use of his contacts and skillfully guided the El Sistema program through a series of turbulent situations in local politics. He outlasted a series of presidents. His contacts with Venezuela's political and financial top brass are often blamed on him. Critical voices point to the intertwining of the government nomenklatura with the El Sistema programme. However, we must be fair and recall that in the former socialist Czechoslovakia, for example, music was

regularly used as a propaganda tool. So, there is nothing new under the sun in Venezuela, either.

Abreu was not just a politician and economist but a skilled musician. In 1967, he was recognised for his musical abilities and received the National Music Award. Abreu was even Minister of Culture from 1983. The interconnectedness of El Sistema's program with the Venezuelan government nomenclature is evident. The Venezuelan government seized on the El Sistema program to showcase the country's stability and success. Government support for El Sistema continues to this day, even though contemporary Venezuela is experiencing an economic crisis, poverty, social disruption and violence. *Inter Arma, Silent Musae*. According to available information, the El Sistema program is currently struggling with the problem of the departure of teachers and the best players of the orchestras of the El Sistema program. The future will tell if the program can overcome the difficult times in its native country.

Since its beginning, El Sistema has been emphasising its social focus. Music is seen first and foremost as a tool for social change. Authors working on the issue identify the five core ideas of the El Sistema programme as social change, orchestral approach, intensive approach, accessibility, and collaboration (Booth 2011; Govias 2011; Simpson 2017).

Social change. The primary goal is to enable children to achieve social improvement through a musical experience. The program is seen as not musical but primarily social.

Orchestral approach. The children gain musical experience in an ensemble. The emphasis on a collective approach is typical of the programme. Collective learning is presented as an effective way to acquire musical skills.

Intensive approach. Ensembles meet several times a week for intensive rehearsals. At frequent performances, children can showcase and share their progress with others. The program is presented as a social one, where music is meant to be a joyful gateway to a better tomorrow.

Accessibility. Membership in the ensemble is free and open to every child without distinction. The program is designed for the most socially needy.

Collaboration. The orchestral groups collaborate with other agencies, parents, schools and the community.

The results of El Sistema have been the subject of several evaluations (Hallam and Burst 2017). Yes, we can encounter critical voices that do not see the El Sistema programme as ideal. Geoffrey Baker is the most significant critic of the programme (Baker 2016; Baker et al. 2018). However, positive evaluations of the El Sistema program prevail (Hallam 2023). For example, an evaluation commissioned by the Scottish Government in 2011 identified the project's impact on the target group as unequivocally positive (GEN 2011). This research also points to a positive effect for children and young people, their families, and the wider community (GCPH 2015). Other research confirms the positive impact of the El Sistema programme on self-management (Alemán 2017; Harkins et al. 2016). In addition to these benefits, research shows that the project has also had significant financial benefits for society. Factors such as future reductions in crime, improved health, and better social outcomes are considered. The benefits to society are more significant than the resources invested in the project (Cuesta 2011).

The El Sistema program has found resonance in many countries. The moral code and methodology are not seen as dogma but as inspiration for emerging programs. It is necessary to be inspired by foreign experiences, not to unquestioningly and uncritically adopt them (Daněk et al. 2023). Emerging movements, identifying themselves as carriers of the ideas of El Sistema, adapt to the specificities of the target group, culture and traditions of the country (Marshall 2016). The El Sistema

programme has found its place in several dozen countries around the world and hundreds of thousands of children have been given the opportunity to participate in its orchestras. In 2012, the Sistema Europe Association was founded. One of the founding members of Sistema Europe is the Harmony Foundation, which has made the ideals of El Sistema possible in the Czech environment. During our research collaboration, we demonstrated musical activities' positive impact on a wide range of areas (Daněk 2024b). When analysing the music education and instrumental approaches used in the Harmony Foundation Orchestra, it became clear that elements of the Suzuki Method play a significant role in the distribution of music education activities.

3 Suzuki Method

The Suzuki Method is a well-known music education term. The Suzuki Method is familiar to music education experts in the Czech Republic but is not massively spread in the Czech music education environment. Shin'ichi Suzuki (1898-1998) was born into a musical family. His father ran the first violin workshop in Japan. The young Suzuki graduated from a trade school and intensively studied violin at 15. The later he picked up the violin for the first time, the harder he studied the instrument. From a young age, Suzuki was convinced that the primary goal of any endeavour was the individual's wellbeing. His study trip to Germany was key. Here, he not only met his wife, was inspired by his meeting with Albert Einstein, and perfected his violin playing, but above all, it laid the foundation for Suzuki's future method of music education. Suzuki had difficulty learning German in Germany. As he struggled with German grammar and vocabulary, he became aware that young children learn the language without any visible effort. This finding was a turning point in his understanding of music education for Suzuki. Over time, he built up the "Mother Tongue Method" approach. Suzuki's approach is built on several ideas. Suzuki argued that a safe, friendly environment and individualised approach allow children to reach their full musical potential. He believed that every child could understand and master the language of music. Language is a key phenomenon for Suzuki. He argues that it is possible to grasp music education like a mother teaches her child to speak.

How does a child learn to speak? By imitation, by repetition, from the simple to the more complex. A friendly environment is essential for healthy language development. So too for the development of musical skills. Suzuki's approach is based on the idea that no talent is entirely innate, but we can build it with the help of a conscious approach and if we can adapt the educational environment. In 1941, Suzuki published the book *Powerful Education*, in which he introduced his concept of music education to the professional community. However, the times have not been kind to Suzuki. The Japanese Empire entered the war, and music was relegated to the back burner. For the second time, *Inter Arma, Silent Musae* can be heard. However, after the end of the war rampage, Suzuki embarks on a victorious journey through the musical world. Thanks to the rise of television, he becomes immensely popular in the US. From the US, Suzuki Method spread all over the world. We can identify these fundamental principles of the Suzuki Method (Suzuki 1969; Suzuki 1981).

Parental involvement. As in language teaching, the parent must be involved in the educational process when teaching music. Parents should attend lessons with their children and act as home teachers during the week. It is recommended that the parents start learning to play the instrument being taught. Only then are they entitled to demand musical results from the child. The parent's primary task is to create a safe and inspiring environment. Suzuki's emphasis on the role of the parent is thought-provoking today. Often, we see parents completely delegating responsibility for educational outcomes to schools, expecting only educational gains without their engagement.

An early start to education. Early instruction on a musical instrument is essential for developing mental processes and

proper muscle coordination. We start at birth, surround the child with music, listen music with the child. The actual teaching should begin around the age of three. However, it is never too late; everyone is musically educable.

Listening. Language is learned by the child by repeated listening to spoken speech. So, too, music should be listened to every day. Emphasis is placed on selected opuses from the Suzuki repertoire so that when the child begins learning to play the instrument, he or she is already familiar with the works played. The piece being studied should also be known by the parent, in Suzuki's concept of music education, the mother. Suzuki was often criticised for his conception of the family not being in line with emancipatory currents. However, his understanding of family life must be taken in the context of the times. The parent knows, and even ideally can play, the piece being studied, which is seen as the best motivation for the child.

Repetition. Repetition is essential for learning to play an instrument. Children learn the opus, play it, and do not forget it. They store the piece in their musical vocabulary and thus enrich their musical language. Therefore, it is necessary to revisit mastered pieces during the lesson. Suzuki prefers frequent smaller blocks of time to long blocks of practice. He recommends creating a fixed daily schedule of preparation.

Praise. As with language, each child is specific. When we teach children to speak, we often praise them; the same must be valid for music education. As educators and as parents, we must be able to praise a child for mastery, even partial success. We must know that applying a one-size-fits-all education model to a child is impossible. We also support the child in building the ability to praise others. This approach enables us to strengthen social competence. Suzuki develops a positive concept where we replace negative expressions with positive ones.

Learning with other children. In addition to the individual approach, confrontation with other children is also needed. Group learning helps children to share their achievements and motivates them to keep working. However, it is group performance that has become a target for critics. Suzuki, in promoting the possibilities of his method, often presented large groups of children playing the same piece. Opponents interpreted these performances as a demonstration of the herd mentality of Asia. They pointed to the alleged soullessness and lack of musicality in the children's performance. We can disagree with this approach and instead point to the method's effectiveness in enabling children with different aptitudes and dispositions to master technical problems. Suzuki Method sees joint lessons as a way to socialise the child and build the ability to listen to others. Joint lessons also strengthen the ability to work as a team. However, the foundation of teaching is laid on individual teaching.

Repertoire. Children who acquire their native language do not practice individual language problems but use the language in their everyday lives. The repertoire of the Suzuki Method is tailored not to individual technical challenges but is placed in the context of the music itself. It does not focus on dry technique; it aims at the holistic potential of the music. The iconic tune of the Suzuki Method is the children's song *Twinkle Twinkle Little Star*. Suzuki has worked this simple melody into exercises that target particular technical issues in the violin play. However, Suzuki encourages students to expand their musical horizons and find inspiration in other musical genres.

Reading the scores. Suzuki points out that a child learns to read only after mastering speaking. He makes the same point for music. The child will be given music notation only after he has mastered the technique of playing an instrument. Playing by heart is preferred. When playing by heart, the child is not distracted by the music part and can concentrate entirely on the music itself. Suzuki does not diminish the importance of musical notation. He states that the ability to read music notation is one of the fundamental skills of music. However, Suzuki warns against too much emphasis on musical notation. Again, he refers

to the spoken word. He argues that we do not learn to speak from books but acquire our ability to speak primarily by listening. Suzuki greatly emphasises mothers' involvement in the music education process. Mothers should be able to read music to convey written music to their children. Suzuki does not just target the child alone; he extends the scope to the child's family, especially the mothers. Involving the parents in the teaching is very effective. However, we often encounter the reluctance of parents who altruistically claim to be musically uneducated.

The Suzuki Method has many supporters among music educators and top performers alike. Suzuki associations have sprung up worldwide; ironically, the least interest in the Suzuki approach is in Japan itself. The famous cellist Yo-Yo Ma is the most well-known figure in the music world associated with the Suzuki Method. However, we also see many opponents of the method. First, they claim that the Suzuki Method is based on the mechanical repetition of compositions, where musicianship is not developed. We beg to differ. The Suzuki Method sees music as a tool for developing an individual's quality. Suzuki sees music as a means of personal growth. He sees each child as a unique individual. After two years, it is assumed that each child can master the basics of playing a musical instrument. If they persevere through two more years of study, each one finds themselves on the path to mastery. However, Suzuki points out the need for regular practice, which is impossible without achieving quality results.

The Suzuki Method's primary goal is to allow the child to develop a complex personality. The method is not intended to produce child prodigies. However, many pupils go on to further their musical education. Suzuki emphasises the person of the teacher, who should have a wide range of knowledge. Character traits carry more weight than musical skills at Suzuki. When studying methodological manuals, the interdisciplinary grasp of music teaching is evident. Suzuki does not take music out of the educational reality but emphasises the important role of music in a child's education. Looking at Suzuki, we see a humble educator who believes that music can improve a person's life. He rejects mindless practising to exhaustion, seeking joy in music to motivate the child.

4 Our contributions to the field of the social reception of musical activities

El Sistema and Suzuki Method have several common features. Music education models are applicable across cultures (Mehl 2009). Like Suzuki Method from Japan, El Sistema from Venezuela has established a firm place in several different cultures. The influence of musical activities on language development is apparent (Brandt et al. 2012). Musical activities also vigorously promote prosocial behaviour (Trainor and Cirelli, 2015). The positive impact on developing communication skills for individuals with autism spectrum disorders cannot be overlooked (Sharda et al. 2018). Today, we often delegate the responsibility for education to the school, but the Suzuki Method reminds us of the irreplaceable role of parents (Einarson et al. 2022). Musical activities can also serve as a tool for social mobility (Vincent and Ball 2007). The Suzuki Method motivates a holistic view of the educational process (Thompson 2016, Hendricks et al. 2021). In the Suzuki Method, there is a strong emphasis on positive connections between educational actors (Colpritt 2000; Hendricks 2011). Significantly similar results can be observed in the El Sistema program. Children's wellbeing is significantly improved through membership in the El Sistema programme (Sperling et al. 2023; Merati et al. 2019), and research suggests a positive impact on neurocognitive function (Hedayatiet al. 2016). In particular, participation in shared musical activities greatly enhances soft life skills (Bussu and Mangiarulo, 2024). As research shows, the musical activities offered in the El Sistema program have significant socialisation potential (Bolden et al. 2021). Engagement in community work is a strong positive (Habibi et al. 2022). The impact of musical activities on educational outcomes is clear (Holochwost et al. 2017).

For this paper, we have compiled three of our previous research projects, in which it has been shown that arts activities have a significantly positive impact not only on pupils with special educational needs but also on individuals at risk of social exclusion (Daněk 2024a; Daněk 2024b). We know that our findings can hardly compete with the integrity of the Suzuki Method or the comprehensiveness of the El Sistema program. Nevertheless, some of the findings could enrich the current knowledge in special music education and the integration of education's musical and social components.

When observing online teaching during the COVID-19 epidemic, we found that the subject of music education was not given the same attention as other subjects. It would be more accurate to say that music education received almost no attention. In mainstream schools, music education is not one of the subjects that are perceived as important. We can only speculate what impact this approach to music education will have on future generations. There is a danger that the coming generations will have a more difficult contact with the arts because they have not been able to form a sufficiently strong bond with the arts, which should be conveyed in the family and school. Education should lead to art because art must be accessible to all social classes.

Furthermore, we found that the implementers of the music activities for our target group, i.e. children with special educational needs, were erudite musicians and music educators. However, they did not have sufficient experience working with children with special educational needs. The music educators we interviewed told us that they had not come into significant contact with the issue of special educational needs during their professional training. They approached problems arising from special educational needs, believing they could be solved by standard means. However, special education issues require special education intervention. When working well with children with special educational needs, it is imperative to thoroughly understand their social environment and social skills to assess their behaviour realistically (Hammel and Hourigan 2013). The demands placed on the intact population may be beyond the capabilities of children with special educational needs. This omission can result in an experience of failure, resulting in an adverse reaction from the child and an end to involvement in musical activity.

Our research has demonstrated artistic competence in most individuals involved and studied. However, the target group significantly lacks competencies that enable them to perform and, more importantly, persist in artistic activities. Respondents identified several factors influencing their approach to arts activities. We can mention social determinants, lack of long-term guidance, difficulties with the language of the artistic environment, and lack of intrinsic motivation predominate. However, artistic activities have significant potential for the group we studied. Individuals with special educational needs often possess considerable creative potential (Kapoula et al. 2016). Their creativity and creative abilities can be a compensatory and pro-growth factor. If we activate artistic competencies in our target group, we will significantly facilitate the integration phase into an intact society. These findings show the considerable potential for resocialisation not only in musical activities but also in art as such. Indeed, in today's society, communication and creative skills are valued and are directly linked to artistic activities (Nazario 2022). However, based on our results, it is clear that the target group has to overcome several obstacles. Our pedagogical duty is cultivating the educational reality to eliminate possible discriminating factors. Gradually, we have realised that an inclusive concept of education does not reduce quality; it reduces barriers. At the same time, we cannot expect the same results but must insist on equal opportunities. Everyone has the right to access education but must not, by consuming this right, restrict other participants in the educational process. It is necessary to give access to the arts to the broadest possible strata to socialise the arts. The arts have a quite extraordinary ability to influence every area of our lives positively. We are convinced that art has an irreplaceable

place in modern education; it must be accessible, open, welcoming, and developing. Art must be an elite phenomenon, not a phenomenon of the elites.

Art not only enriches our souls but has a positive impact on many areas of our lives. Through artistic activities, we acquire creativity, improve communication skills, and experience a sense of accomplishment and self-fulfilment. All of this, in turn, positively influences our employment opportunities, allowing us to climb the social ladder to positions that would be more difficult to reach without the help of artistic activities. For our target group, arts activities can be a unique (and often the only) way to overcome the dangers of social exclusion and cope with the demands of their special educational needs. However, it will be necessary to embrace the idea that special educational needs and social exclusion do not preclude the ability to benefit from arts activities and that special educational needs may hide exceptional talent. If we are willing to look for artistic talent even in environments at risk of social exclusion, we will surely be rewarded with many new great musicians, artists, and writers. Moreover, even if they do not pursue artistic activities professionally, the enriching experience associated with artistic activities will positively impact their future life trajectory. While the different social groups in our society are pervasive, social advancement is often conditioned by the level of education attained. The arts can be the key factor that opens the door to quality education. A quality education then enables social advancement, significantly eliminating the risk of social exclusion. Yes, art in education is not only art relevant to education but, above all, art relevant to society.

5 Conclusion

The paper introduced two globally recognised approaches to music education, the Venezuelan El Sistema programme and the Suzuki Method. These two music education models provided a theoretical framework for investigating the impact of music and musical activities on children with special educational needs and individuals at risk of social exclusion. Music education extends far beyond the social sphere of the individual. It shows that everyone can benefit from being involved in musical activities. The hundreds of thousands of children who have been through El Sistema's orchestras or have been educated in music using the Suzuki Method are proof of this. The theme of social justice has regularly resonated in our research. Why shouldn't everyone have access to musical activities? If not, we need to realise how many beneficial impulses a significant portion of the population is being deprived of. Music activates social skills, promotes educational competence, accelerates communication, and enhances creativity. These competencies will be crucial for future generations. Our planet needs socially, educationally and communicatively proficient creative individuals. Only in this way will we successfully meet the challenges posed by today's rapidly changing society. That is why we must connect the musical and educational worlds with the social world. In this way, the social potential of musical activities will be fulfilled, and music will become an instrument of harmony of tones and social justice.

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Primary Paper Section: A

Secondary Paper Section: AM

CREATIVE DRAMA IN THE SCHOOL ENVIRONMENT

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The research was done as part of KEGA project No. 016KU-4/2020 "The Applying of Creative Drama Methods in the Process of Preschool Education"

Abstract: Creative drama with its content and objectives is one of the indispensable methods when working with children in pre-primary education. It has universal application, it is applied in all daily activities in kindergarten and humanizes the whole educational process. Thanks to it, the teacher can find his way to the children sooner (Šváblová, 2014a). Gradually, nowadays, it is successfully coming into the awareness of many creative educators, they are more and more open to it, and we believe that it will find a place in their creative work with children, who will welcome a motivating environment in which through their activity they gain experience, learn about themselves and the surrounding world.

Keywords: dramatic art, dramatic expression, creative drama, kindergarten teacher.

1 Introduction

Creative drama is applied in a various direction, therefore, it can be a subject, method or principle. In the Slovak educational space, it is most often used as a teaching method. It can also function as a principle, the great advantage of which is that it allows the integration of the learning content of several subjects into one meaningful whole. In the kindergarten environment, creative drama can be applied in all educational areas, thus creating a space for the child to gain a complex experience, i.e. a holistic picture of the world and to be aware of his place in it. In the school environment, we create the best possible environment for a child in pre-primary education so that they receive as many opportunities as possible to get to know themselves, their surroundings and have the opportunity to prepare for life in creative activities. Kotrba and Lacina (2010, p. 41) point out that a person will learn new knowledge much faster and easier if they have the opportunity to try it themselves, which means that they will be as actively involved in the activity as possible.

Creative drama has a special position among motivating and activating methods in the educational process. Creative drama is interdisciplinary, based on the knowledge, methods and goals of several scientific disciplines, and offers a comprehensive development of the child's personality through their own active activity and personal experiences. The advantage of working with creative drama is that new knowledge gained in the creative drama process through personal experience is more permanent and children remember it better.

In practice, we currently encounter the term *dramatic education* or *creative drama* in various authors dealing with the issue of creative drama. In the Czech Republic, the pioneers of dramatic education, Machková (2005), Dismán (1976) and Valenta (1996, 2008), prefer the term *dramatic education*. Valenta (1996, p. 28) uses the terms *dramatic education*, but also *educational drama*, and *creative drama*. We also encounter the terms school play, drama, drama in education, and children's drama. According to Machková (2005, p. 10), the term *creative drama* is more interesting and attractive for the public and children, but the term *dramatic education* is more concise and precise.

Although the term *dramatic education* is equivalent to the term *creative drama*, many have recently been leaning towards the term *creative drama* as the notion of creativity, without which there would be no creative drama, has come more to the fore. Creative drama is not the dramatisation of a literary text, nor is it working with a puppet, nor is it performing theatre, nor is it playing at someone and something. It is active learning, a creative process in which the whole personality of the individual develops comprehensively based on practical experience gained by solving fictitious situations. Here the child becomes the

subject of education and has the opportunity to participate actively in the educational process, thus having the opportunity to understand himself, his surroundings and the world around him (Šváblová, 2008).

Provazník (1998) points out that creative drama is a part of aesthetic education and is closely related to art, specifically dramatic art because it adopts elements and procedures that belong to theatre for the realization of its educational goals. It works with interpersonal relationships, with situations where relationships are best manifested, with the transformation of oneself into someone else, and thanks to this it can work with dramatic persons. According to Valenta (2008) Creative drama models life, in this perspective it is a significant subject of study of life experiences and situations. It is the study of life, people, problems, relationships, decisions and choices about the morality of practical action; it is practical anthropology, psychology and sociology; it is theatre and drama. The roots of drama and theatre go back to play, playing "at someone" and "at something", as a natural human capacity. Creative drama uses both the natural human interest in dramatic, dramatic situations and the spontaneous human capacity to play and imitate to fulfil formative goals. Creative drama as a perfectly elaborated humanistic-creative educational system allows educators to build a quality developing relationship with children and enables children to acquire vital competencies and cultivate their personality in a non-committal and non-threatening process of play (Bekéniová, 2012). If we care about children, we change our approach to them, we change the philosophy of school and education, which is helped by creative drama, which is specific in every way, bringing success to schools. The child and his or her activity are the main, essential elements of creative drama. Creative drama is active learning, primarily based on learning through experience, cooperation and communication.

According to Kollárová (2011), creative drama is one of the alternative approaches in school that can show the way that teaches the child to perceive the world around them through creative drama activities, to think about it, to express and interact with it through words and movement, and to form a relationship with it. In the educational process, the educator does not instruct, but motivates, guides and leads the group to open communication. Creative drama can be practically implemented in the educational process in various forms: creative drama as a separate teaching subject; creative drama as a teaching method; creative drama appearing in the form of an element, but its inclusion in the educational process must not be an end in itself; creative drama as a leisure activity in school clubs; creative drama as a club at school; drama therapy (Kovalčíková, Bekéniová, 1996; Šváblová, 2008).

Zelina (2000, p. 107 – 108) confirms that creative drama can be used independently as a special occupation of children, as a separate lesson, or topic (club, drama group, etc.), but also in the practice of education it is used in classes, lessons of aesthetic education as a part of it and finally it can be used in any lesson, in any educational occupation, where its formative and change-forming phenomena are suitable as a functional and highly motivating for children. We can agree with Machková (2005) that creative drama in schools can also be a therapeutic method used in working with children with different kinds of disorders and disabilities. It follows from the above that creative drama can be applied in the complex development of the child's personality throughout his/her attendance not only in kindergarten but also in the educational process at the higher school level (Šváblová, 2008).

1.1 Creative drama as a teaching subject

Creative drama as a teaching subject is firmly established in the curricula of secondary pedagogical schools and colleges of pedagogical studies, but it can also be taught in primary schools. In school environments, it is applied as a compulsory, optional or compulsory elective subject. Creative drama in pre-primary

education, as we have already mentioned, has its application in all educational areas, but it is most represented and used in the educational area of *Language and Communication*. We know from experience that the child is happy to declaim texts that are part of all educational areas. Those which inspire spontaneous movement, imitate and recreate dramatic situations using body play (stamping, clapping, flapping, snapping fingers, knocking) are welcomed.

We know from experience that the application of creative drama largely depends on the teacher, to what extent he/she is familiar with it, how he/she knows it, whether he/she can work with the group, how he/she has prepared in advance so that the children cooperate in the creative process with interest and without inhibitions to express themselves and realize themselves. As a teacher of creative drama, it is important not only to be professional but also to be creative, original and empathetic towards children. The role of the teacher is interesting and non-traditional, because in creative drama classes, by varying the use of creative drama methods, the role is as active and activating as possible.

Creative drama presented by Semjanová (1995, p. 61 – 62) as a method which, from a general pedagogical point of view, is characterised by the following features:

1. **Communication** - the child in the induced situation enters into communicative acts with his environment and with partners.
2. **Interpretation** - the child is encouraged to interpret the situation in which he finds himself, his vision of the situation, which has both a rational and an emotional side and an evaluative element, the child also presents it with some kind of creation - drawing, music, literary genre, action.
3. **Imagination** - the child has the opportunity to work with imaginary objects, partners, with stories in an imaginary environment, which constantly develops imagination and fantasy.
4. **Empathy** - in dramatic situations, the child puts himself in the role of other people and objects and expresses himself with feelings, thus developing the emotional side of personality and sensitivity to his surroundings.
5. **Socialization** - the child learns to cooperate with a partner, or with a group in various induced dramatic situations, there is an opportunity to assert one's own opinion at the same time.

We must point out that creative drama is specific in its goals because it does not focus only on the final effect but on the overall creative process and its course. Creative drama represents life, therefore it is a significant object of study of life experiences and situations. Marušák et al. (2008) point out that in the application of creative dramatics, the child is an active subject in the ongoing educational process, a co-creator, and in the activity he/she performs, he/she applies already acquired abilities, skills and experiences while gaining new experiences that contribute to positive behaviour and attitude towards life.

1.1.1 Objectives of creative drama

Creative drama can reach the soul of the child, it can remove the stereotype and draw him into a magical world where he finds his place and is able to create, experiment and gain subjective experiences in a stimulating environment. If we want to establish a hierarchy of objectives and tasks of creative drama, we start from the fact that its objectives, content and methods are specific and irreplaceable, it promotes and develops natural and spontaneous children's expression and it is based on experiential learning, learning through personal experience.

The goals of creative drama can be found in the methodologies of many authors in different ways. Many of them are identical, somewhere they enrich and complement each other (Machková, 1998, 2007; Valenta, 2008; Bekéniová, 2012; Šváblová, 2008, 2017, 2018, 2021, etc.). The primary goal of creative drama is

the best possible preparation of the child for life, the education of a creative and perceptive personality. As we have already stated, in the application of creative drama, the process of creation itself and its course is important, it allows the child to take on different social roles and forms of communication and to learn to be responsible for his/her behaviour, decisions and actions.

J. Valenta (2008) detailed the goals of creative drama into five areas (Table 1) (compiled by Šváblová, 2014b).

Table 1 The goals of creative drama

Aesthetic-artistic-educational area	- to develop the aesthetic side of the personality, sense of art and artistic creativity.
General education area	- to develop knowledge about life, about the world, about man, about relationships, about problems, to understand these phenomena and the relationships between them.
Personality development area	- to develop the cognitive side of personality, emotionality, self-knowledge, self-confidence, self-regulation and volitional qualities.
Ethics development area	- develop the ability to take a stance on ethical issues, sensitivity and receptivity to the existence of ethical problems, analyse and solve ethical problems.
Social development area	- to develop situational awareness, to develop communication skills, social.

Source: author

The hierarchy of goals of creative drama varies, depending on which goals are the most current. Sometimes those goals and tasks that are related to the need for social learning, i.e. the acquisition of social abilities and skills, will come to the fore; at other times, more emphasis will be placed on the development of thinking, critical thinking, but in the pursuit of all goals, the task of experiencing remains the dominant one (Šváblová, 2018). A teacher who wants to meet the objectives of creative drama has to try them out for himself in order to be able to motivate children to creative activities in the best possible way.

Table 2: Levels of improvisation by Machková

Improvisation in the narrower sense of the word	- it involves a dramatic activity, which is the child's immediate reaction to a fictitious situation, to the behaviour of others, - takes place without preparation, it is free improvisation.
A game without text	- it is organized based on advance agreement or preparation.
A well-directed improvisation	- it is a work on a chosen topic, theme, situation, or plot without textual preparation, but is created through mutual communication and cooperation of the actors.

Source: author

Depending on the number of actors, improvisation can be collective, group, pair, or solo. In various activities, collective improvisation is the most popular, where children first relax and together imitate and recreate the induced situation by moving together. As Machková (2007) states, working together frees children from inhibitions, they do not feel external pressure and they create their own shape according to their own ideas, which they enrich and complete in peace. Only after gaining experience and working collectively do we approach solo improvisation. Here the voluntariness of accepting the role is respected. We never force the child to do this improvisation. In many dramatic

situations, solo improvisation is carried out by the teacher himself. Improvisation ideas must be age-appropriate for the children and their abilities. They can be based on real life, on children's own life experiences, wishes and needs, on the real world, but also on the fantastic world. Themes taken from literature, art and music are motivating.

Role-play

A key method in creative dramatics is role-playing, which is a mirror of life, reflecting human behaviour and actions. Role-playing someone or something forms the basis of active activities in creative drama. According to Valenta (2008), role play is an educational method that leads to the fulfilment of aesthetic-educational, personal and social development goals based on improvisation and subsequent reflection of the dramatic situation with valuable educational content. Role-playing allows the child to look at the world and life differently than only through his position. From the point of view of the comprehensive development of the child's personality, the application of full role-play in various fictional and dramatic situations is of fundamental importance. Here the child learns about different areas of life, makes decisions, imitates, portrays, and thus gains authentic personal experiences (Šváblová, 2017, 2018).

Playing the role of someone else, empathising and playing a role in a certain activity, in an induced situation, is not something every child can do. The teacher already knows the group in advance, respects their capabilities and abilities and knows what dramatic role-play situations to evoke in the creative process, thus giving each child the opportunity to experience success. Role-play is not a performance, but a process in which the child gains new experiences. Personal experience is a child's best preparation for life (Šváblová, 2007). The advantage of role-play is that the child in a simulated environment and an induced model situation has the opportunity to get acquainted, get to know, observe and understand what he/she could not experience in reality.

Interpretation

Part of creative drama is interpretation, which as a method is closely related to other methods. Interpretation is the creative processing of a literary subject and its rendering using various means of expression. In creative drama, when interpreting a literary text, we are concerned with the creative process, with activity, with collective work and with the expression of emotions through movement and facial expressions. Unlike improvisation, which is based on the spontaneity of expression based on motive and theme, interpretation is an activity based on a certain literary model. It works with poetic, prose and dramatic texts allowing for creativity.

When working with the text, we can proceed and work in several ways: Children get to know the literary work as a whole and then carry out activities based on a specific text;;The children already know the story and the text is read or retold in parts and the children creatively depict it with movement;;The children are introduced to the literary subject and the teacher reads it in parts and asks questions during the conversations, encouraging them to give different answers, to predict the further course of the plot. This way of working with the text gives children the opportunity to independently invent and develop the plot, to understand the connections between the content of the text and the real world, allows them to work with the moment of surprise. Children are eager to know how the story continues and ends, which is a strong motivating factor that can keep children's attention (Šváblová, 2021b).

A literary text that the child listens to and is accompanied by pictures, the child is able to better perceive and experience. This helps him to reproduce the story and, in a collective, encourages him to engage in conversation, and to look for different answers when completing tasks and suggestions. A teacher with years of experience can select and motivate children with stories with interesting characters, dramatic situations and tasks.

Dramatic play

We speak of dramatic play when the ongoing play is with dramatic action, where all participants interact with each other, while in various dramatic situations, they come into contact with a real or imaginary person, where the play comes into action, which allows the individual a certain transformation, transformation, self-expression (Šváblová, 2008). Dramatic play includes not only games with rules but also creative play, work with text, words, musical and movement elements. Dramatic plays, as Machková (2005) points out, differ from other games (didactic, movement, constructive) in that they must contain strong *social elements* (especially roles) and *a conflict, a plot*, to which children react and act, looking for an answer. It is appropriate to complement them with various improvised techniques and the creation of storylines (Zentko, Chanasová, 2011) so that the child has the opportunity to express himself spontaneously, work with the group, and thus gain new experiences. Each dramatic play and dramatic activity ends with self-reflection, reflection or discussion, where there is an opportunity to reevaluate the attitudes and feelings of all the participants in the play.

Pantomime

Pantomime is the expression of activity and action through inner speech, usually performed in an individual form. The main means of expression in pantomime are movement, mimicry, and gesticulation. A child can use pantomime to express various activities, feelings, moods, experiences, attitudes, and relationships with someone and the environment. It is often included when working with a literary text, when expressing dramatic situations, when portraying a certain phenomenon, in dramatic plays and in movement improvisation.

Narrative pantomime is an activity during which the teacher tells or reads a story and the children simultaneously perform activities and represent situations with movement (Šváblová, 2018). The story must be rich with enough actions suitable for pantomime performance. Narrative pantomime tends to be helpful in practising reproduction (Pršová, 2015). Pantomime can draw the child into a play in which they react and perform tasks.

Dramatization

Dramatization is the transformation of a non-dramatic literary text (epic or lyric) into a dramatic form, while the meaning remains unchanged, i.e. its ideological and aesthetic essence (Šváblová, 2008, p. 29). In a dramatic text, there is no narrator present, the whole plot is narrated by the characters who appear in the story. The characteristic feature is that in the course of rendering the situation, the actions of the characters, the mutual communication of the players, and the expressive aspect of speech, i.e. facial expressions, gesticulation, and movement with costumes and props are important.

When dramatizing a fairy tale in pre-primary education, we first act out only a certain dramatic situation with the children as part of educational activities and gradually the whole story. The text can be enlivened with music, song, and rhythmic movements that complement the whole plot of the fairy tale. This is always based on the children's prerequisites.

Free dramatization

After gaining experience working with role-play and dramatization of simple literary stories (The Frog, The Mitten, The Three Little Pigs, The Goatlings and the Wolf, The Turnip, An Egg Went Wandering, Under the Mushroom), we can work with free dramatization in the group. This type of dramatization is about co-creating, but also creatively re-creating stories in which new situations with different characters are added. This opens up space for imagination, fantasy, self-realisation, social interaction and the creativity of all participants in the creative process. It is important to encourage children to express and experience spontaneously.

Stories can be motivated by music, which enlivens the course of the situation, replaces dialogue, relaxes the atmosphere and brings a deeper experience of the dramatic process.

Puppetry

The puppet is dead material, it is an imitation of someone and something and is brought to life by the teacher by lending it his voice. The puppet, by its shape and appearance, must have a pleasant effect on the child, it will help to maintain attention, and concentration and by its expression increase interest in the perception of the word, the story. The puppet must be legible to the child. Its shape, colour and size convey its character and the child will reach for it and work with it without inhibition. There are situations where the child spontaneously engages with the puppet and can work together in a collective. At other times, the child reaches for the puppet in the course of play activities, talks to it, asks it questions, moves it from one place to another, and puts his feelings from real life into the play with the puppet.

The puppet can be used during the child's day at kindergarten. It relaxes the atmosphere and removes barriers to communication, motivates activity, to mutual cooperation, can suppress negative manifestations of aggression, prevents the emergence of stress, and develops verbal and non-verbal expression. Puppets that children can make themselves are popular in kindergarten. These include glove puppets, palm puppets, fruit puppets (poppies, chestnuts, pine cones, straw, pumpkins), flat-headed puppets, wooden spoon puppets, cork puppets, cup puppets and box puppets.

When working with the puppet, the teacher selects simple texts. The child sings with the puppet, and recites a nursery rhyme, but can also act out a fairy tale (The Adventures of the Snails, The Rooster's Slippers, About the Little Dog and the Little Cat, About the Pampúšik, Meduška, Gul'ko Bombul'ko, Maya the Bee and Vilko).

Figure1 The Mitten fairytale



Source: B. Švábová

When working with children and implementing creative drama, there is no exact instruction on *how*, *when*, *where* and *with which* methods to work in drama activities. There is also no indication of what environments, props and costumes to choose when implementing the evoked situations. All this is in the hands and mastery of the teacher. First and foremost, it is about the creative process and not about the final product, about the child's activity and experience.

Applying creative drama in practice requires an imaginative and creative educator. It is important to bear in mind that when working with creative dramatics methods, it is not the final effect that is important, but the creative process itself that is the most important focus. It creates an environment in which the child feels safe and uninhibited in dramatic situations to realise, express himself, solve different tasks, and imitate and portray 'someone' and 'something'. Motivation and evocation of the situation is a decisive moment for the success of the dramatic activities carried out. Managing the process of creative drama is challenging and requires a prepared teacher who is willing to relinquish the traditional single-role position with the highest status and all the authority. His/her position should be multi-role (Bekéniová, 2012).

1.1.2 Teacher of creative drama, reflection and self-reflection

Creative drama is interdisciplinary, based on the knowledge, methods and objectives of several scientific disciplines and opens a new way of working with children on the principles of drama. Turek (2014) points out that if a teacher is to educate, upbringing and develop a child's personality, he/she must have a quality professional, pedagogical, as well as general education. Zelina (2011) points out that a teacher working with children is partly a scientist, an expert and an artist. He or she knows as many methods, strategies and forms of education and teaching as possible, and verifies and monitors their effectiveness, which means having the most accurate and objective feedback on how they work and what their benefits are. Higher motivation can be achieved through creative tasks and activities aimed at developing divergence but also experiencing, creative perception, where children's artistic creativity is emphasized. In this regard, according to Machková (2005, pp. 49-52), a teacher of creative drama needs to be familiar with various concepts not only from the dramatic arts, but also from the fields of pedagogy, psychology, personality psychology, social psychology, developmental psychology, ethics education, biology and aesthetic-educational subjects. This requires a teacher who is flexible, professional, creative, moral, able to experiment, promptly and actively respond to new trends in the educational process.

Bekéniová (2012) emphasizes that the teacher of creative drama should become familiar with the system of creative drama, learn the methods, principles and strategies of creative drama, plan and manage the process of creative drama, diagnose and accept the needs of the child, implement self-reflection and constant self-development.

In a teacher of creative dramatics, not only professionalism is important, but also creativity and an empathetic relationship with the child. Machková (1998, p. 185), when mentioning the specific abilities of the teacher, emphasises pedagogical expressiveness, i.e. the ability to express oneself clearly and to be interesting for children, as well as pedagogical tact, which manifests itself in the relationship with children, to be able to react correctly to the situations that arise, to communicate, to cooperate.

It is up to the creative drama teacher to consider how to lead and direct the drama activities:

1. **direct input**, where he becomes a teammate of the children, directing and role-playing the activities to enliven activities that work towards the pedagogical goal,
2. **lateral guidance**, where he motivates and mediates the dramatic activities and the children carry them out without his direct contact,
3. **indirect guidance**, when he deliberately prepares a stimulating environment, materials, props, aids and monitors the children's work after the tasks have been set.

Practice shows us that not every teacher can implement creative drama effectively when working with children. It is important to have the opportunity to test its effects on oneself and to know oneself in the induced dramatic situations, to verify how one can work with creative drama, to broaden one's horizon and to gain new knowledge by participating in various educational programmes with a focus on creative drama, by studying professional literature and by creating one's stack of dramatic activities. This is the only way to plan and implement dramatic activities interestingly and playfully that will bring effective results when working with children in kindergarten.

2 Researched Issue

The main objective of the research was to find out the current state of the approach to art and creative dramatics in pre-primary education in Slovakia. This aim was reflected in the following sub-objects:

1. To find out the current state of implementation of *educational activities through art* in the educational process in kindergartens from the point of view of teaching staff in relation to the type of kindergarten.
2. To find out the current state of the use of creative drama in the educational process in kindergartens from the point of view of teaching staff in relation to the type of kindergarten.

The research questions are derived from the research objectives:

1. What is the current status of using *learning activities through the arts* from the perspective of teaching staff by kindergarten type? (The current state of the use of the arts meant self-reflection of the frequency of their use by teaching staff in the process of pre-primary education in state, church, private, or another types of kindergarten),
2. What is the current state of the use of creative drama methods in kindergartens in individual artistic areas from the point of view of teaching staff according to kindergarten type? (The current state of the use of arts meant self-reflection of the frequency of their use by pedagogical staff in the process of pre-primary education in public, church, private, or another type of kindergarten).

2.1 Research population and research instrument

A total of 154 respondents took part in the survey, which ran from October 2023 to October 2024. Teachers who expressed willingness to participate in the research were selected in the sample, thus it was an available sample. In terms of the gender of respondents (Table 3), 153 females (99.351%) and 1 male (0.649%) participated in the research.

Table 3 Distribution of respondents by gender

Category	Frequency table: gender (data_final)			
	Count	Cumulative Count	Percent	Cumulative Percent
Woman	153	153	99.35065	99.3506
Man	1	154	0.64935	100.0000
Missing	0	154	0.00000	100.0000

The basic distribution of respondents in terms of type of kindergarten (hereinafter also "KG") as an additional category is shown in Table 4. It shows that a total of 138 respondents are working in public KG, which represents 89.610% of the research population, 5 respondents are working in private KG (3.247%) and 11 respondents are working in church KG, which represents 7.143% of the research population.

Table 4 Distribution of respondents in terms of type of kindergarten

Category	Frequency table: You work in (kindergarten type): (data_final)			
	Count	Cumulative Count	Percent	Cumulative Percent
Public KG	138	138	89.61039	89.6104
Private KG	5	143	3.24675	92.8571
Church KG	11	154	7.14286	100.0000
Missing	0	154	0.00000	100.0000

The research instrument - a questionnaire constructed by the authors was aimed at finding out the opinions of kindergarten teachers on the issue of integrative approach to art in pre-primary education in Slovakia. The questionnaire contained a total of 20 items. The subject of this research study was the field of art educational activities and creative drama:

Q1- Do you think art education plays an important role in institutional education?

Q2- How often do you implement educational activities through art?

Q3- Do you think that creative drama methods can be used in all fields of art?

2.2 Analysis of research results

In the first step, we will try to answer whether there are relationships between the type of kindergarten in which the respondent works and the respective items (Q1, Q2, Q3), while correspondence analysis was chosen as the basic method due to the scale of the variables (nominal or ordinal).

$$Q1 \chi^2=22,0993 \text{ df}=6 \text{ p}=0,0002$$

$$Q2 \chi^2=39,5459 \text{ df}=6 \text{ p}=0,0000$$

$$Q3 \chi^2=21,3344 \text{ df}=8 \text{ p}=0,0063$$

The first significant relationship ($p=0.0002$) at the chosen level of significance was demonstrated between questionnaire item 1 (Do you think arts education plays an important role in institutional education?) and the type of KG in which the respondents teach. From Table 5, the table of the total relative frequencies of the respondents' responses to the first item of the research instrument in relation to the type of the KG in which they teach, it is evident that a total of 92.208% of all the respondents agreed with the question, 7.143% refused to answer and 0.649% of the respondents disagreed.

Table 5 Relative frequencies of respondents' answers to questionnaire item Q1 in relation to the type of KG

	Percentages of Total (data_final) Row variables: You work in (kindergarten type); Column variables: QUEST_1			
	Yes	Don't know	No	Total
Pub	84.41558	4.545455	0.649351	89.6104
Private KG	1.29870	1.948052	0.000000	3.2468
Church KG	6.49351	0.649351	0.000000	7.1429
Total	92.20779	7.142857	0.649351	100.0000

If we take a closer look at the responses of the respondents to the first item of the research instrument according to the type of KG (Table 6) we can see that 94.203% of the respondents who are working in government KG think that arts education plays an important role in institutional education, 4.545% of the respondents of this group "do not know" and only 0.649% of the respondents have chosen the option of "no". On the other hand, 40.000% of the respondents who are working in the private KG think that arts education plays an important role in institutional education and as many as 60% of the respondents of this group "do not know". Respondents who work in a church-based kindergartens mainly chose the option "yes" (90%) and the option "don't know" was chosen by 9.091% of respondents.

Table 6 Relative frequencies of respondents' answers to questionnaire item Q1 by type of KG

	Percentages of Row Totals (data_final) Row variables: You work in (kindergarten type); Column variables: QUEST_1			
	Yes	Don't know	No	Total
Public KG	94.20290	5.07246	0.724638	100.0000
Private KG	40.00000	60.00000	0.000000	100.0000
Church KG	90.90909	9.09091	0.000000	100.0000

From the relationship of the first item of the research instrument (Do you think arts education plays an important role in institutional education?) and the type of KG, it is clear that the "yes" option was mainly chosen by respondents working in public and church KGs, and the "don't know" option was preferred by respondents of private KGs.

When analysing the relationship between the respondents' answers to the research instrument item Q2 (How often do you implement educational activities through the arts?) and the type

of KG in which the respondents work (Table 7), it can be concluded that there is a significant relationship ($p=0.0000$) between the items studied at the chosen significance level $\alpha=0.05$.

Table 7 Relative frequencies of respondents' answers to questionnaire item Q2 in relation to type of KG

	Percentages of Column Totals (data_final) Row variables: QUEST_2 Column variables: You work in (kindergarten type)		
	Public KG	Private KG	Church KG
Very often	21.8978	40.0000	18.1818
Often	75.9124	40.0000	63.6364
Rather rarely	2.1898	0.0000	18.1818
Never	0.0000	20.0000	0.0000
Total	100.0000	100.0000	100.0000

From the detailed responses of the respondents to the item of research instrument Q2 in relation to the type of KG (Table 7), it is clear that 21.898% of the respondents who work in public KG, implement learning activities through arts very often. 75.912% of the respondents who work in public KG implement learning activities through arts often and 2.189% never. Correspondingly, 40% of the respondents who work in private KG implement learning activities through arts "very often" or "often". However, as many as 20% of the respondents, never implement educational activities through art. 18.182% of the respondents who work in a church-based KG implement educational activities through art very often, 63.634% often and 18.182% rather rarely. From the above, the respondents who work in public KG are preferentially inclined to answer "very often" and "often" and the respondents who work in church kindergartens "rather rarely".

A significant relationship ($p=0.0063$) is defined between the item of research instrument Q3 (Do you think that creative drama methods can be used in all fields of art?) and the type of KG in which the respondents work.

Table 8 Relative frequencies of respondents' answers to the questionnaire item Quest_3 by type of KG

	Percentages of Column Totals (data_final) Row variables: QUEST_3; Column variables: You work in (kindergarten type)		
	Public KG	Private KG	Church KG
Very often	74.4526	40.0000	36.3636
Often	11.6788	40.0000	9.0909
Always	10.2190	0.0000	45.4545
Rarely	0.7299	0.0000	0.0000
Sometimes	2.9197	20.0000	9.0909
Total	100.0000	100.0000	100.0000

In light of Table 8, which shows more detailed frequencies of the respondents' responses to the research item of the research instrument Quest_3 according to the type of KG in which the respondents work, it is clear that 74.453% of the respondents from public KG think that creative drama methods can be used very often in all areas of the arts, 11.679% think "often", 10.219% think "always", 0.729% think "rarely" and 2.919% think sometimes. 40% of the respondents who work in private KG think that creative drama methods can be used very often in all arts, 40% "often" and 20% "sometimes". 36.364% of the respondents who are working in a church-based kindergartens think that creative drama methods can be used very often in all areas of arts, 9.091% "often", 45.455% "always" and 9.091% "sometimes".

The research shows that in relation to the item of research instrument Q3, respondents who work in public KG are inclined

to answer "very often" or "rarely", respondents who work in church-based KG are inclined to answer "always" and respondents who work in private kindergarten are inclined to answer "sometimes".

2.3 Discussion

Interpretation of art presupposes a figurative generalization of the surrounding world and motivationally manifests itself in the emotional response to art, images of the surrounding reality and in the presence of interest in performing creative tasks. The teacher's personality is manifested in the ability to perform tasks of a creative nature originally, manifesting creative thinking and imagination.

Research by Rochovská, Šváblová, and Dolinská (2023) confirms that almost half of kindergarten teachers consider musical art important in their lives and more than a third of teachers consider it very important. They also apply it in educational activities in kindergarten, which was expressed by 81.4% of teachers, especially in the frequency of once a week. The use of works of art is mainly included in aesthetic-educational activities, in connection with which some of the results of research by D. Kollárová (2016) should be mentioned. These showed that 58.06% of kindergarten teachers included aesthetic games in a variety of activities throughout the kindergarten day. Among aesthetic games, musical activities had the most frequent representation during the day (46.45%).

Another research (Kocer, 2012) was conducted to evaluate art activities in preschool educational programs in terms of the child's self-expression opportunities. The research results showed that preschool teachers in the research set focus on strengthening fine motor skills when applying art activities in educational programs, and children lack opportunities for effective self-expression and manifestation. The findings of this research also point to the importance of organizing programs related to art education in teacher preparation. There should be courses in art education programs for teachers that provide teachers with an "education through art" perspective as well as an "education for art" perspective through interdisciplinary collaboration.

In the context of an integrative approach to art B. Šváblová and I. Rochovská (2023), in their research, found out on the basis of self-reflection of the respondents in which educational area the elements of creative drama are most applied. The most frequently mentioned educational areas were Language and Communication (93.4%) and Arts and Culture (73.2%). On a positive note, respondents were supportive of the application of creative drama methods in all educational areas, at least to some extent.

2.4 Conclusion of creative activities and reflection

After each activity it is important to reflect on how the activities have affected the child, how they have appealed to him/her, and what changes have occurred in his/her behaviour and actions. It is best when the children sit in a circle so that they can see each other clearly and the teacher asks open questions that encourage spontaneous responses and reactions from the participants in the drama activities. It creates enough space for children to express their inner feelings and experiences. According to Marušák (2010), it is very good if the teacher prepares in advance the questions he wants to ask in the reflection. He supports and encourages the children to answer and express their opinions about the situations they have experienced. Expression is not only through words but also through movement, facial expressions, gestures, as well as pictorial expression, the creation of puppets and props is also welcomed. By drawing, modelling, and gluing, the child can tell what he or she has experienced, and what has left a strong impression on him or her (Šváblová, 2017, 2018).

Reflection in the educational process is a space where an opportunity to communicate with all participants is created in a

pleasant atmosphere. The ability of introspection (self-observation) develops, social relations begin to form, relations to oneself and the environment, and a wide range of possibilities for self-perception, self-reflection and self-development of the child open up. Creative communication about acquired experiences positively influences the holistic development of the child's personality.

Figure 2 Modelling and drawing at the end of the drama activities



Source: B. Švábová

Creative drama is first of all a creative process, in which the creativity of the teacher is also manifested and it depends on what path he chooses to achieve the educational goal. It is important that the child feels comfortable in the school environment, is interested in taking an active part in various activities and cooperates with the group.

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Primary Paper Section: A

Secondary Paper Section: AM

OFFSHORING AND ITS IMPACT ON V4 LABOR MARKET: THE URGENT NEED FOR UPSKILLING AND COMPETENCE ADAPTATION

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The paper was elaborated within the project KEGA 072TUKE-4/2024.

Abstract: Over the past 20 years, production processes have become more fragmented, with various stages offshored to different locations, impacting international and domestic labor markets. CEE countries have become key offshoring destinations due to their skilled labor and competitive costs. This study aims to assess how shifts in international production affect labor markets in the V4 countries. We estimate a system of employment-share equations derived from a translog cost function, incorporating offshoring and domestic outsourcing, using the SUR method. Our findings suggest that offshoring negatively impacts employment for less-skilled occupations, while its effect on high-skilled jobs is insignificant. Thus, the need for continuous training and upskilling of the workforce to maintain competitiveness is highlighted by our findings.

Keywords: Offshoring, V4 countries, Labor Market, Employment shares, Translog Cost Function, SUR method

1 Introduction

The changes that have occurred in the international economy over several decades have gradually expanded. Over the past 20 years, the internationalization of production has significantly deepened, leading to quantitative and qualitative transformations. With the decline in transportation and communication costs and rapid advancements in information technologies, trade in intermediate goods and components has become even more adaptable (Milberg and Winkler, 2013). This has also influenced the dynamics of offshoring by making it easier to fragment production processes and relocate various stages of production. These developments have both positive and negative impacts on the international labor market. Offshoring can result in domestic jobs being replaced and can create downward pressure on wages in the home country. Because low-skilled jobs are more easily moved to countries with a comparative advantage in low-skilled labor-intensive production, globalization may reduce the relative demand for low-skilled workers in developed economies, contributing to rising wage inequality. However, offshoring can also lower costs for domestic firms, improve their productivity, and ultimately lead to expanded production, employment, or higher wages. Central and Eastern European countries have emerged as important destinations for offshoring activities, thanks to their skilled labor force and competitive labor costs. A group of four Central European countries known as the V4 countries are deeply integrated into the German-Central European supply chain, predominantly driven by the automotive industry (Kersan-Skabic, and Barisic, 2023). In this study, we will examine how labor markets in the V4 countries are being influenced by changes in international production, with a particular focus on the impact of offshoring on specific types of professions.

The paper is structured into five sections. Following the introduction, Section 2 provides a review of the relevant empirical literature. Section 3 presents the methodology and data used in our analysis, specifically focusing on the model employed to examine the impact of offshoring on employment shares of different professional groups. In Section 4, we discuss the results and key findings of the study. Finally, the paper concludes with some summarizing remarks and potential implications.

2 Literature Review

Despite extensive debates on offshoring, evaluating its economic effects on domestic employment remains a challenge. Offshoring is often seen as a factor driving job losses and wage cuts in developed countries. However, the literature generally suggests

that these concerns may be exaggerated. Arguments that offshoring leads to job losses in developed economies often ignore the fact that it also creates many jobs in developing countries. For developed countries, offshoring can provide opportunities to improve productivity (Dvořáček and Tyll, 2010).

Measuring offshoring usually focuses on trade in intermediate goods. Feenstra and Hanson (1996, 1999) differentiate between "narrow" and "broad" definitions of offshoring. The narrow definition includes imported intermediate goods from the same industry, while the broad definition includes imports from all industries. Hijzen and Swaim (2007) explain that both narrow and broad offshoring is measured as the share of imported intermediates compared to value added, distinguishing between imports within the same industry and across different industries. Foster-McGregor et al. (2013) studied the effects of offshoring on employment in both manufacturing and services, specifically looking at how it influences labor demand. Using input-output tables, they measured offshoring from narrow and broad perspectives.

The effects of offshoring on employment differ in the short and medium term. In the short term, the impact is often negative, but in the medium term, it can be positive. The benefits of offshoring often appear later and may not directly help the workers who lost their jobs. Additionally, the positive effects of offshoring are sometimes underestimated if new jobs are seen as lower quality. Offshoring can boost productivity, support exports, and increase income, all of which can positively affect employment. These findings are also supported by Agnese's (2012) study on Japan.

In many developed countries, job losses due to offshoring account for less than 10% of total employment, such as in France, Germany, and the United Kingdom. However, in countries like Austria and Slovakia, this share is higher. Today, offshoring is not just about reducing costs; it is also about accessing new ideas and skilled labor. In recent years, research, development, and innovation - traditionally kept domestic - have increasingly been moved abroad (Görg, 2011).

Bramucci et al. (2017) analyzed the impact of offshoring on employment in five European countries and found that the effects vary depending on the industry and the type of labor. Automation tends to affect routine tasks the most, but advances in technology, including algorithms and robotics, are increasing the risk of automation for non-routine tasks as well. Nevertheless, Ottaviano (2015) argues that non-routine tasks are less likely to be moved offshore. Hummels et al. (2014) found that jobs involving routine tasks are more likely to experience wage declines.

Autor and Dorn (2013) noted that alongside the automation of routine jobs in manufacturing, there has been a structural shift in the labor market. They observe a growing demand for manual jobs in the service sector that require greater flexibility and physical adaptability.

Frey and Osborne (2017) used estimates to assess how vulnerable different jobs are to automation. They focused on the U.S. labor market and analyzed how many jobs might be affected by future automation. According to their findings, up to 47% of U.S. jobs are at high risk of being fully automated within the next decade. Jobs in logistics, transportation, and administration are particularly at risk. Surprisingly, a significant portion of jobs in the service sector, which has seen the largest growth in the U.S. over the past decades (Autor and Dorn, 2013), are also highly susceptible to automation.

Frey and Osborne (2017) also suggest that as technology continues to advance, low-skilled workers will likely move into tasks that are less prone to automation, such as those requiring

creativity and social intelligence. Concerns about offshoring have extended to research and development activities, particularly the potential loss of high-skilled jobs. However,

Rassenfosse and Thomson (2019) demonstrated that offshoring in this area can boost productivity in OECD countries.

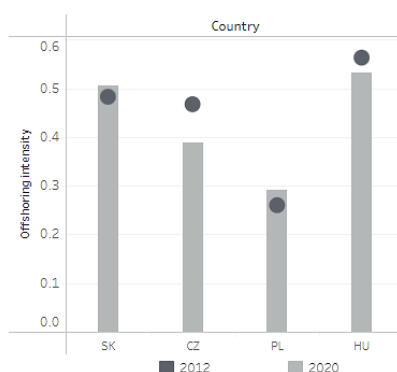


Figure 1 Offshoring intensity in V4 countries

Source: author's elaboration based on data from the OECD TiVA database

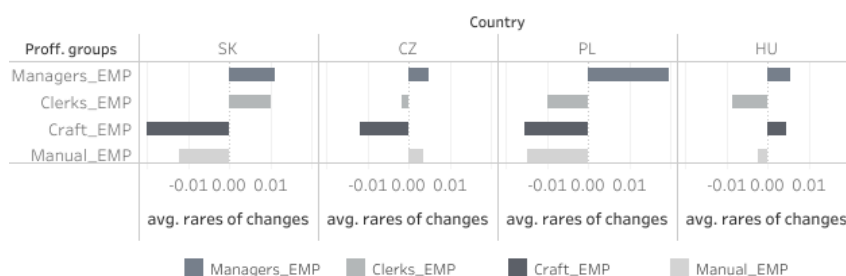


Figure 2 Employment shares dynamics by professional groups - annual average rates of change: 2012-2020

Source: author's elaboration based on data from the ILOSTAT database

Castellani and Pieri (2013) also found that setting up research labs abroad increases productivity in the home country, enhancing competitiveness.

As mentioned above, in the next analysis we focus on the impact of offshoring on individual jobs in the V4 countries.

3 Methodology and Data

The analysis presented in this paper is based on data from the ILOSTAT database, which provides international labor statistics. The ILOSTAT database employs a categorization of employment by professional group using ISCO-08 classification as follows: (1) managers; (2) professionals; (3) technicians and associate professionals; (4) clerical support workers; (5) service and sales workers; (6) skilled agricultural, forestry and fishery workers; (7) craft and related trades workers; (8) Plant and machine operators, and assemblers, (9) elementary occupations. The professional categories have been consolidated into four main groups (Table 1), following the methodology used by Cirillo (2016) and Bramucci et al. (2017). Furthermore, the ILOSTAT database provides information on the average hourly earnings of employees in each occupation.

The OECD TiVA database was employed to construct variables measuring offshoring and domestic outsourcing. As mentioned in the previous section, according to Feenstra and Hanson's (1996, 1999) approach, offshoring can be categorized into two types: broad and narrow. Authors describe offshoring as the ratio of imported inputs to total intermediate inputs, focusing on the choice between sourcing inputs domestically or from abroad. In contrast, we define offshoring as the proportion of imported intermediate inputs relative to value-added as Hijzen and Swaim

(2007), highlight the transfer of production activities that were previously performed within the domestic industry:

$$OFF = \frac{\sum IIM_n}{VA_n}, \quad (1)$$

where IIM represents imported intermediate goods from all industries, n stands for the industry index, and VA refers to the value added.

Table 1 ISCO-08 professional groups

Professional group	ISO-08 classification
Managers	Managers Professionals Technicians and associate professionals;
Clerks	Clerical support workers Service and sales workers
Craft	Skilled agricultural, forestry and fishery workers Craft and related trades workers
Manual	Plant and machine operators, and assemblers Elementary occupations

Source: Cirillo (2016)

Domestic outsourcing is calculated using a similar formula:

$$DO = \frac{\sum TIM_n - \sum IIM_n}{VA_n}. \quad (2)$$

Here, TIM represents total intermediate inputs, IIM stands for imported intermediate inputs from the industry, n is the industry index, and VA refers to the value added.

Data on gross output and capital stock are sourced from the EUKLEMS & INTANPROD database. The analysis focuses on the period from 2012 to 2020, constrained by data availability. The analysis includes coverage of V4 countries, as these countries rank among the EU's most interconnected economies. Their labor markets are influenced by global economic trends, largely due to their strong dependence on international demand, particularly within the automotive sector.

Table 2 Descriptive statistics – average growth rates of variables (2012-2020)

Variable	Mean	Std. Dev.	Minimum	Maximum
$\Delta E_{\text{managers}}$	0,01025	0,01957	-0,01596	0,05887
ΔE_{clerks}	-0,00257	0,01716	-0,03865	0,03739
ΔE_{craft}	-0,01073	0,02128	-0,06408	0,03043
ΔE_{manual}	-0,00646	0,02779	-0,0796	0,04176
$\Delta W_{\text{managers}}$	0,03339	0,19384	-0,33183	0,55574
ΔW_{clerks}	0,05342	0,15182	-0,2919	0,4522
ΔW_{craft}	0,04845	0,1341	-0,24032	0,41936
ΔW_{manual}	0,04947	0,14303	-0,26613	0,41208
ΔW_{IT}	0,0399	0,0394	-0,05409	0,10959
ΔOFF	-0,00163	0,04346	-0,076	0,07974
ΔDO	-0,00985	0,04747	-0,1638	0,0799
ΔY	0,04323	0,02679	-0,01301	0,0987
ΔK	0,03868	0,02578	-0,00694	0,11465

Source: author's elaboration based on data from the ILOSTAT, OECD TiVA and EUKLEMS & INTANPROD databases

Figure 1 illustrates the intensity of offshoring across all industries in V4 countries for 2012 and 2020. Despite a slight decrease from 2012 to 2020, Hungary maintains the highest offshoring intensity (0.563). Similarly, Slovakia and the Czech Republic also show a reduction in offshoring intensity, with Slovakia's levels remaining relatively high (0.483). In contrast, Poland demonstrates the lowest offshoring intensity among the four countries (0.260). Despite the decline, offshoring levels remain significant. As expected, offshoring is particularly pronounced in smaller, open economies, such as the V4 countries.

Figure 2 reveals several key trends in employment shares across different professional groups in the V4 countries. There is a general increase in managerial positions, which reflects a growing demand for higher-level roles. Conversely, employment in clerical, craft, and manual labor positions has generally declined, indicating a contraction in these areas. This pattern suggests a shift towards more managerial roles and away from traditional labor-intensive positions across the region.

Table 2 provides descriptive statistics on the growth rates of the variables analyzed in this study. The data reveals a decline in the employment shares of clerks, craft, and manual workers over the examined period, with the craft sector experiencing the most significant reduction, decreasing by 1.07%. In contrast, the employment share of managers increased by 1.03%. Average hourly earnings show an overall rise across all professional groups, as well as in imported intermediate input. The largest increase in average hourly earnings is observed among clerical workers, with a 5.34% growth. However, the growth rates for offshoring and domestic outsourcing show a downward trend, declining by 0.163 and 0.985, respectively. On the other hand, the average growth rates for gross output and capital remain positive.

To examine how offshoring impacts employment in V4 countries, we draw on the body of research suggesting that offshoring may contribute to skill upgrading (refer to Berman et al., 1994; Feenstra and Hanson, 1996). Foster-McGregor et al. (2013) proposed to adopt a more practical approach by estimating a

system of cost-share equations derived from it. This approach implicitly assumes that the share of a specific variable factor (i.e. labor), in total variable costs can be modeled as a linear function of input prices and quasi-fixed factors (i.e. capital). The variables in the model are defined as follows:

- C - total variable costs
- w_i - wages for different skill levels and material prices for $i = 1, \dots, M$
- x_k - fixed input capital K and total output Y
- z - proxy for skill-biased technological change
- OFF - offshoring
- DO - domestic outsourcing.

The general form of the translog cost function, as proposed by Foster-McGregor et al. (2013), is expressed as:

$$\begin{aligned} \ln C = & \alpha_0 + \sum_{i=1}^M \alpha_i \ln w_i + \sum_{k=1}^K \beta_k \ln x_k + \sum_{y=1}^Y \gamma_y z_y + \\ & + \frac{1}{2} \sum_{i=1}^M \sum_{j=1}^M \gamma_{ij} \ln w_i \ln w_j + \frac{1}{2} \sum_{k=1}^K \sum_{l=1}^K \delta_{kl} \ln x_k \ln x_l + \\ & + \frac{1}{2} \sum_{y=1}^Y \sum_{p=1}^Y \gamma_{yp} z_y z_p + \frac{1}{2} \sum_{i=1}^M \sum_{k=1}^K \theta_{ik} \ln w_i \ln x_k + \\ & + \frac{1}{2} \sum_{i=1}^M \sum_{y=1}^Y \delta_{iy} \ln w_i z_y + \frac{1}{2} \sum_{k=1}^K \sum_{y=1}^Y \delta_{ky} \ln x_k z_y. \end{aligned} \quad (3)$$

The partial derivative of this cost function with respect to wages and material prices provides:

$$\frac{\delta \ln C}{\delta \ln w_i} = \left(\frac{\delta C}{\delta w_i} \right) \left(\frac{w_i}{C} \right). \quad (4)$$

Here, $\left(\frac{\delta C}{\delta w_i} \right)$ captures the demand for the input, resulting in the following expression for the cost share for $i = 1, \dots, M$:

$$s_i = \alpha_i + \frac{1}{2} \sum_{j=1}^M \gamma_{ij} \ln w_j + \frac{1}{2} \sum_{k=1}^K \theta_{ik} \ln x_k + \frac{1}{2} \sum_{y=1}^Y \delta_{iy} \ln z_y. \quad (5)$$

To explore the changes in wage shares of labor skills and materials across different industries represented as $n = 1, \dots, N$ the model considers the differences over time periods, leading to:

$$\Delta s_i = \alpha_0 + \sum_{j=1}^M \gamma_{ij} \Delta \ln w_j + \theta_k \Delta \ln K + \theta_y \Delta \ln Y +$$

$$+\delta_{\text{OFF}} \Delta \ln \text{OFF} + \delta_{\text{DO}} \Delta \ln \text{DO} + \varepsilon_i. \quad (6)$$

In extending the conventional translog cost function, the model incorporates variables for offshoring and domestic outsourcing to capture modern economic dynamics better. We made one deviation from the model described above. Our dependent variable is expressed as shares of employment, rather than cost shares. This substitution is particularly relevant in economies with rigid labor markets, where shifts in employment structure are more pronounced than wage disparities, as highlighted by Hertveldt and Michel (2013). This adjustment also mitigates the

endogeneity problem that arises when hourly wages appear on the right-hand side of the equations, potentially leading to inconsistent estimations. For each labor category, denoted by $EMPI_i$, the employment share equation is formulated as follows:

$$\Delta EMP_i = \alpha_0 + \sum_{j=1}^M \gamma_{ij} \ln w_j + \theta_K \Delta \ln K + \theta_Y \Delta \ln Y + \delta_{\text{OFF}} \Delta \ln \text{OFF} + \delta_{\text{DO}} \Delta \ln \text{DO} + \varepsilon_i. \quad (7)$$

Table 3 SUR results for the full sample of countries

	$\ln E_{\text{managers}}$	$\ln E_{\text{clerks}}$	$\ln E_{\text{craft}}$	$\ln E_{\text{manual}}$
$\ln W_{\text{managers}}$	-0.09906 (0.07044)	0.16219 (0.06140)**	0.07123 (0.06682)	-0.04742 (0.08309)
$\ln W_{\text{clerks}}$	0.31816 (0.24143)	-0.61466 (0.21047)***	-0.36787 (0.22902)	0.37261 (0.28481)
$\ln W_{\text{craft}}$	0.34597 (0.17385)*	-0.30306 (0.15155)*	-0.26643 (0.16491)	-0.16936 (0.20509)
$\ln W_{\text{manual}}$	-0.43796 (0.25889)	0.81576 (0.22569)***	0.30581 (0.24559)	-0.25892 (0.30541)
$\ln W_{II}$	0.00134 (0.26232)	0.33667 (0.22868)	-0.57475 (0.24884)**	0.00221 (0.30946)
$\ln \text{OFF}$	0.10524 (0.11737)	-0.00128 (0.10232)	0.24676 (0.11134)**	-0.29930 (0.13846)**
$\ln \text{DO}$	-0.10836 (0.14165)	-0.06222 (0.12341)	-0.01778 (0.13429)	0.14275 (0.16700)
$\ln Y$	-0.32965 (0.24899)	-0.05180 (0.21705)	0.31026 (0.23619)	0.66814 (0.29373)**
$\ln K$	0.31791 (0.13786)**	-0.27690 (0.12018)	0.45019 (0.13078)***	-0.80357 (0.16264)***
R-squared	0.67064	0.51960	0.76011	0.70701

The set of equations is estimated by SUR; standard errors are given in parentheses.

Reported significance levels *p < 0.1, ** p < 0.05, *** p < 0.01.

The model's parameters are estimated using the Seemingly Unrelated Regressions (SUR) method, which allows for the simultaneous estimation of the entire system of equations, accounting for potential correlations between the equations.

4 Results and Discussion

A priori, offshoring should have a negative effect on the labor-intensity in an industry (the technology effect), but a positive effect on the level of output, due to the productivity gains from offshoring (the scale effect), so that the overall effect is ambiguous (Hijzen and Swaim, 2007).

The results in Table 3 display mixed set of coefficients. Starting with the own-wage coefficients, that are found to be negative and significant for clerks but insignificant for managers, craft and manual workers. The manager wage impacts positively upon the employment shares of clerks, while the craft wage impacts negatively upon the clerk's employment share.

The price of intermediates has a negative and significant impact only on the employment share of craft. The employment share of manual workers is decreasing in capital while increasing in managers and craft. The impact of output growth is significant and positive only upon the manual employment share.

The results suggest that offshoring has reduced demand only for manual workers. This would tend to suggest that only manual workers have been the most negatively affected by international offshoring. Interestingly, domestic outsourcing doesn't have any effect on any employment share.

The overall findings reveal that the employment share of clerks was primarily influenced by changes in wages. The employment share of craft workers was mainly affected by offshoring and capital (positively), and by the prices of intermediate inputs (negatively). In contrast, the employment shares of manual workers were negatively impacted by offshoring and capital, opposite to the effect on craft workers. Lastly, the employment share of managers was not negatively influenced by any of the observed factors.

Our findings indicate that offshoring and capital inputs influence labor across different skill levels in varying ways. As anticipated, lower-skilled jobs are disproportionately impacted by the globalization of production processes and technological advancements. This underscores the critical need for upskilling the less-educated workforce to remain competitive in the labor market. Furthermore, our results demonstrate a positive relationship between capital (both tangible and intangible) and higher-skilled labor, such as managerial roles. This highlights the importance of continuous training for the qualified workforce

to enhance their expertise in new technologies and adapt to the evolving business environment.

5 Conclusion

The deepening of international production networks over the past two decades – fueled by advances in transportation, communication, and information technologies – has led to significant changes in global labor markets. The rise in offshoring has transformed production processes, making them more fragmented and shifting various stages of production to different locations. The main objective of this study was to determine how shifts in international production affect labor markets in the V4 countries with a specific emphasis on the effects of offshoring on professional groups.

The descriptive evidence presented in Section 3 confirmed the presence of structural heterogeneity in employment dynamics across countries and in offshoring intensity. Although a slight decline in offshoring is observed in Slovakia and Poland when compared to the data from 2012, this could be attributed to the impact of the Coronavirus Pandemic. However, the evidence indicates that these countries still have a high level of offshoring intensity.

The econometric estimations, employing the SUR method and detailed in Section 4 (Table 3), indicate that offshoring has a negative effect on employment share for less-skilled (manual) occupations and a positive effect on craft workers. In contrast, the impact of offshoring on high-skilled occupations, such as managers or more routinized professions (clerks), is found to be statistically insignificant. The finding implies that although offshoring may enhance economic efficiency at the macro level, it presents challenges for segments of the labor market that are more likely to be affected by automation and the relocation of production tasks.

Additionally, our findings emphasize the urgent need to upskill the less-educated workforce to maintain their competitiveness in the labor market. They also reveal a strong positive correlation between capital and higher-skilled workers, particularly in managerial positions. This underscores the necessity of ongoing training for the qualified workforce to sharpen their expertise in emerging technologies and to adapt to the shifting dynamics of the business environment.

While numerous studies have focused on Western countries, it makes a significant addition to the existing empirical literature by shifting the focus to the V4 countries in Central and Eastern Europe. Additionally, our research offers a unique perspective by analyzing the effects of offshoring on distinct professional groups, rather than treating the labor market as a homogeneous entity. To effectively prepare for future shifts, policymakers must fully understand the present and anticipated labor market situation. For future research, it will be crucial to examine the relationship between offshoring in manufacturing and service industries and employment, as well as to apply this model to firm-level data.

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Primary Paper Section: A

Secondary Paper Section: AH

CRISIS INTERVENTION AS ONE OF THE FACTORS OF CREATING SAFE SCHOOL ENVIRONMENT

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This article is a partial output of the project KEGA 012KU-4/2022 Safety of School Environment – New Challenge for the Development of Selected competences of Primary and Secondary School Teachers

Abstract: School, as an important educational and socializing factor, should be a safe environment. The safety of the school environment is crucial to ensuring quality education and the protection of both pupils and all school staff. The study deals with crisis intervention in schools, which is one of the factors creating safe school environment. Crisis intervention at schools takes place in the area of solving pupils' as well as teachers' problems, helping in overcoming specific obstacles. It seeks to help pupils or teachers, to create a safe space, to activate sources of support and to focus on restoring one's own strength.

Keywords: safety of a school environment, crisis, crisis situation, crisis intervention at schools.

1 Introduction

The safety of the school environment is an essential condition for an optimal educational process. School safety should be a matter of course for all pupils (regardless of age, gender or social background) and for all school employees.

Current dynamic changes in society encompass many positive, but also negative realities, which are manifested in various areas of life. This is evidenced by various security risks and threats.

According to Miovský et al. (2012), different groups of risk behaviour phenomena are associated with different **safety risks** for pupils and school employees. It is necessary to supplement the school rules for a particular school beyond the obligations given by the legislation in force to minimise the impact of risky behaviour on pupils and staff. These rules can be developed both at the level of school regulations and at the level of recommendations and voluntary rules incorporated into documents relating to various school activities and events (including e.g. excursions, school trips, etc.). We can agree with Kropíková (2016), according to whom parents want the school mainly to ensure safety for their children and peace for schoolwork, they want their children to experience success at school.

The issue of meaningfully addressing the safety of the school environment is now a matter of great urgency. A safe school environment influences pupil satisfaction, which translates positively into learning outcomes. Aggressive pupil behaviour and bullying seriously undermine the safety of the school environment and the wellbeing of pupils as well as the teaching and professional employees of schools.

Comparing the safety of school environments around the world can be quite difficult, as safety conditions vary widely between countries and regions. Each country has its own challenges and contexts that affect the way it deals with security in its schools. Jablonský (2024) presents a set of factors that are relevant when comparing school safety around the world:

- **Security measures, school policies and legislation:** in several countries there are specific laws and regulations that set out requirements for the security of school facilities. These laws often include standards for the physical security of buildings, rules for crisis management, and protocols for reporting incidents. World organisations such as UNESCO and UNICEF provide frameworks and recommendations for the security of school environments at a global level, which can be adapted to local conditions. Among the above, we can include specific regulations such as school security audits that assess the state of security measures and identify

areas for improvement, as well as security protocols for immediate reporting of any threats or incidents, regular crisis drills and stricter access controls to school buildings, etc.

- **Incidence of violence and crime:** this is a serious problem that affects the physical and psychological well-being of pupils and employees. This problem encompasses various forms of violence, including physical attacks, bullying, cyberbullying, vandalism, etc.
- **Social and economic conditions:** safety of the school environment can also be influenced by the social and economic conditions in a given country. Countries with higher rates of poverty, unemployment or social conflicts may face greater challenges in ensuring safety in their schools.
- **Cultural and educational factors:** each culture has its own norms and values that can influence safety standards in schools. Countries with an emphasis on discipline and respect for authority may have different approaches to ensuring safety in their schools than countries with an emphasis on individualism and democratic principles.

Depending on these factors, the safety of school environments around the world can vary. Some countries have very high security standards and very low levels of school violence, while other countries may face greater security challenges. Overall, however, the goal of all countries is to provide a safe and supportive learning environment for pupils.

The safety of the school environment is threatened by various factors, including risky and problematic behaviour of pupils. In particular, aggressive behaviour and bullying have a dominant negative impact. Similarly, the use of alcohol and other drugs can also be counted among the risk factors, as many of them lower inhibitions. Under the influence of alcohol or other addictive substances, people are more likely to engage in risky behaviour that endangers their health, but they may also commit acts against their surroundings, even criminal offences.

The range of problematic or risky behaviour of pupils is wide (from minor offences to violations of school rules to serious social pathologies) and is constantly changing. The reality of school practice is illustrated by the results of research, particularly with teachers and pupils, prevention practitioners and parents of pupils (Bielčíková, Hollá, 2022; Čerešník, 2019; Emmerová, 2022, 2023; Espelage et al., 2013; Garrett, 2014; Kauppi, Pörhölä, 2012; Kopecký, Szotkowski, 2017; Lipnická, 2022; Saracho, 2017; Tomšík et al., 2018; Verešová, Mujkošová, 2020; Wachs et al., 2018 and others).

2 Crisis intervention at school

Crisis is a popular and often used term that describes a dramatic change with negative emotions. According to Špatenková (2017), the definition of a crisis usually affects three basic components of a crisis: a certain triggering event occurs, the individual perceives it as threatening and dangerous, and the usual ways of coping fail. In an effective crisis intervention, these three components should be identified and understood.

Crisis intervention is a broader term; we will focus on crisis intervention at schools.

Intervention is defined by Bělík, Hoferková, Kraus et al. (2017) as an acute professional intervention. In the teaching about upbringing and education of socially disturbed youth, it represents pedagogical measures that intervene in the natural social life situations of individuals with disorders (problems) of emotions and behaviour.

Crisis intervention means intervention or interference in a crisis. Špatenková (2011) defines it as specialised help for people who

find themselves in crisis, i.e. in a situation that causes changes in their usual way of life and induces a state of imbalance, threat and stress.

Anyalaiová et al. (2023), in relation to crisis situations in schools, list the types of crises among pupils: developmental crises (transition from one developmental level to another) and situational crises (unexpected and accidental). Situational crises take the school community by surprise and often the school needs outside help. It affects pupils, teachers and other school employees. Specific crisis situations are considered to be events:

- with a particularly serious impact on the school community and society,
- with a potential to polarize society,
- with a higher number of dead and injured,
- with a history of dealing with trauma and loss in the school community in the last year,
- with a larger number of people affected (class, whole school),
- with a particularly vulnerable or traumatised population in the school community,
- a high-profile media event.

Experts in the field of crisis intervention (Gajdošová, 2020; Špatenková, 2017) emphasize the following basic principles and specific features of crisis intervention:

A crisis always has an individual character.
 The state of crisis is limited in time.
 Help should be as quick as possible.
 Help should always be available.
 Structured, active or even direct approach.
 Professional work in crisis intervention is eclectic.
 Care should be continuous.
 Care should consider the context of the client's relationships.
 Care should have defined at least minimum achievable goals.
 Strengthen the client's competences for crisis management and prevention from the outset.
 The focus of the work with the client is problem solving.
 The starting point is the assessment of the situation and communication with the client.
 The first step is to diagnose the crisis, its time and place of occurrence.
 With the client, we should only aim for the near future.
 The solution of the crisis comes from the bio-psycho-social-spiritual area.
 Care must also consider the possibility of deterioration of the condition.
 Care should be provided in the least threatening and restrictive space.

Crisis intervention, according to Anyalaiová, Lednická, Krnáčová and Križo (2023), is consequently perceived school's response to a serious acute crisis experienced by people in the school environment that they have no control over. Schools - not only in times of social emergency - experience smaller or larger upheavals. The basis for good adaptation and coping with difficult situations is a safe atmosphere inside the school (prevention), which protects it from falling apart at the first impact. When nothing serious is happening and the school is not in a crisis, a crisis plan (preparation) should be developed in case of a crisis

In times of crisis, there is no longer enough time to prepare materials and allocate responsibilities, who is responsible for what. Good preparation significantly helps the school system to respond adequately to reduced safety, fear and loss of control (intervention) and to create opportunities for new values in safe community life (postvention) that will help the school system to recover from a crisis event and even to strengthen itself (resilience).

The starting points for the implementation of crisis intervention are elaborated in the Standards for Professional Activities - Crisis Intervention (2021). Crisis intervention provider:

- psychologist, social pedagogue, special pedagogue, therapeutic pedagogue with training in crisis intervention,
- the crisis intervention provider is continuously educated and updated in this area to provide services in accordance with the latest scientific knowledge,
- a member of the school support team with crisis intervention training provides a specific agenda in the following areas:
 - prevention (promotion of safe schools),
 - preparation of crisis plans,
 - educating pedagogical and other professional school employees,
 - implementation of crisis intervention in cooperation with the relevant counselling facility,
 - providing "post-intervention",
 - planning, assessment of the impact of the event, counselling, consultation, screening aimed at mapping who else within the school needs crisis intervention,
 - provides education and outreach to school headmasters on the need for and importance of crisis intervention as an effective tool for the prevention of post-traumatic stress disorder.

The actual implementation of the crisis intervention is adapted to the current situation, possibilities and needs of the group. The professional team considers the pace of the group and chooses adequate professional procedures for crisis intervention.

As Madro (2020) states, a well-directed crisis intervention helps to kick-start adaptive coping mechanisms, it accelerates psychological recovery and minimizes the impact on the individual's and society's mental health for the future.

Overcoming, coping with a crisis, according to Špatenková (2017), means regaining the energy needed to function "normally", rebuilding relationships and connections to people, regaining the ability to feel satisfaction or even joy; difficulties are not permanent and endless, but can be reactivated from time to time. Most crises bring with them some threat, danger, destruction or loss; on the other hand, it is always possible to see a crisis as an opportunity or a chance. Similarly, according to Vodáčková (2020), a crisis carries the possibility of fundamental change, which implies that it is both a danger and an opportunity.

Růžička et al. (2013) point out that a teacher is considered a layperson or trained layperson in the context of crisis intervention. Effective teacher intervention can be a useful support, namely: calming the individual in crisis, stabilizing his or her condition and reducing the danger.

In 2023, the Slovak Republic introduced a system of support measures in education and training into the regional education system, which were incorporated into the School Act (Amendment No. 182/2023 Coll.) with effect from 1 September 2023. The introduction of new support measures in education and training contributes to making the school system more responsive to the diverse individual educational and special educational needs of pupils, thus increasing their chances of success in education, as well as in life and in society.

Act No. 138/2019 on pedagogical employees and professional employees and on the change and supplement to some acts defines a school support team in Section 84a. For the purposes of inclusive education, the headmaster of a kindergarten, primary or secondary school may establish a school support team, whose task is, in particular, to coordinate the development of inclusive education, to ensure the application in education and training of approaches and strategies that arise from the various fields of science and technology, to cooperate with guidance and prevention services and other bodies in supporting children, pupils and their legal representatives in education and training, to provide advice to children, pupils and legal representatives and methodological support to teaching employees, to participate in the development of the school curriculum.

The school's special pedagogue and all professional employees of the school are members of the school's support team. Other teaching employees may also be members of the school support team. The composition of the school support team shall be regulated by the headmaster in the internal regulations after discussion in the pedagogical council, if established.

The headmaster will assess the realities of the school in terms of pupil composition. If the school has a high proportion of pupils from a marginalised community, it is advisable to have a social pedagogue as a member of the school support team to support the inclusion of pupils in the class or group, to strengthen communication with the pupils' family and legal representatives, to map the family environment, and to assist in building a positive classroom and school climate. The school psychologist supports pupils' adaptation to the school environment, provides counselling on pupils' developmental needs, etc. The school special pedagogue works with pupils with special educational needs.

3 Conclusion

Veteška, Svobodová and Tureckiová (2022) aptly point out that any visions and strategies are not realisable unless we feel safe, and therefore, for the quality implementation of the pedagogical process, it is first necessary to provide a safe environment. In this regard, they emphasize school rules and communication rules. The basis of safety is formed by rules that provide a framework for mutual relationships and desirable modes of communication behaviour in school. Existing rules need to be communicated; if someone is unaware of a rule, they cannot be expected to respect it.

Jablonský (2023) points out that current education should explicitly aim for pupils to think critically, to be able to cooperate and to be able to solve problem situations.

Nešpor (2019) emphasizes the skills necessary for life - the so-called life skills: self-management skills (to motivate for a healthy lifestyle, to lead a balanced lifestyle) and social skills (the ability to face social pressure, healthy self-assertion, finding a compromise, the ability to foresee the consequences of one's actions, etc.). Blinka (2015) states that currently implemented prevention programmes provide information on negative consequences but need to be complemented by targeted attitude change and the development of skills for life.

The content standards for the area of life skills development - social skills and skills of self-management/self-regulation (Tichý, Vojtová, Božík, Kříž, 2023) define the skills of self-management as personal and systematic application of strategies aimed at changing behaviour in order to achieve the desired changes in one's own behaviour (this includes critical thinking skills, creative thinking, constructive problem solving, decision-making about one's own life goals and priorities, anticipating the consequences of certain behaviours and actions, goal-setting, self-motivation, self-reflection and self-awareness, self-assessment and self-evaluation, emotion management, stress management, planning and control, time management, flexibility) and social skills - as the skills of adaptive, learned and socially acceptable behaviour that enable one to cope effectively with the demands and challenges of everyday life. This includes the ability to cope with social pressure, assertive skills (in particular the ability to assert oneself in a healthy way), empathy skills, communication skills, constructive conflict resolution skills, ability to build healthy social relationships, ability to self-reflect and get to know others (social perception), coping with stressful and conflict situations (coping strategies), media literacy.

In regard of creating a safe school environment for practice, we recommend:

- To monitor the occurrence of risky or problem behaviour. Preventive activities must be targeted according to the composition of pupils and problems, which are specific and

based on the diversity of school classes, the long-term effects of social influences, etc.

- Even minor behavioural problems need to be consistently addressed in the school environment, as overlooking or underestimating them can lead to more serious forms of deviant behaviour.
- To implement both specific and non-specific prevention.
- Since pupils have problems in the area of interpersonal relationships and social competence, it is necessary to teach them how to resolve conflicts, process failure, etc.
- At schools, it is not enough to eliminate risky behaviour of pupils, it is also necessary to implement activities to promote social relations between pupils in the classroom, as well as between pupils and teachers.
- To create an inclusive environment, employ social pedagogues and school psychologists.
- To implement prevention of victimisation.
- Discuss with school employees the procedure in the event of an armed attack. Awareness in this area is part of creating security awareness. Explain to pupils how to react in the event of an armed attack, i.e.: flight - shelter - attack.
- Implement effective rules and procedures. Develop a crisis intervention plan.
- Consider the advantages and disadvantages of installing CCTV systems.

The issue of meaningful addressing the safety of the school environment is now a matter of great urgency. A safe school environment influences pupil satisfaction, which translates positively into learning outcomes. Providing crisis intervention in the event of a crisis situation contributes to a sense of safety and overall security of the school environment.

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Primary Paper Section: A

Secondary Paper Section: AM

ATTITUDES OF FUTURE PRIMARY EDUCATION TEACHERS TOWARDS THE USE OF AUGMENTED REALITY MOBILE TECHNOLOGIES IN THE TEACHING OF HUMAN BIOLOGY

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This study was supported by grants KEGA 026UK-4/2022 Concept of constructionism and augmented reality in STEM education (CEPENSAR) and VEGA 1/0033/22 Inquiry-oriented teaching in mathematics, science, and technical education.

Abstract: Technological progress affects different areas of life, such as the economy, health or education, which inevitably requires experts from the given fields to adapt to the given changes. New technologies with modern teaching methods in education are often more motivating and attractive for students. In the following study, we evaluate the effectiveness of using one of such technologies, i.e. applications of augmented reality, in the teaching of human biology to university students, future teachers of primary education. We consider it important that new modern methods of teaching using modern technologies are part of the preparation of students for their future teaching profession. At the same time, we evaluate the attitudes of future teachers towards the use of modern technologies, as their appropriate implementation in teaching in primary education depends on their relationship to the given form of teaching. The conclusions of the study confirmed a higher understanding of the content of the university curriculum, better cooperation, as well as an increase in the interest and motivation of students. Despite the fact that the applications of augmented reality in the field of biology were known to students, they often did not use them to work with them. Students who graduated from biology, or graduated from gymnasium, were more familiar with the given teaching technology than students who did not graduate from high school in biology. The correct and appropriate implementation of modern technology in teaching is therefore also dependent on the students' previous knowledge and experience with the given topic of the subject in which modern technology can be used. Therefore, the introduction of modern technologies into the teaching of future teachers of primary education necessarily requires a sufficient understanding of the content of the subject in which the given technology will be implemented

Keywords: digital technology, augmented reality, human anatomy and physiology, student attitudes, biological knowledge and experience, teacher training

1 Introduction

Many authors have noted the positive impact of augmented reality in the context of education. Connecting virtual objects to the real environment allows students to visualize complex spatial relationships and abstract concepts (Arvanitis, et al., 2007). Various augmented reality technologies are therefore helpful in teaching complex and complicated subjects such as human anatomy (Ganguly, 2010). Fairén González, Farrés and Moyes Ardiaca emphasize that it is not possible to explain mainly the relationships between individual bodies organs common didactic aids such as textbooks and visual aids (Fairén González, Farrés, & Moyes Ardiaca, 2017). On the other hand, augmented reality applications in teaching anatomy provide students with interactive and convenient multimedia functions, thereby increasing students' interest in the subject (Kurniawan, Suhartito, & Witjaksono, 2018). Suzzana and Gaol (2021) add that the method of augmented reality also presents new prospects for adapting to different educational facilities, creating a unique educational approach capable of adapting to different types of students (Suzanna & Gaol, 2021).

At Ludwig-Maximilians-Universität (LMU) in Munich, the augmented reality method was used for the first time in the RGB-D sensor system in an anatomy course in the 2015/2016 school year. This system enables the connection of a real radiological image with the projection of the student's torso. Using gesture input, students have the opportunity to interactively explore radiological images in various cross-sections of anatomical structures. Kugelman and his colleagues observed the reactions and opinions of students who had the opportunity to work with the system in groups of 12 members during the lesson (Kugelman, et al., 2018). At the end of the research, each participant was invited to rate their satisfaction with work in the given system by filling out a questionnaire. Overall, the students evaluated the experience with the augmented reality system very positively and appreciated the use of this system within the anatomy course. The majority of

students (69.1%) found the system useful. One of the main advantages of an augmented reality system compared to previously designed multimedia learning resources is its interactive component. 82.4% of students agreed that augmented reality stimulates active learning. In this case, the emphasis was mainly on active learning, but also on the three-dimensional understanding of individual body structures. As one of the most frequent advantages of the system, the students identified the improvement of the three-dimensional understanding of the structure by being able to switch and cut the virtual body in different planes (in the horizontal, sagittal and vertical directions) in the system. The authors were surprised that students found augmented reality technology more useful in understanding the three-dimensional display of structures compared to classic laboratory exercises. The shortcomings of the system were more of a technical nature. The most common disadvantages were the rapid failure of the augmented reality system and the lower graphical interface of higher resolution images. Alternatively, the students would welcome if the system were expanded to include additional images, and for more advanced students, the authors are considering the design of the system for pathological conditions as well. Research proves that for understanding the three-dimensional representation of anatomical structures, those applications that depict individual organ structures of the body at the same time and not just one organ part are suitable.

Although similar very well-designed interactive CDs for teaching anatomy are available today, a constant problem is their high cost. In contrast, augmented reality web applications are developed to support learning about the anatomy of the human body and are often available for free. The web interface is one of the media that is suitable for teaching support because it is easily accessible through computers, tablets and mobile phones which connect to the Internet. In addition, students already know how to handle devices, so they can quickly find their way around individual applications (Layona, Yulianto, & Tunardi, 2018). One such web application that displays the human body in a 4D environment is Anatomy 4D. In this application, all anatomical systems are displayed simultaneously and separately, thanks to which it reveals the spatial relationships of individual internal organs and allows students to understand the physiological processes that take place in the human organism. At the same time, it is possible to see very well in the application the explicit and detailed structure of the organs themselves. Based on the above facts, this simple learning environment is suitable for classroom teaching and is widely used mainly by teachers, students and practitioners. Through the application, teachers can visualize one of the most complex areas of biology, such as human anatomy (Anatomy 4D, 2019). In our research, we used the given application to explain the neurohumoral regulation of the child's growth and development, as this application provides a representation of individual organs within the human organism as a whole, thereby providing an explanation of the interrelationships of individual anatomical systems. We used the application The Brain iExplore for a detailed image of the brain (The Brain iExplore AR, 2019).

In the following study, we evaluate the effectiveness of the use of the two mentioned applications of augmented reality in the field of anatomy of the human body ("The Brain iExplore" and "Anatomy 4D") in the lesson of "Somatic development of the child" among students of the Faculty of Education of the Comenius University in Bratislava, future teachers at the primary level of education. In the study, we investigate whether more complex topics from the field of biology, such as neurohumoral regulation of growth and development, are more understandable using this teaching method and students are more motivated to learn the more demanding content of biology using the augmented reality method. Last but not least, we present in the study an evaluation of students' opinions on the use of mobile technologies (which cannot be used to work with

augmented reality applications) within higher education. The aim of the study was to evaluate the use of augmented reality applications and mobile technologies in the teaching of human biology. Furthermore, we evaluated the interest in the given type of teaching among students who completed the high school diploma in biology and who did not complete the high school diploma in biology, and at the same time we addressed whether the difference in the answers about interest can be influenced by the type of secondary school that the students attended before starting college. Vocational secondary schools often have fewer biology classes, or none compared to grammar schools, so the approach of students with different biology backgrounds to using apps may differ.

2 Material and Methods

Research focused on the use of augmented reality applications in the teaching of biology (within the subject Somatic development of the child) and the use of mobile technologies in the lives of university students was carried out in November 2017 in a group of 62 students (future teachers at the primary level of education) at the Faculty of Education of the Comenius University in Bratislava. The average age of the students was 19.73 years. We divided the students into two groups according to the type of secondary school the students attended (gymnasium (N = 32) or secondary vocational school - SVS (N = 30)) and according to whether they graduated from the subject of biology (N = 20) or did not graduate (N = 42). In the given lesson of repeating the subject of the child's somatic development, in which our research was carried out, we were also based on constructionist conceptions of learning. It should be recalled that the same students also completed the frontal organizational form of the Somatic Development of the Child lesson and at the same time a lesson with constructionist concepts of learning in a repeat lesson using mobile technology and augmented reality applications.

As part of the research, we used the following applications: "The Brain iExplore" and "Anatomy 4D". The card applications, needed to be loaded, are freely available on the Internet. The first application offers detailed color images of individual parts of the brain and the principle of the function of its motor area (figure 1).

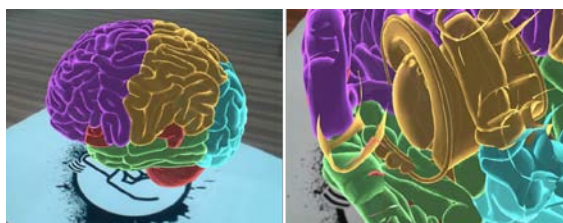


Figure 1. "The Brain iExplore" application: a color representation of individual parts of the brain visible on its surface using augmented reality (photo: Mária Fuchsová)

In the second application, the student can read the individual anatomical systems of the human body, simultaneously and separately (Fig. 2), for a better understanding of their connection and functioning within the framework of integration. Some functions of the human body are also described on the card, which serves as a marker for loading the application. As part of the neurohumoral regulation of growth and development, we used a card called "The Human Body".

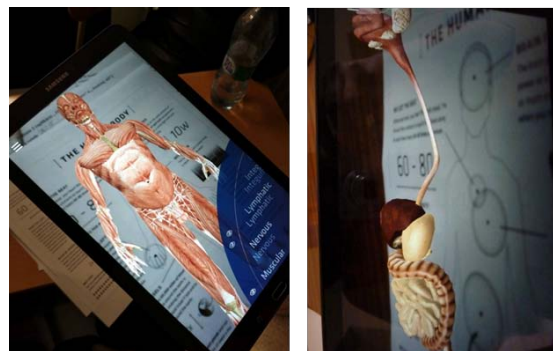


Figure 2. "Anatomy 4D" application: visualization of individual systems of the human body using augmented reality (photo: Mária Fuchsová)

During the revision lesson, students worked in groups of 3 to 4 people (17 groups) using the method of constructionist concepts. In the course of qualitative research, the results of which we present in the publication "Visualisation in Basic Science and Engineering Education of Future Primary School Teachers in Human Biology Education Using Augmented Reality" (Fuchsová & Koreňová, 2019), we observed the effect of augmented reality applications on student learning in constructionist environment. With "The Brain iExplore" and "Anatomy 4D" apps, students can use augmented reality technologies to study the anatomy of the nervous and endocrine systems as they appear in the apps in three dimensions. Students worked with the nervous and endocrine systems to understand the neurohumoral regulation of child growth and development. In the first activity, students had to identify parts of the brain in the application "The Brain iExplore" and describe their function, and in the second activity, students in the application "Anatomy 4D" had to identify endocrine glands in individual anatomical systems and describe their function. Each group received two cards needed to load the applications, one for "The Brain iExplore" application and one for the "Anatomy 4D" application. They worked with the given applications for 60 minutes. A particularly interesting part of the qualitative research was how the students tried to find those parts of the neurohumoral system on the Internet or in an anatomy book that were not familiar to them. Some students tried to translate the English names of anatomical systems into Slovak using the Internet. The results of the first part of our qualitative pedagogical research, published in the publication "Visualisation in Basic Science and Engineering Education of Future Primary School Teachers in Human Biology Education Using Augmented" (Fuchsová & Koreňová, 2019), were based on the description of the teacher as an observer in the given research and on video recordings of students' work. Subsequently, we present the results of the second part of the research, which is based on the students' opinions on working with mobile technologies, as well as with the augmented reality applications themselves in the Somatic Development of the Child class. Students' interest in this type of teaching was verified by an electronic questionnaire. Each student filled out the questionnaire on his own. The questionnaire contained thirteen closed questions, one semi-closed and one open question. We compared the students' answers according to the type of high school they attended and whether they graduated with a high school diploma in biology. We present the differences in the answers of individual groups as a percentage. We tested the statistical significance in the differences of answers with the chi-square test (CHITEST) in the Excel program ($\alpha = 0.05$).

3 Results

The first task for the students in the lesson on repeating and understanding the neurohumoral regulation of child growth in the lesson of "Somatic development of the child" was to recognize the individual colored parts of the brain in the "The Brain iExplore" application, describe their function and identify which of these parts is most involved in growth regulation. Only five groups of students out of seventeen recognized all the parts

of the brain that the application depicts and correctly determined their function. It was interesting to see how these students, by approaching the model with their tablets, revealed the internal parts of the brain in the given application. The other students recognized only some parts, even one group of students could not recognize which part of the brain in the application is the front and which is the back (Fuchsová & Koreňová, 2019). The difficulty of the given task could result from the fact that the brain in the application as a whole moved in space and individual parts of the brain changed color at the same time. This also explains the fact that not all groups completed the activity for the given application. They tried to determine only the parts of the brain, but they did not determine their function. The answers to the first question from the questionnaire "Which application did you like the most?" also revealed a lesser interest in the given application, when the majority of students (regardless of whether they passed their high school diploma in biology or the type of school they attended) stated that they liked the work more with the "Anatomy 4D" application (87.5 to 96.67%, tab. 1).

According to Fuchsová and Koreňová (Fuchsová & Koreňová, 2019), it was the difficulty of the given task in the "The Brain iExplore" application that forced the students to cooperate more and they even did not hesitate to use other resources to complete the task (such as an anatomy book or a smartphone and the Internet). The authors of the study found that students often helped each other when solving the task. In most cases, they used the plural when talking to each other about the issue, which means that the students did not see their tasks as individual. The cooperation of the students was thus quite clear. During the lesson, students explored together, determined mutual connections and helped each other understand anatomical concepts and their functions. The students' mutual learning with the help of the constructionist approach was effective.

Table 1. Percentage display of answers to the question "Which application did you like the most"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
The Brain iExplore	2	10,00	3	7,14	4	12,50	1	3,33
Anatomy 4D	18	90,00	39	92,86	28	87,50	29	96,67

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0.70$), the difference between the answers of students who attended grammar school and SVS ($p = 0.19$)

In the second activity, students had to identify the endocrine glands in the individual anatomical systems of the "Anatomy 4D" application and describe which of them, through the hormones they secrete, are involved in the regulation of growth and development. The application offered English anatomical names. Some students took this as a challenge and started looking up individual terms on the Internet. On observation, it was very clear that the students worked together to solve the task; they explained some concepts and mutual relationships and performed activities without much intervention from the teacher (Fuchsová & Koreňová, 2019).

Working with the "Anatomy 4D" application was more interesting for the students and at the same time less demanding than working with the "The Brain iExplore" application (Table 1). In order to understand the individual anatomical structures, it is important to depict them in the organism as a whole. "The Brain iExplore" application contained only the structure of individual brain, which additionally moved in space and changed colors. As part of the "Anatomy 4D" application, students could view anatomical structures independently, but also as part of individual systems, which enabled students to better understand the interconnection of the relationships of the given systems, as well as their function in the regulation of the child's growth and

development. We chose the application "The Brain iExplore" for work on the constructionist approach to learning because it showed more detailed brain structures than the "Anatomy 4D" application. We could therefore conclude that the most appropriate choice would be where the brain would be depicted in detail within the individual systems of the organism as a whole. This option is offered by other applications (e.g. Human Anatomy Atlas, 2024), which, however, unlike the selected applications ("The Brain iExplore" and "Anatomy 4D"), are only available on the Internet for a fee.

Despite the fact that the students worked better with the "Anatomy 4D" application in the revision lesson, the results of the questionnaire revealed to us that the students know both applications equally and even if they know them, they do not use them often (tab. 2 and 3).

Table 2. Percentage display of answers to the question "Do you know or use the application "The Brain iExplore"?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Know and use	1	5,00	2	4,76	2	6,25	1	3,33
Know and do not use	16	80,00	30	71,43	25	78,13	21	70,00
Do not know	3	15,00	10	23,81	5	15,62	8	26,67

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0.73$), the difference between the answers of students who attended grammar school and SVS ($p = 0.52$)

Table 3. Percentage display of answers to the question "Do you know or use the application "Anatomy 4D"?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Know and use	2	10,00	3	7,14	2	6,25	3	10,00
Know and do not use	16	80,00	30	71,43	25	78,13	21	70,00
Do not know	2	10,00	9	21,43	5	15,62	6	20,00

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0.53$), the difference between the answers of students who attended grammar school and SVS ($p = 0.75$)

From the given results, it also follows that students who graduated from biology, or graduated from grammar school, they know more about the augmented reality applications used ("The Brain iExplore" and "Anatomy 4D") than students who did not graduate from biology and only attended vocational high school. We did not notice statistically significant differences in the answers; this difference was only 9% ($p > 0.05$) (tables 2 and 3).

If we asked about other applications from the field of biology that students are familiar with, they were again more familiar with a higher percentage of students who graduated from biology (15.00% versus 2.38%) and attended gymnasium (9.38% versus 3.33%, table 4). However, we did not see a statistical difference in the responses ($p > 0.05$) and when we looked at the type of applications that the students mentioned, we learned that the applications in question were not from the field of augmented reality. The students mentioned "Human Body" app which is a virtual reality app, "Kahoot" app which is just a mobile app without virtual or augmented reality. The only app that featured augmented reality was the "Human anatomy" app, which was mentioned by only one student.

Table 4. Percentage display of answers to the question "Do you know or use other applications for biology?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Yes	3	15,00	1	2,38	3	9,38	1	3,33
No	17	85,00	41	97,62	29	90,62	29	96,67

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0,06$), the difference between the answers of students who attended grammar school and SVS ($p = 0,33$)

It is clear from the students' answers that the repeat lesson of the subject "Somatic development of the child" with the use of augmented reality applications was interesting for the students (tab. 5) and despite the fact that most of them had not encountered this type of teaching until now, all except one students agreed with the opinion that they would welcome this type of teaching in biology classes in the future as well (tab. 6).

Table 5. Percentage display of answers to the question "Were you interested in the activity with augmented reality in the lesson "Somatic development of the child"?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Yes	19	95,00	39	92,86	31	96,88	27	90,00
No	1	5,00	3	7,14	1	3,12	3	10,00

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0,75$), the difference between the answers of students who attended grammar school and SVS ($p = 0,27$)

Table 6. Percentage display of responses to the question "Do you think the biology class would be more interesting using the given augmented reality applications?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Yes	20	100,00	41	97,62	32	100,00	29	96,67
No	0	0,00	1	2,38	0	0,00	1	3,33

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0,49$), the difference between the answers of students who attended grammar school and SVS ($p = 0,30$)

At the same time, the applications of augmented reality models that we used in the lesson "Somatic development of the child" ("The Brain iExplore" and "Anatomy 4D") helped the students to better understand the neurohumoral regulation of growth and development of the child (tab. 7). In fact, more than 80% of students (regardless of whether they graduated from biology or the type of school they attended) stated that they gained new information about the subject through the given activity with augmented reality (tab. 8).

Table 7. Percentage display of answers to the question "Did the activities with AR model applications help you when repeating the given biology lesson?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Yes	19	95,00	40	95,24	29	90,62	30	100,00
No	1	5,00	2	4,76	3	9,38	0	0,00

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0,97$), the difference between the answers of students who attended grammar school and SVS ($p = 0,09$)

Table 8. Percentage display of answers to the question "Did you gain any new information about the given issue with the given activity with augmented reality?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Yes	16	80,00	36	85,71	27	84,38	25	83,33
No	4	20,00	6	14,29	5	15,62	5	16,67

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0,57$), the difference between the answers of students who attended grammar school and SVS ($p = 0,91$)

At the end of our research, we were interested in how students perceive the possibility of using mobile technologies (smartphones and tablets, which can also be used to visualize augmented reality applications) in the teaching of biology in higher education. Students who did not graduate from the subject of biology and attended secondary vocational school considered the use of mobile technologies very useful in teaching biology, while students who graduated from biology, or attended grammar school more often stated that the use of mobile technologies is only somewhat useful in teaching biology. In the group of students according to the type of secondary school they attended, there were even differences in the answer on the border of statistical significance ($p = 0,05$, tab. 9). Perhaps the fact that most high school students had little knowledge of biology plays a bigger role here, and therefore the easier form of transferring biological information using augmented reality seemed more engaging and interesting to them.

Table 9. Percentage display of answers to the question "Do you think mobile technologies are useful in teaching biology?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Very useful	10	50,00	29	69,05	16	50,00	23	76,67
Somewhat useful	8	40,00	12	28,57	13	40,62	7	23,33
I do not know	2	10,00	1	2,38	3	9,38	0	0,00

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0,2357$), the difference between the answers of students who attended grammar school and SVS ($p = 0,05$)

The students answered the same way in the case of the question of the effectiveness of using smartphones and tablets in teaching biology, even though the percentage differences in the answers were smaller in this case without statistical significance between both groups. Only 75% of students who had final exam from

biology considered teaching biology using smartphones and tablets to be effective, compared to 90.48% of students who did not have final exam from biology. In the group of students from different types of schools they attended, there was only a 2.3% difference in the answer (tab. 10).

Table 10. Percentage display of answers to the question "In your opinion, it would be effective if students used smartphones or tablets more in biology lessons?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Yes	15	75,00	38	90,48	27	84,37	26	86,67
No	4	20,00	2	4,76	3	9,38	3	10,00
I do not know	1	5,00	2	4,76	2	6,25	1	3,33

Note: CHITEST the difference between the answers of students with and without a high school diploma in biology ($p = 0,16$), 57 the difference between the answers of students who attended grammar school and SVS ($p = 0,87$)

An open question in the questionnaire encouraged students to express their opinion about the use of augmented reality applications and the use of mobile technologies in teaching biology. Students who graduated from the subject of biology, or they attended gymnasium, they considered the given type of teaching to be very interesting. They literally claimed that working with the given applications provided "a very interesting execution within the 3D model, an excellent understanding of the placement of individual organs" and that "it would be appropriate to devote more time to it in the class", but they saw the possibility of connecting to the Internet as the main problem. They stated that "the apps took a long time to load and froze" and that "it would be better if the apps worked without internet". The students, graduates of secondary vocational schools, also enjoyed working with augmented reality models, but they had a question about the English version of the given applications. They would like to welcome applications in the Slovak language. More often, they considered working with applications to be more demanding, and they also noted malfunctions with devices, tablets, with the help of which it is possible to work with applications. It should be emphasized that the functioning of augmented reality applications, which we used in the revision class, as well as other applications with augmented reality, is often dependent on the Internet connection, which means that it also depends on the material and technological support of the faculty.

Despite the minor shortcomings in connection to the Internet, we see the use of mobile technologies in the teaching of biology as very promising, because the students of today's generation own mobile technology (tab. 11), they can easily install the applications of augmented reality which are freely available on the Internet to their devices (especially smartphones) and use them in class using a mobile internet connection.

Table 11. Percentage display of answers to the question "What mobile technology do you own?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Smartphone	19	95,00	41	97,62	31	96,88	29	96,67
Laptop	20	100,00	37	88,10	31	96,88	26	86,67
Tablet	4	20,00	15	35,71	6	18,75	13	43,33
Book reader	0	0,00	2	4,76	0	0,00	2	6,67
Apple watch	0	0,00	1	2,38	0	0,00	1	3,33

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0,61$), 57 the difference between the answers of students who attended grammar school and SVS ($p = 0,20$)

Table 12. Percentage display of answers to the question "Do you have a mobile internet connection?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Yes	18	90,00	38	90,48	28	87,50	28	93,33
No	2	10,00	4	9,52	4	12,50	2	6,67

Note: CHITEST the difference between the answers of students with and without a high school diploma in biology ($p = 0,95$), 57 the difference between the answers of students who attended grammar school and SVS ($p = 0,44$)

More than 87.5% of students have a mobile internet connection (tab. 12), but a smaller percentage uses a wifi connection provided by the faculty (73.33% - 81.25%, tab. 13). As the students already stated in the free question, they see the main problem in using augmented reality applications in the biology lesson mainly in connection to the Internet. After improving the material and technological provision of the faculty, the use of this form of teaching biology can be very interesting and stimulating for students, as they stated that working with applications is fun for them, motivating them to learn complex topics in the field of biology and at the same time providing them better understanding of the subject matter.

Table 13. Percentage display of answers to the question "Do you use a wifi connection provided by the faculty?"

	With diploma in biology		Without diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Yes	16	80,00	32	76,19	26	81,25	22	73,33
No	4	20,00	10	23,81	6	18,75	8	26,67

Note: CHITEST: the difference between the answers of students with and without a high school diploma in biology ($p = 0,74$), 57 the difference between the answers of students who attended grammar school and SVS ($p = 0,46$)

We recommend to use more mobile technologies and applications of augmented reality in teaching biology at the university, as already more than 80% of students use technology in learning (tab. 14), so it is obvious that this type of obtaining information about the given issue is familiar and close to them. From the conclusions of the research, we can confirm that by using the form of teaching with the help of augmented reality, it is possible to achieve an increase in students' interest in more complex topics in the field of biology, such as neurohumoral regulation of child growth and development.

Table 14. Percentage display of answers to the question "Do you use a smartphone/tablet as part of learning?"

	With diploma in biology		ithout diploma in biology		Grammar school		SVS	
	N	%	N	%	N	%	N	%
Yes	18	90,00	34	80,95	28	87,50	24	80,00
No	2	10,00	8	19,05	4	12,50	6	20,00

Note: CHITEST the difference between the answers of students with and without a high school diploma in biology ($p = 0,37$), 57 the difference between the answers of students who attended grammar school and SVS ($p = 0,42$)

4 Discussion

With the use of augmented reality applications that mobile devices bring to education, students should be able to improve their learning environment and their ability to retain information. The conclusions of our qualitative study confirmed that augmented reality mobile technology helps students to understand better the content of biology from the field of human anatomy and physiology. It seems that the teaching method using augmented reality technology is effective. Students moved from regular instructional learning to the method of independent education and mutual learning (Fuchsová & Koreňová, 2019). Augmented reality applications are mainly suitable for students who have a problem with converting and visualizing a two-dimensional shape into a three-dimensional real image (Layona, Yulianto, & Tunardi, 2018). Medical and biology teachers point out that the use of augmented reality can help identify anatomical structures, strengthen the association between anatomy, physiology and movement through their use on mobile devices (Siqueira da Silva, Klein, & Munchen Brandão, 2017).

Despite the fact that nowadays various information technology means are often used in education, augmented reality technology has not been sufficiently accepted (Azuma, Billinghurst, & Klinker, 2011). According to Billinghurst, this technology is still underutilized because there are not enough experts available who are able to expertly fulfill the content of the subject (Billinghurst, 2024). But if we look at the opinion of the teachers themselves about the given applications, the teachers, despite the fact that they have no previous experience with the given form of teaching, accept the new technology positively. They are able to orient themselves in the given applications very quickly (Iftene & Trandabă, 2018) and consider augmented reality applications to be simple and useful (Yilmaz, 2016). The ease of use of augmented reality applications was also confirmed by the results of our quantitative research, when students who had lower knowledge and abilities in biological content considered this form of teaching more attractive and useful in teaching complex structures of the human body.

Another issue of the introduction of augmented reality technologies into the teaching process is the lack of material and technological support of universities. For example, Lin and colleagues reported that students find augmented reality applications as complicated and often encounter technical difficulties (Lin, Hsieh, Wang, Sie, & Chang, 2011). During our research, we noticed problems with the Internet connection, which made it impossible to work with some augmented reality applications, which reduces the effectiveness of using tablets and augmented reality applications in teaching biology. Moreover, without a well-designed interface and student guidance, augmented reality technology as a teaching method can be too complicated (Squire & Jan, 2007). The students of our study saw the ability to connect to the Internet as the main problem in using augmented reality applications. They stated that "the apps took a long time to load and froze" and that "it would be better if the apps worked without internet". Iftene and Trandabă who have used apps to teach biology to school-age students, add that

younger students tend to tap the screen too quickly, which can often block apps (Iftene & Trandabă, 2018).

However, most studies report that augmented reality technology leads to improved learning outcomes at all levels of education. Augmented reality applications increase the motivation to learn and at the same time help students to better understand the content of the curriculum of the given subjects (Akçayır & Akçayır, 2017). However, it is also necessary to take into account the age of the recipients of the given technologies, as improperly implemented interactions with the form of augmented reality can lead to passivity (Yilmaz, 2016). In his studies, Yilmaz brings augmented reality technology closer to children in the form of toys (puzzles and cards). In this form, children of preschool age accepted augmented reality applications positively. The applications interested them, they were involved in the activity and were active in education. The author then reminds that the implementation of augmented reality in the form of games, stories and puzzles played an important role in the adoption of applications by children. Iftene and Trandabă noted interest in augmented reality applications even among students of aged 9 to 16, if this teaching method was introduced to them in the form of a competition (Iftene & Trandabă, 2018). All the mentioned authors say that it is very fun for children, as well as pupils, to observe objects in 3D real space. The attractiveness of the given applications also depends on the quality and method of implementation of augmented reality objects. Students who participated in our research confirmed that working with the "Anatomy 4D" application was more interesting and less demanding for them than working with the "The Brain iExplore" application. In order to understand the individual anatomical structures, it is important to visualize them in the organism as a whole, which the application "The Brain iExplore" did not fulfill. The given application only provided an image of the given structure of the brain, as a separate unit and not as a part of the organism. In addition, the given structure moved and changed colors in the application. Kugelman and colleagues, who used augmented reality in the form of X-ray images and detailed depictions of body structures within the organism, even found that students in anatomy classes found the technology more useful in depicting three-dimensional structures than classic laboratory exercises (Kugelman, et al., 2018). However, Kiourexidou and the team emphasize that this method does not serve as a substitute for laboratory exercises, but rather serves as a complementary method to continuous education in an environment outside of school (Kiourexidou, et al., 2015). Therefore, before incorporating augmented reality applications into the teaching process, it is advisable to analyze its suitability for the given content of the teaching subject adapted to the age of the pupils or students.

In general, educational technology researchers agree that augmented reality technology, as one of the teaching methods, should be more thoroughly and researched (Lee, et al., 2012). The use of this technology could be very effective in motivating students, as well as in supporting the active involvement of students in the teaching process. Based on the results of our study, we encourage schools at all levels of education to adopt and implement augmented reality applications as an effective tool for positive learning and education.

5 Summary

In the present study, we investigated how augmented reality technology can contribute to a better understanding of human anatomy curriculum. Subsequently, we summarized the opinions of university students on the use of augmented reality technology in the teaching of biology, specifically human anatomy and physiology. This research followed the previous research by the authors Fuchsová and Koreňová (2019), which conclusions confirmed a higher understanding of the content of the university curriculum, better cooperation, as well as an increase in the interest and motivation of students. Augmented reality applications in the field of biology, which were the subject of research, were known to the students, but they did not use them to work with them. Students who graduated from

biology, or graduated from grammar school, were more familiar with the given teaching technology than students who did not graduate from high school in biology. These students also mentioned other well-known mobile apps, but the apps they mentioned did not include augmented reality technology. The class using augmented reality applications was interesting for the students, and despite the fact that most of them had not encountered this type of teaching until now, all except one student agreed that they would accept this type of teaching in biology classes in the future. Students considered the use of mobile technologies in the teaching of biology in higher education to be very useful and effective, while students from secondary schools without a biology degree support more this opinion. The results could probably be influenced by the fact that the majority of secondary school students had less knowledge of biology and therefore an easier form of transfer of biological information from human anatomy and physiology seemed more engaging and interesting to them. The only disadvantage in the use of augmented reality applications is that they are tied to an Internet connection. Due to the lower material and technological provision of the faculty, work with augmented reality technologies can therefore be difficult and more complicated. The advantage of freely available augmented reality applications is that they are inexpensive, but it is necessary to take into account that they are often modified by developers and that updated versions or new ones are created, the functionality of which can be used for the given educational content should be analyzed in advance.

Despite minor shortcomings in the use of applications, we consider augmented reality technology to be a suitable method of teaching biology and recommend its inclusion in the educational process as a complementary method to classical educational methods. Our results are encouraging and we are convinced that such new technologies, if regularly used in biology teaching, can be an important tool of a modern and integrated educational program.

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Primary Paper Section: A

Secondary Paper Section: AM

EVOLUTION OF INTELLECTUAL CAPITAL AS AN INTANGIBLE ASSET IN ACCOUNTING: SYSTEMATIC LITERATURE REVIEW AND BIBLIOMETRIC ANALYSIS

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We gratefully acknowledge the funding of this paper by the VEGA project No. 1/0638/22, Intellectual capital and productivity of European regions.

Abstract: This study presents a systematic literature review and bibliometric analysis focusing on the evolution of intellectual capital as an intangible asset in accounting research. Drawing data from two prominent scientific databases, Web of Science and Scopus, we provide significant insights into key topics, leading countries, authors, and affiliations in this field. Our findings highlight variations across databases in certain areas, emphasizing the nuanced differences in research trends and outputs. Additionally, we identify a time lag in the evolution of topics within Scopus compared to Web of Science. This research contributes original insights by offering a comprehensive overview of past and current relevant topics, serving as a valuable resource for stakeholders interested in intellectual capital research and its implications in accounting.

Keywords: intellectual capital, intangible assets, accounting, bibliometric analysis.

1 Introduction

The accounting for intangible assets and intellectual capital (IC) has seen significant changes in Europe, North America, Australia, and Asia since the year 2000. This has increased the importance of academic research in this field, and the interest in intangible assets and intellectual capital is not limited to academic research alone. Regulatory bodies like the Financial Accounting Standards Board and businesses have also shown a growing interest in this issue from a practical perspective (Garanina et al., 2021).

The issue of intangible assets and intellectual capital's relevance is confirmed by several reasons. Firstly, from a regulatory perspective, the field of intangible assets has significantly developed over the past 30 years (Garanina et al., 2021). Reforms implemented between 1994 and 2004 resulted in the adoption of International Accounting Standards (IAS), expanding accounting options for companies globally. Starting from April 1, 2001, the International Accounting Standards Board (IASB) has embraced International Financial Reporting Standards (IFRS), previously referred to as IAS, as the recognized accounting standards (IFRS, 2018). Since 2005, the European Union has mandated the use of IFRS as the accounting standard for EU countries. Starting in 2007, efforts to align IFRS with the generally accepted accounting principles of the United States (US GAAP) have been initiated. Currently, despite variations in the accounting treatment of intangible assets, the harmonization process is progressing at a higher level (Garanina et al., 2021).

Despite the new regulations on accounting standards, accounting practices related to intangible assets and intellectual capital remain controversial. Some researchers, such as Chalmers et al. (2012) or Baruch Lev (2018), blame IAS 38 (International Accounting Standards) and SFAS 2 (Statements of Financial Accounting Standards) for the way intangible assets are reported, valued, and disclosed. Furthermore, practitioners and researchers often criticize accounting standards for not providing additional guidance on the accurate measurement of intangible assets.

There is a need to merge two distinct approaches in defining, measuring, and managing reported intangible assets and intellectual capital, which are developing simultaneously. One approach is emerging in Europe, Australia, and Asia, while the other is developing in North America. Both approaches tackle the same problem but employ different terminology to define core concepts. For instance, scholars in Europe, Australia, or Asia use the term "intellectual capital," whereas in the USA, the

term "intangible assets" or "intangibles" is more commonly utilized (Garanina et al., 2021). Although the terms are used in different areas, intangible assets in accounting literature, knowledge assets in economists' literature, and intellectual capital in managerial and legal literature essentially refer to the same thing – future benefits that are not materially embodied. Therefore, in academic research, definitions of terms such as "intangible assets," "knowledge assets," "intellectual capital," and others are examined and compared (Lev, 2018).

Over the course of twenty-five years, research on intellectual capital has progressed through five distinct stages. The initial phase established the concept as a "good idea," while the second phase developed frameworks for analysing intellectual capital. The subsequent phase delved into understanding how intellectual capital functions in practical applications (Guthrie et al., 2012). From these beginnings, some researchers have progressed to the fourth phase, which they call the ecosystem approach to effective intellectual capital management. The fifth phase of research addresses the question of whether managing intellectual capital is a worthwhile endeavour, considering how intellectual capital can address not only organizational but also societal issues. Understanding the various stages of intellectual capital research helps identify possible future directions for its study (Garanina et al., 2021).

2 Literature review

Historically, intangible assets have been viewed as risky because they are difficult to measure. Intangible assets, unlike tangible ones such as real estate and machinery, have less easily measurable potential future benefits. However, in today's economy, intangible capital is becoming increasingly valuable as it creates value (Eckstein, 2004).

The global impact of information and technological and communication development has transformed our society and prioritized the globalization of the economy and innovation as key factors in global competition. The economic, political, and social environment has recently undergone profound changes, leading to a higher level of globalization and increased competition. As a result, the transition from traditional accounting to modern accounting now requires more information. The evolution from the agricultural age to the industrial age has also changed the approach to intangible assets and their importance. This is evident in published studies: in 1978, intangible assets accounted for 5% of all assets; in 1998, this number increased to 72% of all assets, and currently, intangible assets represent 75-85% of all assets (Giju et al., 2012).

In several countries, investments in intangible assets are rapidly growing. In some states, these investments exceed those in traditional capital, such as machinery, equipment, or buildings. The significance of intangible assets for companies, industries, and national economies continues to be reinforced by aspects such as intense global competition, information and communication technologies (ICT), new business models, and others. Given such a situation, policymakers in many developing economies are striving to develop intangible assets necessary for success in high-value-added activities (OECD, 2011).

Intangible assets are resources that are used to add value to a business entity. These assets do not have a physical nature and are classified or defined differently by international organizations, researchers, and regulatory bodies. Given the varying definitions of intangible assets and how they are categorized, the following subchapters describe the approach to this issue from the viewpoint of accounting and regulatory bodies, as well as from the perspective of academic researchers.

According to the OECD, intangible assets can be defined as assets that lack physical or financial form. Intangible assets can

be grouped into three categories according to OECD classifications (OECD, 2011):

1. computer-based information – this group includes intangible assets such as software and databases;
2. innovative property – this group includes intangible assets such as scientific research, non-scientific research, copyrights, designs, and trademarks;
3. economic competencies – this group includes intangible assets such as brand value, human capital, networks connecting people and institutions, and organizational know-how.

The European Central Bank (ECB) defines intangible assets as non-monetary assets that lack physical or financial substance. This category includes a wide variety of assets like human capital, innovative products, brands, patents, software, consumer relationships, databases, and distribution systems. These assets can help businesses improve productivity and efficiency through the use of new technologies. Specifically, intangible assets cover investments in computational and computer-based information (such as software and databases), innovative company characteristics and competencies (like scientific and non-scientific research and development, copyrights, designs, and trademarks), economic competencies (including brand value, company-specific human capital, networks connecting people and institutions, organizational know-how enhancing efficiency, and advertising and marketing aspects). They are also known as "intellectual assets," "knowledge assets," or "intellectual capital" (ECB, 2018).

As per IFRS/IAS 38, an intangible asset is an identifiable non-monetary property without physical substance. An intangible asset is identifiable when it can be separated (sold, transferred, licensed, etc.) or when it arises from contractual or other legal rights. Expenditures on an intangible asset are recognized as an expense unless the item meets the definition of an intangible asset and it is probable that economic benefits will flow from the asset in the future, and the acquisition cost of the asset can be reliably measured. It's challenging to distinguish between costs to create intangible assets and maintenance costs from an internal perspective. Therefore, internally generated brands, titles, publishing titles, customer lists, and similar items are not recognized as intangible assets. Costs to create other intangible assets generated by own activities are classified based on the phase during which they arose, either in the research phase or in the development phase. Research expenditures are recognized as an expense, and development expenditures are recognized as the acquisition cost of intangible assets (if they meet specified criteria). (IFRS, 2022). In Table 1, we have depicted the recognition rules for intangible assets according to IAS 38.

Table 1 Recognition of intangible assets according to IAS 38

Recognition of intangible assets
Recognition criteria for (intangible) assets: <ul style="list-style-type: none"> • It is probable that future economic benefits will flow to the entity. • The acquisition cost of the asset can be reliably measured.
Additional recognition criteria for intangible assets arising from development: <ul style="list-style-type: none"> • Technical feasibility • Focus on completion • Usability or saleability • Potential to generate future economic benefits • Availability of adequate technical, financial, and other resources • Ability to reliably measure attributable expenditures
Specific restrictions for the recognition of internally generated intangible assets: <ul style="list-style-type: none"> • Internally generated goodwill cannot be recognized. • Internally generated brands, publishing titles, customer lists, and similar items cannot be recognized. • Expenditures related to start-up activities, training

activities, advertising and promotional activities, relocation, or reorganization are part of the overall entity.

- Expenditures on intangible assets initially recognized as expenses cannot be capitalized later.

Source: own proceeding according to IFRS, 2022

The Financial Accounting Standards Board (FASB) categorizes intangible assets into five groups: marketing-related intangible assets, customer-related intangible assets, artistic-related intangible assets, contract-based intangible assets, and technological intangible assets. Table 2 also provides specific examples of these groups of intangible assets (Yallwe & Buscemi, 2014).

Table 2 Classification of intangible assets according to FASB

Group of intangible assets	Examples of intangible assets
Intangible assets related to marketing	Trademarks, trade names, service marks, collective marks, certification marks, trade dress (unique colour, shape, or packaging design), newspaper headlines, internet domain names, and non-compete agreements.
Intangible assets related to customers	Customer lists, outstanding orders or production, contracts with customers and related customer relationships, and non-contractual customer relationships.
Intangible assets related to art	Games, opera books, ballet books, magazines, newspapers, other literary works, musical works such as compositions, song lyrics, jingles, images, photographs, video and audiovisual material, including films, music videos, and television programs.
Intangible assets based on contracts	Licenses, licensing agreements, advertising, construction, management, services, or supply contracts, lease agreements, construction permits, franchise agreements, operating and broadcasting rights, utility rights such as drilling, water, air, mineral rights, timber harvesting, and easements, service contracts such as mortgage services contracts, employment contracts.
Technological intangible assets	Patented technology, computer software and mask works, unpatented technology, databases, including plant varieties, trade secrets such as secret formulas, processes, and recipes.

Source: own processing according to Yallwe & Buscemi, 2014

From the above classifications and definitions, we can consider the terms "intellectual asset," "intangible asset," "knowledge asset," and "intellectual capital" as interchangeable. Furthermore, in general, all characteristics of intangible assets can be summarized as (Yallwe & Buscemi, 2014):

- Organizational resources without physical existence;
- Provide future economic benefits;
- Legally protected (i.e., ownership);
- Acquired from past activities (research and development, training, learning by practice, contractual agreement).

3 Methodology

This study involves bibliographic research that provides valuable information about research trends and gaps through a systematic and quantitative analysis of intellectual capital evolution as an intangible in accounting. The analysis of empirical data in published literature guides the bibliometric analysis of the research area and identifies major themes (Leung et al., 2017). The application of mathematical and statistical methods to books and other forms of communication (Pritchard, 1969).

For our study, we utilize the standard science mapping workflow developed by Börner et al.(2003) and further developed by Aria & Cuccurullo (2017) Cobo et al. (2011) and Zupic & Čater (2015). The standard workflow consists of 5 stages: study design, data collection, data analysis, data visualization, and interpretation. For our study design, we formulated the following research questions:

RQ1: What are the emerging trends in publication and citation patterns in the Web of Science and Scopus databases?

RQ2: What are the key trends and themes according to the keywords in publication patterns in the Web of Science and Scopus databases?

RQ3: How have publication trends evolved in the Web of Science and Scopus databases?

RQ4: Which countries are leading in publication counts in the Web of Science and Scopus databases, and what are their key international collaborations?

RQ5: Which journals are the most relevant in terms of publication metrics in the Web of Science and Scopus databases?

RQ6: Which authors are the most relevant in terms of publication metrics in the Web of Science and Scopus databases? How have their publication trends evolved? What do their collaboration networks look like?

RQ7: Which affiliations are the most relevant in terms of publication metrics in the Web of Science and Scopus databases? What do their collaboration networks look like?

In order to address these research questions, we utilized bibliometric techniques as outlined in Table 3.

Table 3 Standard bibliometric techniques

Bibliometric technique		The unit of analysis used	Kind of relation
Bibliographic coupling	Author	Author's oeuvres	Common references among author's oeuvres
	Document	Document	Common references among documents
	Sources	Journal's oeuvres	Common references among the journal's oeuvres
Co-author	Author	Author's name	Authors' co-occurrence
	Country	Country from affiliation	Countries' co-occurrence
	Institution	Institution from affiliation	Institutions' co-occurrence
Co-citation	Author	Author's reference	Co-cited author
	Document	Reference	Co-cited documents
	Journal	Journal's reference	Co-cited journal
Co-word		Keyword, or term extracted from	Terms' co-occurrence title, abstract, or document's body

Source: own proceeding according to the Cobo et al. (2011)

Data was collected on June 3, 2024, from two main research databases: Web of Science and Scopus. The PubMed database was excluded from the selected databases because it only yielded 6 publications and did not provide valuable output for analysis. The inclusion criteria of data filtering are described in Table 4.

Table 4 Inclusion criteria for data collecting

Inclusion Criteria	Web of Science	Scopus
Keywords	"intellectual capital" AND "intangible assets" AND "accounting" OR "IFRS" OR "IAS" OR "US GAAP" Should include "intellectual capital" AND "intellectual capital management" Search within all fields	
Document Type	Article	
Language	English	
Subject Area / Category	Business Finance; Management; Business; Economics; Multidisciplinary Sciences. Exclude all other	Business, Management and Accounting; Economics, Econometrics and Finance. Limited to the mentioned area
Total number of selected documents	4,767 documents	3,369 documents

Source: own proceeding

To gain a better insight into our research topic's evolution, we collected data from all available years without filtering any specific time period. For Web of Science, we analysed data from 1985 to 2024; for Scopus, we looked at the period from 1997 to 2024. Since the year 2024 is not yet finished, our analyses may be subject to change by the end of the year. However, we do not anticipate any changes in the research area, but only in the number of published documents. We chose not to exclude the year 2024 in order to understand the current trends.

To analyse the collected samples, we use the latest version of RStudio (2024.04.2+ 764) installed on a Windows 11 platform. For bibliometric analysis, we utilize a package called "bibliometrix". Data from both databases are imported as ".bib" files. Using the "biblioshiny" package command, we delete duplicated articles and process the analyses. The Figure 1 illustrates the analysis of features that can be performed by "biblioshiny" using R (Aria & Cuccurullo, 2017; Donthu et al., 2021).

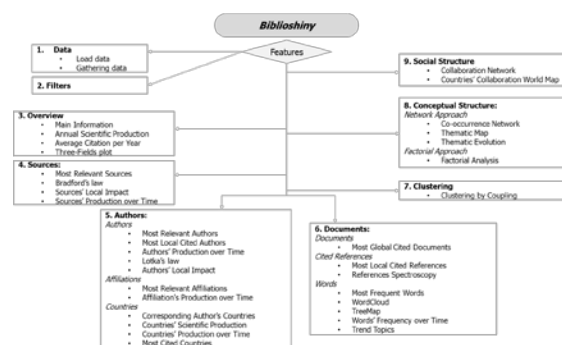


Figure 1 Features of "biblioshiny" in RStudio

Source: own proceeding

4 Results

After making the necessary corrections to the loaded sample (such as deleting duplicated evidence), we have finalized our samples, which are described in Table 5. Based on these samples, all other analyses were proceeded.

Table 5 Summarize of selected samples

Description	Web of Science	Scopus
Timespan	1985 - 2024	1997 - 2024
Sources (Journals, Books, etc)	624	827
Documents	4,763	3,333
Annual Growth Rate %	14.58	16
Document Average Age	7.38	7.66
Average citations per	22.74	33.41

doc		
Author's Keywords (DE)	8,003	6,641
Authors	8,628	6,505

Source: own proceeding

4.1 Descriptive statistics

Between 1985 and June 3rd, 2024, a total of 8,628 authors produced 4,763 documents across 624 sources listed in the Web of Science database. In the case of 827 Scopus-listed sources, 6,505 authors produced 3,333 documents during the period from 1997 to June 3rd, 2024. The publication trend for both scientific databases is illustrated in Figure 2. We observe that both databases show a consistent increasing trend in publications related to intellectual capital in accounting.

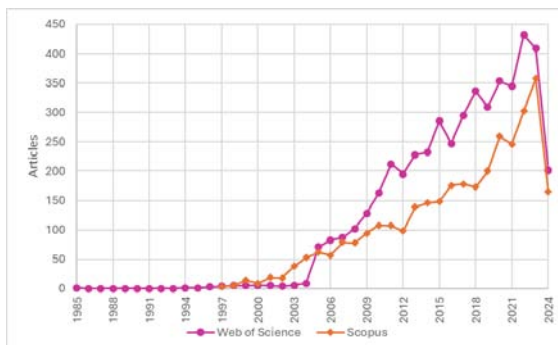


Figure 2 The publication trend

Source: own proceeding

Not less important are citations. Table 6 compares two databases based on the average citations per article and citation years.

Table 6 Citation comparison of Web of Science and Scopus

Year	Web of Science			Scopus		
	Average citations per article	Number of articles	Citable Years	Average citations per article	Number of articles	Citable Years
1985	2	1	40			
1994	128	1	31			
1995	0	1	30			
1996	13	3	29			
1997	151	4	28	105.67	3	28
1998	315.8	5	27	239.83	6	27
1999	305.6	5	26	267.93	14	26
2000	347.17	6	25	58.11	9	25
2001	147.6	5	24	192.95	19	24
2002	181.75	4	23	83.06	18	23
2003	258.17	6	22	95.32	38	22
2004	239	9	21	83.02	53	21
2005	83.8	71	20	86.06	62	20
2006	46.92	83	19	72.14	57	19
2007	54.57	87	18	68.96	79	18
2008	58.86	102	17	62.78	78	17
2009	33.98	128	16	38.6	94	16
2010	44.6	163	15	58.55	108	15
2011	33.88	212	14	50.69	107	14
2012	36.38	195	13	48.32	98	13
2013	31.39	228	12	37.58	139	12
2014	26.75	232	11	28.84	146	11
2015	25.07	285	10	40.35	148	10
2016	24.75	247	9	30.5	176	9
2017	19.17	295	8	42.14	178	8
2018	14.77	336	7	32.65	173	7
2019	12.61	309	6	22.72	200	6
2020	11.69	353	5	21.05	259	5
2021	7.12	344	4	14.41	246	4
2022	4.71	432	3	10.85	302	3
2023	1.96	409	2	3.71	358	2
2024	0.73	202	1	1.02	165	1

Source: own proceeding

For a better understanding of the citation trend for both databases, we have illustrated the average citations per year in Figure 3.

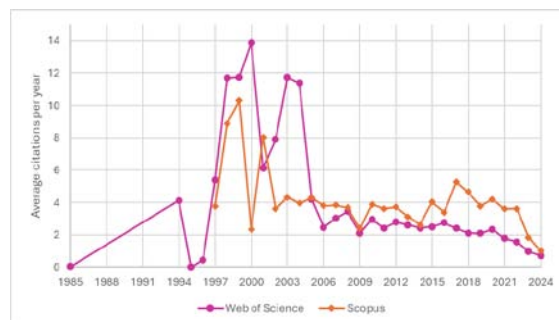


Figure 3 Citation trends in Web of Science and Scopus

Source: own proceeding

4.2 Keywords bibliometric analyses

The Web of Science sample contains 8,003 authors' keywords, which will be analysed in subsequent parts of this chapter. The Scopus sample includes 6,641 keywords. The top 20 most frequent keywords for both samples are listed in Table 7.

Table 7 The most frequent keywords for Web of Science and Scopus

Web of Science		Scopus	
Words	Occurrences	Words	Occurrences
Intellectual capital	1238	Intellectual capital	1162
IFRS	812	Intangible assets	314
Disclosure	217	Human capital	274
Human capital	188	Knowledge management	177
Corporate governance	162	Innovation	152
Earnings management	160	Financial performance	149
Value relevance	160	Disclosure	148
Financial reporting	153	Performance	119
Capital	130	Structural capital	102
Performance	127	Relational capital	100
Intangible assets	125	Corporate governance	97
Innovation	124	Intangibles	92
Accounting	118	Content analysis	82
Knowledge management	117	Firm performance	81
IFRS adoption	109	Corporate social responsibility	67
Financial performance	99	Competitive advantage	66
International financial reporting standards	98	Balanced scorecard	60
Accounting standards	89	Integrated reporting	59
Fair value	88	Value creation	55
Structural capital	84	India	54

Source: own proceeding

We used a word cloud to visualise the top 100 keywords for both samples. To account for keyword frequency variations and enhance visualisation clarity, we utilized square roots of keyword occurrences. The word cloud for Web of Science is illustrated in Figure 4 and for Scopus in Figure 5.



Figure 4 Word Cloud: Web of Science

Source: own proceeding

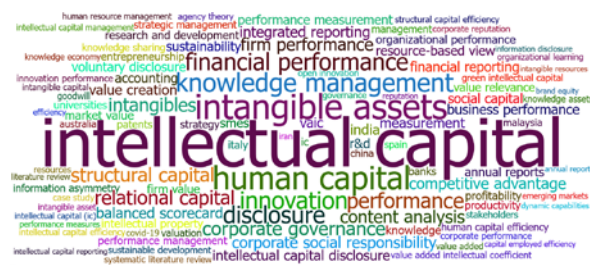


Figure 5 Word Cloud: Scopus

Source: own proceeding

The Web of Science keywords were categorised into three clusters using co-word net analysis. The first cluster (red) is linked to intellectual capital as an intangible asset in corporations. The second cluster (blue) is associated with accounting standards and reporting. The final cluster (green) pertains to intellectual capital, its components, and calculations related to firm performance and innovation. The node network is depicted in Figure 6.



Figure 6 Co-word net: Web of Science

Source: own proceeding

The Scopus keywords were categorised into six clusters using co-word net analysis. The first cluster (red) is related to the innovation perspective, including R&D, patents, and intellectual property. The second cluster (blue) is related to intellectual capital as intangible, which provides a competitive advantage and has an impact on firm performance. The third cluster (green) combines words related to corporate finance and accounting. The fourth cluster (purple) is related to reporting and measurement. The fifth cluster (orange) is related to performance measurement, and the final cluster (brown) is related to intellectual capital components. The node network is depicted in Figure 7.

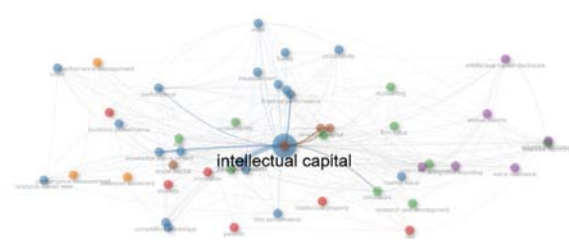


Figure 7 Co-word net: Scopus

Source: own proceeding

We have analysed the themes based on keywords, considering their relevance and level of development. The themes have been divided into four categories:

1. Niche themes (high development, low relevance);
2. Motor themes (high development, high relevance);
3. Emerging or declining themes (low development, low relevance);
4. Basic themes (low development, high relevance).

A thematic map for the Web of Science is shown in Figure 8. The map encompasses niche themes such as entrepreneurship, competitive advantage, governance, and efficiency. Additionally, it covers motor themes like IFRS disclosure and corporate governance. Emerging topics include themes related to annual

reports, profitability, and IFRS 9. The largest group consists of basic themes, which touch upon topics like intellectual capital and its components, disclosure and measurement of intellectual capital, universities, and innovations.

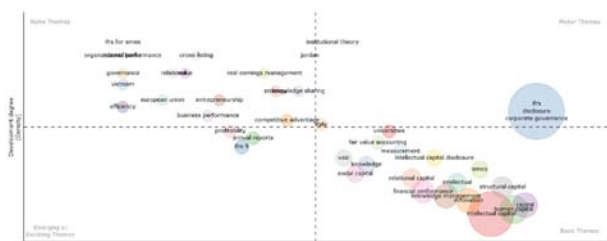


Figure 8 Thematic map: Web of Science

Source: own proceeding

In the case of Scopus, niche themes include topics such as panel data, open innovation, and human resources. Organizational learning is identified as a motor theme. Additionally, topics like intellectual capital, intangible assets, and human capital are shifting from basic themes to motor themes. Emerging themes include agency theory. Within the group of basic themes, we can find systematic literature review, value relevance, knowledge sharing, and information asymmetry, among others. Figure 9 shows a thematic map for Scopus.

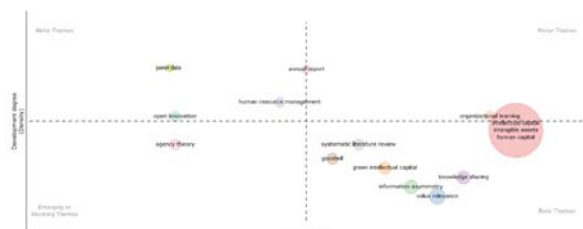


Figure 9 Thematic map: Scopus

Source: own proceeding

It's widely known that trends and topics change over time. To illustrate how these topics have evolved, we've conducted a thematic evolution analysis. We divided the period into smaller intervals with four time points. These time points were chosen based on the evolution of intellectual capital in literature. The first time cut was in the year 2000 when the concept and empirical confirmations of intellectual capital gained attention from international accounting organisations amid reforms about standards for intangibles in accounting and reporting systems. The second time point is in the year 2010 when all accounting standards were harmonized, and researchers began focusing not only on organisational intellectual capital but also on national and regional intellectual capital, while countries were recovering from the global crisis. The next time point was set for the year 2015, and the last for 2020.

In our analysis of the Web of Science sample, we divided the data into five time intervals: 1985 – 2000, 2001 – 2010, 2011 – 2015, 2016 – 2020, and 2021 – 2024. In the first interval, the focus was on "capital markets" and "international accounting standards." The second interval covered a wider range of topics, including intellectual capital, performance, and annual reports. The third interval emphasized social aspects and the impact of intangibles and innovations on information asymmetry in capital markets (referred to as "agency theory"). After 2015, attention shifted towards sustainable economics. The most recent interval, from 2021 to the present, reflects contemporary global events such as the COVID-19 pandemic, the war in Ukraine, and energy crises. Therefore, we are now focusing on topics such as innovations, knowledge management and sharing, competitive advantage, intellectual capital efficiency, development, and others. The results for Web of Science listed documents are illustrated in Figure 10.

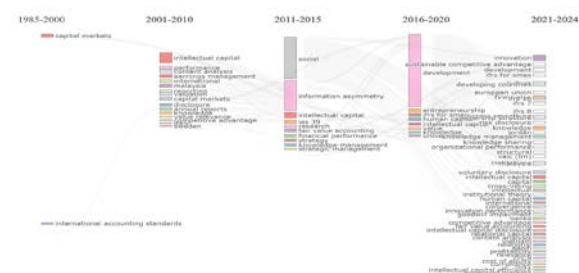


Figure 10 Thematic evolution: Web of Science
Source: own proceeding

In our analysis of the Scopus sample, we divided the data into five time intervals: 1997-2000, 2001-2010, 2011-2015, 2016-2020, and 2021-2024. The results for each interval vary. Starting in 1997, the first interval is characterised by intellectual capital, intangible assets, knowledge management, and measurements. The second period focuses on intellectual capital, intangibles, and financial reporting. The third interval adds innovations and risk management to the previous topics. In contrast to the Web of Science, agency theory and information asymmetry have been addressed since 2016. The last interval emphasises intellectual capital, SMEs, and measurements. The results Scopus listed documents are illustrated in Figure 11.

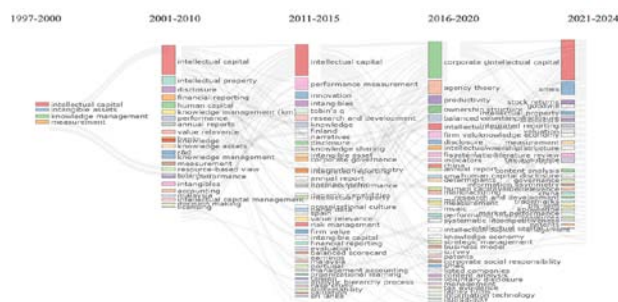


Figure 11 Thematic evolution: Scopus
Source: own proceeding

4.3 Countries bibliometric analyses

The scientific output from both databases is on the rise. In the case of Web of Science, for the year 2024, 109 countries contributed to scientific content (published in articles, books, etc.). The United States of America leads in this type of production with 2,014 publications, followed by the United Kingdom with 1,146 publications. China closes the top 3 scientific producers list with 1,010 publications. Scientific production for all countries is illustrated in Figure 12.

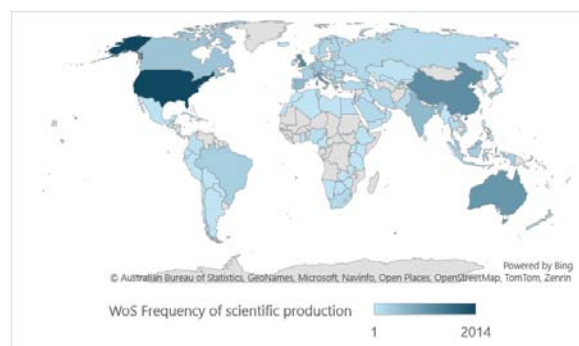


Figure 12 Country scientific production: Web of Science
Source: own proceeding

In contrast to the previous database, scientific content listed in Scopus in the year 2024 is contributed by 100 countries. In this case, Italy leads with 669 publications, followed by the United

States of America with 581 publications. The top 3 are closed by China, as in the previous case, with 535 publications. Scientific production for all countries is illustrated in Figure 13.

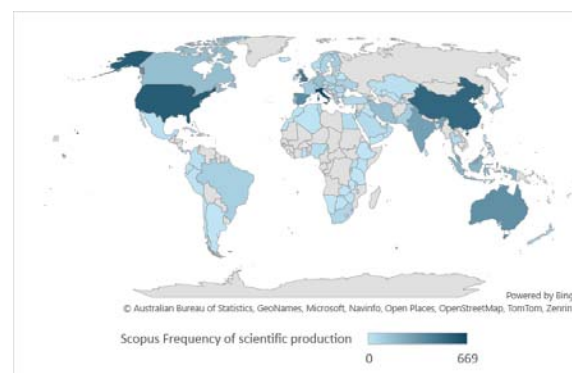


Figure 13 Country scientific production: Scopus
Source: own proceeding

To enhance the relevance of research in the field of intangible intellectual capital in accounting, we present the number of publications for 2013 and 2023 for the top 10 countries of each database, thus interpreting the trends over the past 10 years. These results are illustrated in Figure 14 for Web of Science and Figure 15 for Scopus.

In the case of Web of Science, the top 10 producers of research content are the USA, the UK, China, Australia, Italy, Spain, India, Canada, Germany, and Malaysia. For the top 3 countries, the scientific output from 2013 to 2023 increased as follows: USA from 714 to 1,939, UK from 347 to 1,110, and China from 249 to 1,012. Nearly all of the top 10 countries at least doubled their scientific production.

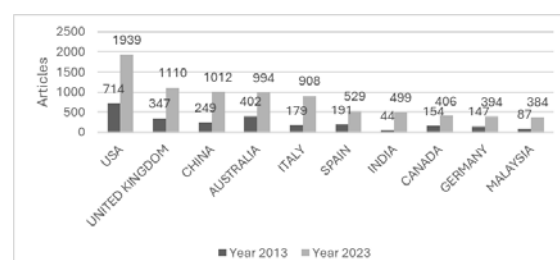


Figure 14 The top 10 countries production in the years 2013 and 2023: Web of Science
Source: own proceeding

In the case of Scopus, the top 10 producers of research content are Italy, the USA, China, the UK, Spain, Australia, India, Malaysia, Indonesia, and Portugal. The scientific output from 2013 to 2023 for the top 3 countries increased as follows: Italy from 102 to 644, the USA from 228 to 552, and China from 157 to 483. Nearly all of the top 10 countries more than doubled their scientific production.

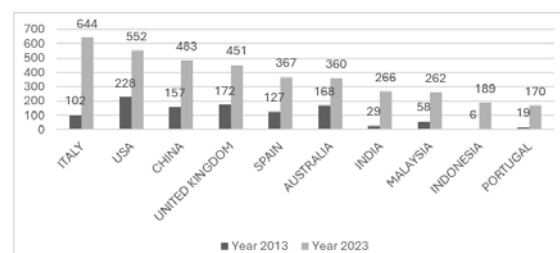


Figure 15 The top 10 countries production in the years 2013 and 2023: Scopus
Source: own proceeding

Next, we examined the collaborative patterns among countries to determine whether they had solely domestic publications or if they engaged in international co-authorship. We identified corresponding authors and country collaboration maps to better understand these connections. The corresponding author's countries are illustrated in Figure 16 for Web of Science and in Figure 18 for Scopus.

The top 20 countries in Web of Science primarily produce publications within their borders.

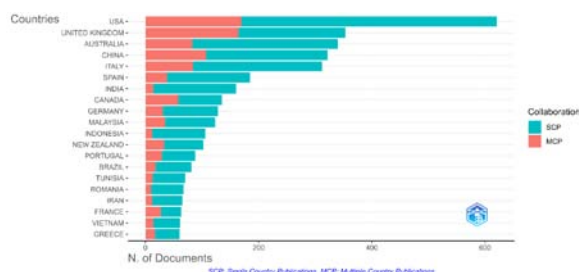


Figure 16 Corresponding author's countries: Web of Science
Source: own proceeding

The USA collaborates most frequently with China (87 collaborations), the UK (67 collaborations), and Canada (44 collaborations). On the other hand, the USA has the lowest collaborations with South Africa, Serbia, Poland, Pakistan, Nigeria, Mexico, Malta, Lithuania, Iran, Hungary, Ghana, Czech Republic, Chile, Bahrain, and Argentina, with only one collaboration with each of these countries. In the case of the United Kingdom, their top three collaborations are with Australia (47 collaborations), Italy (38 collaborations), and China (28 collaborations). Conversely, the UK has very minimal collaboration with Ukraine, Tanzania, Montenegro, Monaco, Mexico, Malta, Lithuania, Liechtenstein, Latvia, Kenya, Kazakhstan, Hungary, Ecuador, and the Czech Republic, with only one collaboration with each of these countries. Australia's most frequent collaborations are with New Zealand (29 collaborations), Italy (28 collaborations), and Malaysia (10 collaborations), while their least frequent collaborations are with Ukraine, Turkey, Tanzania, Romania, Pakistan, Norway, Nigeria, Mauritius, Libya, Lebanon, Korea, Israel, Ireland, Finland, Fiji, Egypt, Brazil, Austria, and Albania, with only one collaboration with each of these countries. The collaboration links map is illustrated in Figure 17. It is important to note, that we are explaining countries, with whom mentioned countries collaborate at least 1 time. Countries with which they do not collaborate may be dedicated from Figure 17.



Figure 17 Collaboration world map: Web of Science
Source: own proceeding

The top 20 Scopus countries are all single-country producers, with the exception of Pakistan.

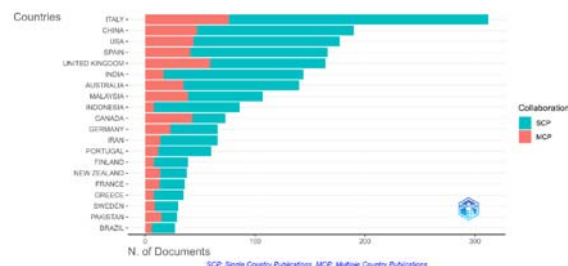


Figure 18 Corresponding author's countries: Scopus
Source: own proceeding

Italy most frequently collaborates with the United Kingdom (38 collaborations), Australia (23 collaborations), and the USA (15 collaborations). On the other hand, Italy has only one collaboration each with Turkey, Tunisia, Switzerland, Serbia, Romania, Qatar, Morocco, Mexico, Kazakhstan, Jordan, Indonesia, and Estonia. China frequently collaborates with the United Kingdom (13 collaborations), Malaysia (12 collaborations), and Australia (10 collaborations). Conversely, China has only one collaboration with each of the following: Ukraine, Turkey, Thailand, Romania, Philippines, Oman, Latvia, Japan, Iran, Indonesia, Greece, Denmark, and Croatia. The USA's most frequent collaborations are with China (32 collaborations), the United Kingdom (27 collaborations), and Canada (18 collaborations). The USA has only one collaboration with each of the following countries: Ukraine, Uganda, Slovenia, Oman, Nigeria, New Zealand, Namibia, Malta, Kuwait, Japan, Ireland, Indonesia, Ghana, Georgia, Egypt, Czech Republic, Croatia, Chile, Brazil, and Bahrain. The collaboration links map is illustrated in Figure 19. It is important to note that we are referring to countries with which the mentioned countries have collaborated at least once. Countries with which they do not collaborate are not described.

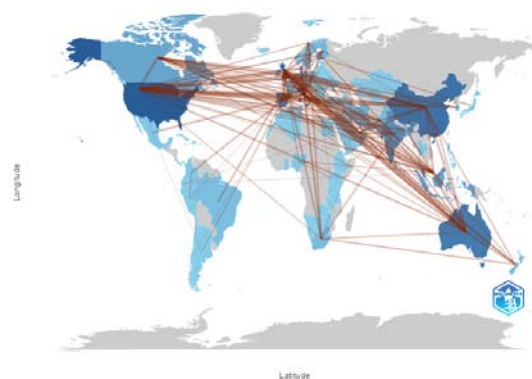


Figure 19 Collaboration world map: Scopus
Source: own proceeding

4.4 Sources bibliometric analyses

The main bibliometric analysis tool for journals is Bradford's law. Bradford's law is a pattern first described by Samuel C. Bradford in 1934 that estimates the exponentially diminishing returns of searching for references in science journals. According to the law, if the number of articles sorts journals in a field into three groups, each with about one-third of all articles, then the number of journals in each group will be proportional: $1:n:n^2$ (Naranan, 1970). In many disciplines, this pattern is called a Pareto distribution. Core Sources by Bradford's law for Web of Science and Scopus are illustrated in Figure 20 and Figure 21.

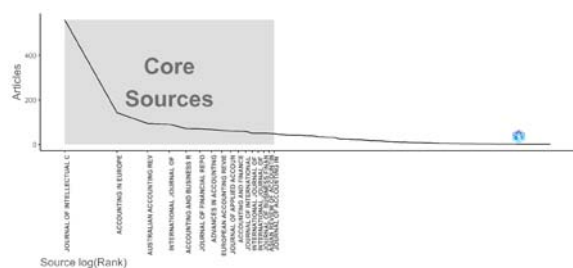


Figure 20 Core sources by Bradford's law: Web of Science
Source: own proceeding

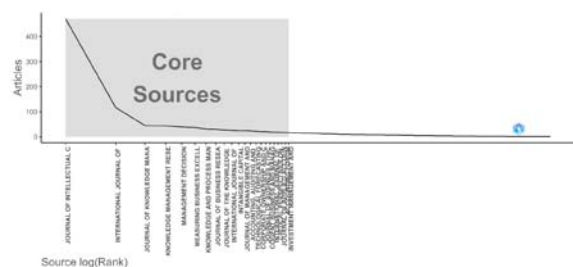


Figure 21 Core sources by Bradford's law: Scopus
Source: own proceeding

We thoroughly analysed these journals to better understand the core sources' structure according to Bradford's Law. First, we examined the most relevant sources of production for both databases. The results for Web of Science are illustrated in Figure 22 and for Scopus in Figure 23.

The Journal of Intellectual Capital is the most prominent journal in the Web of Science database, having published 561 articles. Accounting in Europe follows with 143 articles, making it the second most significant journal. The Australian Accounting Review rounds out the top 3. Lastly, the top 10 includes Accounting and Finance, which has published 60 articles.

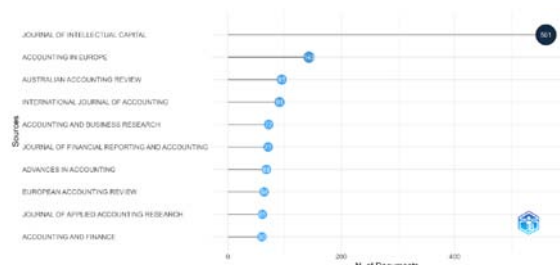


Figure 22 Most relevant sources: Web of Science
Source: own proceeding

In addition to the previous case, the Journal of Intellectual Capital is also highly relevant in Scopus. It has a significant lead with the second place being taken by the International Journal of Learning and Intellectual Capital with 117 articles. The top 3 is rounded out by the Journal of Knowledge Management with 45 articles. The top 10 is completed by the International Journal of Productivity and Performance.

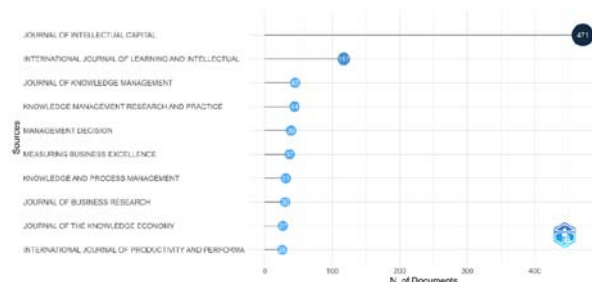


Figure 23 Most relevant sources: Scopus
Source: own proceeding

4.5 Authors bibliometric analyses

Lotka's law is a basic infometrics law for analysing the authors (similar to Bradford's law for sources). Lotka's law, named after Alfred J. Lotka, is a special application of Zipf's law that describes the frequency of publication by authors in any given field. Let's define X as the number of publications, Y as the number of authors with X publications, and k as a constant that depends on the specific field. Lotka's law states that $Y \propto X^{-(k)}$. Lotka initially claimed that $k = 2$, but subsequent research has shown that k varies depending on the discipline. Alternatively, Lotka's law can be expressed as $Y' \propto X^{-(k-1)}$, where Y' is the number of authors with at least X publications. These two expressions can be proven equivalent by taking the derivative (Qiu et al., 2017). Lotka's law for the Web of Science sample is illustrated in Figure 24 and for Scopus – Figure 25.

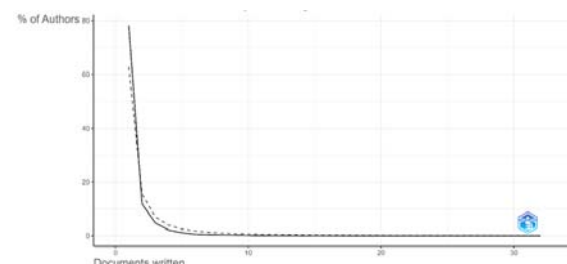


Figure 24 Lotka's law: Web of Science
Source: own proceeding

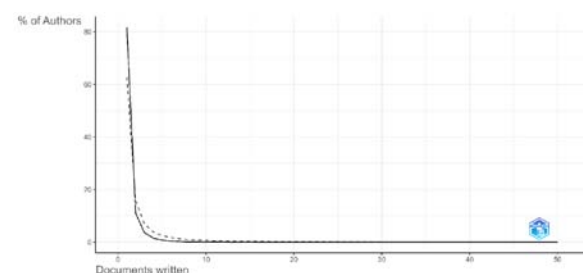


Figure 25 Lotka's law: Scopus
Source: own proceeding

In our analysis, we examined the top 10 most relevant authors from both samples and analysed their individual production and fractionalized articles. Fractional authorship measures an author's contributions to a set of published papers, assuming uniform contributions from all co-authors for each document. We calculated fractional frequency as follows (Demaine, 2022):

$$\text{FracFreq}(AU_j) = \sum_{h \in AU_j} \frac{1}{\text{number of co-authors}(h)},$$

where AU_j is the set of documents co-authored by the author j , and h is a document included in AU_j .

The most relevant authors according to Web of Science are N. Bontis, J. Dumay, C. Nobes, H. Gupta, V. A. Nageswaran, T. V. Somanathan, A. Krimpmann, M. Salehi, K. Wennberg, and P. Chand. In the case of Scopus, the top 10 authors are N. Bontis, J. Dumay, J. Guthrie, I. Abeysekera, G. Roos, M. Grimaldi, L. Cricelli, J. Mouritsen, P. Paoloni, and S. Veltri. We provide information about articles and fractionalized articles for both samples in Table 8.

Table 8 Most relevant authors from Web of Science and Scopus

Web of Science			Scopus		
Author	Articles	Articles Fractionalized	Author	Articles	Articles Fractionalized

BONTIS, N.	32	11,16666667	BONTIS, N.	50	17,96666667
DUMAY, J.	30	12,45	DUMAY, J.	31	12,28333333
NOBES, C.	26	20,33333333	GUTHRIE, J.	22	8,61666667
GUPTA, H.	18	6	ABEYSEKERA, I.	19	15,5
NAGESWARAN, V. A.	17	5,66666667	ROOS, G.	17	7,28333333
SOMANATHAN, T. V.	17	5,66666667	GRIMALDI, M.	16	5,11666667
KRIMPANN, A.	16	16	CRICELLI, L.	15	4,61666667
SALEH, M.	16	4,88333333	MOURITSEN, J.	15	6,68333333
WENNERBERG, K.	16	5,45	PAOLONI, P.	15	5,25
CHAND, P.	15	6,33333333	VELTRI, S.	15	7,5

Source: own proceeding

Additionally, we also provide analysis of the author's production and citations per year for both samples. The results are illustrated in Figure 26 for Web of Science and in Figure 27 for Scopus.

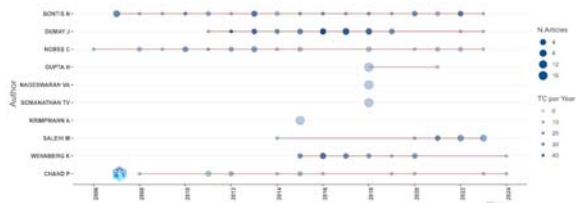


Figure 26 Author's production and citations over time: Web of Science

Source: own proceeding

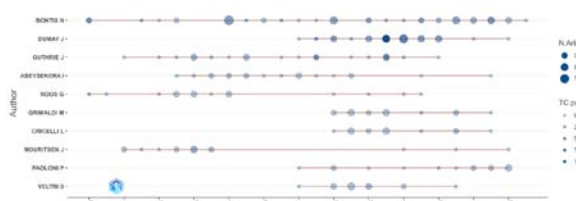


Figure 27 Author's production and citations over time: Scopus

Source: own proceeding

We provide a network of authors for collaboration, normalized by associations. The collaboration network for Web of Science is shown in Figure 28 and for Scopus in Figure 29.

In the Web of Science sample, we have identified 11 clusters of authors. The first collaboration cluster includes N. Bontis, J. Dumay, J. Guthrie, M. Khaliq, G. Secundo, I. Abeysekera, S. Abhayawansa, and M. Massaro. The second cluster consists of authors such as S. J. Gray, M. Joshi, N. Hellman, and J. Birt. In the third cluster, we have M. Grimaldi and L. Cricelli. The fourth cluster contains two authors, I. W. K. Ting and Q. L. Kweh. The fifth cluster is represented by L. L. Rodrigues and J. Craig. The sixth cluster includes M. Walker, E. Lee, and J. Xu. The seventh cluster consists of authors P. Chand and C. Patel. The eighth cluster includes two authors, A. Kianto and J. Saenz. In the ninth cluster, we have H. Gupta, V. A. Nageswaran, and T. V. Somanathan. The tenth cluster includes R. Barker and M. E. Barth. The last cluster is represented by I. Tsalavoutas and K. Hussainey.

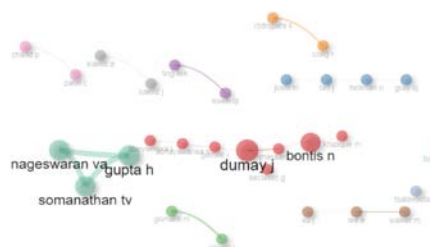


Figure 28 Author collaboration network: Web of Science

Source: own proceeding

In the case of Scopus, we identify as well 11 clusters. The first collaboration cluster includes M. Grimaldi and L. Cricelli. The second cluster consists of authors such as N. Soewarno and B. Tjahjadi. In the third cluster, we have E. Shakina and A. Barajas. The fourth cluster contains two authors, V. O. Dh and N. P. Tran. The fifth cluster is represented by N. Bontis and K. Asiaei. The sixth cluster includes J. Dumay, J. Guthrie, I. Abeysekera, G. Roos, S. Veltri, S. Abhayawansa, G. Secundo and S. Cuganesan. The seventh cluster consists of authors N. Raimo and F. Vitolla. The eighth cluster includes four authors, G. Schiuma, B. Marr, A. Lönnqvist and D. Carlucci. In the ninth cluster, we have U. Johanson, J. Holland, M. Giuliani and M. Skoog. The tenth cluster includes J. Mouritsen, R. Roslender and C. Nielsen. The last cluster is represented by Q. L. Kweh, W. M. Lu and I. W. K. Ting.

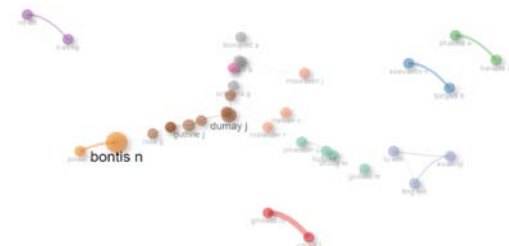


Figure 29 Author collaboration network: Scopus

Source: own proceeding

4.6 Affiliations bibliometric analyses

The top 10 most relevant affiliations in Web of Science are Macquarie University, University of Sydney, Massey University of New Zealand, McMaster University, Universidad de Castilla – La Mancha, Islamic Azad University, University Kebangsaan Malaysia, Hong Kong Polytechnic University, Auckland University of Technology, and Makerere University. The number of articles produced by these affiliations is illustrated in Figure 30.

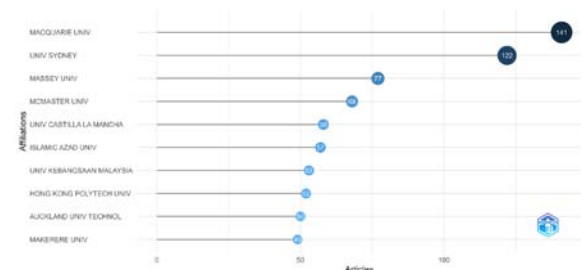


Figure 30 Most relevant affiliations: Web of Science

Source: own proceeding

The top 10 most relevant affiliations in Scopus are Macquarie University, McMaster University, National Research University Higher School of Economics, Islamic Azad University, Universiti Teknologi MARA, University of Cassino and Southern Lazio, University of Salerno, University of Calabria, Universidad de Castilla – La Mancha, and Universiti Teknologi Malaysia. The number of articles produced by these affiliations is illustrated in Figure 31.

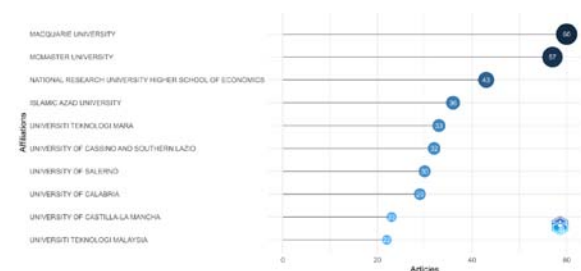


Figure 31 Most relevant affiliations: Scopus

Source: own proceeding

Similarly, we create collaboration networks for affiliations for both Web of Science and Scopus, as illustrated in Figures 32 and 33.

In the case of Web of Science, there are 9 collaboration clusters. The first cluster includes affiliations such as the University of Sfax, the University of Naples Federico II, the Athens University of Economics and Business, the University of Valencia, and the University of Salerno. The second cluster consists of McMaster University, Islamic Azad University, and Ferdowsi University of Mashhad. The third cluster is the largest, containing 17 affiliations: Macquarie University, the University of Sydney, Massey University of New Zealand, The Hong Kong Polytechnic University, Auckland University of Technology, The University of Western Australia, The University of Glasgow, Lancaster University, University of Wollongong, University of Technology Sydney, Swinburne University of Technology, The University of Adelaide, University of Calabria, University of Cassino and Southern Lazio, University Of Salento, Royal Holloway University of London, and the University of Otago. The fourth cluster includes the University Kebangsaan Malaysia, University of Technology MARA, University Utara Malaysia, and International Islamic University Malaysia. The fifth cluster contains two affiliations: University of São Paulo and University of Genoa. The sixth cluster includes the Royal Melbourne Institute of Technology, La Trobe University, Monash University, The University of Queensland, and Griffith University. The seventh cluster consists of the University of Pretoria and The University of Auckland. The eighth cluster includes the Bucharest University of Economic Studies and the University of Birmingham. The last cluster includes National Chengchi University and National Taiwan University.

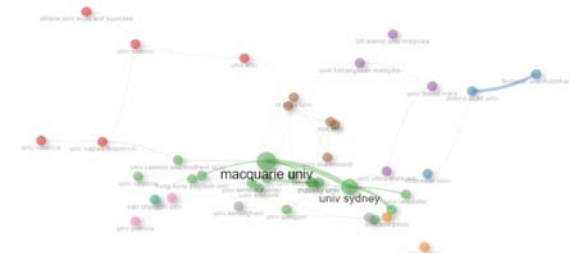


Figure 32 Affiliation collaboration network: Web of Science
Source: own proceeding

When looking at Scopus, there are 10 collaboration clusters. The first cluster consists of the University of Castilla-La Mancha, the University of Technology Malaysia, and the International Islamic University Malaysia. The second cluster includes the University of Salerno, the University of Turin, Tampere University of Technology, the University of Salento, and the University of Basilicata. The third cluster comprises three affiliations: the University of Glasgow, the University of Ferrara, and the University of Florence. The fourth cluster includes the National Research University Higher School of Economics, Lappeenranta University of Technology, the University of Vaasa, and the University of Deusto. The fifth cluster contains National Chengchi University, Chinese Culture University, National Taiwan University, and National Cheng Kung University. The sixth cluster consists of Ahlia University and the University of Johannesburg. The seventh cluster includes two affiliations: Universitas Airlangga and the University of Wollongong. The largest affiliation cluster contains 12 organizations: Macquarie University, the University of Cassino and Southern Lazio, the University of Calabria, Copenhagen Business School, the University of Sydney, RMIT University, Swinburne University of Technology, Monash University, the University of Bologna, the University of Waikato, Sapienza University of Rome, and the University of New South Wales. The ninth cluster includes McMaster University, Islamic Azad University, the University of Malaya, Ferdowsi University of Mashhad, and the University of Isfahan. The last cluster contains

the University of Technology MARA, University Utara Malaysia, and Universiti Kebangsaan Malaysia.

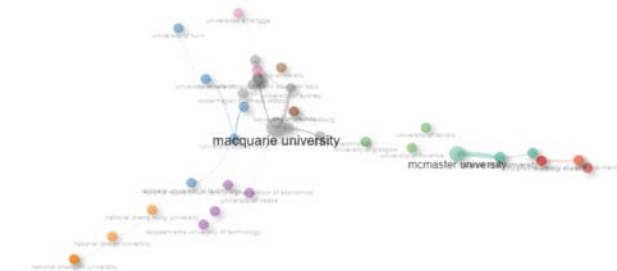


Figure 33 Affiliation collaboration network: Scopus
Source: own proceeding

5 Conclusion

The existing literature contains a significant amount of research on intellectual capital and the accounting of intangibles. In this study, we combine both sides, as intellectual capital is an intangible asset for firms, regions, and countries. We provide a systematic literature review on the accounting of intangibles, as well as systematic bibliometric analyses on the research of intellectual capital as a part of intangible assets in accounting. For our research we use Web of Science and Scopus database as the hugest scientific sources. The PubMed database was excluded because of non-relevant amount of available documents.

We used bibliometric analysis to answer our research questions. Our first question focused on publication and citation patterns. The publication pattern in both samples is increasing, confirming the relevance of the chosen topic. Unfortunately, citation patterns in both databases are decreasing.

The second research question pertained to trend topics and themes. In the Web of Science database, the trending topics are intellectual capital, innovations, and accounting standards. These themes were divided into 4 groups: niche, motor, emerging, and basic. Niche themes include entrepreneurship, competitive advantage, governance, and efficiency. Motor themes cover IFRS disclosure and corporate governance. Emerging topics involve annual reports, profitability, and IFRS 9. The largest group consists of basic themes, which cover intellectual capital and its components, disclosure and measurement of intellectual capital, universities, and innovations. In the case of Scopus, the focus is on innovations, intellectual capital as intangible, and the measurement and reporting of intangibles. Niche themes include panel data, open innovation, and human resources. Organizational learning is classified as a motor theme. Additionally, topics such as intellectual capital, intangible assets, and human capital are transitioning from basic themes to motor themes. Emerging themes include agency theory. Within the basic themes group, we find systematic literature review, value relevance, knowledge sharing, and information asymmetry, among others.

The third research question solving the topics' evolution. The research in the area of intellectual capital as an intangible asset is divided into 5 time intervals. In the Web of Science sample, the data is divided into intervals from 1985 to 2024, with a shift in focus over time. Themes evolved from capital markets to knowledge management, intellectual capital, innovations, etc. In contrast, the Scopus sample, divided into intervals from 1997 to 2024, displays varying results across each interval. Topics evolved from intellectual capital and intangible assets to intellectual property and intellectual capital components. Also we can see that Scopus topics are evolving with a small lags.

The fourth research question focuses on the perspective of country-level research output. In the case of Web of Science, the USA stands out as the leading country, with a significant gap in the number of publications compared to other countries. The top three is rounded out by the UK and China. Over the past 10

years, the top 10 countries have at least doubled their scientific production. We also examined the corresponding author's country, finding that most analysed countries primarily have single-country publications. To better understand collaboration networks, we analysed these networks in detail for all the countries. In the case of Scopus, the leading country is Italy, followed closely by the USA, with China completing the top three. The patterns in scientific publications, corresponding authors, and collaboration networks are quite similar to those observed in the Web of Science data.

The fifth research question focuses on the sources of scientific publications. Using Bradford's law, we identified the core journals for both samples. We also analysed the top 10 journals by their scientific production. In both databases, the leading journal is the Journal of Intellectual Capital.

The sixth research question addresses identifying the most relevant authors, their scientific production, and their collaboration networks. To describe the frequency of authors' publications, we applied Lotka's law, which showed similar patterns for both samples. The top two authors in both databases are N. Bontis and J. Dumay. However, the frequency of their publications varies between Web of Science and Scopus, likely due to the differing criteria these databases use to list sources. Additionally, we mapped out the collaboration networks for both samples to provide a comprehensive view of author collaborations.

The final research question focuses on identifying the most relevant affiliations and their collaboration networks. It was observed that in the Web of Science database, the relevant affiliations tend to publish more scientific production compared to those in Scopus.

Our research also has several limitations that need to be acknowledged. Firstly, there is a data lag issue. We opted not to exclude the year 2024 to ensure we have the most current information available. However, it's important to note that while the basic information might not change significantly, the number of publications could still vary. Secondly, there is a coverage bias due to the databases not uniformly covering all languages. We focused primarily on English, the dominant scientific language. However, results for minor languages may not be as reliably represented in our analysis. These limitations underscore the need for cautious interpretation of our findings, particularly regarding the currency of data and the language bias inherent in our database selection.

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Primary Paper Section: A

Secondary Paper Section: AH

MODERN UKRAINIAN WOMEN IN THE ARMY: REALITIES AND PROSPECTS

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Abstract: The article is devoted to the analysis of the problem of servicewomen in the Armed Forces of Ukraine, the realities of war in the gender dimension, the prospects of women in the army, and the issue of the leadership of servicewomen in Ukraine. The issue is extremely relevant today due to Russia's military aggression against Ukraine. The authors aim to find out the prospects of Ukrainian women in the Armed Forces, including leadership positions of Ukrainian women in the army following the example of NATO and a number of countries all over the world. There are already about 8,000 female officers in command positions in the Armed Forces of Ukraine. It is noted that modern Western Europe demonstrates a tolerant attitude towards women who serve in the military forces or participate in armed conflicts as warriors. It is considered effective to use the synergy of women and men on the battlefield to achieve military goals. The article analyzes both the attitude of modern Ukrainian society to women warriors and the reactions and experiences of the women warriors themselves, who are well-known to the Ukrainian public. In conclusion it is stressed that a qualitatively new state of the Ukrainian army has been formed, in particular, thanks to the active participation of women.

Keywords: Armed Forces of Ukraine, gender component of military policy, servicewomen, military elite, Russian-Ukrainian war.

1 Introduction

When it comes to the Ukrainian women who are fighting in the ranks of the Armed Forces of Ukraine against the Russians for the right of their people to exist, to live a full life in freedom, it is not difficult to perceive that in a society that has feels a real threat of destruction by a cruel enemy, a positive, moreover, grateful attitude towards their defenders has been formed during the open full-scale aggression of the Russian Federation. At the same time, however, an average Ukrainian still believes that this state of affairs is due to a certain deficiency of servicemen, and therefore certain hopelessness, not thanks to a free and conscious choice of the women who joined the ranks of the Armed Forces. Moreover, sometimes in the public informational field of Ukraine, the voices are heard which deny the need and even the possibility of women's participation in military operations as servicewomen, and their service in the army on the whole (Hrabovska, 2022b). Such beliefs clearly contradict current global trends. It is worth mentioning that today Ukraine has surpassed NATO countries in the number of women serving in the army, which is unprecedented for NATO member states. It is worth recognizing that Ukrainian women join the ranks of the state's defense forces not only and exclusively because of their own desire, but due to the pressures of the life circumstances or military duties as in the case of doctors and nurses. However, there are no relevant surveys or sociological studies on this issue at present.

Today, in a large number of armies around the world women soldiers have become commonplace. Wikipedia, the most accessible resource for the mass reader, provides the following information about women in armies around the world: "The proportion of female military personnel in the world's armies varies. It is about 3% in India, 10% in the United Kingdom, 15% in France, 13% in Sweden, 16% in the United States, 15.3% in Canada, and 27% in South Africa." (Wikipedia, 2024). The most prominent example of women's presence in the army is Israel. However, women also serve in the armed forces of France, Germany, Canada, Spain, Sweden, the United States, the United Kingdom, Norway, China, Eritrea, North Korea, Peru, Malaysia, Benin, and others. Obviously, this is a global brand today which should be seriously analyzed.

The purpose of this study is to analyze the current realities of the Ukrainian women's participation in the war against the Nazi occupiers and to assess the prospects of women in the Ukrainian Defense Forces, including such an important issue as prospects for the women's leadership in the army.

2 Analysis of scientific publications

There are few academic studies devoted to the participation of the Ukrainian women in the war against the Russian aggressors. However, both the problem itself and the specifics of its coverage in the scientific research of the contemporary Ukrainian social and humanitarian studies deserve special attention, primarily due to the fact that this massive recruitment of women into the ranks of the Armed Forces during a full-scale war in the center of Europe is a unique phenomenon. This reality requires special attention and investigation.

The formation the existing gender stereotypes are emphasized by such researchers as O. Syniavska, N. Tymchenko, and L. Tymoshenko who analyze the protection of women's rights in the military forces in the context of the Russian-Ukrainian war (2023). It is worth accentuating the authors' statement that "the experience of 2014 showed that from the beginning of Russia's aggression against Ukraine women have joined the fight side by side with men. They have responded to the mobilization, some of them have become volunteers, and together with men they performed all the necessary duties required at that time. This trend is still going on. In the context of the Russian-Ukrainian war significant reforms have been made to protect the rights of women in the military forces, which are primarily aimed at gender equality and security. Ukraine actively supports equal opportunities for women in the military ranks, ensuring their access to various professional opportunities and career growth. This contributes to the development of women's individual potential and strengthening their status in the military community" (Syniavska, Tymchenko and Tymoshenko, 2023, 114).

Nevertheless, there are still many problems caused by the specifics of the conflict situation in Ukraine, which are constantly emerging during the Russian-Ukrainian war, and the existing stereotypes of the mass consciousness as for the gender roles in the society.

The correlation of this issue with the historical reality, wars, conflicts, and revolutions, in which women have taken an active part is interesting and useful. This is the subject of the study by Kiriukhina M. V. and Khomiak O. V. "Historical Feats of Women from Ukraine in Wars" (2023). The authors prove that "war makes no exceptions, affecting both women and men. At the same time, women's history in war has long remained unwritten. In Soviet times, the truth about the fate of women in the war was forbidden, suppressed, or even distorted" (Kiriukhina and Khomiak, 2023, 62). The need to recreate historical justice regarding the role of women, for example, in World War II, changes some fundamental accents regarding the importance of participation or non-participation of the entire citizenry in the struggle for the country's survival, the ability of the community to consolidate and organize popular resistance to the enemy.

The article "Equality of Rights of Men and Women in Military Service in Ukraine: Wartime Challenges" by O. Chervyakova, O. Sereda, and Yarygina analyzes the parity of rights and responsibilities of women and men in the defense and security sector of the modern Ukrainian state. The article focuses on the current state and promising ways to ensure gender equality in the defense and security forces of Ukraine. The authors emphasize that the main purpose of their research is to study the policies, standards and procedures of NATO member states and other countries that have succeeded in reforming their own defense

and security forces (Chervyakova, Sereda and Yarigina, 2022, 109).

The authors of the report pay special attention to this issue in a number of scientific articles and a monographic studies (Vlasova, Hrabovska and Halytska 2018).

Some special attention should be paid to the academi publications devoted to the problem of Ukrainian women as a possible military elite of the country, the problem which is obviously absent in the socio-humanitarian discourse of modern Ukraine. Meanwhile, it seems that this topic should become one of the most relevant in the context of the study of gender aspects of reforming the Armed Forces in accordance with NATO principles. (See more about this: Hrabovska and Tsiurupa, 2023).

3 Results

In Ukrainian history, as well as in the histories of other peoples of the Earth, women's participation in combat was sporadic and never widespread, unless we recollect the legendary Amazons, whose testimonies of military victories should still be attributed to myths and legends, not to the scientifically proven facts, despite the existing modern historical research on this issue (Roslyakov, 2004).

However, we have many examples of stories of Ukrainian women who along with men stood up to defend Ukraine in wars against an external aggressor and in the national liberation wars, which were numerous in the Ukrainian history. Some of these fighters expressed indignation at the unequal treatment of women as partners in the struggle. Thus, Ulas Samchuk testified that Olena Teliha categorically refused to stay in the safe Lviv when her comrades went to the East in 1941 during World War II. Samchuk writes that Olena: "strongly and completely disagreed with the decision of the OUN leadership in Melnyk to expel her from the group. How? Will she stay here? "Alone"? At a time when "there"... And so on, and so forth. Oh, no! Never! Her stormy, explosive nature is overflowing, her small room is full of noise, she is engaged in fierce battles and negotiations with all members of the group, proving that this is utter nonsense, mobilizing the opposition of our entire army, demanding justice. ... *What does war mean? What are the benefits? How can we divide into men and women here? No and no! She does not agree with this, she will not agree with this!*" (*emphasis added*) (Samchuk, 1998, 85).

It is noteworthy that Olena Teliha appeals to the sense of justice, which is one of the key elements of the Ukrainian mentality (Hrabovska, 2022a). Now modern Ukraine is sure to undergo revolutionary changes. And this is not only due to reforms in the Armed Forces on Ukraine's path to NATO, but also due to the realities of the 10-year war with Russia. The reflections of real war "practitioners" are extremely interested for the consideration of the problem discussed here. For example, Ruslan Onyshchenko, the former commander of the Shakhtar volunteer battalion (the Shakhtar volunteer battalion was transformed into the Tornado company during the ATO), while noting that he is generally against women in war, nevertheless admits that it is very difficult without them. He writes that one of his mistakes as a commander was that: "...I allowed girls to serve in the battalion. The best girl fighter remains a woman, and this is a problem. ... Why did I gather all the women who wanted to serve in the battalion? Because nothing can replace women's hands. When a soldier is wounded, women's hands make him endure and survive, and this is a fact. Anyone who knows anything about war will understand me. And so, knowing that women's hands are needed by fighters, I endured women's follies, women's flirtations and romances, which are unavoidable if you have women in your unit. But all this was worth for the sake of the magical power of women's hands. And I will say not only hands, but also lips, breasts, stomach, and ass" (Onyshchenko, 2021, 126-127).

Perhaps too frankly and unusually for our "chaste" humanities, but this is the truth of war and it is worth hearing, knowing and working with. And then the warrior author turns to the philosophical reflections on life, which also deserve attention. So "...when a young fighter is wounded, he is scared because he feels he is losing his strength, he wants to see a woman next to him. This is probably an instinct. We come into the world and are put on a woman's chest. And when we leave the world, we want to hold a woman's breast or a woman's hand. ...If you do not understand what I am talking about, then you are lucky and have not died and have not felt how loudly death breathes and how cold its breath is. ...Death loves heart-to-heart conversations while you can still speak. So, believe me, before death or when it seems like it's the end, you want to confess something and cling to the sweetest thing - a woman's breast or lips. That's how we are as people, and it's normal, because a woman is the beginning of life, and you always want to be in an embrace with life. Yes, that's exactly right. That's why I was patient and accepted girls into the battalion who remain girls even in uniform" (Onyshchenko, 2021, 127).

These reflections of an experienced Ukrainian military commander echo the statement made by US General Robert B. Heller to the US Senate after the campaigns in Iraq and Afghanistan saying that it is no longer possible to go to war without women, and that the synergy of men and women should be used to resolve global conflicts (Trobaugh, 2018).

The full-scale war of eruption against Ukraine has accelerated the speed of social time for Ukrainians. Public opinion and public opposition often lag behind the realities of this war. While objections are raised against women's participation in combats, or healing properties of women's hands, breasts, lips, etc. are praised, Tetyana Chornovol is driving the racists away from Kyiv with her Stuhna. And we already have had many examples of the undeniably heroic participation of Ukrainian women in combat (Bilozerska, 2021). The Ukrainian community should listen to the opinion of Lyudmyla Darahan, State Secretary of the Ministry of Defense of Ukraine: "We have already overcome the stereotype that women cannot fight. Now we need to overcome the stereotype that a woman cannot command." (Espresso TV, 2023).

It is significant that "Today, on the battlefield in Ukraine, we have the largest number of women in modern world history. They prove themselves not only as good military financiers or doctors, but also as brave soldiers who faithfully defend their homeland. Our task is to do everything we can to help them build their careers," said Natalia Kalmykova, Executive Director of the Ukrainian Veterans Fund and now Deputy Minister of Defense of Ukraine. (Armyinform, 2023) Obviously, Ukraine will follow the path of modern Israel in reorganizing its army, when women and men who are fit for military service serve in the IDF (Israel Defense Forces). In Israel, all women are liable for military service on an equal footing with men. However, women serve one year less than men, namely 2 years, and may not be mobilized due to pregnancy or religious beliefs. Israeli women join the IDF at the age of 18, just like men in this country. Like men, they participate in combat operations. Women in this country can serve in the air force, ground forces, navy, artillery, border guard, assault forces, etc. Even before the war with Hamas, every third Israeli soldier was a woman.

In 2011, the Israeli army welcomed General Orna Barbivai, who, upon taking office as Major General of the IDF, declared her support for the principle of gender equality and equity in her country's army and congratulated women who are able to break down established stereotypes and barriers. This is not the only example in the modern world when a woman becomes a representative of the country's military elite (Hrabovska and Tsiurupa, 2023) E.g., Brigadier General Pamela McGahan joined NATO's top military and political leadership, and General Jacqueline D. van Oost became the commander of the Department of Logistics of the US Department of Defense.

As the researcher Elizabeth M. Trobeau notes: "Women have been part of the U.S. Army and its campaigns since the American Revolution. With the advent of the Women's Army Corps in 1943, women could officially enlist in the military. During this time, recruits faced unofficial smear campaigns that dramatically reversed recruitment. Over the past 70 years, the roles of women in the military have changed as rapidly, and in some cases faster, than society has changed. Many of these changes have been good. For example, many women have excelled in careers, specialties and skills. However, women still face stereotypes about who they are and how well they perform. These attitudes and beliefs threaten the integrity of the Armed Forces, as well as their mission to defend the United States," notes the author of the analytical report on women in the US Army" (Trobaugh, 2018).

It is worth paying attention to the valid fact that women's political leadership is much more "numerous" and well-known than military leadership. Nevertheless, even in the military sphere, women have certain achievements, which still vary depending on the country and its military policy (An Interview with Jacqueline D. Van Ovost, 2022). The facts of women's military leadership deserve attention and study, for example: in 2018, Susan Helm (UK) became the General of the British Army; in 2008, Igrid Grenset became the first female General of the Norwegian Armed Forces; in 2019, General Juliet Charron became the first woman to command the Canadian Armed Forces; in 2001, Wanda Karachi became the first female General of the Bundeswehr (Germany); from 2015 to 2017, Loretta Lynch served as Secretary of Defense of the United States and was the first female Secretary of Defense of the United States; in 2016, Patricia Horner became the first woman to serve as Commander of the U.S. Northern Command; in 1994, Marianne Nilsson became the first female general of the Swedish Armed Forces; in 2011, Miriam Alsheville became the first female general of the Israeli Defense Forces, etc. Modern Ukraine cannot yet boast of such achievements in the field of implementing the principles of gender democracy in the military, but such prospects are now widely available to Ukrainian women in the army.

As it is known, military leadership is represented by individuals who hold key leadership positions in the armed forces of their own country or military alliances. They may hold different positions in the military and have different ranks. They are responsible for the strategic and tactical direction of military operations. They also control the discipline, training, defense and offense of troops in accordance with national security objectives. Military leaders include: generals, admirals, marshals, armed forces commanders, and field commanders. Each of the above military leaders is responsible for a specific area of work in the army. The highest ranking officer in the army is a general. They can hold various positions, including commanders of brigades or military districts, command the air force, and be responsible for operations in airspace. Admirals are responsible for operations at sea and on the water. They are the leaders of the naval forces. Outstanding military leaders of the highest rank, who have a special status for their merits in military service, are given the rank of marshal. The military elite also includes the commanders of the armed forces. These are ministers of defense and chiefs of general staff. These military officers coordinate the work of the entire army. Field commanders, who lead troops on the battlefield, can also be military leaders when they show charisma and heroism.

Today, there are 7,700 female officers in the Ukrainian Armed Forces. Evidently, some of them can make their way to military leadership. In the Ministry of Defense of Ukraine, there are 81 freelance gender advisors, and 74 more volunteer advisors monitor the implementation of NATO principles on gender equality.

In 2023, the statistics of women in the Armed Forces of Ukraine is as follows: "As of October 2023, there are more than 62 thousand women, which is 7% of the total number of the Armed Forces. Of these, 43.5 thousand are servicewomen, and 18.6

thousand are civilian personnel. 7.7 thousand women are officers; 11.7 thousand are non-commissioned officers, and 22.7 thousand are soldiers. At the same time, approximately 5 thousand women from the Armed Forces are in the combat zone." (Espresso TV, 2023).

Compared to 2021 before Russia's full-scale invasion, by now the number of women in the Armed Forces has increased by 40%. The Ministry of Defense is actively pursuing gender reforms in the Ukrainian army. In particular, it: "abolished restrictions on positions for women. Now a woman in the army can be a driver, grenade launcher, deputy commander of a reconnaissance group, commander of an infantry fighting vehicle, repairman, machine gunner, sniper, etc.; abolished age restrictions: previously, women aged 18-40 could sign a contract, now they can become contractors up to 60; they are provided an opportunity to receive military education at all levels. Women can master the same specialties as men and then serve in a wide range of positions which raise awareness in the army on the issues of equality of the Ukrainian army (trainings, seminars, educational programs, round tables with the participation of international organizations); all documents developed by the Ministry of Defense are subject to gender expertise taking into account all aspects of equality; women can work on the logistics as servicewomen to ensure that clothing and ammunition meet their anatomical features; to work to prevent sexual harassment and other human rights violations" (Barsukova, 2023).

Of course, if it is necessary to enact a law on general mobilization in Ukraine, public sentiment and public opinion on this issue should be taken into account. Currently, there is no question of the mandatory mobilization of the Ukrainian women into the Armed Forces in discussions of the draft of a new law on calling up into a military service in Ukraine. As a part of the investigation in this project a number of colleagues from Ukrainian universities and research institutions were interviewed concerning their attitudes toward general mobilization, as a result some interesting trends are found out. Before Russia's open aggression against Ukraine the vast majority of interlocutors of different age groups were against general mobilization for women (out of 10 respondents 8 were completely against it rejecting the possibility), after two years of war, almost all of them (7 out of 8) have changed their minds, noting that "...obviously, it cannot be avoided, because this is the reality." Now all 10 respondents speak positively about servicewomen as their defenders ("...our girls are heroines! They protect all of us today, even at the cost of their own lives! Many thanks to them!" - this opinion is unanimous, all 10 respondents support those women who voluntarily joined the Ukrainian Defense Forces to defend their homeland). These are the results of a survey of colleagues on possible general mobilization for women and men in Ukraine, conducted by Iryna Hrabovska in 2021 and 2024.

This survey cannot be considered representative, but it has revealed a certain tendency for changes in the mass consciousness of Ukrainian citizens who are currently experiencing a brutal war that threatens the survival of both the Ukrainian state and the nation on the whole. It can be stated that nowadays there is an active movement in the Ukrainian intelligentsia toward recognizing the positive aspects of parity gender democracy. Now a woman in the Armed Forces is "not exotic, though not the norm either" (Korba, 2022).

In reality, even today, despite the participation of Ukrainian women soldiers in battles against the Russian aggressors, "a woman is always forced to prove that she is worth something, that she will not let the guys down, that she can be trusted and relied on. ...She is treated being more scrutinized, while a man in a combat position is automatically respected." Here we quote these thoughts of Maryna Moloshna, one of the women fighters of the Ukrainian Armed Forces, considering that they are illustrative. Similar thoughts are often expressed by women fighters who participate in the combat operations (Korba, 2022).

At the same time the reform of the Armed Forces of Ukraine is taking place at a rapid pace. Oksana Hryhorieva, Gender Advisor to the Commander of the Land Forces of the Armed Forces of Ukraine, says: "If earlier it was a post-Soviet army, rough and masculine, now the army is becoming more correct and equal, the qualitative role of women is much greater, they are really demonstrate it." (Korba, 2022).

4 Conclusion

The analysis of the real situation of the Ukrainian women's participation in Russia's current full-scale war against Ukraine suggests that in general servicewomen of the Armed Forces of Ukraine and the country's Defence Forces play a significant role in the self-preservation of the Ukrainian nation and state while consolidating Ukrainian society around the main task of destroying the enemy on the territory of the independent Ukraine, thus bringing the victory over the enemy. The specific features of the present situation is obviously a wide representation of women warriors at the front, and their active participation in the combat operations. Today, about 5,000 Ukrainian women are fighting for their homeland in the hottest spots on the line of the direct contact with the Russian occupiers. About 8,000 women hold the rank of the officer, and many will be able to join the ranks of the Ukraine's military elite in the future, which is a unique phenomenon in the country's history. In the future, there should be developments in the gender-role distribution in the Armed Forces. The focus is on the formation of the army on the principles of general mobilisation following the example of Israel (this idea is gaining relevance in the mass consciousness of the Ukrainian society today), thus women soldiers will become a significant part of the professional Ukrainian army. The idea of admitting it as an alternative to general mobilisation also has supporters among Ukrainians. While defining the military policy of the Ukrainian state it should be stressed that nowadays the Ukrainian army is being actively restructured in terms of gender in accordance with NATO principles. Special attention is paid to the fact that the active involvement of the Ukrainian women in the country's defense forces, including the Armed Forces, is in line with the leading trends in the modern world concerning the use of the synergy of women and men in the conflicts with the aim of their successful overcoming.

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Primary Paper Section: A

Secondary Paper Section: AD

EMPLOYMENT CHANGES IN THE CONTEXT OF CHANGES IN EDUCATION CASE STUDY FROM LUXEMBOURG

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This work was supported under the research project No. VEGA 1/0396/23 Smart Solutions and their Impact on the Socio-economic Development of Regions in the Context of Agenda 2030

Abstract: Labour shortage, the increasing share of employed foreigners and digitalisation are changing the factors affecting employment. The relationship between employment and education is changing. Luxembourg has a special position among EU countries, as has the largest share of employed foreigners in the EU. It has the best performing economy. The aim of the study is to specify the dependence between employment and education in Luxembourg using an econometric approach. In the specification and quantification of the model, statistical and econometric verification was performed. Employment is statistically significantly affected by the participation rate in education and training persons. The conclusions of the empirical analysis confirm the link between employment and adult education in Luxembourg.

Keywords: employment; adult education; tertiary educational attainment, econometric modelling.

1 Introduction

The current trend in the labour market is that the size of the workforce is changing. This change is the result of long-term unfavourable demographic trends. As a result, European Union (EU) countries are placing much more emphasis on employee retention and the employment of foreigners.

Luxembourg has a special position in the employment of foreigners. The country has the largest share of employed foreigners in the EU (54.2% of the employed) (Eurostat, 2024, 1) and the largest economic performance in terms of GDP. "Luxembourg is consistently ranked 1st in the world on the basis of GDP per capita" (Ministry of Foreign and European Affairs of the Slovak Republic, 2024). Across all indicators, Luxembourg's economy has continuously maintained or improved its position (Ministry of Foreign and European Affairs of the Slovak Republic, 2024). Luxembourg achieves excellent results in the use of Smart technologies in enterprises. It ranks third (in 2023) in the use of AI technologies in enterprises (Eurostat, 2024, 3). The country has the fourth-highest share of people who have participated in education in the last four weeks (after Sweden, Finland and Denmark). Based on its economic performance, Luxembourg can be seen as a model for other EU countries. We are also interested in the country because of the large proportion of working immigrants and high public support for immigration. Analysis of its approaches may be beneficial for other EU countries.

Existing studies highlight the fact that in the current era of staff shortage (Groiss & Sondermann, 2024; Deschênes, 2023) and rapid digital change, there is a need to address both the retention of existing staff (Gelencsér *et al.*, 2024; Haar & Kelly, 2024) and to make efforts to attract new staff. Staff shortage increase pressure on employers to increase employee retention efforts. Employee retention is a complex issue. It can be addressed in a number of ways. An important attribute is lifelong learning. It is directly linked to the labour market and the workforce. The importance of enhancing employment and education is set out in both national policies and transnational goals. Requirements for their improvement are also part of the concept of sustainable growth – Agenda 2030 (Esha, 2020).

Although there has been an increase in studies on the need for and impact of education on the labour market and on employment, it can be concluded that there has not been a full in-depth examination of the relationship between education and employment based on empirical studies. We consider the lack of

findings on the relationship between employment and adult learning to be a research gap at present.

With our case study focusing on Luxembourg, we want to identify the relationship in the most economically powerful country with a large share of foreigners. Based on the sources studied and the values of the indicators in Luxembourg, we assume that there is a direct relationship between employment and the highest level of education attained and adult education. If we confirm this relationship, we would like to draw attention to the need for the same approach to education in other EU countries.

We will two scientific hypotheses: H1 and H2.

H1: There is a relationship between employment and the share of persons with tertiary educational attainment in Luxembourg.

H2: There is a relationship between employment the participation rate in education and training (previous 4 weeks) persons (adult education) in Luxembourg.

The aim of the study is to specify the dependence between employment and education in Luxembourg using an econometric approach.

The main point we want to stress is that the participation rate in education and training (previous 4 weeks) persons in Luxembourg could not be so high if the employers in Luxembourg did not provide educational activities to working foreigners, whose share is more than 50%. Thus, in Luxembourg both the government and employers show a positive approach towards adult education. This is different from the approach of many countries in the EU (see e.g. the approach in Great Britain in Liu-Farrer *et al.*, 2023). At the same time, it is important that employees are willing to participate in education. This is based on theoretical concept of regional opportunity structures (Bernard *et al.*, 2023). The availability of opportunities on a regional scale explains differences in inequalities. In a country with a high economic performance, with a positive approach of the government and business towards adult education, the share of people participating in education and influencing the labour market situation is high too. If this assumption is confirmed, in countries where there is a shortage of employees, it will be appropriate to consider introducing support programmes for adult education in order to retain employees.

The findings of our study can contribute to the understanding of the relationship between employment and education. The added value lies especially in identifying the relationship between employment and adult education in the most advanced country, whose approach can serve as an example for other countries. The results of our study may be relevant to government policy makers, employers and researchers, seeking to address the issue of employee retention or adult education. They can provide important education-related approaches.

The study consists of five main sections. The Introduction, stating the purpose of the study, is followed by the Literature review. This section provides an overview of recent findings on the relationship between employment and education published in scholarly studies while highlighting the factors causing disparities across countries. The following section describes the data and research methods. This is followed by the Results and Discussion. The last section is Conclusion.

2 Literature review

Existing studies point out that knowledge and skills from school are very important but need to be continuously adapted to the changing environment (Mirke *et al.*, 2019). Consequently, knowledge and skills acquired at school are not sufficient for the entire working life of people (Lindqvist *et al.*, 2023). Employers

in most professions require employees to learn technology and digital skills. In addition, soft skills and employee continuous personal development are vital. The primary goal of continuing education is to improve the knowledge and skills of employees, and thereby enhance organizational performance, employee productivity, and competitive strength (Hajdari *et al.*, 2023).

Lifelong learning has positive impact on development not only at the micro level but also on the prosperity of a country – especially on economic well-being, productivity, social development, or employment. "Participation in adult learning (in general) stimulates the economic well-being of a country, as countries with higher levels of skills and competences are more likely to be more competitive" (European Commission, 2018, p. 19). "The continuing vocational training is seen as an investment, which is expected to yield productivity gains which lead to returns on investment" (Cedefop, 2015, p. 166). Education is important for forming smart people in building Smart Regions. Using technology is not possible without smart people (Chye *et al.*, 2022).

Many studies have found that adult learning increases employability, participation, or prospects in the labour market. Training has positive effect on both the number and length of employment episodes. Adult education affects greatly *older workers'* employability in terms of improving their adaptability in the labour market (Kalenda & Kočvarová, 2022; Nilsson, 2016; Picchio & van Ours, 2013; Yeatts *et al.*, 2000). Adult education depends on the economic capability of nations. Economic downturns may induce the adoption of austerity measures, meaning that less people can engage in adult education. Nevertheless, public policies may tend to increase spending on adult education and thus to regulate the labour market (European Centre for Development of Vocational Training, 2015).

Promoting adult learning is part of government policies and objectives in the EU. "The importance of adult learning is reflected in EU-level targets, namely that by 2025, at least 47% of adults aged 25-64 should have participated in learning during the last 12 months (European Education Area) and that by 2030, at least 60% of all adults should be participating in training every year" (Eurostat, 2023, 4). There are huge differences across nations regarding the impact that educational attainment and lifelong learning have on employment. The effects of adult education on employability and employment vary considerably across countries (Midtsundstad, 2019; Bélanger *et al.*, 2015; Nordlund *et al.*, 2012; Heckman *et al.*, 1999; Gritz, 1993). Differences arise from different national characteristics.

Continuous adult learning plays a major role in SMEs because by developing the skills of business owners, managers and employees, businesses remain viable and prosperous (Saah, 2022). It is, however, necessary to have enough educators (Beszédes & Farkas, 2023). It needs to be underscored that education appears to be effective especially when it is led by people who have both experience from practice and academic knowledge (Janowski *et al.*, 2023). Continuous learning is part of building Smart Regions. Only people who have mastered the latest skills are able to innovate and improve sustainable development and quality of life and make efficient use of resources (Ručinská & Fečko, 2018).

In terms of the changing age structure of the workforce, it is worth noting that employment is associated with healthy ageing (Arroyo-Quiroz *et al.*, 2023). Educational expansion is associated with better employment options and healthy ageing. A college degree also improves employment prospects (Ali & Jalal, 2018). It is a common practice that employers give preference to college graduates when they select new employees. They do so because of their greater adaptability to jobs and their ability to be more productive. Employers' interest in university graduates has also been stimulated by the proliferation of digital technologies. Jobs are becoming more flexible and complex, and require workers with independent thinking and creativity, which are the distinctive qualities of mainly university graduates. Tertiary

educational attainment has benefits for both employers and employees. "An increase in education raises the wage earned. This is because higher education will help workers achieve certain better positions" (Wicaksono *et al.*, 2023, p. 6). Myslíková & Večerník (2019) give emphasis to higher wages in the service sector as many workers with tertiary educational attainment work there. Increases in educational attainment are reflected in performance increases across industries (Sinaga *et al.*, 2019). It remains also true that "education contributes to human capital accumulation, positively impacting productivity" (Wicaksono *et al.*, 2023, p. 6). Regarding national differences, the share of people with tertiary educational attainment has been increasing across the EU countries over the last decade (Profirou *et al.*, 2022). However, countries differ in its growth rate and the differences by gender

3 Research methods

To know and understand the specifics of the relationships between employment and other macroeconomic factors, it is suitable to use time series or panel data and an econometric approach. Time series and econometric approaches allow to understand relationships and reveal occurring events within an economic system (Lütkepohl & Krätzig, 2004). Methodologically, the econometric approach using time series emphasizes the need to investigate their cointegration in case they are non-stationary, and thus to detect the so-called spurious regressions. This fact is referred to by several authors (Adamec *et al.*, 2017; Výrost *et al.*, 2013; Blatná, 2018; Fromentin, 2013; Hatrák, 2007).

Within education, we consider it important to monitor the share of people with tertiary education and the share of people participating in lifelong learning. The indicator participation rate in education and training (previous 4 weeks) persons from 25 to 64 years (adult education) is used to characterize adult learning. In order to identify the impact of education, we will also use the indicator of the share of people with tertiary educational attainment. Employment is expressed with the indicator of the employment persons in the labour force from 15 to 64 years in % (v_{1t}). Tertiary educational attainment is quantified using the share of persons with tertiary educational attainment from 15 to 64 years in % (v_{2t}). Adult learning is quantified using the participation rate in education and training (previous 4 weeks) persons from 25 to 64 years in % (v_{3t}).

The data are drawn from the Eurostat database (2023, 1; 2023, 2; 2023, 3). The period analysed is 1993 to 2020. The years of 2021 and 2022 were markedly affected by the epidemiological situation. For this reason, the 2021 and 2022 data were not used in the analysis.

The basic stages of the econometric approach include 1/ Model specification. In this stage, variables are selected, functional forms chosen, and the model built. 2/ Quantification of the econometric model. In this stage, parameter estimation is made. 3/ Verification of the econometric model. In the third stage, statistical and econometric verification are performed. 4/ Application of the econometric model, in which the results are applied and compared (Adamec *et al.*, 2017). The first step is to specify the relationship between dependent and independent variables. Time series are employed and the relationships between variables are quantified.

The shape of the model is: $v_{1t} = f(v_{2t}, v_{3t}) + \epsilon_t$, where ϵ_t represents the random component - the residue component and $\epsilon_t \sim N(0, \sigma_0^2)$ holds true.

The basic functional relationship is:

$$v_{1t} = \beta_0 + \beta_1 v_{2t} + \beta_2 v_{3t} + \epsilon_t, \quad t = 1, 2, \dots, T. \quad (1)$$

The dependent variable v_{1t} is employment persons in the labour force from 15 to 64 years in %.

Independent variables are:

1/ v_{2t} - the share of persons with tertiary educational attainment from 15 to 64 years in %.

2/ v_{3t} - the participation rate in education and training (previous 4 weeks) persons from 25 to 64 years in %.

OLS method is used to express an econometric model expressing a linear relationship between the dependent and independent variables.

Characteristics of the model specification procedure

An important part of the analysis is to check the stationarity of the time series. In the case of non-stationarity, the cointegration of time series is identified. In the case of non-stationarity of time series with independent variables that are not cointegrated with the time series of the dependent variable, it may be a spurious regression and model (1) will not be used (Lukáčik & Pekár, 2006). Transformation is used, stationarity and cointegration of time series with logarithmic variables examined and model (2) utilized.

$$\log v_{1t} = \beta_0 + \beta_1 \log v_{2t} + \beta_2 \log v_{3t} + \epsilon_t \quad t = 1, 2, \dots, T \quad (2)$$

Augmented Dickey-Fuller test will be used to check stationarity. Engle-Granger test (Lukáčik & Pekár, 2006) will be used to check cointegration. Model specification will be verified by RESET test - second and third powers. Statistical and econometric verifications for each model are performed. Gretl statistical software was used to make the analysis. In case of stationary or non-stationary cointegrated time series, statistical and econometric verification in the expressed model are carried out.

Statistical verification

If the regression coefficient β_1 is not statistically significant or the model does not meet the econometric verification conditions, the variable v_{2t} is omitted. If the regression coefficient β_2 is not statistically significant or the model does not meet the econometric verification conditions, the variable v_{3t} is omitted. As part of the statistical verification, the statistical significance of the model parameters is verified through a t-test (Adamec *et al.*, 2017). F-test is employed to verify the statistical significance of the model (Lukáčik & Šlosiar, 2010).

Econometric verification

Econometric verification checks whether the requirements for the econometric model are met. The Chi-square goodness-of-fit test is used to analyse the normality of the residuals. The Breusch-Godfrey test is used to detect first-order autocorrelation or the LM test for first-order autocorrelation (Vogelvang, 2005, p. 119). RESET test is used to identify model specifications (Hatrák, 2007). The statistical significance of the parameters and the model as well as the normality of the residuals, autocorrelation and model specification is assessed at the significance level of 0.05. The adjusted coefficient of determination expresses what percentage of the total variability is explained by the model.

4 Results and Discussion

Model specification and quantification for Luxembourg

Luxembourg reported below-average employment rates throughout the period analysed. However, the share of people with tertiary education was consistently above average from 2004. Luxembourg ranks among countries with the fastest growing shares of tertiary-educated people. From 2009, Luxembourg also had a consistently above-average share of people aged 25-64 who participated in education and training in the previous four weeks. It can therefore be assumed that major policy changes in adult learning had been implemented (Graph 1).

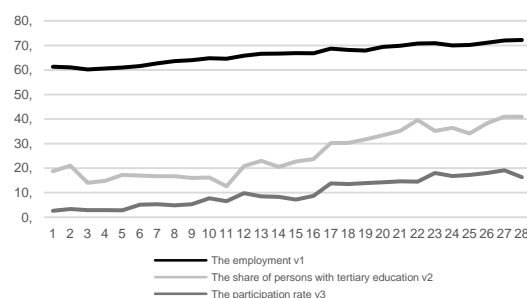
Time series v_{1t} v_{2t} were non-stationary and non-cointegrated. Time series v_{3t} was stationary (time series with a trend). Due to the non-cointegration of non-stationary time series with the original values, logarithm values were used. The resulting model for Luxembourg

$\log v_{1t}$, $\log v_{3t}$ are non-stationary and but cointegrated (Graph 2). $\log v_{2t}$ is not cointegrated with $\log v_{1t}$. Using the OLS method, the resulting model was obtained:

$$\log v_{1t} = 4.01166 + 0.08596 \log v_{3t} + \epsilon_t \quad t = 1, 2, \dots, 28 \quad (3)$$

Both model and regression coefficient β_2 are statistically significant. There is a statistically significant relationship between $\log v_{1t}$ and $\log v_{3t}$. Regression coefficient is a positive number (Tab. 1). There is a positive relationship between the two variables. The model has a normal distribution of residuals; there is no autocorrelation of residuals. The model is correctly specified (Tab. 1).

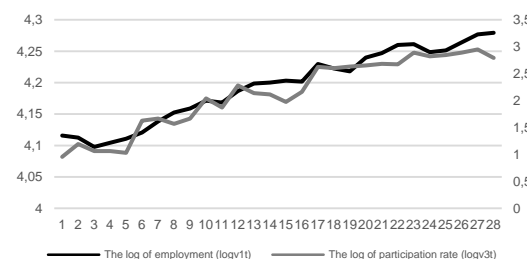
Graph 1: Indicators evolution in Luxembourg



Note: the numbers on the x-axis in represent 28 years since 1993. Data on tertiary educational attainment from 15 to 64 years in % was not published in 1998. It was estimated as the arithmetic average of the 1997 and 1999 values.

Source: Own elaboration according Eurostat (2023, 1; 2023, 2; 2023, 3).

Graph 2: Evolution of logarithm indicators in Luxembourg



Note: the numbers on the x-axis in represent 28 years since 1993.

Source: Own elaboration according Eurostat (2023, 1; 2023, 2).

The share of employment persons in the labour force from 15 to 64 years in Luxembourg is affected by the participation rate in education and training (previous 4 weeks) persons from 25 to 64 years.

One percent increase in the proportion of the participation rate in education and training (previous 4 weeks) persons from 25 to 64 years in % will increase the share of employment persons in the labour force from 15 to 64 years by 0.0860 percent on average. The dependence between employment and tertiary educational attainment from 15 to 64 years in % was not confirmed.

Tab. 1: Characteristics of the Luxembourg model

	Coefficient	T-ratio	P-value
constant	4.01166	438.9	7.62e-52***
$\log v_{3t}$	0.08596	20.89	8.99e-18***
p-value (F)	8.99e-18		
adjusted R-squared	0.94159		
Chi-square			0.777804
LM test for autocorrelation			0.21323
RESET test for specification			0.23751

Source: Own calculations based on Eurostat (2023, 1; 2023, 2; 2023, 3).

We can summarise that the impact of adult education on employment in Luxembourg was statistically significant. The Luxembourg model expresses a direct relationship between the logarithms of variables. Thus, it characterises the relationship between annual changes in both variables. More than 94% of the total variability is estimated by the Luxembourg model. For the Luxembourg model, the impact of the independent variable on the dependent variable is high compared to the impact of a random disturbance. The conclusions obtained indicate a significant impact of adult education on employment. Promoting adult education in Luxembourg also promotes employment.

Because Luxembourg has a large proportion of working immigrants, the connection between employment and adult education would not be achievable without an excellent immigrant education system. We consider Luxembourg's approach to adult education for immigrants as a model for other countries. A unique aspect of adult education in Luxembourg is its success in supporting immigrants' professional development. Luxembourg ranks first in the share of "employed foreign-born (immigrants) who increased their qualifications from their last job before migrating to their current job" (Eurostat, 2024, 2). Based on the above, we can view the system of adult education aimed at immigrants, as an example of good practice in immigrant integration.

As a result of our examination of the state of the art in addressing the issue in scientific studies, we found out that the authors mentioned in our critical analysis point out that employment and education are in mutual interaction (Arora, 2023; Le *et al.*, 2023; Choy & Le, 2023; Eurostat, 2023, 4; Kalenda & Kočvarová, 2022). As expected, in line with the sources mentioned above, we were able to specify the dependence between employment and adult education in Luxembourg. The impact of tertiary education on employment was not confirmed.

A limitation of our study is that we tested the relationships between employment and education for an exceptional country with a high-performing economy and a large share of foreigners; these relationships may therefore be specific to this country. However, the study is intended to point out that the in terms of its approach to adult education, Luxembourg can serve as a model for other countries.

The research findings, however, support Melnikova *et al.* (2019) assertion that adult learning is an important factor in tracking employment so there is a need for raising awareness of its significant role and for promoting adult education at the level of government policies.

5 Conclusions

The aim of the study was to specify the dependence between employment and education in Luxembourg. The research hypothesis that there is a relationship between employment and adult education in Luxembourg was confirmed. The results of the analysis based on an econometric approach involving, at non-stationarity, the verification of time series cointegration confirmed that employment was statistically significantly affected by adult education. The derived functional relationship for Luxembourg is expressed by the logarithms of variables. The change in employment in Luxembourg is influenced by the change in the share of people who have participated in education in the last four weeks. For the model in Luxembourg, the impact of the independent variable on the dependent variable is high compared to the impact of a random disturbance.

Based on fact that Luxembourg has achieved first place in the share of "employed foreign-born (immigrants) who increased their qualifications from their last job before migrating to their current job", we can view the system of adult education aimed at immigrants as an example of good practice in immigrant integration.

The study confirmed adult learning to be an important means for increasing employment in Luxembourg. Its promotion at national level is therefore of crucial importance.

The study extends knowledge in the field of labour market and education. In addition, the value of the research study lies in confirming the impact of adult education on employment. The research findings can provide government policy makers in countries with relevant data confirming the importance of national policies aimed at promoting adult education for employment.

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Primary Paper Section: A

Secondary Paper Section: AH

COMPETITIVENESS OF SOCIAL ENTERPRISES IN SLOVAKIA: THE STRUGGLE FOR CONTRACTS IN PUBLIC PROCUREMENT

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This work was supported by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and Slovak Academy of Sciences under Grant number 1/0681/22 and number 1/0646/23; and The Slovak Research and Development Agency under Grant number APVV-20-0608.

Abstract: This paper examines public procurement contracts on the e-contracting portal (EKS) in Slovakia from September 2014 to January 2023, analysing 160,387 contracts. Social enterprises participated in 1,642 bids, representing 0.44% of unique bidders, with a notable success rate of 33.13% for contracts they contested. Financial allocations to social enterprises remained below 1% across all reviewed periods. The analysis reveals that social enterprises primarily engage in service-oriented contracts, while commercial suppliers focus on specialized goods. Using machine learning methods and logistic regression, the key determinants of success for social enterprises are identified. They include the number of bidders and submitted bids, bid type, and short-term bank loan value. These findings provide insights into the role of social enterprises in public procurement and inform strategies to enhance their participation.

Keywords: decision trees, determinants of success, logistic regression, public procurement, social enterprises, social procurement

1 Introduction

Public procurement is vital in ensuring the efficient and transparent utilization of public resources. Involving social enterprises in this process offers numerous benefits, including promoting employment opportunities for individuals from disadvantaged groups and developing innovative solutions that enhance the quality of services. This approach not only enhances economic efficiency but also fosters social justice, thereby contributing to the overall advancement of society and reinforcing the integration of diverse social groups into economic activities. Emphasizing these dimensions of public procurement can facilitate systemic changes that bolster democratic values and accountability within public administration.

This paper examines the use of public procurement as a funding mechanism for social enterprises, addressing a gap in research within the broader field of public procurement, and more specifically, in social procurement. Specifically, it examines the extent of Slovak social enterprises' participation in public procurement and their success rates within this process. It provides a comparative analysis of the funds allocated to social enterprises versus commercial entrepreneurs. Additionally, the study seeks to identify the factors influencing the success rates of social enterprises in public procurement. Furthermore, it explores opportunities for greater involvement of social enterprises, based on their economic activities and the goods and services demanded in public procurement, as classified by Common Procurement Vocabulary (CPV), which standardizes procurement terminology across EU countries (Commission Regulation (EC) No 213/2008). Given the limited scholarly attention in this domain, the study aims to contribute valuable insights into how public procurement can support the financial sustainability and growth of social enterprises.

2 Literature review

An examination of the worldwide institutional frameworks often uncovers notable variations in how people organize themselves for social, economic, and political activities. Different forms of governance along with a range of economic entities illustrate the diverse institutional arrangements that exist in the contemporary world (Salamon & Anheier, 1992).

Despite the diversity of institutional realities, we recognize the existence of two major complexes of organizations into which social life is conventionally divided: the market and the state.

While the actual institutional entities encompassed by these abstract concepts are numerous and varied, these abstractions have proven to be meaningful and, indeed, indispensable analytical tools for understanding and describing modern life (Salamon & Anheier, 1992).

However, since the 1990s, there has been a concerted global effort to seek alternatives to the public sector. This movement was primarily driven by dissatisfaction with the costs and effectiveness of the public sector, along with a growing acknowledgement that relying solely on the government to address social and developmental issues was inadequate. This re-evaluation of the state's role has effectively challenged the fundamental ways we conceptualize the structure of social and economic life (Salamon & Anheier, 1996).

Over the past two decades, entrepreneurial activities and business approaches have transformed significantly, particularly with the growing focus on social enterprises (Peter et al., 2022).

2.1 Social enterprises

Social enterprises (SEs) are frequently discussed within the framework of the social economy, which is regarded as either an alternative to or a complement of both the public sector and the traditional market (Plaček et al., 2021).

Social enterprises emerged in the not-for-profit sector as a response to decreasing government involvement in the economy and society. They are often viewed as more proactive than the state in addressing social needs, being deeply embedded in communities and capable of offering flexible, alternative, or complementary interventions to state services (Defourny & Nyssens, 2006; Stevens et al., 2015; Kelly et al., 2019).

The primary goal of social entrepreneurship is to uncover innovative combinations of resources that generate social value by promoting social change or addressing societal needs (Břanda & Urbančíková, 2020). Social entrepreneurs typically target areas where they perceive unmet social needs or seek to create new social opportunities that the public or private sectors have inadequately addressed (Hynes, 2009; Břanda & Urbančíková, 2020). This form of entrepreneurship can be characterized as a process that accelerates social transformation and tackles social issues without prioritizing immediate financial gain for the entrepreneurs (Austin et al., 2006; Defourny & Nyssens, 2008; Hynes, 2009; Stevens et al., 2015; Defourny & Nyssens, 2017; Břanda & Urbančíková, 2020).

According to Šebestová & Mačkinová (2019), a fundamental principle of social entrepreneurship is thus the effective utilization of local resources. Although these resources may be limited, they can help mitigate the negative impacts of globalization processes to some extent. By leveraging local assets, social enterprises contribute to building resilient communities and promoting sustainable practices that align with the broader goals of the social economy (Defourny & Nyssens 2017, European Commission, 2020; Břanda & Urbančíková, 2020, Plaček a kol. 2021).

Social enterprises therefore encompass a broad and diverse range of economic activities. However, the challenge in analysing them lies in the ambiguity of the concept's boundaries, as it refers to different interpretations depending on the context in which it is used (Peter et al., 2022). Only a handful of countries have established clear policies that offer specific and consistent fiscal incentives tailored to meet the unique needs of social enterprises and support their growth (Hemels, 2023).

Until 2018, social enterprises in Slovakia were often met with scepticism due to unfair financing practices and the connotations associated with the term "social" (Brožmanová-Gregorová &

Murray-Svidroňová, 2020). In the realm of social entrepreneurship, there is often a conflation of the "social" aspect, which is associated with non-economic values and altruism, with "enterprise," a fundamental element of the private market that embodies individualism and self-interest (Polačková, 2020).

A significant milestone for Slovak civil society was the enactment of Act No. 112/2018 Coll. on Social Economy and Social Enterprises, along with amendments to certain other laws, in 2018. This legislation introduced the concepts of "social economy entity" and "social enterprise." According to this law, a social enterprise is defined as an entity that engages in independent economic activities aimed at achieving measurable positive social impact, dedicating over 50% of its post-tax profits to this goal, and involving stakeholders in its management.

In Slovakia, a registered social enterprise can take one of three forms:

- Integrative Enterprise;
- Housing Social Enterprise and
- General Registered Social Enterprise (Act No. 112/2018 Coll.)

As of December 31, 2023, there were 650 entities recognized as social enterprises in Slovakia. Legally, these enterprises must demonstrate measurable positive social impact, which can be assessed through various criteria. The most common metric is the percentage of disadvantaged and vulnerable individuals employed, with up to 99% of registered social enterprises reporting such measurable positive social impact.

This framework not only highlights the role of social enterprises in fostering social inclusion and economic participation but also aligns with the overarching goals of the Slovak legislation aimed at enhancing the social economy.

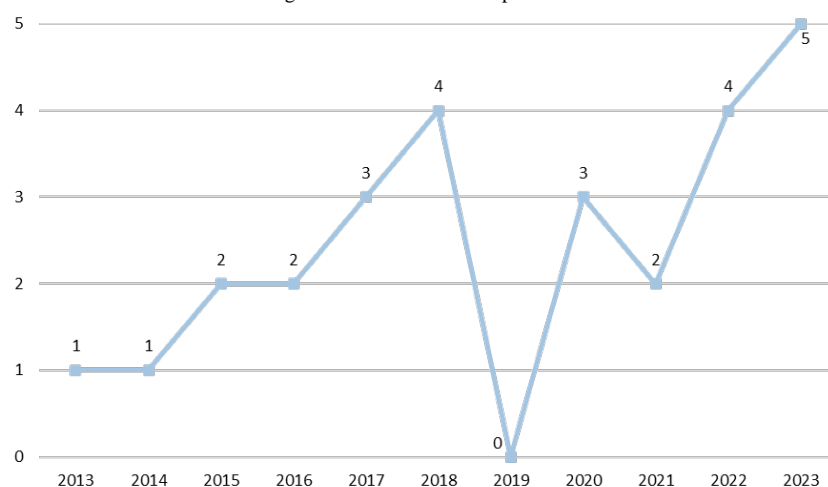
2.2 Public procurement

Public procurement (PP) is increasingly recognized as a crucial mechanism for fostering innovation, addressing societal challenges, and facilitating structural change (Uyarra et al., 2020; Januska & Palacka, 2023). Uyarra et al. (2020) further assert that the transition from a predominantly supply-driven innovation policy to one centred on innovation-focused public procurement necessitates substantial political, cultural, and organizational transformations. Moreover, the authors note that public procurement can serve as an incentive for developers of new technologies, many of whom may not receive support from traditional R&D funding subsidies. Similarly, Stehlík (2018), Bauhr et al. (2020), and Kubak et al. (2023) emphasize that the effectiveness of public procurement in promoting fair and corruption-free competition is fundamentally dependent on the transparency of public procurement procedures.

The significance of social entrepreneurship is increasingly recognized within the framework of public procurement, leading to the development of the concept of socially responsible public procurement, which includes criteria for bidders related to social responsibility.

The relevance of this topic is underscored by the increasing number of scientific publications available on the Web of Science portal that address this issue (see Figure 1).

Figure 1: Annual scientific production



Source: Own processing from RStudio software based on Web of Science database

The European Commission (a, b) defines public procurement as a process by which public authorities, such as ministries or local government bodies, acquire labour, goods, or services from private companies. Consequently, public procurement is regarded as a fundamental component of public administration development and a core function of public organizations (Nemec et al., 2019; Trammell et al., 2019). It serves as one of the market-based instruments aimed at achieving smart, sustainable, and inclusive growth while ensuring the most efficient use of public funds (Lukáčka & Kubolek, 2018; European Commission a).

Trammell et al. (2019) highlight that procurement is often responsible for enhancing efficiency by reducing costs while maintaining the quality of goods and services provided by the organization. Furthermore, Lukáčka and Kubolek (2018) emphasize that effective regulation of public procurement and its consistent application are critical pillars for ensuring the efficient

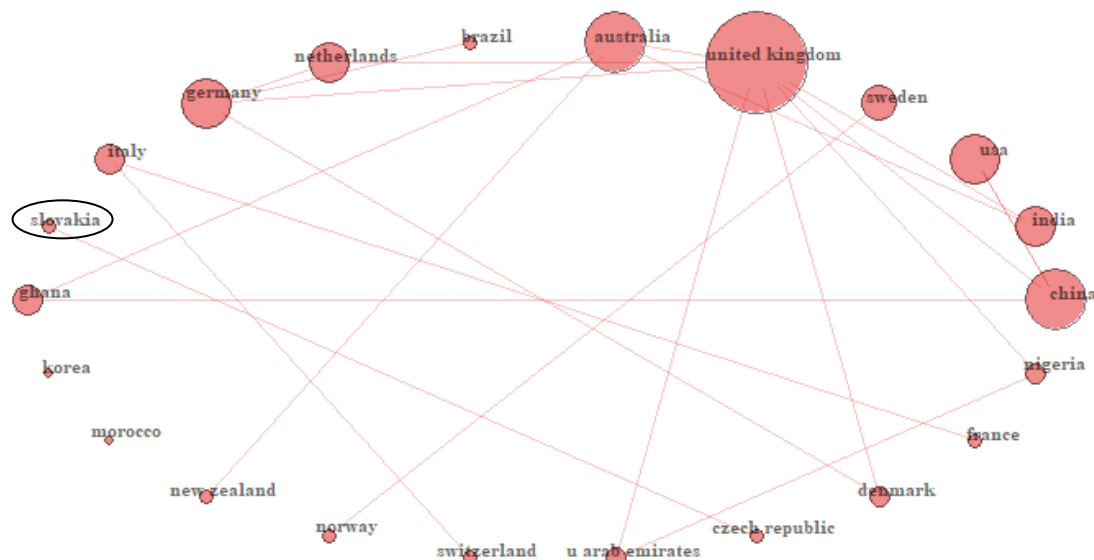
and economical use of public funds. Ultimately, the quality of public services relies on modern, well-managed, and efficient procurement processes (European Commission a).

In Slovakia, the regulation of public procurement has been governed by several legal acts, including Act No. 263/1999 Coll. on Public Procurement and Act No. 25/2006 Coll. on Public Procurement, along with their subsequent amendments. Currently, since 2015, Act No. 343/2015 Coll. on Public Procurement has been in effect, defining public procurement as the process of "awarding contracts for the supply of goods, the execution of construction works, the provision of services, the solicitation of proposals, and the granting of concessions for construction works and services, as well as the administration of public procurement". This Act outlines the rules and procedures for awarding contracts, concessions, and tenders, with the primary objective of ensuring the efficient use of public funds.

While scholarly activity on public procurement with a social dimension exhibits geographical fragmentation, it is evident that certain collaborations and connections among authors emerge

due to geographical or historical proximity, as observed in the case of Slovakia (see Figure 2).

Figure 2: Collaboration among authors from various countries in research focused on public procurement with a social dimension



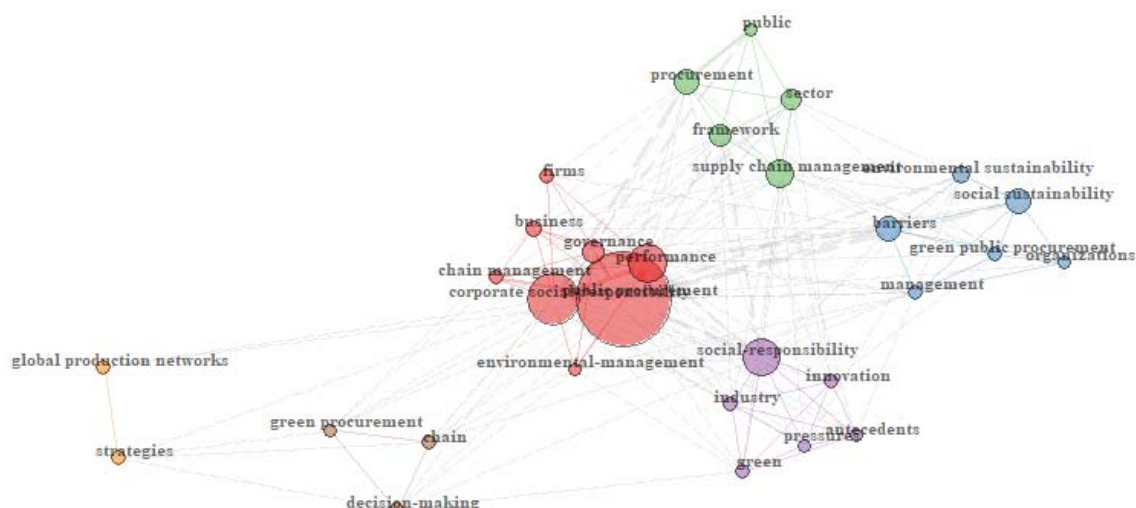
Source: Own processing from RStudio software based on Web of Science database

The connections among authors signify a more comprehensive analysis of this issue, underscoring its significance.

Based on an analysis of the co-occurrence of keywords in the existing literature on public procurement with a social dimension (see Figure 3), we can identify six primary areas of research interest:

- Public Procurement and Corporate Social Responsibility: Examining the performance and oversight of corporations within the context of supply chain management and environmental management.
- Social Responsibility and Innovation: Investigating the relationship between social responsibility and the promotion of green business practices.
- Social Sustainability: Exploring barriers to green public procurement and broader environmental sustainability.
- Supply Chain Dynamics: Analysing the role of supply chains within the public procurement sector.
- Decision-Making Processes: Assessing the decision-making mechanisms within green procurement chains.
- Strategic Considerations: Evaluating strategy concerning global production networks.

Figure 3: Occurrence of Keywords in the Literature on Public Procurement with a Social Dimension



Source: Own processing from RStudio software based on Web of Science database

Loosemore et al. (2020) highlight the resurgence of the concept of social procurement as a favoured public policy mechanism for governments to address increasing social disadvantage and inequality. Public authorities can engage in socially responsible public procurement by acquiring ethical products and services and utilizing tenders to generate employment opportunities, promote decent work, foster social and professional inclusion,

and improve conditions for individuals with disabilities and other disadvantaged groups (European Commission b). Loosemore et al. (2020) provide a simplified definition of social procurement as the acquisition of various assets and services aimed at intentionally generating social outcomes.

Social value can be created in various ways, however, the most prevalent mechanism in emerging social procurement policies is the stipulation to generate employment opportunities for disadvantaged individuals. This broad category may encompass people with disabilities, at-risk youth, long-term unemployed individuals, as well as migrants and refugees (Loosemore et al., 2020).

A positive development for Slovakia in this regard is the public procurement process, which allows – and indeed encourages – the prioritization of vulnerable segments of the population, thereby promoting their integration into the country's economic life and contributing to the resolution of economic, social, and environmental challenges. However, despite public procurement facilitating the competitive marketing of products and services by social enterprises, there remains a critical need to assist these enterprises in competing effectively against profit-oriented businesses.

Thus, under Act No. 343/2015 Coll. on Public Procurement in Slovakia, the social aspect of public procurement is defined as *“an aspect related to the subject of the contract that may lead to a positive social impact from the performance of the contract”*. This includes, but is not limited to, *“the creation or promotion of employment opportunities, the provision of decent, fair, and satisfactory working conditions that exceed legal obligations, the inclusion of disadvantaged, vulnerable, or excluded individuals and groups in social relations, and the facilitation of their access to the labour market”*. Additionally, it encompasses *“enhancing the accessibility and usability of goods, services, and works for individuals with disabilities, promoting ethical and fair trade, supporting the growth of a knowledge-based economy and innovation, ensuring resource sustainability and social and territorial cohesion, increasing supplier accountability concerning societal interests—particularly by integrating socially beneficial activities into the supplier's operations—and collaborating with stakeholders affected by their activities or mitigating the consequences of economic and social underdevelopment in the least developed regions”*.

Under this legislation, contracting authorities are mandated to incorporate social considerations into public procurement practices and have the option to establish “reserved contracts.” A reserved contract is defined in the Act as a procurement opportunity exclusively available *“to registered integrative social enterprises, sheltered workshops, or natural persons with disabilities who operate or are self-employed in sheltered workplaces”*. Additionally, *“the performance of the contract may be reserved for sheltered workplace programs, provided that at least 30% of the employees in registered integrative social enterprises, sheltered workshops, or sheltered workplace programs are individuals with disabilities or other disadvantaged persons”*. Contracting authorities will face sanctions if they fail to adhere to the conditions of social procurement.

Flammer's (2018) further indicates that organizations demonstrating higher social and environmental performance tend to receive a greater number of contracts. This suggests that corporate social responsibility can function as a signalling and differentiation strategy that influences the purchasing decisions of government agencies.

3 Methodology

This paper examines the use of public procurement as a funding mechanism for social enterprises. The analysis focuses on a comprehensive database of all public procurements conducted through the e-contracting portal (EKS) in Slovakia.

3.1 Research objective

The objective of this analysis is to highlight the uneven involvement of social enterprises in public procurement, which can be attributed to both a lack of awareness and reluctance to compete.

Motivated by the existing gap in scientific research within this area, we aim to address the following research questions:

1. Are social enterprises in Slovakia reasonably involved in public procurement compared to commercial enterprises?
2. What factors determine the success of social enterprises in public procurement?
3. Is there untapped potential for greater social enterprise involvement in public procurement?

To address these carefully formulated research questions, we focus on:

- a comparative analysis of the participation levels of social enterprises versus commercial enterprises in public procurement in Slovakia;
- a comparative evaluation of the financial resources allocated to social enterprises and commercial enterprises via public procurement processes;
- an evaluation of the success rates of social enterprises in public procurement;
- an identification of the factors influencing the success rate of social enterprises in public procurement, including legal, financial, and operational variables;
- a determination of the economic sectors where social enterprises serve as suppliers, based on CPV codes;
- an analysis of the goods and services most in demand in all public procurements; and
- an identification of potential areas for increasing the involvement of social enterprises in public procurement, based on the demand for goods and services in public procurement categorized by CPV codes and the economic activities of social enterprises.

3.2 Methods

To address the stated research question, we employ a range of methodological techniques, beginning with basic descriptive statistics. In addition, we utilize advanced data science and knowledge discovery methods, specifically machine learning algorithms such as decision trees, for classification and prediction tasks. Furthermore, we incorporate regression techniques, with a particular emphasis on binary logistic regression.

The selection of these methods is grounded in their prevalence and effectiveness within contemporary scientific research in the field of business, where the integration of data science techniques, including decision trees and logistic regression, has become increasingly common (e.g. Deal & Edgett, 1997; Kipkoge et al., 2021).

A decision tree is a type of supervised learning model that organizes data into a hierarchical structure to arrive at a set of outcomes. The objective of the optimization algorithm in a decision tree is to classify the data and identify the distribution that maximizes information gain, leading to a more straightforward classification (Suthaharan, 2016). Decision trees are therefore commonly used in machine learning for tasks such as prediction and description, i.e. classification. This method is favoured for its simplicity, ease of interpretation, accuracy, and strong predictive capabilities (Rokach & Maimon, 2007). In recent years, decision trees have also been utilized in fields like entrepreneurship and social entrepreneurship to assess potential success (e.g. Ochuenwike, Ofozor & Ejiofor, 2019; Yin & Wang, 2020).

Logistic regression is widely used by economists and is frequently applied in procurement and entrepreneurship analysis (e.g. Reijonen, Saastamoinen & Tammi, 2018; Gyamfi, Anderson & Prokop, 2019). Logistic regression models are commonly used to examine the impact of predictor variables on categorical outcomes, typically when the dependent variable is binary (Nick, & Campbell, 2007). In such models, the dependent variable takes on one of two possible values: 1 (success) or 0 (failure) (Aldrich & Nelson, 1984; Wooldridge, 2012). Logistic

regression works by modelling the natural logarithm of the odds of success as a function of the independent variables, establishing the relationship between the binary outcome and the predictors. This allows for an understanding of how each predictor influences the likelihood of the outcome occurring (LaValley, 2008; Stoltzfus, 2011).

In this paper, we quantify the involvement of social enterprises in public procurement using descriptive statistics. To evaluate the success of social enterprises in public procurement and identify the factors influencing that success, we apply the decision tree methodology. Additionally, we employ regression techniques, with a specific focus on binary logistic regression, to assess the impact of these factors on the success of social enterprises in public procurement. This combination of methods provides a comprehensive view of both statistical trends and underlying determinants of social enterprise success in this context.

3.3 Data and variables

For this research, we analyse data for public procurement from the EKS portal covering the period from September 30, 2014, to January 31, 2023, which comprises 513,651 records.

Utilizing these records, we identified social enterprises participating in public procurement contracts based on their Unique Identification Number (IČO), cross-referencing with databases from the Register of Social Enterprises (RoSE) maintained by the Ministry of Labour, Social Affairs, and Family of the Slovak Republic. However, it is important to note that the Social Enterprise Act was enacted in Slovakia on May 1, 2018. Consequently, the register of social enterprises contains

data starting from September 17, 2018, which marks the date when the first social enterprise was officially registered in Slovakia. Thus, in our analysis, we include all social enterprises that have existed from the time the Act came into force until 2023, amounting to a total of 608 registered social enterprises.

As for the involvement of social enterprises in public procurement, we consider the entire period analysed, from 2014 to 2023. However, for the years 2014–2017, the recorded involvement reflects a time when currently registered social enterprises were competing for public procurement contracts as traditional commercial enterprises before their formal registration under the Social Enterprise Act introduced in 2018. This distinction is important to acknowledge, as it highlights the transition of these entities from conventional commercial roles to their current status as social enterprises.

Additionally, we incorporated financial data related to social enterprises bidding for public procurement contracts, which was obtained through a paid Finstat license. This financial data encompasses all information included in the financial statements submitted by social enterprises during the specified period.

The methods outlined in subchapter 3.2 were applied to analyse these secondary data. A detailed list of all variables used in this study, along with their respective sources, is presented in Tables 1–3.

Table 1: Variables derived from EKS

Label	Characteristic	Source	Label	Characteristic	Source
SUCCESS FAILURE (dependent variable)	A binary variable representing the success of the SE in the PP if it contains the value 1, and the failure of the SE in the PP if it contains the value 0	EKS	Number of notified suppliers	The count of relevant potential suppliers informed about the opportunity to participate in the PP	EKS
CA City	City where the headquarters of the contracting authority is located	EKS	Entry price	The price of the tender suggested by the first tenderer	EKS
Descriptive form type	The subject of the procurement including the goods, services, or a combination of both	EKS	Number of contestants	The total count of potential suppliers bidding for a contract in the PP	EKS
Descriptive form service category	Category of procured services, classified according to the CPV code	EKS	Number of submitted bids	The total number of bids submitted by tenders	EKS
Region of Fulfilment	The region where the goods or services are to be delivered	EKS	Offer type	A binary variable indicating whether the tender is classified as a contractual tender or an auction tender	EKS
Maximum resources amount	The maximum financial limit set by the contracting authority at the time of the call for tenders	EKS	Final value amount	The final price established for the PP	EKS
Contractual relationship	The nature of the contractual arrangement under which the procurement will be executed	EKS	Evaluation criteria	A binary variable representing the criterion for selecting the winning tender, with options for price including VAT and price excluding VAT	EKS
EU funding	A binary variable indicating whether EU resources will be used to finance the procurement (TRUE/FALSE)	EKS			

Source: Own based on EKS

Table 2: Variables derived from RoSE

Label	Characteristic	Source	Label	Characteristic	Source
Type of RSE	The classification of the registered SE in Slovakia	RoSE	LLC	A binary variable expressing whether the legal form of the SE is a Limited Liability Company	RoSE
Legal form	The legal structure of the SE	RoSE	Cooperative	A binary variable indicating whether the legal form of the SE is a Cooperative (1) or not	RoSE

				(0)	
Registered office of the enterprise Region	The region where the headquarters of the SE is located	RoSE	SE	A binary variable indicating the creation and operation of the SE, where a value of 1 signifies that it is a SE, and 0 indicates it is not	RoSE
Measurable positive social impact	The specific type of positive social impact reported by the SE	RoSE			

Source: Own based on RoSE

Table 3: Variables derived from Finstat

Label	Characteristic	Source	Label	Characteristic	Source
SK NACE	The specific code associated with the business activities of the supplier	Finstat	Profit from operations line	Income generated by the SE from its economic activities in €	Finstat
Type of ownership	The type of ownership for the bidder (SEs)	Finstat	Revenue from the sale of goods	Total revenue earned from the sale of goods by the SE in €	Finstat
Number of employees	The total number of employees working for the SE	Finstat	Revenue from the sale of own products	Total revenue from the sale of the SE's products in €	Finstat
EBITDA	The EBITDA for the SE in €	Finstat	Current financial assets	Current financial assets of SE in €	Finstat
Statutory body binary	A binary variable where 1 indicates the SE's statutory officer is female, and 0 indicates the officer is male	Finstat	Revenue from the sale of own services	Total revenue earned by the SE from the sale of services in €	Finstat
DEBTS	A binary variable where 1 indicates that the SE has existing debt, and 0 means the SE has no debt	Finstat	Changes in internal inventory	The changes in the internal inventories within the SE in €	Finstat
Non-current financial assets	The total amount of non-current financial assets of the SE in €	Finstat	Own work capitalized	The capitalisation of materials and goods within the SE in €	Finstat
Non-current receivables	The total amount of non-current receivables of the SE in €	Finstat	Current bank loans	Loans taken by the SE from banks with current repayment schedules in €	Finstat
Current receivables	The total amount of current receivables of the SE in €	Finstat	Operating result	The operating result of the SE in €	Finstat
Revenue from the sale of own products and services	Total revenue earned by the SE from the sale of its own products and services (MFIs) in €	Finstat	Other operating income	Additional income from economic activities of SE in €	Finstat
Equity	The total equity held by the SE in €	Finstat	Profit from financial activities	Income from the SE's financial activities in €	Finstat
Long-term Provisions	The amount of long-term financial provisions of the SE in €	Finstat	Interest income	Revenue from interest earned by the SE in €	Finstat
Long-term bank loans	Loans taken by the SE from banks with long-term repayment schedules in €	Finstat	Exchange rate gains	Profits generated by the SE due to foreign exchange gains in €	Finstat
Short-term Provisions	The amount of short-term financial provisions of the SE in €	Finstat	Payment orders	A binary variable where 1 indicates that a payment order has been issued to the SE, and 0 indicates no payment order	Finstat
Sale of non-current intangible and tangible assets and material	Income of SE generated from the sale of non-current intangible and non-current tangible assets, as well as materials in €	Finstat	Net assets	The total net assets of the SE in €	Finstat
Short-term financial assistance	Short-term financial assistance provided to SE in €	Finstat	Added value	The increased utility of a product supplied by SE in €	Finstat
Net turnover	The total net turnover of the SE in €	Finstat	Other income from financial activities	Additional income related to the financial activities of the SE in €	Finstat

Source: Own based on Finstat

4 Results

This section presents the key findings of the research, focusing on the involvement of social enterprises in public procurement, the financial allocations to these enterprises, and the business activities contracted through public procurement, as categorized by CPV codes.

4.1 Involvement of social enterprises in public procurement

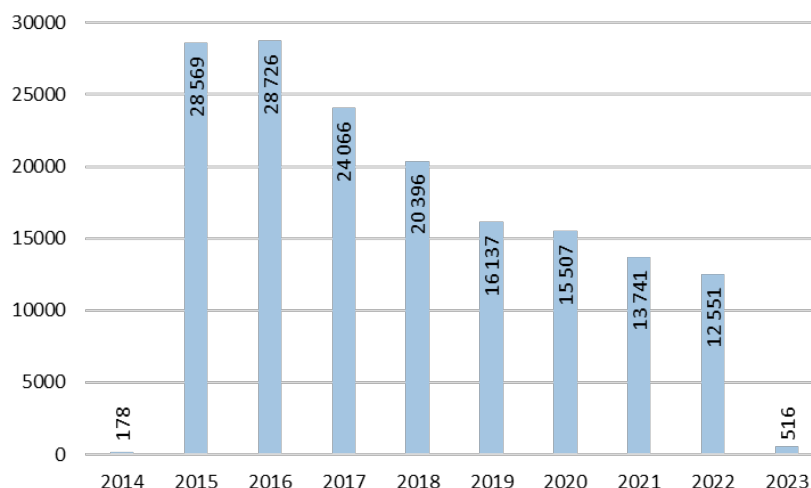
In the area of public procurement, we analysed all public procurement contracts launched and implemented through the EKS from September 2014 to January 2023 (see Figure 4). Thus, a total of 513,651 records from the EKS portal were analysed, with a total number of 160,387 contracts.

In the Public Procurement through the EKS portal, out of 160,387 contracts, social enterprises were involved a total of 1,642 times, with 38 unique social enterprises bidding for the contracts, representing 0.44% of all unique bidders (8,644). The data analysed thus shows that social enterprises were involved in 1% of the contracts launched on the EKS portal.

The success rate of social enterprises was 0.34% (544 wins) of all contracts published on the portal (160,387 contracts) over the

period under review. However, the success rate of social enterprises for the contracts for which they bid (1,642 contracts) was 33.13% (544 wins). This shows that when social enterprises were involved in public procurement, almost a third of social enterprises were successful and won the contract.

Figure 4: Number of PP launched on EKS platform from September 2014 - January 2023



Note: The displayed numbers represent all public procurements announced through the EKS portal from its launch in September 2014 until the end of January 2023.

Source: Own processing based on EKS database

Based on the yearly overview (see Table 4), we can conclude that social enterprises experienced the most successful public procurement outcomes in 2015 and 2022. However, it is important to highlight that in 2015, there were no registered social enterprises in Slovakia; instead, they operated as ordinary commercial enterprises. Notably, the years 2020 and 2021 also proved to be strong for social enterprises, coinciding with the highest number of newly established or newly registered social enterprises, including those that transformed from commercial enterprises into social enterprises.

Table 4: Yearly overview of winners in public procurement

Year	Number of non-SE contractors	Number of SE contractors
Total	160,387	544
2014	178	0
2015	28,569	110
2016	28,726	55
2017	24,066	41
2018	20,396	27
2019	16,137	41
2020	15,507	82
2021	13,741	76
2022	12,551	107
2023	516	5

Source: Own processing based on EKS and RoSE database

Interestingly, in 2023, despite only analysing data from the first month of the year (see Table 4), we observed that the success rate of social enterprises in public procurement closely mirrors that of 2022, showing no significant deviation from the established trend.

Out of the pool of 38 unique social enterprises that bid for contracts on the EKS portal, 73.68% (28) of them were successful. Thus, a total of 28 different (unique) social enterprises won contracts through the EKS portal, representing 0.46% of all unique winners (6,144).

Of all the contracts that social enterprises competed for,

- 19.85% of them (326) ranked 2nd,
- 12.85% of them (211) in 3rd place,
- 6.21% of them (102) in 4th place,
- 4.75% of them (78) in 5th place, and
- the remaining 23.39% (384) in the higher ranks (lower overall ranking).

On average, social enterprises ranked 4th based on the last bid price for the contract. The average number of bids submitted per contract recorded in the EKS portal in the analysed dataset was 3.2, with the most frequent number of bids submitted per contract being 1 and the highest number of bids submitted per contract being 30.

4.2 Financial amount allocated to the social enterprises in public procurement

Another area of interest of this paper was the comparison of funds allocated to social enterprises versus other companies participating in public procurement. Given that social entrepreneurship in Slovakia was only introduced in 2018, we divided the SEs sample into two subsamples. This division reflects the existence and involvement of enterprises in public procurement before 2018 when they were not yet recognized as part of the social economy. We examined the total funds allocated to all contractors in public procurement, the funds earned by enterprises that later transformed into SEs for the years 2015-2017, and the funds allocated directly to SEs from 2018 to January 2023.

Based on the analysis conducted, it is evident that the volume of funds allocated to social enterprises through public procurement did not exceed the 1% threshold in any of the reviewed periods. The highest allocation to social enterprises occurred in 2020, coinciding with the peak in the registration of new social enterprises (see Table 5).

Considering that only one calendar month is included in the analysis for 2023, we can conclude that the ratio of financial resources allocated to social enterprises compared to conventional commercial enterprises remains relatively unchanged from the previously analysed periods.

Additionally, during the period from 2014 to 2017, organizations that later transitioned into social enterprises participated in public procurement. However, the financial amounts awarded during that time did not significantly differ from those in the subsequent period starting in 2018.

Table 5: An overview of the funds allocated through public procurement during the analysed period

	All contractors	SE contractors		Non-SE contractors	
YEAR	€	€	%	€	%
2014	1,309,982.06	-	-	1,309,982.06	100.00
2015	217,537,958.61	578,879.45	0.27	216,959,079.16	99.73
2016	331,906,525.84	1,163,452.13	0.35	330,743,073.71	99.65
2017	340,821,921.31	1,695,048.61	0.50	339,126,872.70	99.50
2018	339,379,236.58	686,985.48	0.20	338,692,251.10	99.80
2019	270,426,582.59	824,815.60	0.31	269,601,766.99	99.69
2020	230,871,050.24	1,847,312.53	0.80	229,023,737.71	99.20
2021	236,172,971.77	1,291,490.49	0.55	234,881,481.28	99.45
2022	204,238,494.72	1,459,945.44	0.71	202,778,549.28	99.29
2023	8,925,752.86	17,413.95	0.20	8,908,338.91	99.80
TOTAL	218,159,047.58	9,565,343.68	0.44	2,172,025,133.90	99.56

Source: Own processing based on EKS and RoSE database

4.3 Business activities (CPV) contracted through public procurement

Subsequently, we examined the business activities that social enterprises can provide by analysing the Common Procurement Vocabulary (CPV) codes associated with individual calls for tenders. This analysis included both all contracts and those specifically involving social enterprises. We focused on level 4 of CPV codes, which are formatted as XXXX.

In the procurement process, a single procurement may feature multiple CPV codes, resulting in a substantial increase in our database. We processed a total of 510,783 CPV codes across 160,387 procurements.

The overall number of unique CPV codes identified for all contracting authorities was 1,061. The most frequently occurring CPV code across all contracts, as well as those involving SEs, was code 6000, which pertains to transport services for the delivery of ordered goods. Consequently, we excluded this code from further analysis. The actual goods or services most requested from procuring entities were represented by CPV group 30190000, which encompasses Various office equipment and supplies (25,620 occurrences). Following this, the next most frequent codes for all contracts included 30230000 - Computer-related equipment (16,264 occurrences), 30120000 - Photocopying and offset printing equipment (16,138 occurrences), and 39830000 - Cleaning products (12,230 occurrences). The remaining 1,056 codes were requested fewer than 10,000 times, and a detailed list of the 85 most frequent CPV codes, each occurring more than 999 times across all contracting authorities, can be found in Annex.

Regarding the public procurements in which social enterprises participated, the sample comprised 194 unique CPV codes. The most frequently used codes included 98310000 - Washing and dry-cleaning services (463 occurrences), 79710000 - Security services (370 occurrences), 90910000 - Cleaning services (357 occurrences), 18830000 - Protective footwear (141 occurrences), 30210000 - Data-processing machines (hardware) (139 occurrences), and 30230000 - Computer-related equipment (117 occurrences). A comprehensive list of the 71 most frequently occurring CPV codes (with more than three occurrences) is available in Annex.

The analysis thus indicates that business activities contracted through public procurement vary significantly depending on the type of suppliers involved. Social enterprises are more actively engaged in tenders focused on service performance, such as laundry, cleaning, security, and janitorial services. This finding aligns with the predominant economic activities of social enterprises registered in Slovakia, where the majority report engaging primarily in business services, construction work, hospitality (including hotels and restaurants), retail services, as well as social services and services for individuals. In contrast, commercial suppliers predominantly participate in contracts related to the supply of specialized goods, including office equipment, computer-related equipment, and cleaning products. This distinction highlights the differing roles of social enterprises and commercial suppliers within public procurement, with SEs playing a more service-oriented role.

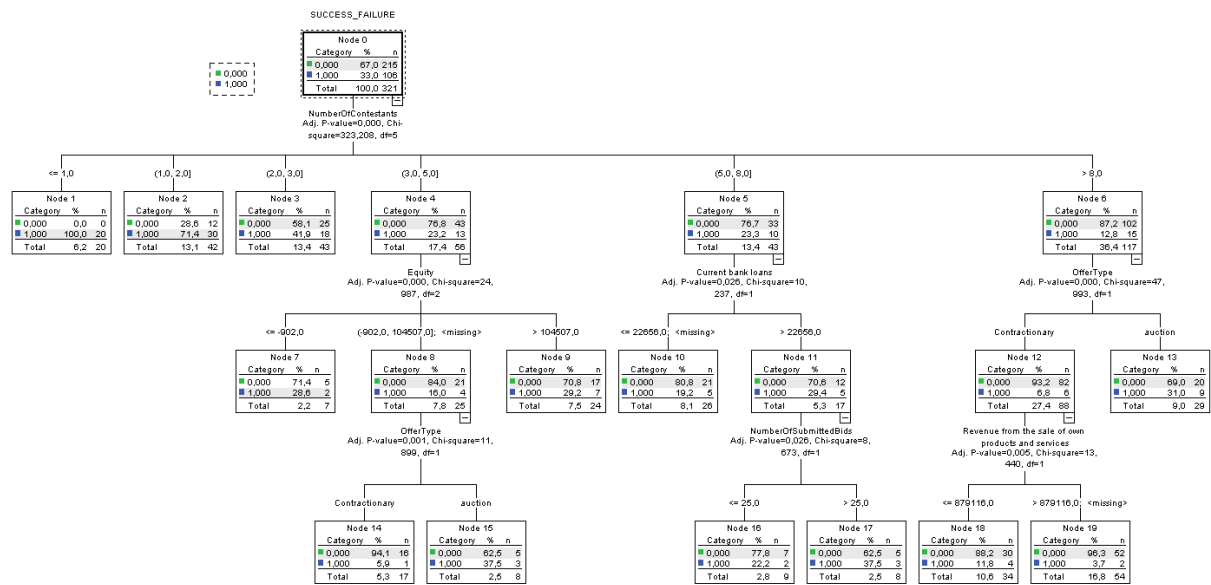
4.4 Determinants of success of social enterprises in public procurement

Consequently, our analysis focused on identifying the determinants influencing the success of social enterprises in public procurement through decision trees and subsequent regression analysis showing the direction of action of each of the identified variables.

The initial step in the analysis was the identification of statistically significant variables shaping the success of social enterprises in public procurement using regression and classification trees CHAID (see Figure 5), EXHAUSTIVE CHAID (see Figure 6), and CRT (see Figure 7), and the classification algorithm QUEST (see Figure 8).

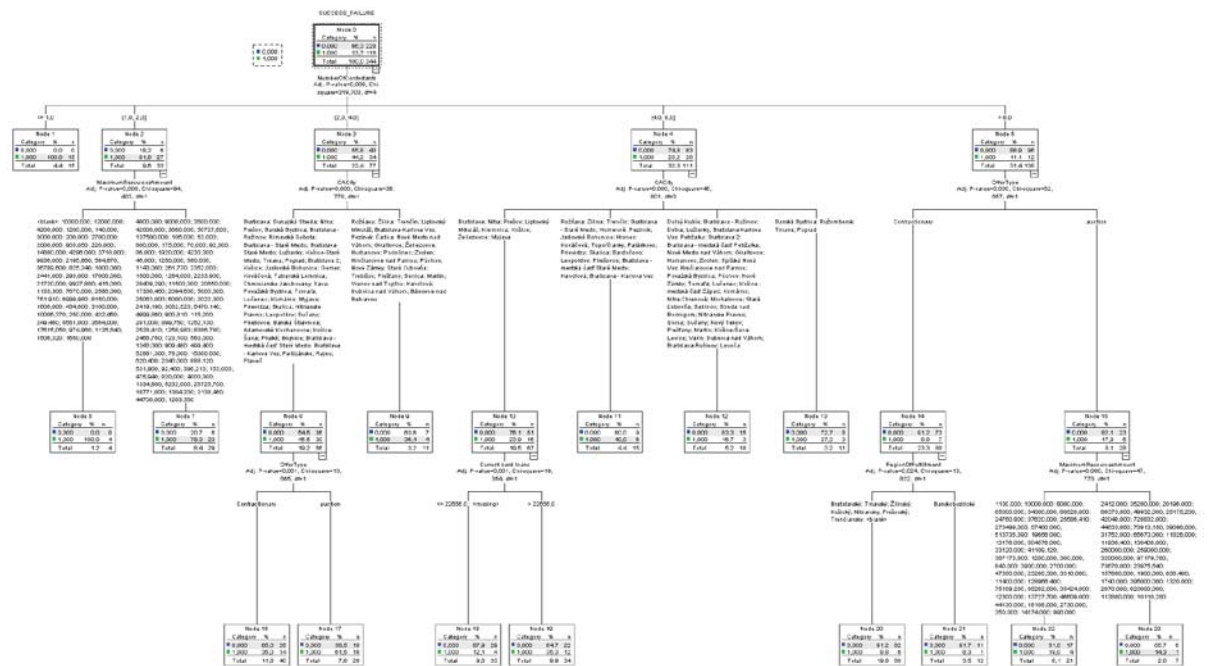
In all the machine learning methods used, the fundamental assumptions included dividing the analysis sample into training and test sets in an 80:20 ratio, setting the significance level at 0.05, and pruning at a maximum level of 5 as recommended in the relevant literature (e.g. Friedman, Kohavi & Yun, 1996; Doan, 2005; Boonamnuay, Kerdprasop & Kerdprasop, 2018; Han, Jeong & Kim, 2023).

Figure 5: CHAID for the variable SUCCESS_FAILURE



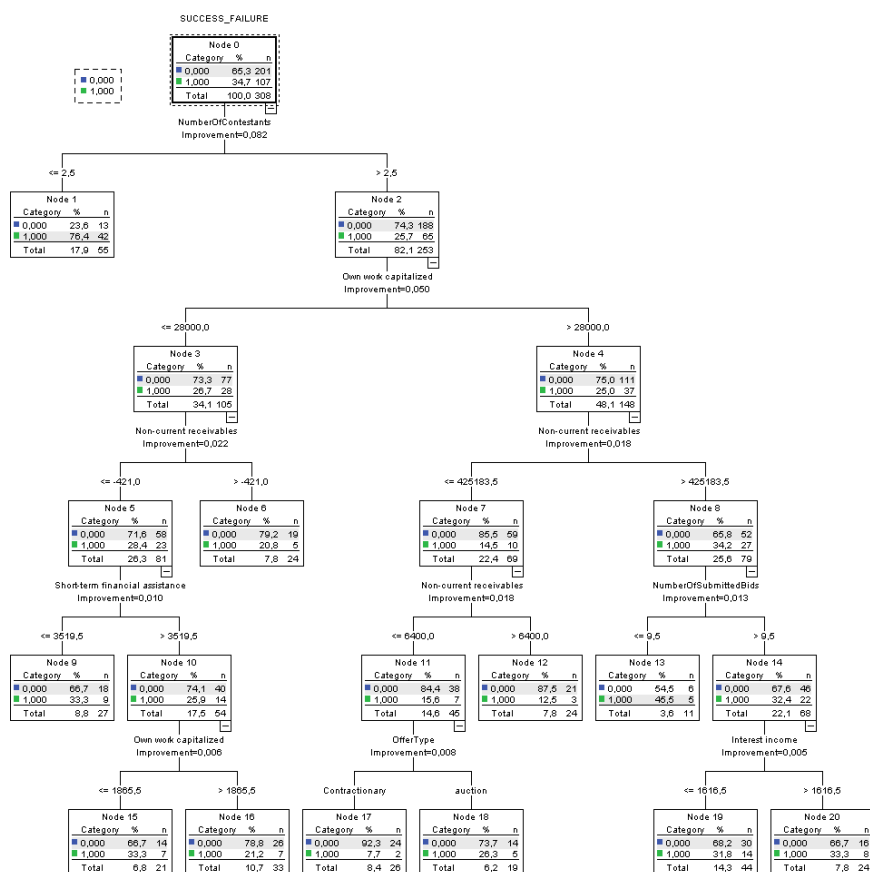
Source: Own processing from SPSS software

Figure 6: EXHAUSTIVE CHAID for the variable SUCCESS_FAILURE



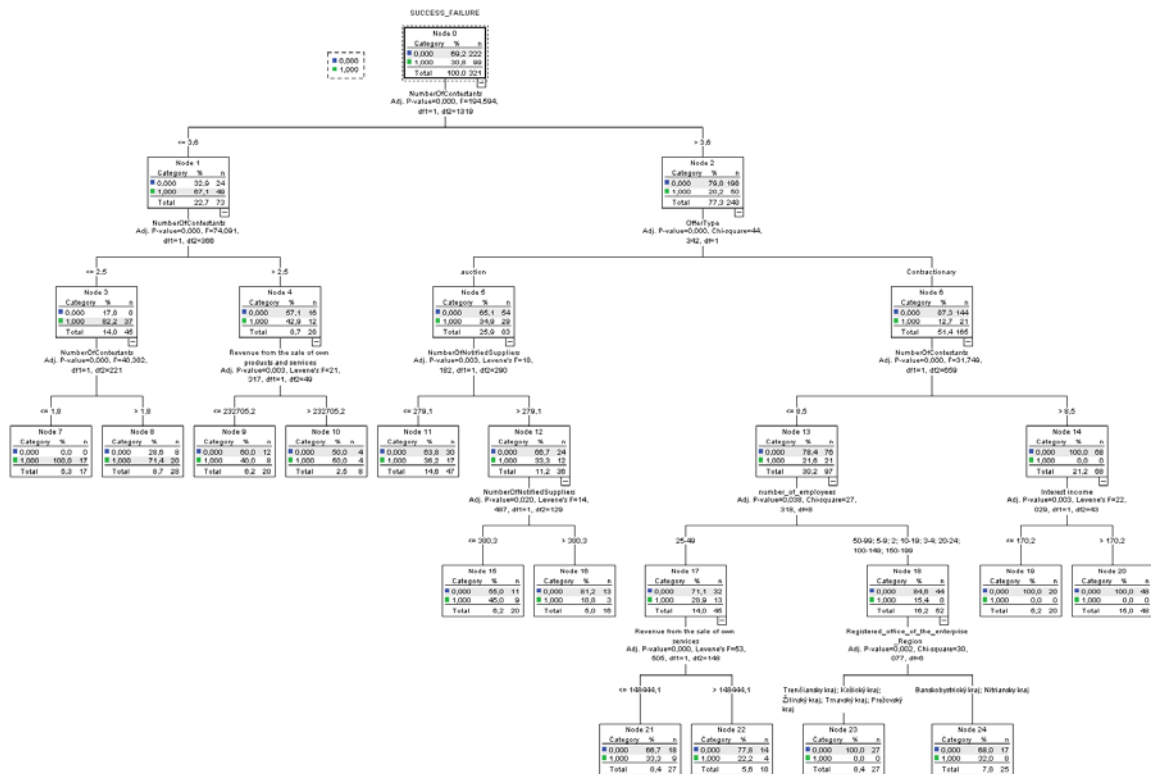
Source: Own processing from SPSS software

Figure 7: CRT for the variable SUCCESS_FAILURE



Source: Own processing from SPSS software

Figure 8: QUEST for the variable SUCCESS_FAILURE



Source: Own processing from SPSS software

Based on this method, we determined the most significant variables influencing the success rate of the analysed social enterprises in public procurement, expressed through a binary variable, where a value of 0 meant the failure (loss) of the social enterprise in bidding for a public procurement contract and a value of 1 meant the success (win) of the social enterprise in bidding for a public procurement contract.

The most important variables influencing the success of social enterprises in public procurement, as predicted by at least two decision trees, include:

- number of bidders for a given contract;

- type of bid available for public procurement (contracting vs. auction bid);
- value of short-term bank loans taken by the social enterprise;
- number of tenders submitted by the tenderers for the contract;
- revenue from the sale of own products and services by the social enterprise; and
- interest income received by the social enterprise.

In Table 6, we present the list of all significant variables affecting the success of social enterprise in the public procurement revealed by the decision trees.

Table 6: The most significant variables affecting the success of SE in the PP based on the decision tree analysis

Variable	Method			
	CHAID	EXHAUSTIVE CHAID	CRT	QUEST
Number of contestants	x	x	x	x
Offer type	x	x	x	x
Current bank loans	x	x		
Number of submitted bids	x		x	
Revenue from the sale of own products and services	x			x
Equity	x			
Maximum resources amount		x		
CA City		x		
Region of fulfilment		x		
Interest income			x	x
Own work capitalized			x	
Non-current receivables			x	
Short-term financial assistance			x	
Number of notified suppliers				x
Number of employees				x
Revenue from the sale of own services				x
Registered office of the enterprise region				x

Source: Own processing from SPSS software based on EKS, RoSE and Finstat database

These variables were identified as key factors influencing the likelihood of social enterprises' success in public procurement processes. Regarding the predictive performance of the regression and classification trees (see Table 7), their predictive accuracy is notably high, with all models demonstrating a predictive ability of at least 72%.

Table 7: Predictive performance of the decision trees

Method used	Predicted Correct
CHAID	77.9%
EXHAUSTIVE CHAID	72.4%
CRT	74.4%
QUEST	78.2%

Source: Own processing from SPSS software

Based on the results from the regression and classification decision trees, we proceeded with regression analysis to assess the direction of their impact on the success of social enterprises in public procurement. We employed logistic regression, using the binary variable representing the success or failure of social enterprises in public procurement as the dependent variable, and included all the previously identified variables (shown in Table 6) as predictors.

Our regression analysis identified the most significant variables as the number of bidders for a contract, the number of tenders submitted, the type of procurement bid (contracting vs. auction), maximum resource availability, number of employees, interest income, and current bank loans, with the significance levels detailed in Table 8.

Factors that contribute positively to the success of social enterprises in public procurement include:

- Maximum number of resources, where for each unit increase in the maximum allocated resources by contracting

authority, the odds of success increase proportionally by a factor of 1, holding all other factors constant.

- Offer type, where if the procurement process is conducted via auction, the odds of success are 139% higher compared to failure, assuming no changes in other conditions.
- Current bank loans, where a unit increase in current bank loans leads to a corresponding increase in the odds of success by a factor of 1, *ceteris paribus*.

Based on the regression analysis, we found that while the maximum contract price is a significant factor, it does not guarantee that social enterprises will win the public procurement. Interestingly, when procurement is decided solely based on the initial contract offer from each bidder – without proceeding to further ordinary action – social enterprises are less likely to succeed in these tenders.

Another noteworthy finding is the amount of current debt that the social enterprise holds with the bank; since its presence and greater amount appear to enhance the social enterprises chances of success in procurement. To explore this insight further, we consulted with staff at the Regional Centre of Social Economy established by the Implementation Agency of the Ministry of Labour, Social Affairs, and Family of the Slovak Republic. We learned that social enterprises seeking state aid must demonstrate self-sufficiency and co-finance with the aid provided for their operations. Consequently, social enterprises may take out loans from banks equivalent to 20% of the state aid received. This may explain why well-established social enterprises engaged in public procurement have bank debts, thus highlighting the importance of this factor in their success.

On the other hand, factors negatively affecting SP's success in public procurement include:

- Number of participants, where for every additional participant in the procurement process, the odds of failure are 18% higher than odds to success, *ceteris paribus*.
- Number of submitted bids, where an increase in the number of bids submitted raises the odds of failure by a factor of 1 for each additional bid, assuming no changes in other conditions.
- Number of employees, where each additional employee corresponds to 12% higher odds of failure compared to success, holding all other factors constant.
- Interest income, where a unit increase in interest income increases the odds of failure by a factor of 1, *ceteris paribus*.

In examining the factors that negatively affect the odds of success of social enterprises in public procurement, the number of bidders emerges as a critical issue. A higher number of participants diminishes the chances of success for the social enterprise, as commercial competitors often drive down contract prices to unacceptably low levels. This situation significantly undermines the competitiveness of social enterprises, which frequently cannot reduce their bids sufficiently due to the higher operating costs associated with providing a supportive work environment for disadvantaged and disabled employees. A similar dynamic exists when there are numerous bids submitted; increased competition can be detrimental, especially since social enterprises may not engage in aggressive pricing strategies.

Table 8: Logistic Regression Analysis Results

Variable	Coefficient	Std. Error	z	p-value		Odds ratio
const	0.3132	0.3177	0.9858	0.3242		-
CA City	-0.0021	0.0023	-0.8993	0.3685		0.9979
Region of fulfilment	-0.0223	0.0265	-0.8396	0.4011		0.9780
Maximum resources amount	2.7e-06	1.2e-06	2.3710	0.0178	**	1.0000
Number of notified suppliers	-0.0007	0.0004	-1.6430	0.1003		0.9993
Number of contestants	-0.2034	0.0274	-7.4170	<0.0001	***	0.8160
Number of submitted bids	-0.0031	0.0010	-2.9390	0.0033	***	0.9969
Offer type	0.8720	0.1368	6.3750	<0.0001	***	2.3917
Number of employees	-0.1247	0.0544	-2.2930	0.0218	**	0.8828
Registered office of the enterprise	-0.0889	0.0644	-1.3810	0.1674		0.9149
Noncurrent receivables	-2.1e-07	9.3e-07	-0.2243	0.8226		1.0000
Equity	1.2e-07	3.3e-07	0.3569	0.7211		1.0000
Current bank loans	1.4e-06	7.8e-07	1.7260	0.0843	*	1.0000
Short term financial assistance	3.6e-06	3.6e-06	0.9783	0.3279		1.0000
Revenue from the sale of own property	-3.2e-07	2.8e-07	-1.1480	0.2508		1.0000
Revenue from sale of own services	-7.8e-09	2.7e-07	-0.0286	0.9772		1.0000
Own work capitalized	-0.0002	0.0002	-0.9930	0.3207		0.9998
Interest income	-0.0004	0.0002	-2.3690	0.0178	**	0.9996

Note: Significance codes marked as (*), (**) and (***) correspond to significance levels of $p < 0.1$, $p < 0.05$ and $p < 0.01$, respectively.

Source: Own processing from Gretl software based on EKS, RoSE and Finstat database

Another intriguing factor related to social enterprises challenges is the number of employees. However, it is essential to note that this observation might be manipulated by the specific structure of the sample, which primarily included social enterprises with employee counts between 25 and 49 (a total of 773). In contrast, the other size categories, comprising a total of 836 social enterprises, ranged from fewer than 25 to more than 49 employees (i.e. 9 separate categories). Therefore, it is reasonable to conclude that an increase in employee numbers should not significantly affect the success of social enterprises in the procurement process.

Additionally, interest income poses another challenge for social enterprises in public procurement. It is important to highlight that only 16.2% (266) of the social enterprises in our sample reported having interest income, which could introduce bias in the regression results.

5 Discussion

RQ1: Are social enterprises in Slovakia reasonably involved in public procurement compared to commercial enterprises?

Based on our analysis, we conclude that the participation of social enterprises in public procurement in Slovakia remains significantly low, with only 38 out of 650 registered social enterprises involved during the monitored period. Moreover, the share of public procurement contracts bid on by these social enterprises was less than 1%, indicating insufficient engagement. To address this, it is crucial to raise awareness about the opportunities for social enterprises to secure funding through public procurement. Simultaneously, contracting authorities

should be encouraged to consider awarding more contracts to social enterprises rather than relying solely on traditional commercial entities (Polačková, 2021).

RQ2: What factors determine the success of social enterprises in public procurement?

Our analysis revealed that key factors determining the success of social enterprises in public procurement include both the number of bidders and the volume of bids submitted. This reflects a "competitive effect", where a higher number of participants drives prices down (Stehlik, 2018). Social enterprises, however, often struggle to compete with the lower bids offered by commercial entities, which significantly limits their competitiveness.

Additional factors that significantly affect the likelihood of success for social enterprises in public procurement include the bid type variable, with social enterprises being less successful when contracts are awarded based on an initial bid. It is important to note, however, that the data analysed here suggests possible collusion in some tenders, where suppliers pre-negotiate and submit unrealistically low bids, later adjusting to a more realistic price due to changes in material or labour costs.

Variables that improve the chances of social enterprise success include the maximum contract amount set by the contracting authority and the current bank loans held by the social enterprise. While indebtedness may not be an ideal indicator of financial health, in the context of Slovakia, it can signal a positive aspect. Social enterprises awaiting state aid must demonstrate liquidity

of at least 20% of the granted aid, which often leads them to secure bank loans.

Regression and classification decision trees, along with logistic regression, also identified interest income and the number of employees as significant variables that decrease the likelihood of success of social enterprise in public procurement. However, these variables presented considerable bias in the sample, as only a few social enterprises reported interest income, and a large proportion of social enterprises fall into the same category of employee numbers within the nine categories recorded.

RQ3: Is there untapped potential for greater social enterprise involvement in public procurement?

Given the service-oriented nature of social enterprises, there is clear potential for increasing their participation in public procurement focused on service provision. Operating across diverse sectors and offering services in a wide range of economic activities, these enterprises could significantly benefit from additional funding. Expanding their capacities through increased support, including public procurement opportunities, would not only drive higher turnover but also amplify their positive social impact.

6 Conclusion

Social entrepreneurship refers to the establishment of ventures aimed at addressing social issues and fostering positive social change, with a particular emphasis on community impact over profit generation. Social enterprises often focus on areas where traditional market players or public services inadequately meet social needs, providing innovative and flexible solutions to these challenges. Thus, promoting social procurement, which integrates social considerations into public procurement practices, is essential for fostering both economic and social progress. This approach enables contracting authorities to leverage their purchasing power not only for the acquisition of goods and services but also to address societal challenges, including inequality, unemployment, and social exclusion. The involvement of social enterprises in public procurement can facilitate job creation for disadvantaged groups, enhance social cohesion, and promote the delivery of innovative, community-focused services.

This paper aims to analyse the participation and success rates of social enterprises in public procurement in Slovakia from 2014 to 2023. We seek to identify the key factors that influence these enterprises' success in securing public contracts. By comparing the engagement of social enterprises with that of commercial suppliers, this study contributes to a deeper understanding of how public procurement can serve as a crucial mechanism for fostering the growth of social enterprises and enhancing their role in societal development.

The analysis of public procurement contracts launched through the EKS from September 2014 to January 2023 revealed a total of 513,651 records, corresponding to 160,387 contracts. However, social enterprises participated in only 1% of these contracts, with less than 6% of the total registered social enterprises in Slovakia engaging in public procurement. Social enterprises secured a mere 0.34% of these contracts, yet an interesting finding was that when a social enterprise competed for a contract, it achieved success in up to a third of cases. In terms of financial volume, contracts awarded to social enterprises represented only 0.44% of the total volume awarded in all tenders during the review period. To explore the factors influencing the success of social enterprises in public procurement, we employed regression and classification trees, and logistic regression methods. Our analyses revealed that the most significant variable enhancing the likelihood of success for social enterprises was the type of offer; when procurement processes were conducted via auction, the odds of success increased by a factor of 2.39, assuming other conditions remained constant. Conversely, the variables that negatively impacted the chances of success included the number of participants and the number of submitted bids. This indicates

that popular contracts are challenging for social enterprises to secure, due to both high competition and the nature of negotiations, where these enterprises cannot leverage price reductions owing to their high operational costs, which fund their social impact initiatives.

Additionally, our analysis indicated that social enterprises tend to be more service-oriented, primarily engaging in public procurement contracts focused on service delivery rather than the supply of goods. However, these findings align with the primary economic activities undertaken by social enterprises in Slovakia, which include business services, construction work, hospitality, retail services, and services for individuals, among others.

Based on our analysis, there is significant potential for greater involvement of social enterprises in public procurement. However, there remains a gap in measures to ensure their success within this process. While there is an instance of a "reserved contract" in Slovakia, it is not reflected in the EKS portal, making it unclear whether social enterprises are winning contracts due to competitive participation or other factors. A limitation of this study is also the relatively short period examined, as registered social enterprises have only been formally recognized in Slovakia since 2018. Moreover, support for the creation and sustainability of social enterprises, particularly through the National Project Institute of Social Economy (I, II) managed by the Implementing Agency of the Ministry of Labour, Social Affairs and Family, is still in its early stages. Future research should focus on analysing public procurement based on the type of participants, distinguishing between purely commercial, mixed, and social procurement. This would help better identify success factors and the conditions under which social enterprises can effectively compete and win public contracts. Additionally, examining the motivations of contracting authorities to prioritize social outcomes over simply securing the lowest price would provide insights into the broader societal benefits of public procurement. It would also be valuable to explore the financial support provided by the state to social enterprises through direct public procurement contracts, subsidies, or grants aimed at employing disadvantaged groups.

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Primary Paper Section: A

Secondary Paper Section: AH

Annex: The most frequent CPV codes in PP

CPV4	Count	CPV4	Count	CPV4	Count	CPV4	Count
All contractors		SE contractors		All contractors		SE contractors	
3019	25,620	9831	463	1842	1,571	3373	11
3023	16,264	7971	370	3379	1,567	3582	11
3012	16,138	9091	357	7981	1,553	9800	11
3983	12,230	1883	141	1952	1,549	3953	10
3021	9,984	3021	139	3491	1,505	7131	10
3314	9,287	3023	117	1581	1,489	3374	9
3922	6,945	1814	91	3800	1,489	5041	9
0322	6,513	1810	89	3430	1,469	1830	8
3971	5,383	1811	71	2432	1,427	1841	7
3319	5,205	3511	68	3929	1,415	5051	7
3376	3,970	1881	65	3300	1,349	9051	7
3369	3,355	3314	64	2495	1,339	1840	6
4411	3,263	1842	62	4523	1,299	1921	6
3911	3,196	1880	54	5552	1,296	1964	6
9051	3,036	3983	53	3310	1,284	2445	6
3980	2,790	1513	35	3365	1,283	3916	6
1511	2,778	3020	35	3362	1,237	3952	6
3371	2,605	3019	32	0912	1,232	5071	6
1533	2,603	1833	31	0931	1,232	6651	6
2445	2,289	3929	31	7226	1,229	7981	6
3492	2,268	9834	31	1551	1,220	1813	5
3020	2,228	9090	30	2431	1,213	2246	5
3843	2,179	3371	29	3153	1,208	3300	5
3411	2,159	7970	28	3511	1,194	3370	5
3865	2,088	3012	26	6041	1,170	3865	5
3931	2,056	1511	24	2496	1,164	3956	5
3435	1,983	4452	24	3242	1,143	3980	5
1513	1,980	8531	20	1631	1,130	8051	5
3377	1,945	3376	19	1561	1,091	9062	5
3916	1,945	3377	18	9831	1,081	0312	4
3312	1,933	1823	17	1554	1,080	1882	4
3913	1,932	1822	16	0321	1,071	3234	4
5011	1,926	1844	16	1555	1,060	4500	4
3374	1,845	4411	16	3316	1,059	4530	4
3951	1,837	7982	15	3910	1,053	4540	4
1587	1,815	3435	14	4461	1,046	5000	4
7982	1,805	3951	14	3152	1,028	5032	4
4451	1,798	3319	13	4431	1,019	6010	4
3914	1,762	3512	13	7163	1,014	7135	4
2430	1,684	1800	12	6040	1,012	7731	4
1589	1,621	4448	12	4483	1,010	7980	4
2400	1,603	7033	12	3412	1,000		

Source: Own processing based on EKS and RoSE database

ORGANIZATIONAL TRUST AND INNOVATIVENESS IN FRANCHISING FIRMS: THE MEDIATING ROLE OF ORGANIZATIONAL AUTONOMY

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This research was funded by the Slovak Ministry of Education's Scientific grant agency VEGA 1/0718/22 Human resources development in small and medium-sized enterprises in the context of the 21st century challenges.

Abstract: While much research has explored the relationship between organizational trust, autonomy, and innovation, less attention has been paid to these issues within franchise systems. Considering the mediating role of organizational autonomy (AU), the main objective of this study is to identify the impact of organizational trust (TR) on organizational innovativeness (IN) in franchise companies. A survey of 150 franchise companies was conducted, and structural equation modeling (SEM) was applied to test direct and indirect effects of organizational trust on innovativeness, with organizational autonomy as a mediator. The findings revealed that the organizational innovativeness of franchise companies can be enhanced by implementing organizational trust. In addition, organizational autonomy can be beneficial for innovativeness within the franchise system and acts as a mediator in other organizational relationships. The paper emphasizes the unique aspects of organizational innovation in franchising firms, which is crucial for both academics and practitioners in the field.

Keywords: organizational autonomy; organizational innovativeness; organizational trust; mediator; mediation.

1 Introduction

At present, the competitiveness of each firm is significantly affected by the fundamental shift in the global business landscape connected with the aftereffects of the pandemic, geopolitical conflicts, and technological advancements. These changes and their challenges are forcing companies to look for new ways to stay competitive, and innovation has become a key factor in this process. Extensive research has demonstrated that innovation is closely linked to the competitiveness and sustainable development of enterprise (Yang et al., 2023; Brancati et al., 2022; Rambe & Khaola, 2022). It was confirmed that firms that create a conducive environment for innovation and promote innovativeness are more competitive in both the local or global market (e.g. Rambe & Khaola, 2022; Kubickova et al., 2023; Ključnikov et al., 2021).

Initially, innovation was considered a technical term for developing new products, services, or technologies, and technological innovation has been identified as one of the key drivers of firms' performance and competitiveness (Li et al., 2019). However, over time, the concept of innovation has expanded and now encompasses many managerial domains and features. One of them is organizational innovation. The research studies confirmed the impact of organizational innovation on firm performance (Bočková et al., 2019; Mai, et al., 2022) and competitiveness (Zhu & Cheung, 2017; Azeem et al., 2021). Previous research has been intensively devoted to investigating the connection between innovation and various organizational factors, such as trust, autonomy, leadership, organizational culture, and working conditions. Of the organizational factors mentioned, trust and autonomy are key factors because they create an environment that is supportive of innovation (Park & Kang, 2024). Numerous studies support this notion, for instance, Cera, et al. (2023) confirmed the positive impact of organizational trust on open innovation in SMEs. Similarly, Sankowska & Paliszkievicz (2016) found a significant positive relationship between the various dimensions of institutionalized organizational trust and innovation. Based on a survey of 214 respondents in the ICT and pulp and paper industries in Finland, Ellonen et al. (2008) analyzed the effects of interpersonal and

impersonal organizational trust on organizational innovativeness. They found that the impersonal form has an important role in determining organizational innovativeness. Different results are presented by Hwang et al. (2022), who studied the impact of trust on the performance of innovation in clustered small and medium enterprises in Korea, however, were not able to confirm this impact.

Similarly, the topic of job autonomy has also been discussed in the context of innovation. For instance, the impact of job autonomy on the innovative behavior of individuals has been highlighted in the studies of Orth & Volmer (2017), and Albort-Morant et al. (2020). A statistically significant effect of strategic thinking on organizational innovation, with a moderating effect of autonomy to enhance this effect, was confirmed by Bakir & Al Shibly (2023). One of the few examples would be the work of Jankelova (2022), who found out that the link between entrepreneurial orientation and organizational innovativeness in medium and large companies in Slovakia is strongly mediated through the trust and job autonomy variables.

Previous research has shown that organizational trust and autonomy can influence innovation, but most studies focus on traditional firms or SMEs. Research conducted within franchise systems in the areas of autonomy, trust, and innovation is even rarer, which highlights the innovative nature of this study. The literature surrounding this subject is not extensive, and the available studies do not provide a comprehensive overview of the topic. For instance, the study by Colla et al. (2019) analyzed the impact of franchisee autonomy in human resource management and marketing decisions and network innovativeness on the franchisee relative performance of 226 franchisees in France. Similarly, Watson et al. (2020a) identified several selected organizational and relational factors that influence franchisee engagement in innovation.

Given the pivotal role of organizational factors such as trust, and autonomy in fostering innovation processes, examining these elements together in the context of franchising is crucial. A deeper understanding of how trust and autonomy interact within the franchise systems can enhance collaboration, motivate franchisees, and ultimately drive innovation. Ignoring these factors may hinder innovation development in franchising. While there is a growing body of literature dealing with organizational innovation where trust and autonomy play an important and mediating role, in the context of firms, SMEs, network cooperation, and specific economic sectors, most prior studies do not focus specifically on franchising firms. Stated represents a significant research gap in existing research. This study aims to fill this research gap by examining how trust and the mediating role of autonomy can enhance organizational innovativeness in franchising, providing a deeper understanding of these dynamics in a franchise context.

This research can provide important insights for franchise managers, who are looking for ways to increase the innovation capacity of their business by building trust and providing autonomy to franchisees. The contribution of the paper is therefore supplementing theoretical knowledge with an indication of the importance of building an organizational trust within cooperation for the organization that conducts innovative activities within the network, and based on this knowledge, to determine the practical implications for both franchisors and franchisees to increase their competitiveness.

This paper is structured as follows. The literature review gives explanations of three main constructs of this study in Section 2. The methodological part in Section 3 clarifies the explanation of research approaches, procedures, and used methods. Section 4 presents the results and discussion of our research findings. Finally, the summarization of the main findings related to the mediation effect of organizational autonomy between

organizational trust and organizational innovativeness is presented in Section 5.

2 Literature Review and Hypotheses Development

Franchising is a stable system and business relationship between the franchisor and the franchisee under one brand. The owner of the brand and business model transfers them to the franchisee for a fee, together with all associated trademarks, goods, or systems. Franchising is based on good relations between the franchisor and the franchisee, and consistent business strategies, competent leadership, and effective communication guarantee the involvement of all parties. At the heart of franchising is a franchise agreement defining the franchisor's relationship with its franchisees, designed to ensure consistency and quality, ensuring a certain level of trust in the products and services they provide. The importance of leadership in the growth of trust and loyalty in franchise partnerships is indicated by cultivating values such as reliability, honesty, credibility, and mutual understanding in organizations. The honest and trustworthy relationship between the franchisor and the franchisee leads to a well-managed franchise system, where most decisions are made by consensus.

A key component of a successful franchising system is the ability to foster collaboration (Kremez et al., 2020), coordination (Hadjielias et al., 2021), and cooperation (Yakimova et al., 2021) between franchisor and franchisee, as these elements are crucial for building trust and achieving shared goals. In the literature, these components within the organization are intensively explored (e.g. Castañer & Oliveira, 2020). Collaboration within the organization is defined as synergy between teams aimed at performing a specific task and refers to members of a given hierarchical level from different functional areas (Lin et al., 2015). Collaboration within an organization is often analyzed as a multi-dimensional construct that includes many specific areas, such as collaborative relationships, collaborative leadership, communication and information sharing, trust building, and collaborative decision-making (Fanousse et al., 2021). According to Castañer & Oliveira (2020), coordination is a procedural process involving communication and information exchange that ensures the integration, and distribution of tasks, and resources between partners. They define cooperation as a multifaceted concept encompassing attitudes, behaviors, and outcomes, with a primary emphasis on behavior (Yakimova et al., 2021).

Furthermore, collaboration, coordination, and cooperation play critical roles in the creation of new knowledge as a part of the social process. The social capital built in this way affects the efficiency of the organization, serving as a contribution to the joint creation of knowledge and innovation. Knowledge creation is the spontaneous result of interaction and collaboration between networks of individuals, workgroups, and organizations where members with different backgrounds, and resources discover innovative opportunities to gain a competitive advantage or adapt to existing conditions (Al-Omouh et al., 2020; and Lemańska-Majdzik, 2023). This is of particular importance when it comes to cooperation within the organization.

Social capital includes social interaction, mutual trust, and understanding, a shared vision and norms that allow members of an organization to successfully work together to achieve a goal. It is commonly believed that innovation requires the use of knowledge of various actors, and social capital enables this application. Hence, a positive relationship between social capital and innovation is often indicated (Watson et al., 2020a). The existence of trust between the members of the organization improves communication and cooperation as well as the efficient use of resources, which stimulates innovation (Ozgun et al., 2022).

Developed social capital makes it possible for employees to access and exchange a wide range of information, ideas, and perspectives through collaborative networks, which increases the

level of innovation. Social capital has a direct impact on the processes of connection and exchange and provides easy access to the most valuable resource, which is information. Internal cooperation is therefore a precursor of innovation, which entails the integration of intangible resources, basic research, and development based on cooperation networks (Kakakhel & Khalil, 2022). Trust in colleagues encourages the sharing of knowledge and ideas. Social capital has an impact on innovation, and the importance of collaborating for the firm's ability to radically innovate is emphasized in particular (Dost & Badir, 2019).

The role of social capital in fostering innovation also aligns closely with the collaborative dynamics of franchising systems, where both franchisors and franchisees actively contribute to the innovation process through shared knowledge, trust, and effective cooperation.

The development of the franchising system depends heavily on innovation, with creativity being essential not only for franchisors but also shared responsibility of franchisees. Franchisees and franchisors collaborate and actively participate in the innovation process (Karmeni et al., 2018). Achieving a competitive advantage in today's rapidly changing environment requires the ability to identify and leverage intangible assets created by both internal and external stakeholders. Effective knowledge management is also critical, enabling the flexible allocation of resources to adapt to environmental changes.

The growth of the franchisee largely depends on the employees who manage and monitor daily operations. Therefore, the innovativeness of franchisee organizations is a highly valued attribute within the system. Ideas generated at this level are often supported by franchisors with appropriate resources and rewarded, fostering a culture of shared innovation and continuous improvement. (Lee & Yoo, 2019). Being competitive requires constant development of the offer that will meet the requirements of customers. Therefore, the franchisor must be the creator of a system that disseminates and implements best practices, while supporting an innovative and constantly improved organizational culture. To achieve this, the franchisor needs the cooperation of all stakeholders of the ecosystem and suppliers, especially franchisees, whose employees, based on trust and cooperation, will build a system conducive to innovation (Hizam-Hanafiah et al., 2023).

Referring to authors Wang and Chen (2020) the concept of organizational innovativeness can be described in three broad streams: as a product of the search for better practices among neighboring organizations and their introduction into the central organization, which brings new changes in the organizational routines; as the changes in any non-technical aspects, which are considered as the administrative or managerial activities; and as changes in several aspects: knowledge management, structure and enterprise's relationship with other firms or public institutions or methods that aim to improve enterprise's use of knowledge, quality of goods and services, or efficiency of workflows.

The development and operation within the franchising system have a bidirectional impact on the franchising actors. Between franchisor and franchisee exist various interactions, interdependence, and constraints, while the franchisor can influence franchisees' commitment and behavior. Collaborative relationships in this system can be formed only through continuous communication, which Kang & Jindal (2018) considered the key driver of the franchising relationship. Effective communication is an element that builds trust in the franchising system (Abdul Ghaniet al., 2022). Fernández-Monroy et al. consider communication as the precursor of trust. At this individual level, trust is understood as a state in which a person trusts a specific person or group of people with specific characteristics concerning a specific item. In this case, we are talking about the so-called relational trust, which is a narrower concept than generalized trust in others. It should be noted, however, that relational and generalized trust are causally

related. Jang and Park stated that trust consists of a willingness to rely on partners, believing that the partner is honest, and the partner will fulfill its obligations, and performing actions with long-term interest, trusting belief, and trusting intention. Hence, the relationship between cooperation, which includes as well as intra-organizational cooperation, and trust is visible.

The topic of trust is part of organizational theories and in the context of cooperation and collaboration is investigated in the form of organizational trust (Guinot et al., 2021). Organizational trust is considered the foundation of long-term employee-employer relationships. It can be defined as a willingness to be vulnerable to the actions of the other party, based on the expectation that the other party will perform a certain action important to the relying party regardless of the ability to monitor or control the other party. Organizational trust is treated as a form of social capital, as it translates into many benefits, such as reducing transaction costs in the organization or increasing cooperation among employees. In addition, trust reduces oversight costs, reduces opportunistic behavior, supports organizational innovation, and provides the organization with unique competitiveness. It is indicated that trust affects not only outcomes but also relationship processes, such as the quality of interactions (Silva et al., 2023). Organizational trust is linked to the individual's strong sense that the organization in which the individual is a member will be beneficial in all aspects. Organizational trust is perceived in two ways, firstly as trust within a given organization, and secondly as trust in the leaders of that organization. Organizational trust is an organizational attribute that has a positive social connotation, which facilitates the implementation of tasks in organizations. At the same time, the role of leaders in building organizational trust is emphasized, from which the entire process of strengthening trust within organizational structures begins (Ilyas et al., 2020).

We generally recognize that when individuals can be trusted, transaction costs are lower, and collaboration in different areas becomes more frequent. This also applies to innovative activities. There is evidence of the role of relational trust and cooperation in the innovation process of firms, as well as of the positive relationship between universal trust and firm-level innovation (Bischoff et al., 2023).

Trust plays both universal and context-specific roles in the innovativeness of enterprises. In the innovation process, trust is essential due to the inherent risk and uncertainty, which determine the effectiveness of creating and implementing innovative ideas. These risks often manifest as opportunistic behaviors, errors, technological failures, and organizational or financial problems. In such contexts, trust enables organizations to share information and collectively solve problems, thereby facilitating effective innovation management. At the same time, the decision on whom to trust will be dictated by the individual's perception of whether the individual is trustworthy, i.e., whether they can help in the project due to their competence and whether they show kindness and honesty to keep their word, fulfill obligations and respect mutual - agreed guidelines and rules (Shazi et al., 2015). Innovation requires trust that increases organizational commitment and performance and, as a result, the likelihood of successfully developing new ideas or products. It should be noted that organizational trust develops over time and on many levels. Trust can be related to the individual (individual trust), the organization itself (organizational trust), or, more generally, to social institutions or business structures (institutional trust). The existing interaction of these three levels in the processes of strengthening intra-organizational trust and the role of the trust environment in relation to the innovativeness of the organization are also indicated (Harrer et al., 2023).

An important element that builds on trust and plays a crucial role in fostering innovation and adaptability in the franchising system is autonomy. Autonomy is the extent to which employees can decide for themselves how to perform their tasks, including control of time and methods. Autonomy is seen as a motivator for organizational performance, as greater role flexibility associated with autonomy leads to a greater perception of

responsibility for work performance, prompting employees to take more responsibility for processes in their organization, which has a positive effect on motivation. Autonomy is a situational work resource, and trust on the part of superiors allowing for independence in performing tasks plays a role as a motivational mechanism generating increased engagement and commitment.

Organizational autonomy means providing employees with freedom in activities for the organization, strengthening their independence and self-organization, developing creativity, and using their individual potential in innovative activities. This requires a policy of empowerment, trust, and open communication, unlimited access to resources of knowledge and information, and authorization to operate without constant supervision. By providing the employee with autonomy at work, leaders confirm their trust in the employee who can work effectively without strict restrictions from superiors. Autonomy is treated as a necessary element that encourages members of the organization to actively engage in entrepreneurial and innovative activities. Autonomy can be a success factor if employees feel the trust of leaders to act without constraints and consent, which encourages them to deviate from established practices and make changes flexibly. Autonomy is, therefore, a key driver of flexibility, and indirect innovation, in response to changes in the environment and market signals. Autonomy allows for faster reconfiguration of operations, as individuals have the freedom to use their human capital in a way that helps the company adapt to changes and respond to the needs of its markets and the actions of rivals (Hughes & Morgan, 2007).

Autonomy requires a high level of personal fit with the organization to bring out the individual's personal strengths and ensure a high level of psychological security. Unleashing the full potential of autonomy depends on whether the individual acts of their own free will, as threats and stressors such as fear of failure and judgment are eliminated. On the other hand, in an environment with low fit and low trust in the organization, independent actions are a source of stress, generating frustration and increasing the fear of failure. Autonomy is a determinant of action, innovation, and success, provided that the employee trusts that the organization will act in their best interests, and then will be able to develop and achieve benefits. However, not every employee is sufficiently adapted to the organization so autonomy provides a sense of comfort, and trust from the organization is not a source of stress (Sørli et al., 2022).

Based on the arguments stated above, we propose the following research hypotheses:

H1: There is a significant positive relationship between Organizational Trust (TR) and Organizational Innovativeness (IN).

H2: There is a significant positive relationship between Organizational Trust (TR) and Organizational Autonomy (AU).

H3: There is a significant positive relationship between Organizational Autonomy (AU) and organizational innovativeness (IN).

H4: Organizational Autonomy (AU) mediates the relationship between Organizational Trust (TR) and Organizational Innovativeness (IN).

Figure 1 shows the proposed research framework for examining four aspects of this study: the influence of TR on IN and AU (H1+; H2+), the influence of AU on IN (H3+), and the influence of TR on IN through the mediator AU (H4).

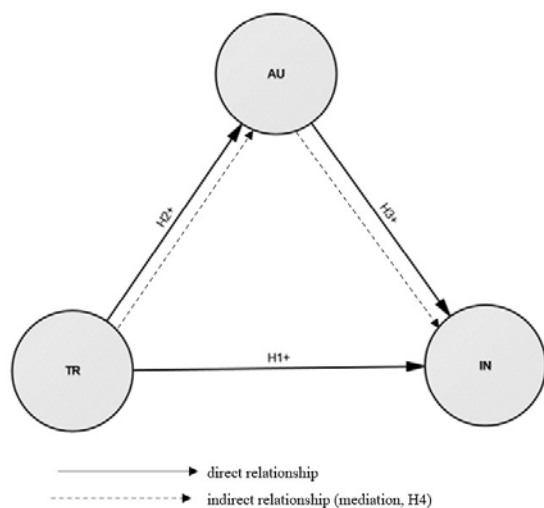


Figure 1: Proposed research framework.

Source: own research

3 Research methodology

Structural equation modeling (SEM) was used to test the proposed research model using IBM SPSS 25.0 and IBM SPSS Amos 26. We used Confirmatory Factor Analysis (CFA) and mediation analysis to evaluate the proposed research model with direct, indirect, and total effects. An innovative approach in the study was the use of an employee approach, while most research in the area of organizational variables uses a managerial approach. Therefore, in practice, employee research will allow to gain access to knowledge unavailable to managers. The tool for data collection was based on a previously designed and validated questionnaire.

Sample Selection and Data Collection

The data was collected by distributing a questionnaire survey to a purpose-random selection sample of franchise systems. To determine the required sample size for a study that uses SEM, we carried out the calculation of minimum sample size to detect the specified effect, and the minimum sample size required given the structural complexity of the model using the free online calculator of Soper (2023). The following necessary parameter values were used for the calculation of the required sample size: anticipated effect size (0.3), desired statistical power level (0.8), number of latent variables (16), and probability level (0.05). The results showed the following parameters required: a minimum sample size to detect the effect = 119 and a minimum sample size for model structure = 123.

The survey was preceded by a pilot study on a group of 10 franchise systems to check the correctness of the survey and the transparency of its content. The obtained data were arranged, analyzed, and interpreted, and the results were compiled in the form of a research report. The final study ultimately covered 14 large franchise systems, from which a total of 150 questionnaires were obtained and included in the further analysis.

The respondents' opinions were obtained in the form of subjective assessments using a 5-point Likert scale (from 1 – totally disagree to 5- totally agree).

Measurement of Constructs

The variables were built for the survey as a result of a literature review (Hughes & Morgan (2007); Celep & Yilmazturk (2012); Sankowska & Paliszkievicz (2016)). Three multi-item constructs were developed: Organizational Trust (TR), Organizational Autonomy (AU), and Organizational innovativeness (IN). Each construct consisted of four items, questions that referred to actions/activities at the following levels: individual, group, organizational, and inter-

organizational. This study uses AU as a mediator. We want to examine if the construct TR has an indirect effect through AU to construct IN. And if a direct relationship between the independent variable (TR) and dependent variable (IN) in the presence of a mediator (AU) exists.

Data management

In our research, the preliminary step was to examine data to make sure there were no errors, outliers, or respondent misconduct. As a result of this examination, 20 questionnaires were discarded.

To reach the main aim of this paper, Structural Equation Modeling (SEM) as an important statistical tool to investigate mediation effects (Cheung and Lau, 2007) was adopted. It is a tool with better investigation of latent variables with multiple indicators (Holmbeck, 1997).

The mediation analysis with SEM was performed using AMOS IBM software. Approach to SEM in which the measurement model fit and construct validity are first assessed using CFA, including an assessment of the significance of relationships (Hair et al., 2010). It is necessary to assess the adequacy of the measurement model by examining measures of fit indices, factor loadings, construct reliability, and validity.

For the model improvement, it was necessary to draw covariances between error terms of the same construct and check the Standardized Residual Covariances, based on which results the inappropriate items were deleted. The structural model was tested only after adequate measurement and construct validity were established (Hair et al., 2010).

Finally, the mediation analysis was conducted using bootstrap analysis in AMOS, and the results were further evaluated within the framework of the four-step approach proposed by Baron and Kenny (1986).

Following Kline (2023), Hair et al. (2010), Byrne (2010), Hulin et al. (2001), and Bagozzi and Yi (1988) this study follows the next rules: Factor loading whose value was <0.50 was deleted. The overall measurement and structural model fit was assessed by model fit measures: Chi-Square (CMIN), Chi-Square/df (CMIN/DF), CFI (Comparative Fit Index, ≥ 0.9), GFI (Goodness of Fit Index, ≥ 0.9), TLI (Tucker-Lewis coefficient, > 0.90), RMSEA (Root Mean Square Error of Approximation, < 0.05 (good fit); $< 0.08 - 1$ (reasonable fit)), and SRMR (Standardized Root Mean Square Residual, < 0.08 (acceptable fit)).

For a measure of the internal consistency of a group of items (constructs), Cronbach's alpha was used. Cronbach's alpha ranges between 0 and 1. The accepted value of Cronbach's alpha for identification, if a construct is reliable, is a value greater than 0.70. A value of 0.80 or higher indicates a very good level of reliability. However, values higher than 0.95 are not necessarily good, since they might be an indication of redundancy (Hulin et al., 2001).

Composite reliability (CR) is a measure of internal consistency in scale items (Netemeyer et al. 2003). The accepted value of CR according to Hair et al. (2022) is a value of 0.60-0.90, whereas values between 0.70 and 0.95 are considered satisfactory to good.

Average variance extracted (AVE) is the metric used for evaluating a construct's convergent validity. An acceptable value of AVE is 0.50 or higher indicating, that the construct explains at least 50% of the variance of its items (Hair et al., 2018).

The mediating effect of AU was primarily tested using the bootstrapping procedure in IBM SPSS Amos 26, following Preacher and Hayes (2004). The results were also evaluated within the framework of the four-step approach proposed by Baron and Kenny (1986). In this study, the 95% confidence

interval of the indirect effects was obtained with 5000 bootstrap resamples.

4 Results and Discussion

CFA was computed to test the measurement model using two major steps. As the first step, the analysis of the goodness of model-fit measures (Tab 1) was performed. Within the second step, the reliability and validity of the measurement's model

constructs (Tab. 2) were assessed. The model-fit measures (Tab. 1) and the results of constructs' reliability and validity (Tab. 2) were used to assess the model's overall goodness of fit and all values were within the theory's respective common acceptance levels (Kline (2023), Hair et al. (2010), Byrne (2010)). Hence the measurement model of the study met the acceptable fit and the final (structural) SEM model was used for mediation analysis.

Table 1: Model fit indices.

Index	Level of acceptance	Measurement model fit (3F/9I) ^a
RMSEA	<0.05 (good fit) <0.08 – 1 (reasonable fit)	0.067
GFI	≥0.90	0.945
CFI	≥0.90	0.972
NFI	≥0.90	0.930
TLI	>0.90	0.957
Chisq/df (PCMIN/DF)	<3.00	1.584
SRMR	<0.08	0.056

^a F- factors, I – items

Source: own research.

The three-factor model (Organizational Autonomy, Organizational Innovativeness, and Organization Trust) with nine observed variables (AU2, AU3, AU4, IN1, IN2, TR1, TR2, TR6, TR7) yielded a good fit for the data obtained through the questionnaire survey. Items AU1, IN3, IN4, TR3, TR4, TR5, and TR8 were removed, because without their deletion, the results led to a decrease in composite reliability or average variance extracted and they didn't reach the recommended value (Hair et al., 2016).

The items in the analysis related to TR focused on four main key aspects of trust within the franchise company. Specifically, they examined managerial trust in employees; employees' trust in managers; interpersonal trust at the individual level; and the overall level of trust among employees within the organization.

The items related to IN were linked to two aspects: the support and recognition of employees' innovative activities aimed at improving processes, expanding operations, and enhancing organizational performance; and the formation of teams and

groups structured to maximize innovation in their contributions to the organization.

The AU in this study is represented by three key aspects: the formation of teams or groups with the freedom to independently execute tasks for the organization; organizational structures that support the development of autonomy and self-reliance within the organization; and autonomy in the actions of employees and managers that extends beyond the organization, enabling independent collaboration with partners and institutions.

Table 2 summarizes the results of CFA employed in AMOS IBM and SPSS IBM. The results indicated that all standardized factor loadings ranged from 0.55 to 0.93, whereas a factor loading of each item ≥0.50 is used to confirm a satisfactory fit (Bagozzi & Yi, 1988). Cronbach's alpha for each construct in the study was found to be over the required limit of 0.70, and ranged from 0.75 to 0.84, above the 0.70 benchmark (Hulin et al., 2001). Moreover, the values of AVE and CR exceed the acceptable levels of 0.50 and 0.60 (Hair et al., 2018; Hair et al., 2022).

Table 2: Summary of the CFA report

Construct	Item	Factor loading	AVE	CR	Cronbach's alpha
Organizational Autonomy	AU2	0.734	0.595	0.807	0.784
	AU3	0.973			
	AU4	0.547			
Organizational Innovativeness	IN1	0.640	0.638	0.773	0.745
	IN2	0.931			
Organizational Trust	TR1	0.613	0.556	0.832	0.835
	TR2	0.705			
	TR6	0.785			
	TR7	0.858			
Acceptance level		>0.50	≥0.50	0.60-0.90	>0.70

^a F- factors, I – items

Source: own research.

The final SEM model and the relationships between variables are shown in Figure 2, together with the results of suitability (Fit indices).

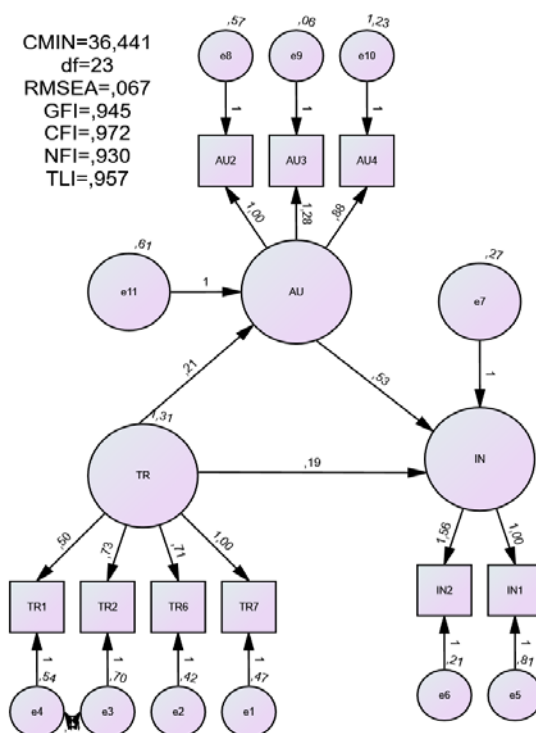


Figure 2: Final SEM model with Fit indices.
Source: own research

Table 3 presents the results of the first three steps of the four-step approach of Baron and Kenny (1986) to evaluate the mediation process.

Table 3: The results of hypotheses H1, H2, H3 testing.

Hypothesis	Regression Path	Beta	SE	t	Sig.	Decision
H1	TR → IN	0.377	0.095	3.974	***	Supported
H2	TR → AU	0.212	0.072	2.942	0.003	Supported
H3	AU → IN	0.532	0.112	4.753	***	Supported

*** $p < 0.05$

Source: own processing.

To obtain the results in Table 3, we followed the four-step procedure.

Within the first step we assessed the association between the independent variable (TR) and the dependent variable (IN). As shown in Table 3, the relationship was a significant and direct ($\beta = 0.377$, $p < 0.001$). **The hypothesis H1 was supported.**

The second step tested the relationship between the independent variable (TR) and the mediator (AU). The results showed a positive and significant relationship ($\beta = 0.212$, $p = 0.003$). **The hypothesis H2 was supported.**

The third step assessed the relationship between the mediator (AU) and the dependent variable (IN). The results confirmed a significant positive relationship as shown in Table 3 ($\beta = 0.532$, $p < 0.001$). **The hypothesis H3 was supported.**

In the fourth step, the mediation analysis was conducting. According to Baron and Kenny (1986), all three previous steps must show significant results to meet the preconditions for testing mediation. As shown in Table 3, these preconditions were fulfilled. In this step, both constructs (TR and AU) were taken as the independent variables, and IN was taken as the dependent variable. The results of this step are presented in Table 4.

Table 4: Mediation analysis summary (H4).

	Direct effect	Indirect effect	Confidence interval		p-value	Conclusion
			Lower Bound	Upper Bound		
TR → AU → IN	0.192 (0.003)	0.113	0.051	0.318	0.005	Partial mediation

Source: own research.

The results of the mediation analysis (Table 4) indicate that TR has both direct and indirect effect on IN through the mediating variable, AU. The results revealed a significant direct effect ($\beta = 0.192$, $t = 2.942$, $p = 0.003$) and significant indirect effect on impact of TR on IN that was positive ($\beta = 0.113$, $t = 3.128$, $p = 0.005$) with a 95% confidence interval [0.051, 0.318] that does not include zero. These findings confirm a partial mediation. Hence, AU partially mediated the relationship

between TR and IN (Table 4). **The hypothesis H4 was supported.**

The results of hypotheses testing, as presented in Tables 3 and 4, confirmed all the hypotheses proposed in this research. Overall, the organizational innovativeness of franchise companies can be enhanced through the implementation of organizational trust, and the promotion of organizational autonomy.

Previous research has provided cutting-edge empirical evidence of a link between widespread trust between individuals and organizational innovation, with the link strengthening for small and medium-sized enterprises (Sankowska & Paliszewicz, 2016; Jankelova, 2022) or link with a firm's performance (Minarikova et al., 2020). Some authors (Chams-Anturi et al., 2020; Hariputra et al., 2024) emphasized the high correlation between organizational trust and business performance, which has important implications for enterprise managers. Consequently, organizational trust can be essential to the success of an organization and can generate innovative behaviors (Ma et al., 2022) that foster overall business development and competitiveness. Understanding the essence of business helps SMEs to adequately develop an interest in innovation and increase the performance of enterprises (Dvorsky et al., 2023). It is also often indicated in the literature that organizational trust inseparably contributes to the development of the enterprise because it stimulates intra-organizational cooperation, which is crucial for maintaining a competitive advantage. Organization members must trust each other to develop their collaborative relationships. Within an organization, innovation is conditioned by the ability of managers to build trusting relationships with employees. However, innovation is associated with organizational changes, which naturally cause defensive reactions of the organization's members against new ways of doing things. Therefore, it is emphasized that organizational trust is necessary to anticipate reasonable and positive reactions of others to attempts at innovation. Lack of trust evokes defensive reactions that inhibit collaboration, commitment, and organizational learning, creating a barrier to creating organizational value through the adoption of innovation (Mitcheltree, 2021).

Organizational autonomy represents a foundational construct in management that contributes to innovativeness and competitiveness. The knowledge about organizational autonomy is fragmented, and the theoretical perspectives applied to specific questions vary widely and tend to omit the multilevel nature of this construct (Arregle et al., 2023). Autonomy can be enhanced by encouraging employees to pursue learning and growth in their roles and by offering them greater opportunities to take ownership and lead themselves in their work tasks (Alshamsi et al., 2020). Individuals with high motivation and commitment responsible for finding and commercializing innovations are strongly motivated by the possibility of working in project teams with high autonomy and freedom in the allocation of time and tasks (Corsino et al., 2019), as well as participating in achieving competitiveness and performance (Cochet et al., 2008). Autonomy at the team level encourages collaboration and creativity, leading to more effective problem solving and innovation implementation. According to Hughes & Morgan (2007), autonomy is a key prerequisite for the flexibility of organizations, which allows them to respond to a dynamic environment and changing market demands. This ability to respond to external conditions was also confirmed in our study, where organizational autonomy significantly influenced organizational innovativeness.

Studies of innovation within franchising are limited, and studies of franchisee innovation are rare (Watson et al., 2020a). The studies of organizational innovativeness in franchise systems connected with trust and autonomy are limited and rare.

Our results showed that trust can bring advantages for innovativeness within the franchising system. Although franchisees are independent owners, and not employees, often with their entrepreneurial ambitions, they are contractually obligated to adhere to the business template provided by the franchisor (Watson et al., 2020a). Despite this fact, our results confirmed the earlier general assumptions in the literature that the autonomy of work, which provides individuals and teams with freedom of creativity and invention, is indicated as a factor supporting innovative activity and entrepreneurial cooperation (Guzmán et al., 2019). Autonomy suggests support (by the franchisor) for independent thinking and action by individuals or

teams within the organization, where autonomous decision-making is encouraged (Watson et al., 2020b).

5 Conclusion

The conducted research confirmed the importance of organizational trust in building the innovativeness of franchise organizations. Despite the high specificity of managing the franchisee's company, which must comply with the franchise agreement, it has been shown that organizational trust encourages franchisees to undertake innovative activities.

The authors also confirmed the dependence of organizational innovation on effective organizational autonomy, which was used as a mediating factor in this study. Organizational autonomy is a factor rarely studied in the literature, due to the assumptions about the limited autonomy of the franchise company. In this study, however, we decided to demonstrate the importance of organizational autonomy for the innovativeness of a franchising company, which positively determines it, even if the framework of the franchisor-franchisee agreement creates restrictions in this area.

This study provides practical implications for practitioners in franchise systems, who should focus on building trust-based relationships with their franchisees and fostering autonomy to encourage innovative practices. These findings contribute to the literature on organizational behavior by highlighting the role of trust and autonomy in driving innovation in franchise systems.

This study is limited by its cross-sectional design, as the research sample consists of franchises from various sectors, and different types. Future research could explore the role of trust and autonomy in enhancing innovation with a focus on a specific industries or a types of franchise system. Nevertheless, this study provides valuable insights into the dynamics of trust, autonomy, and innovation within franchise systems.

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Primary Paper Section: A

Secondary Paper Section: AE, AH

EFFECTIVE FIRST-AID EDUCATION FOR SECONDARY SCHOOL CHILDREN: CURRENT METHODS AND LATEST INSIGHTS

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The paper is published with the support of the grant of the GA JU (GA JU 042/2022/S and GA JU 123/2019/S).

Abstract: This article aims to analyse, through a questionnaire, whether the selected activating methods and the CLIL methods are effective in teaching first aid for secondary school children. Secondary school children (lower secondary level, N=231) from South Bohemia (municipalities with different populations) filled out questionnaires before and after a first-aid course between 2019 and 2023. Evidence-based educational pathway and current European Resuscitation Council guidelines were followed. The study was focused on the differences in the level of knowledge and attitudes of children educated partially/fully through activating methods/CLIL compared to common first-aid teaching (PowerPoint presentation, first-aid videos, worksheets). Through the questionnaire survey (a) significant differences were found in the mean values of knowledge of first aid in sum before and after a first-aid course in all subgroups with partial/fully teaching through activating methods/CLIL ($p=0.00$) as in all subgroups with conventional teaching ($p=0.00$), (b) the assigned role (rescuer vs. rescued) in simulations with mannequin does not affect the increase in knowledge level ($p=0.53$) and children prefer the role of the rescued ($p=0.04$), and (c) children educated through activating methods/CLIL declare a higher attractiveness of teaching (100%), a greater motivation to continue learning first aid using the same methods (88%) and a greater willingness to pass another first-aid course (100%). In general, from the short-term perspective both approaches of teaching first aid are effective ($p=0.00$), but from the long-term perspective teaching partially/fully using activating methods/CLIL is more appreciated by children. After the first-aid course 96% of children evaluated that first aid is a very important or important part of the curriculum.

Keywords: first aid, education, lower secondary level, school, activating method, mannequin, CLIL, social science

1 Introduction

First pre-medical aid is defined as the first and immediate assistance given to any person with either a minor or serious illness or injury, with care provided (a) to preserve life, (b) prevent the condition from worsening (e.g. circulatory failures), or (c) to promote recovery. It includes initial intervention before professional medical help is available, such as stopping massive bleeding, helping during choking, and (if necessary) performing cardiopulmonary resuscitation (CPR) while waiting for an ambulance, as well as the complete treatment of minor conditions, such as applying disinfectant and a plaster to a cut. First aid is generally performed by someone with basic medical training, who must consider also his or her own safety and the safety of other people present (FAM, 2021; Kelnarová et al., 2012; Hrušková & Gutvirth, 2010).

Any human being (including secondary school children) is always expected to provide basic assistance, especially in case of emergency. That is not just a moral obligation but also a legal requirement for an adult, which includes calling the Emergency Medical Service (in the Czech Republic 155) for professional help (§ 150, No. 40/2009 Coll.).

First-aid training for children can make a significant impact: first-aid knowledge and skills can enable children to react effectively in emergency situations and help their peers and families in need. First-aid training also helps to diffuse preventive messages and strengthens the processes of behavioural change aimed at making youngsters more resilient, safer and healthier (GFARC, 2024). For example, in Norway first aid tends to be taught from the primary-school level (Bakke, Bakke & Schwebbs, 2017) and 72% of the population felt that they would be able to provide first aid in case of an emergency (Bakke et al., 2016). Comparison of the number of patients that

received CPR from a bystander (in 2020 before the lockdown; Tjemland et al., 2023) showed that willingness to provide CPR in Norway (60/100,000) is among the highest worldwide. In the Czech Republic, an even higher willingness to provide CPR was calculated in 2020 before the lockdown (68/100,000; Tjemland et al., 2023), but this high number could be influenced by the fact that in certain cases in the Czech Republic, it is not necessary to breathe into an adult due to the quick arrival of Czech emergency services. Therefore, other statistics point to the percentage of patients reported as receiving FullCPR (bystander CPR with chest compressions and ventilations): 8% in the Czech Republic vs. 92% in the Netherlands (median 21%). Reversible collapse, defibrillator and FullCPR significantly affect patient survival. Chest compressions alone (CConly) seem to be less effective only in primary cardiac arrest with quick arrival of an ambulance as FullCPR and CConly differ significantly regarding “location at home”, “shockable rhythm”, “collapse witnessed” and “intervention time” (Wnent et al., 2021). Additionally, in the overall paediatric cohort aged 0 to 18 years, CPR with rescue breathing was associated with a greater odd of neurologically favourable survival compared with compression-only bystander cardiopulmonary resuscitation (Naim et al., 2021).

While the public can play a crucial role in saving lives during emergencies, intervention is only effective if people have the skills, confidence and willingness to help (Heard, Pearce & Rogers, 2020). Human factors contributing to decision-making during resuscitation are identified and can be mitigated by tailored stress training and cognitive aids (Groombridge et al., 2019). Students with previous first-aid training reported providing first aid more frequently than those who had not passed any first-aid course. Students with first-aid training could be tutors at educational activities or camps, consequently they could provide first aid more frequently. Also, students who have gone through a first-aid course could be less afraid to help someone (Kuba & Havlíková, 2023). In the Czech Republic (Kuba, Sekerášová & Ročková, 2023), security is significantly the strongest factor that would reduce respondents' willingness to provide first aid (own security for 67% of respondents; security of other persons – family members, friends, etc. – then for 64%). Other factors influencing willingness to provide first aid (Kuba, Sekerášová & Ročková, 2023) are the “looks healthy” factor (bystanders don't know if the person needs help; 47%), the “bystander effect” factor (someone else is already helping that person, 41%) and poor knowledge of first aid/uncertainty (37%). In any case, most of the factors that cause a decline in willingness to help can be positively influenced by targeted long-term first-aid training.

Public knowledge of first aid is a valuable survival tool and key factor in reducing the number of avoidable deaths during emergency situations (Oliver, Walter & Redmond, 2017). In the field of first-aid education, the most relevant knowledge source is the European Resuscitation Council (ERC Guidelines, 2015; 2021). These guidelines are updated usually every five years and reflect the latest scientific findings in the field of first aid. Other publications and projects subsequently build on these findings (e.g. Greif et al., 2021; British Red Cross, 2022; Truhlář et al., 2021; SBR Project, 2022). The basic rules for communication in a crisis are summarized as (a) choosing the shortest possible forms of expression, (b) choosing clear, unmistakable words for communication and (c) focusing on the quick use of acquired knowledge in specific situations (Tesařová, 2014). When calling the emergency line, Tesařová (2014) recommended following the rule for communication: (1) “I am (who, where), (2) I see, (3) I foresee, (4) I do and (5) I request”. These basic rules can be taught to Czech pupils not only in Czech but also in foreign languages. The acquired language resources may one day help them save their lives.

Educational goals and the educational pathway in the first-aid theme are generally designed to positively influence bystanders'

willingness to help and specifically for children and teenagers include knowledge, skills and attitudes which are precisely defined (De Buck et al., 2015; De Buck et al., 2020; Global First Aid Reference Centre (GFARC, 2024); Belgian Red Cross, 2024). For educating school and home learners, e.g. the British Red Cross supports teachers (British Red Cross, 2024a) and pupils/students (British Red Cross, 2024b) by appreciated supporting materials with step-by-step activities. It is recommended that training interventions be longer than 3 hours in duration, include theoretical, practical and didactic components, contain well-designed resources, and require advanced lecturers. Certainly, educational resources should be age appropriate and context specific (Reveruzzi, Buckley & Sheehan, 2016). The top three most appropriate and successful teaching methods for each age group are as follows: (a) for 5–8-year-old children Game, Story Telling and Song, (b) for 9–12-year-old children Case Study, Game and Role-Play, and (c) for 13–18-year-old children Role-Play, Flip Chart, Case Study/Video/Manikin. In contrast, text messaging and the use of individual worksheets for children were perceived as non-feasible or non-desirable educational methods (De Buck et al., 2020).

The knowledge and opinions regarding first aid of teachers (Hrušková et al., 2022) and future teachers (Hrušková et al., 2023) were assessed. The inclusion of a mandatory first-aid course for future teachers, the content of which was influenced by statistical data from the South Bohemian Rescue Service and teacher statistics were examined (Hrušková et al., 2023). However, pupils/students also have their own attitude to first aid and to the methods and forms by which this theme is taught.

The aim of our study was to analyse, through a questionnaire, whether the selected methods (simulations with moulage, the CLIL methods, educational games cooperative and non-cooperative) are effective in teaching first aid for secondary school children. Another aim of the study was to assess feedback for the selected methods and the attitudes on first aid held by secondary school children.

2 Material and methods

The study was conducted between 2019 and 2023 at selected secondary schools from South Bohemia (municipalities with different populations). Teachers, parents of children and children (N=277; Tab.1. below) were contacted personally and via email. Teachers supervised the children throughout the filling in of the questionnaires and the first-aid course. The first-aid courses (a mandatory part of the curriculum in selected secondary schools) were led by future teachers (students of the Faculty of Education, University of South Bohemia).

Table 1: Numbers of children.

	3rd grade of lower secondary level	4th grade of lower secondary level	In total
Simulations with moulage	78 (49 boys, 29 girls)	-	78
German/Czech CLIL	24 (11 boys, 13 girls)	-	24
English/Czech CLIL	-	48 (24 boys, 24 girls)	48
Educational games	112 (60 boys, 52 girls)	15 (7 boys, 8 girls)	127
In total	214	63	277

Various educational forms and methods of teaching were used. Children filled out anonymously the same questionnaire before (Pretest) and immediately after the end of the course (Posttest/Posttest I), some of them also completed the test 14 days (educational cooperative games), 21 days (German/Czech CLIL) and 30 days (simulations with moulage, English/Czech CLIL) after the course (Posttest II). Through a questionnaire, the

knowledge level of first aid (between 20 and 25 items), feedback for selected methods (between 3 and 5 items) and attitudes (between 3 and 5 items) were collected. The questionnaire items and their number were consulted with the children's teachers. The results of several pilot studies are also presented (below).

The educational pathway (De Buck et al., 2015; De Buck et al., 2020; GFARC, 2024; Belgian Red Cross, 2024) and current European Resuscitation Council guidelines (ERC Guidelines, 2015; 2021) were followed. In the process of developing curricula for primary and secondary education with the Ministry of Health/Ministry of Education, the tool can be useful for the inclusion of first aid in health education (GFARC, 2024).

The themes of first aid are listed below (Tab. 2. below). For every theme, there is a list of objectives. These objectives are categorized under knowledge, skills and attitudes. Knowledge corresponds to "What a child should know and understand", Skills corresponds to "What a child should be able to practically apply", and Attitude corresponds to "The child's willingness to show a particular behaviour". In any event, the educational pathway for first aid sets the objectives per two-year age range (11 to 12 years, 13 to 14 years, etc.).

The educational pathway for first aid covers the following first-aid themes: General (seeking help from an adult or medical care provider, hand-washing, wearing gloves, etc.), Four Main Steps in First Aid (make the area safe, evaluate the ill or injured person's condition, seek help, give first aid), Resuscitation (CPR), Choking, Skin Wounds, Burns, Bleeding, Injuries to Bones, Muscles or Joints, Poisoning, Stings and Bites, Fever, Diarrhoea, Convulsive States and Disaster Principles.

For each objective, a certain age cluster offers a time frame or "window" for the following: Encourage (E), Know (K), Repeat (R). Encourage (E) means that the teacher encourages the children to achieve the goal. Encouraging means that the teacher actively pays attention to it. Know/Know How (K) means that the teacher makes explicit efforts so that all the children achieve the goals. The children should acquire certain knowledge, skills or attitude. Repeat (R) means that the teacher repeats and emphasizes the purpose consciously with the children. He/she repeats for the children who have already achieved the objective and strives to reach the children who have not yet achieved the objective. If "–" is mentioned after an objective has already been reached, no specific attention should be paid to this objective (of course, there is possibility of feedback during a guided discussion with these advanced pupils/students).

An evidence-based educational pathway (De Buck et al., 2015; De Buck et al., 2020; GFARC, 2024; Belgian Red Cross, 2024) has been adapted to the needs of a Central European country. Due to the frequency with which damage to health occurred (UZIS, 2022), selected objectives were reduced (e.g. the danger of carbon monoxide (CO) poisoning, as well as some objectives in the topics Stings and Bites, Fever, Diarrhoea and Convulsive States/Fits). On the other hand, the two-way tourism of Central Europeans and people living in areas with a higher incidence of these dangers and the interest in the breeding of poisonous animals and the cultivation of poisonous plants in Central Europe means that even these topics cannot be completely ignored. In addition, in Central Europe there is also a notable need for education for emergency situations (accidents, fires, natural disasters, terrorist actions and other situations associated with evacuations), but this is not the aim of this text, only solitary topics of this theme have been added to the evidence-based educational pathway.

The educational pathway on first aid can be used by first-aid teachers to help them decide which content to teach to children of certain age ranges. In the process of developing curricula for primary and secondary education with the Ministry of Health/Ministry of Education, the tool can be useful for advocating the importance of first aid in health education (GFARC, 2024).

Table 2: Evidence-based educational pathway for 11–12-year-olds (11), 13–14-year-olds (13), 15–16-year-olds (15) and 17–18-year-olds (17) (De Buck et al., 2015; De Buck et al., 2020; GFARC, 2024; Belgian Red Cross, 2024), modified by authors.

1. GENERAL				
Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know why/that they must find help from an adult as quickly as possible in an emergency.	R	~	~	~
The children know how to seek help from a medical care provider.	R	R	R	R
The children know the six principles of first aid (but not psychosocial first aid, only comforting in a simple way).	K	R	R	~
SKILLS	(11)	(13)	(15)	(17)
The children can wash their hands.	R	R	R	R
The children can put on disposable rubber gloves or plastic bags.	R	R	R	R
The children can use the six principles of first aid when looking after an ill or injured person (without delivering psychosocial first aid).	K	R	R	R
ATTITUDES	(11)	(13)	(15)	(17)
The children are prepared to help.	R	R	R	R
The children are prepared to comfort the ill or injured person.	R	R	R	R
The children are prepared to ensure their own safety.	R	R	~	~
The children are prepared to fetch an adult.	R	R	R	R
The children recognise the importance of fetching an adult.	R	R	R	R
The children recognise the importance of seeking help from a medical care provider.	R	~	~	~
The children recognise the importance of avoiding infection.	R	R	R	R
The children recognise the importance of ensuring the comfort of the ill or injured person (by covering him with a blanket, by protecting him against the sun, etc.).	K	R	R	R
2. FOUR MAIN STEPS IN FIRST AID				
Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know the four main steps in first aid.	K	R	R	R
The children know which wound must be treated first when providing first aid.	K	R	R	~
The children know the importance of an open airway.	K	R	R	R
The children know when they should place a person in the recovery position.	E	K	R	R
The children know when someone is about to faint or has fainted.	R	R	R	R
The children know what to do when someone is about to faint or	R	R	R	R

has fainted.				
SKILLS	(11)	(13)	(15)	(17)
The children ensure their own safety.	R	~	~	~
The children ensure the safety of the ill or injured person and bystanders.	R	R	~	~
The children can seek help from an adult in an emergency.	R	~	~	~
The children can seek help from a medical care provider correctly.	R	R	~	~
The children can establish whether a person is conscious or not.	R	R	R	R
The children can establish whether an unconscious person is breathing.	K	R	R	R
The children can tilt the head back and lift the chin up correctly [technique].	K	R	R	R
The children can place a person in the recovery position [technique].	K	R	R	R
The children can provide further first aid.	E	K	R	R
ATTITUDES	(11)	(13)	(15)	(17)
The child's willingness to provide four main steps in first aid.	~	~	~	~
The children appreciate the importance of ensuring their own safety.	R	R	~	~
The children appreciate that it is also important to ensure the safety of the ill or injured person and bystanders.	R	R	~	~
The children recognise the importance of fetching an adult.	R	~	~	~
The children recognise the importance of the correct and complete application of the four main steps in first aid.	K	R	~	~
The children are ready to provide further first aid where able.	E	K	R	R
3. RESUSCITATION				
Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know that they should perform cardiopulmonary resuscitation (CPR) on an unconscious person who is not breathing normally.	K	R	R	~
The children know the different aspects of CPR, and in which order they should be administered.	K	R	R	~
The children know how many chest compressions should be given.	K	R	R	~
The children know the correct chest compression depth.	K	R	R	~
The children know the frequency at which chest compressions should be given.	K	R	R	~
The children know how many rescue breaths should be administered.	K	R	R	~
The children know that they must always seek help from a medical	K	R	R	~

care provider if a person is unconscious.				
SKILLS	(11)	(13)	(15)	(17)
The children can correctly perform CPR on an unconscious person who is not breathing normally.	E	K	R	R
The children can correctly carry out chest compressions [technique].	E	K	R	R
The children can correctly administer rescue breaths [technique].	E	K	R	R
ATTITUDES	(11)	(13)	(15)	(17)
The child's willingness to provide resuscitation in first aid.	~	~	~	~
The children recognise the importance of performing CPR.	E	K	R	R
The children are prepared to perform CPR.	E	K	R	R
4. CHOKING Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know the difference between mild and severe choking.	K	R	R	~
SKILLS	(11)	(13)	(15)	(17)
The children can administer first aid correctly in the event of a choking incident.	K	R	R	~
The children can correctly give blows to the back [technique].	K	R	R	~
The children can correctly give abdominal thrusts [technique].	E	K	R	R
ATTITUDES	(11)	(13)	(15)	(17)
The child's willingness to provide first aid in the event of a choking incident.	~	~	~	~
5. SKIN WOUND Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children recognise a skin wound.	R	~	~	~
The children know which equipment is needed to provide first aid for a skin wound.	R	~	~	~
The children know when the injured person should seek medical help for a skin wound.	K	R	R	R
The children know the importance of tetanus vaccinations, and why tetanus is dangerous and linked with skin wounds.	K	R	R	R
The children know that an injured person with a skin wound in which a foreign object is embedded should always seek medical help.	K	R	R	R
SKILLS	(11)	(13)	(15)	(17)
The children can correctly provide first aid for a skin wound if clean water is available.	R	R	~	~
The children can stop the bleeding of a wound that does not stop bleeding by itself.	K	R	R	R
The children can correctly provide first aid for a skin wound in which a foreign object is embedded.		K	R	R

ATTITUDES	(11)	(13)	(15)	(17)
The child's willingness to provide first aid in the event of a skin wound incident.	~	~	~	~
The children recognise the importance of correctly providing first aid for a skin wound in which a foreign object is embedded.	E	K	R	R
6. BURNS Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children recognise a burn.	R	R	~	~
The children know how to provide first aid for a burn (regardless of the degree of the burn).	R	R	~	~
The children know when to seek medical help for a burn.	K	R	R	R
The children know the difference between a superficial, intermediate and deep burn.	E	K	R	R
The children know what commonly causes burns (hot water, flames, fire).	R	~	~	~
The children know what can cause a burn (heat, chemicals, radiation, etc.).	E	K	R	R
SKILLS	(11)	(13)	(15)	(17)
The children can correctly provide first aid for a burn.	R	R	~	~
The children can seek medical help if the burn is serious.	K	R	R	R
ATTITUDES	(11)	(13)	(15)	(17)
The child's willingness to provide first aid in the event of a burn incident.	~	~	~	~
The children recognise the importance of continuously applying water to a burn.	R	R	~	~
7. BLEEDING Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know what they have to do in the event of a nose bleed.	R	R	~	~
The children know when to seek medical help for a nose bleed.	R	R	~	~
The children know how to correctly stop (severe) bleeding.	K	R	R	~
The children know that medical help must always be sought in the event of severe bleeding.	K	R	R	~
SKILLS	(11)	(13)	(15)	(17)
The children can correctly stop a nose bleed.	R	R	~	~
The children can apply a bandage to stop (severe) bleeding [technique].	K	R	R	~
ATTITUDES	(11)	(13)	(15)	(17)
The child's willingness to provide first aid in the event of a bleeding incident.	~	~	~	~
The children recognise the importance of stopping bleeding as quickly as possible.	R	R	~	~

8. INJURIES TO BONES, MUSCLES OR JOINTS Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know that they must not move a part of the body that is seriously painful.	R	~	~	~
The children know three possible injuries to the motor system (dislocation, fracture, muscle or joint injury).	K	R	R	~
The children recognise an injury to bones, muscles or joints.	K	R	R	~
The children know the difference between an open and closed dislocation or fracture.		K	R	R
SKILLS	(11)	(13)	(15)	(17)
The children can correctly provide first aid for a minor injury to bones, muscles or joints.	E	K	R	R
The children can splint a broken bone.	E	K	R	R
The children can provide first aid to a person with an open fracture.		K	R	R
ATTITUDES	(11)	(13)	(15)	(17)
The child's willingness to provide first aid in the event of injuries to bones, muscles or joints.	~	~	~	~
9. POISONING Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know the signs of poisoning.	E	K	R	R
The children know some of the causes of poisoning (alcohol, drugs, toxic substances, CO, etc.) and how poisoning can be prevented.	E	K	R	R
The children know that urgent transportation to medical care is necessary.	E	K	R	R
The children know toxic substances that are poisonous when swallowed.	R	R	~	~
SKILLS	(11)	(13)	(15)	(17)
The children can gather information on the nature and severity of the poisoning incident.	E	K	R	R
The children can seek medical help in case of poisoning.	E	K	R	R
ATTITUDES	(11)	(13)	(15)	(17)
The child's willingness to provide first aid in the event of a poisoning incident.	~	~	~	~
10. STINGS AND BITES Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know that a bee or wasp sting can be life-threatening because of allergic reactions.	E	K	R	R
The children know when to seek medical help in case of bee or wasp stings.	E	K	R	~
The children know that they must always seek help from a medical care provider in the case of a snake bite.	R	R	R	~

The children know that many snakes are poisonous, and that some types of snake venom can cause death.	E	K	R	~
The children know that it is not safe to touch or catch the snake.	R	R	R	~
The children know that sucking or cutting the venom out will not help and may harm the person even more.	E	K	R	~
SKILLS	(11)	(13)	(15)	(17)
The children can remove a bee or wasp stinger.	E	K	R	~
The children can provide further first aid in case of a bee or wasp sting.	E	K	R	~
The children can provide further first aid in case of a snake bite.	E	K	R	~
ATTITUDES	(11)	(13)	(15)	(17)
The child's willingness to provide first aid in the event of injuries to bones, muscles or joints.	~	~	~	~
The children recognise the importance of correctly providing first aid in case of a bee or wasp sting.	E	K	R	R
The children recognise the importance of correctly providing first aid in case of a snake bite.	E	K	R	R
11. FEVER Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know that fever can be a sign of serious illness.	R	R	R	~
The children know that a person with fever needs medical attention to determine the cause of the fever.	R	R	R	~
The children know that fever can be very dangerous and lead to death if left untreated.	R	R	R	~
The children know that a person with fever needs to rest and drink lots of fluids.	R	R	R	~
12. DIARRHOEA Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know that diarrhoea is usually caused by an infection.	R	R	R	~
The children know that poor hygiene (not washing hands, touching stools, eating unsafe food, drinking unsafe water) can lead to diarrhoea.	R	R	R	~
The children know that diarrhoea causes dehydration.	R	R	R	~
The children know that diarrhoea can be very dangerous and can lead to death if left untreated.	R	R	R	~
The children know when to seek medical help in case of diarrhoea.	K	R	R	~
The children know that someone with diarrhoea needs to drink lots of fluids.	R	R	R	~
13. CONVULSIVE STATES/FITS Encourage (E), Know/Know How (K), Repeat (R)				

KNOWLEDGE	(11)	(13)	(15)	(17)
The children know that convulsive states are not caused by demons or bad spirits but are the result of physical illnesses or injuries.	R	R	R	~
The children know that someone having convulsive states is not contagious.	R	R	R	~
The children know that convulsive states can be accompanied by other symptoms such as loss of consciousness, discolouration of nails and lips, eyes turning away, etc.	K	R	R	~
The children know they should not hold the person experiencing a fit down or put objects into his/her mouth.	R	R	R	~
The children know how to provide first aid in case of convulsive states.	R	R	R	~
The children know when to seek medical help in case of convulsive states.	K	R	R	~
14. DISASTER PRINCIPLES Encourage (E), Know/Know How (K), Repeat (R)				
KNOWLEDGE	(11)	(13)	(15)	(17)
The children know the concept of risk awareness.	E	K	R	R
The children know the concept of which disaster victims are more likely to survive and different categories of victims to treat (triage).	E	K	R	R

Source: De Buck et al., 2015; De Buck et al., 2020; GFARC, 2024; Belgian Red Cross, 2024; modified by authors.

The points scored in the Pretest and Posttest I, and in Posttest II, were analysed using repeated-measures ANOVA or Students t-test (total points scores of first-aid items and separately feedback and attitudes). All analyses were conducted in Statistica 14 (Tibco Software, CA, USA). The level of significance α was set as 0.05.

3 Results

3.1 Simulations with moulage

Simulations with moulage after a theoretical explanation of correct first-aid procedures allow students to practice skills, decision-making and critical thinking in a safe, supervised environment. Thus, such simulations improve preparedness for crisis situations and develop empathic behaviour (Weller et al., 2012; DCosta et al., 2024). They provide physical prompts, conceptual prompts (e.g. bleeding means low blood pressure), and semantic prompts (e.g. moulage contributes to emotional engagement) (Stokes-Parish, Duvivier & Jolly, 2019).

The aim of our study was to examine the effect of assigned roles in selected simulations with moulage (unconsciousness, skin wounds caused by glass shards, 1st, 2nd and 3rd degree burns, bleeding, open fracture, joint injury) and improving first-aid skills through simulation and moulage techniques. The following first-aid themes were included: general, four main steps in first aid, resuscitation (CPR), skin wounds, burns, bleeding and injuries to bones, muscles or joints.

The children (49 boys, 29 girls, 3rd grade of lower secondary level/in the Czech Republic 8th grade of elementary school) were after the theoretical basis of first aid (1 hour, "classroom teaching" activity, i.e. presentation and first-aid videos, a puzzle-solving activity in worksheets) divided according to the results of the Pretest into two groups (Rescuers vs. Rescued, both

subgroups N=39) with a close knowledge level (t-test; $p=0.84$). Each child from the subgroup of Rescuers (39 children) had to correctly treat selected emergency conditions and injuries (non-cooperative educational game). Each child from the subgroup of Rescued (39 children) had to apply make-up according to the template and follow the prepared script. The moulage techniques included make-up techniques with special effects on rescued participants. Castings and moulded wounds, painted bruises, lacerations and illusions of blood loss were applied. The moulage provided visual cues for the rescuers' actions, with the importance of not disrupting the flow of the experience and allowing sufficient space and time.

The points scored in the Pretest and Posttest regarding the role in simulations (the subgroup "Rescuers" and the subgroup "Rescued") were analysed using repeated measures ANOVA (total points scores).

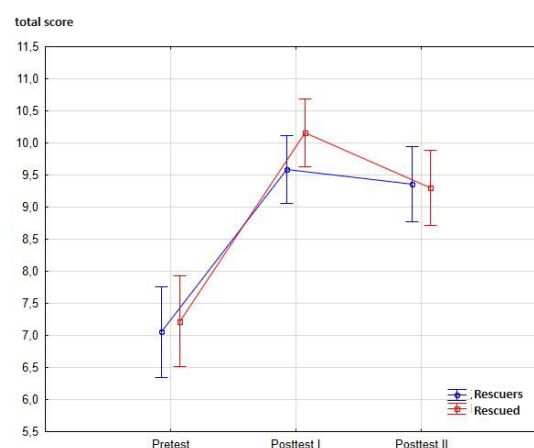
a. Level of knowledge according to the assigned role in simulations with moulage

The level of first-aid knowledge changes over time (Tab. 3., Graph 1.). The lowest level of knowledge of first aid is in Pretest, the highest in Posttest I. Although after 30 days (Posttest II) the level of knowledge decreased only slightly, it shows the importance of repeating the information already learned and following an evidence-based educational pathway.

Table 3: Total points scores in the subgroups of Rescuers and Rescued (Pretest, Posttest I, Posttest II).

		Mean	SD	Median
Pretest	Rescuers (N=39)	7.1	2.43	7.5
	Rescued (N=39)	7.2	1.98	7.5
Posttest I	Rescuers (N=39)	9.6	1.73	9.5
	Rescued (N=39)	10.2	1.58	10.5
Posttest II	Rescuers (N=39)	9.4	1.82	9.5
	Rescued (N=39)	9.3	1.88	9.5

Source: Authors.



Graph 1: Level of knowledge of first aid in Rescuers vs. Rescued group. Attending the first-aid course increased significantly the total score in both research groups (details in text). Source: Authors.

A repeated measures ANOVA was used to evaluate the questionnaire. In general, the effect of having completed a first-aid course with simulations and moulage is statistically highly

significant ($F_{2, 152} = 93.30$; $p < 10^{-17}$). The increase did not differ depending on the role ($F_{1, 76} = 0.40$; $p = 0.53$) or time ($F_{2, 152} = 1.12$; $p = 0.33$). Thus, the assigned role had no influence on the first-aid knowledge level.

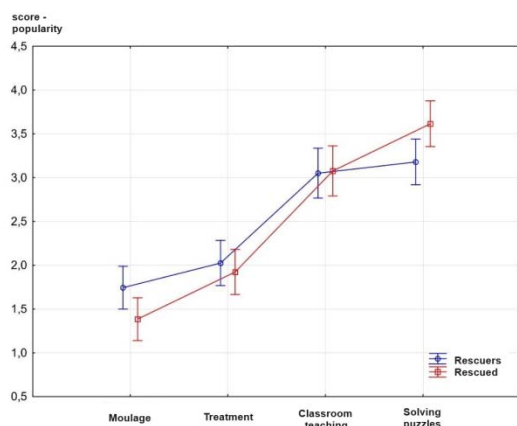
b. Preferences of activities according to the role

Children (even if the “rescued” children did not treat and the “rescuers” did not mask) rated first-aid course activities (“moulage”, “treatment”, “classroom teaching”, “puzzle solving”) according to popularity (1st most popular/favourite to 4th least popular). Evaluating of activities according to popularity showed that the “moulage” and “treatment” activities were rated mostly as very/quite popular/favourite or quite popular/favourite, on the contrary, the “solving puzzles” and “classroom teaching” activities were evaluated mostly as quite unpopular/least popular.

Table 4: Personal preference of activities in the first-aid course – Rescuers and Rescued.

Personal preference	1st	2nd	3rd	4th
Moulage	45 (58%)	25 (32%)	5 (6%)	3 (4%)
Treatment	23 (30%)	37 (47%)	15 (19%)	3 (4%)
Classroom teaching	6 (8%)	10 (13%)	35 (45%)	27 (34%)
Solving puzzles	4 (5%)	6 (8%)	23 (29%)	45 (58%)

Source: Authors.



Graph 2: Personal preference of activities in the first-aid course (from 1st most popular/favourite to 4th least popular) – Rescuers and Rescued. Source: Authors.

Even if the group of Rescued did not treat and the group of Rescuers did not mask, both groups rated the individual activities very similarly. The effect of the role (by a repeated measures ANOVA) in the level of knowledge of first aid is not statistically significant ($F_{1, 76} = 0.40$; $p = 0.53$).

Two-sample t-tests and the non-parametric Mann-Whitney test (M-W) were used to compare the order of personal preference of individual activities, as the use of the t-test is disputable with the order scale used (1–4). The popularity of the “treatment” and “classroom teaching” activities did not differ (t-test: all $p > 0.57$, M-W: all $p > 0.71$), the ratings of the “moulage” and “solving puzzles” differs in the groups. The “moulage” activity was rated better by Rescued (t-test: $t = 2.07$; $df = 76$; $p = 0.04$; M-W: $U = 622$; $p = 0.17$), whereas the “puzzle-solving” activity was rated better by Rescuers (t-test: $t = -2.35$; $df = 76$; $p = 0.02$; MW: $U = 607.5$; $p = 0.13$).

c. Grades for activities according to the role

The individual activities (“moulage”, “treatment”, “classroom teaching”, “puzzle solving”) regarding the assigned role (the subgroup Rescuers and the subgroup Rescued) were analysed using repeated measures ANOVA. Children rated the individual activities (1 outstanding, 2 very good, 3 satisfactory, 4 marginal, 5 unsatisfactory).

The effect of the role (by a repeated measures ANOVA) in the rating of activities during the first-aid course is statistically significant ($F_{3, 228} = 3.65$; $p < 0.01$). Two-sample t-tests and the non-parametric Mann-Whitney test (M-W) were used to verify the results of the average grades of individual activities, as the use of the t-test is disputable with the ranking scale used (1–5). The mean grades of the “moulage”, “treatment” and “classroom teaching” activities did not differ (t-test: all $p > 0.29$, M-W: all $p > 0.33$), the mean grades of the “solving puzzles” activities differ across the groups with a better rating among the Rescuers (t-test: $t = -2.31$; $df = 76$; $p = 0.02$; M-W: $U = 530$; $p = 0.02$).

Table 5: Evaluation by grades for activities in the first-aid course – Rescuers and Rescued.

	N	Mean	SD	Median
Moulage	78	1.54	0.85	1.00
Treatment	78	1.78	0.98	1.00
Classroom teaching	78	2.08	1.13	2.00
Solving puzzles	78	2.65	1.26	3.00

Source: Authors.

d. Other items of the questionnaire

Is it useful to be able to provide first aid?

96% of children agree/rather agree with the statement, 3% neither agree nor disagree, 1% rather disagree.

Is it useful to use simulations with moulage in first-aid teaching? 77% of children found it useful to use simulations with moulage in first-aid teaching.

Teachers and parents of children expressed their support for including simulations with moulage in first-aid teaching (100%). Beyond the scope of the questionnaire, some teachers pointed to the time-consuming preparation of this activating method.

3.2 Content and Language Integrated Learning (CLIL) in German/Czech and English/Czech

CLIL is a competency-based educational approach (Coyle, Hood, & Marsh, 2010). The idea is to teach both (a) the content/subject (educational non-language goal) and (b) the language (educational language goal). This idea is captured in the phrase “using language to learn, learning to use language” (British Council, 2024). CLIL also uses specially standardized tests designed for a foreign language and non-language content (Ball, Kelly & Clegg, 2014). We differentiate two kinds of CLIL: (a) the soft CLIL involves a strong focus on the linguistic requirement and less focus on the content knowledge, as opposed to (b) the hard CLIL approach where children/students are taught mostly content-based information with a small and supportive amount of linguistic skills (Ikeda, 2013). Also, the CLIL had no detrimental effects on the science learning of the secondary learners participating in the study (Hughes & Madrid, 2019).

First-aid teaching through hard CLIL (according to Ikeda, 2013) enables Czechs to receive assistance in a foreign country and also to help tourists visiting the Czech Republic in case of an emergency. By integrating language learning with practical first-aid skills, CLIL enhances cognitive abilities, engagement and preparedness, ultimately leading to more effective and competent bystanders.

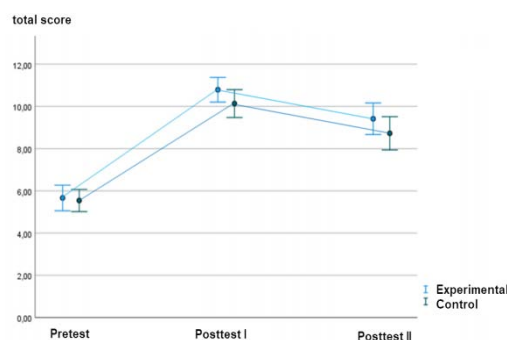
Additionally, CLIL also supports curricula that promote interpersonal skills, cultural sensitivity and the communication and language skills required by employers, as well as develops pupils' self-confidence, motivation and independence and supports internal motivation to learn. It also leads pupils to higher creativity and engagement of higher cognitive functions (Tejkalová, 2013).

3.2.1 German/Czech CLIL

Children (N=24; 11 boys and 13 girls) were in the 3rd grade of lower secondary level/in the Czech Republic 8th grade of elementary school; A1 level according to Common European Framework of Reference for Languages (CEFR, 2024). Current secondary school children in the Czech Republic choose a 1st foreign language (English in our group) and 2nd foreign language (German in our group). The language goal (vocabulary and grammar) resulted from the content of a first-aid course (the hard CLIL according to Ikeda, 2013). The principles of language support (scaffolding) were used in the teaching (Mehisto, Marsh & Frigols, 2008). Children were divided according to the results of the total score of the Pretest into knowledge balanced subgroups with the German/Czech CLIL (experimental; N=12) and without the German/Czech CLIL (control, N=12). Both groups passed a one-day first-aid course (5 hours in total). The subgroup with German/Czech CLIL passed the first-aid course in German (in their 2nd foreign language) and Czech, the subgroup without German/Czech CLIL passed the first-aid course in Czech only. The content of the first-aid course was calling emergency services, four main steps in first aid, resuscitation, bleeding, injuries to bones, burns and convulsive state/epilepsy.

a. Level of knowledge of first aid – the German/Czech CLIL

The lowest level of knowledge of first aid is shown in Pretest (Graph 2, below), groups with and without CLIL did not differ (t-test, $p=0.76$). The highest levels of knowledge of first aid were counted in Posttest I (Pretest vs. Posttest I, both groups $p=0.00$). A better Posttest I score was found in the subgroup with the German/Czech CLIL ($p=0.04$). After 21 days (Posttest II) the level of knowledge decreased slightly, the Posttest I vs. the Posttest II scores differ statistically significantly (both $p=0.00$). This shows the importance of repeating the information already learned and following an evidence-based educational pathway.



Graph 2: Level of knowledge of first aid with the German/Czech CLIL (experimental group) vs. first aid without CLIL (control group). Attending a first-aid course increased significantly the total score in both research groups (details in text). Source: Authors.

In general, both groups improved their knowledge statistically significantly ($p=0.00$; repeated measures ANOVA). The subgroups with the German/Czech CLIL scored higher than the subgroup without CLIL in Posttest I ($p=0.04$). This may indicate a greater motivation of the CLIL group as children were learning in an unusual way.

We can conclude that the use of CLIL in teaching first aid will not worsen the level of knowledge and we support using CLIL in first-aid teaching.

b. Benefits of learning first aid and a foreign language together – the German/Czech CLIL

The language educational goal does not disadvantage secondary school children teaching with CLIL in natural sciences (grammar, vocabulary, working with text, communication, etc.; Hughes & Madrid, 2019).

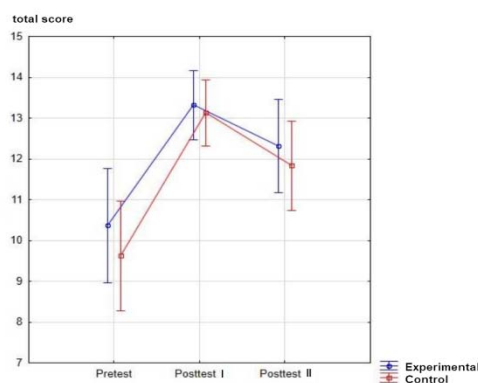
It was investigated whether the children themselves perceive teaching with CLIL as a benefit. Learning first aid combined with any foreign language proved to be useful in their life for 87% pupils and 83% of pupils proved it as important.

Furthermore, the pupils recorded which foreign language they would prefer in combination with biology (including first aid): if children must use a foreign language (their 1st foreign language is English, 2nd foreign language is German) during biology lessons, 78% of pupils would choose English exclusively and 13% both English and German. No other language was chosen and 9% of pupils rejected any form of implementation of a foreign language within biology lessons (including first aid).

3.2.2 English/Czech CLIL

Children (N=48; 24 boys and 24 girls, 4th grade of lower secondary level/in the Czech Republic 9th grade of elementary school; A2 level according to CEFR, 2024) passed a 3-hour first-aid course (calling emergency services, four main steps in first aid, resuscitation, bleeding, injuries to bones). The subgroups with and without the English/Czech CLIL corresponded to classes for organizational reasons and given that the Pretest total scores did not differ ($p=0.60$). The subgroup for a specific class was decided by a coin toss. The principles of language support (scaffolding) were used in the teaching (Mehisto, Marsh & Frigols, 2008). A first-aid course for the experimental group (12 boys and 12 girls) made use of the English/Czech CLIL method, but for the control group (12 boys and 12 girls) only Czech was the language of communication. The language goal resulted from the content of a first-aid course (the hard CLIL according to Ikeda, 2013).

a. Level of knowledge of first aid – the English/Czech CLIL



Graph 3: Level of knowledge of first aid with the English/Czech CLIL (experimental group) vs. first aid without CLIL (control group). An attendance of the first-aid course increased significantly the total score in both research groups (details in text). Source: Authors.

The level of knowledge of first aid in the Pretest and Posttests in our English/Czech CLIL study shows a similar trend as in the German/Czech CLIL study. The lowest level of knowledge of first aid was in Pretest (groups with and without CLIL did not differ; t-test, $p=0.60$), the highest in Posttest I in both groups. After 30 days (Posttest II) the level of knowledge decreased slightly.

A repeated measures ANOVA and Tukey's test show that students improved statistically significantly ($p=10^{-12}$). The level of knowledge did not differ between the experimental and

control groups in Pretest, Posttest I and Posttest II ($p=0.76$), therefore the CLIL/non-CLIL learning had no effect on the pupils' level of knowledge of first aid. We can conclude that the use of CLIL in teaching first aid will not worsen the level of knowledge and support.

b. Importance of first aid knowledge perceived by children – the English/Czech CLIL

In Pretest, both groups of children evaluated the importance of more than 4 points out of a maximum of 5 (Mean 4.7 and SD 0.6 in the experimental group and Mean 4.3 and SD 1.0 in the control group; $p=0.12$). In Posttest and Posttest 2 both groups of children increase the mean rating of the importance of first-aid knowledge ($p=0.22$), but the differences between the experimental and control groups were not statistically significant ($p=0.73$). Thus, no influence of CLIL vs. non-CLIL teaching on the importance rating of first aid was found.

c. Benefits of learning first aid and a foreign language together – the English/Czech CLIL

In the Pretest, both groups of children rated the benefit an average of 4 points out of a maximum of 5 (Mean 4.0 and SD 1.2 in the experimental group and Mean 4.0 and SD 1.1 in the control group; $p=0.90$). As the repeated measures ANOVA analysis showed, the change in the perception of the benefit of learning a foreign language and first aid together over time is not statistically significant ($p=0.76$). At the same time no effect of teaching on the rating of the language benefit was found ($p=0.58$). The perception of the benefit of a foreign language in first-aid learning seems to be high and did not change due to the teaching.

d. Other items of the questionnaire – the English/Czech CLIL

The most popular part of the course was the resuscitation training and an educational game (quiz questions from all parts of the course). Both activities received on average more than 4 points out of a maximum of 5. Some children with a positive attitude towards the CLIL method determined in which subject they would like to encounter the CLIL method. Besides biology geography was the most frequently mentioned (mainly because of travelling), followed by "all subjects", physics, mathematics, physical education and history.

3.3 Educational games

a. Cooperative educational games

This type of game involves collaboration, negotiation, and the sharing of resources among players. For organizational reasons the experimental (4th grade of lower secondary level, $N=15$, 7 boys and 8 girls) and control (3rd grade of lower secondary level, $N=20$, 14 boys and 6 girls) group were determined randomly (a coin toss), regarding the fact that 3rd and 4th grade did not differ in the level of knowledge in Pretest ($p=0.83$).

An experimental group was learned through educational games (board game with cards, quiz, cooperative "escape game" with simulations and moulage). A control group was educated in the same themes using conventional teaching (PowerPoint presentation first-aid videos, worksheets).

The lowest first-aid knowledge level was calculated in Pretest and the highest level in Posttest I; after 14 days the knowledge level decreased slightly (Posttest II). Both groups improved their knowledge statistically significantly ($p=0.00$; ANOVA).

T-test did not assess any differences between the experimental and control groups in Posttest I or Posttest II ($p=0.53$ and $p=0.34$, respectively). Using repeated measures ANOVA showed that the level of knowledge was not affected by inclusion in the experimental or control group ($p=0.88$).

Children rated a first-aid course with and without a cooperative educational game (1 outstanding, 2 very good, 3 satisfactory, 4 marginal, 5 unsatisfactory). 93% of children in the experimental group (with a cooperative educational game) rated the activity at an outstanding/very good level. The means of evaluation grade was 1.27 ± 0.57 in the experimental group and 1.40 ± 0.60 in the control group ($t=0.52$, $sv=33$, $p=0.61$).

b. Non-cooperative educational games

Non-cooperative games focus on strategic decision-making without cooperation or communication between players. The children (3rd grade of lower secondary level/in the Czech Republic 8th grade of elementary school, $N=39$, 25 boys and 14 girls) rated a non-cooperative "escape game" with simulations and moulage. Masked participants were "rescued" using a pre-prepared scenario at selected locations. There are tools near all locations, only a few were needed for proper treatment. If the rescuer were treated correctly, the rescuer got one of the clues and moves on, if not, the rescuer (a) incurred a penalty, (b) could learn the correct treatment with a quick look for help and (c) had to go back one or more locations. As the pupil moved forward in the game, the combination of clues led to a password that would open the treasure chest. The activity was intended for any number of pupils. This activity can also be easily adjusted according to the number of pupils and their abilities.

Children rated the first-aid course with a non-cooperative educational game (1 outstanding, 2 very good, 3 satisfactory, 4 marginal, 5 unsatisfactory). 79% of children with the non-cooperative educational game rated the activity at an outstanding/very good level.

c. Educational games during COVID pandemic restrictions

During the COVID pandemic restrictions, online learning e.g. via Microsoft Teams was the only possibility for educating most children in the Czech Republic. In the experimental group ($N=26$, 12 boys and 14 girls, 3rd grade of lower secondary level/in the Czech Republic 8th grade of elementary school) the children were taught by instructional videos, brainstorming, practical skills training, educational game and worksheets. Instead of manikins, children used plush toys, dolls, robots, etc. to practice improvised exercise of resuscitation at home. In the control group ($N=20$, 12 boys and 8 girls, 3rd grade of lower secondary level/in the Czech Republic 8th grade of elementary school) the children were taught theoretically through a presentation and a worksheet.

Level of first-aid knowledge: The level of knowledge of first aid in the Pretest and Posttest in our pandemic study shows a similar trend as the studies above. Both groups (experimental and control, Pretest vs. Posttest) improved their knowledge statistically significantly (both $p=0.00$).

First aid in the curriculum: Children taught online during the COVID pandemic restrictions, e.g. via Microsoft Teams graded the importance of first aid in the curriculum (1 very important, 2 important, 3 neither important nor unimportant, 4 unimportant, 5 very unimportant). In Posttest (Mean 1.37, SD 0.64) children rated the first-aid course to be part of the curriculum higher than in Pretest (Mean 1.80, SD 1.00; $p=0.02$, Tab. 6.).

Table 6: Evaluation by grades for first aid as part of the curriculum (1 very important, 2 important, 3 neither important nor unimportant, 4 unimportant, 5 very unimportant).

Grade	1	2	3	4	5
Pretest	23	13	7	2	1
Posttest	32	12	1	1	0

Source: Authors.

96% of children in Posttest vs. 78% of children in Pretest evaluated first aid as a part of the curriculum as very important or important.

d. Willingness to pass another first-aid course

Primary schoolchildren (N=8, 5th grade) evaluated the teaching of first aid using the theoretical basis and educational games very positively, they considered it more fun than learning (100%). We focused on opinions and attitudes among the children on the lower secondary level again (3rd grade of lower secondary level). The children were asked if they can declare a higher attractiveness of teaching through educational games vs. conventional teaching (100%), a greater motivation to continue learning first aid using the same methods vs. conventional teaching (88%) and a greater willingness to pass another first-aid course (100%).

e. Learning with physical activity/movement

Although our studies did not primarily focus on the need for movement during lessons, children from the secondary school level indicated a high need for movement during lessons. Activities associated with chest compressions on manikins or solving tasks associated with physical activity were rated very highly (82–93% stated that the activity was their favourite compared to various activities without movement).

4 Discussion

Children are never too young to learn first aid. The earlier children are trained, the more likely it is that the provision of first aid will become a normal part of their lives. Repeated training provides them with a lot of knowledge and life skills, which leads to empowerment. From as early as 6 or 7 years old, children can learn how to seek help from an adult or medical care provider, how to ensure their own safety, how to bandage a wound and how to comfort an injured person. To this end, training tools and materials have to be adapted to their age and context (GFARC, 2024).

Moreover, the Czech children could be motivated by the example of Peter Safar, one of the world's most famous doctors of Czech origin born in Austria (Ingram, 2024). He designed the concept of the “alphabet of cardiopulmonary resuscitation”, which was first published in 1964 in the journal of the Iowa State Medical Society (Safar, 1964). He confirmed the effectiveness of relaxing the airways by tilting the head in the field and the mechanical efficiency of lung-to-lung breathing. He provided evidence that lung-to-lung breathing also leads to adequate oxygenation of the blood and brain of people who have experienced respiratory arrest (Franěk, 2024). He was close to the scientists who rediscovered chest compressions and the use of an external defibrillator. After Laerdal visited Safar in the USA, the first Resusci-Anne was created in 1960, which enabled the start of population-wide and systematic resuscitation training. Marginal note: as a model for the manikin's face, Laerdal used the death mask of the so-called “Unknown Woman of the Seine” as a symbol for the drowning, who represent one of the target groups of resuscitation (Franěk, 2024).

4.1 Educational pathway

For supporting motivation and encouraging the teaching of first aid, an educational pathway is given (above). Motivation to teach first aid could be reduced by the unclear range of topics and procedures of basic first aid for pupils (Bakke et al., 2017), lack of time for the inclusion of first-aid teaching in education (Campbell, 2012) as a consequence of an extensive curriculum of subjects, or lack of funds for first-aid instructors and equipment (De Buck et al., 2015) – especially a sufficient number of resuscitation manikins (Kuba & Havlíková, 2023). Additionally, our previous research (Hrušková et al., 2022) has shown that some teachers (3% of all teachers) stated None regarding a first-aid course. According to Czech law and from the point of view of pupils and their parents, it seems impossible

for children and adolescents be under the charge of someone who has not passed any first-aid course. A lack of knowledge of first aid can have serious consequences for a particular teacher.

An acute condition does not have to be lethal if bystanders can take the right steps immediately, however. Bystanders are the basis for the chain of survival (a series of actions that, properly executed, reduce mortality). Trained pupils could help themselves and the people around them, and not only after the first-aid course but also in adulthood. They could be bystanders willing and able to help. When first-aid training is not mandatory, uptake in schools is low, even if teachers are convinced of its importance (Campbell, 2012).

According to a British study (Cooper, 2012), 89–99% of the pupils enjoyed first-aid training, and 98% of the parents believed it was important for their children to learn first aid. Future teachers of Physical Education, Human Biology, etc. can teach first aid very competently (Jimenez-Fábrega et al., 2009; Bohn et al., 2012) but need more support in their university curricula in Norway (Bakke et al., 2017), just as in the Czech Republic (Kuba & Havlíková, 2023). Also primary schoolchildren evaluated the importance of first aid. 85% of pupils before the first-aid course and 95% after the course rated first-aid teaching as very important/important (Simandlová, 2019). They also chose first-aid teaching at school as the best source of information, closely followed by the family. Other sources (books, internet, clubs) were rated worse (Simandlová, 2019).

In the Czech Republic, teaching basic first aid should be an integral part of the Framework Education Programme for Basic Education (FEP BE, 2008). After an update (“minor revision”; FEP BE, 2021) only isolated parts of basic first aid remained in the mandatory education at the lower secondary-school level: within the mandatory subject Physical Education, first aid in physical education and sports is required; within the mandatory subject Chemistry, first aid in case of skin contact with acid or hydroxide is required; and within the mandatory subject Biology, first aid for mushroom poisoning is required. On the contrary, providing adequate first aid if necessary is a required part of the non-mandatory subject Health Education. Another update (“major revision”; FEP BE, 2023) is currently being worked out, which should hopefully lead to the re-inclusion of all basic first aid for pupils.

The educational pathway on first aid can be used by first-aid teachers to help them decide which content to teach to children of certain age ranges. In the process of developing curricula for primary and secondary education with the Ministry of Health/Ministry of Education, the tool can be useful for advocating the importance of first aid in health education (GFARC, 2024).

4.2 Simulations with moulage

Moulage is a technique used to simulate injury, disease and other physical characteristics specific to a scenario, often used in health and emergency-worker training, predominantly for simulation-based learning activities. There is ample opportunity for broadening its scope. In first-aid teaching, the use of moulage and simulation in first-aid training is a powerful educational tool that significantly improves the quality of training for professionals as well as for non-professionals (DCosta et al., 2024). In medicine, moulages are a proven educational tool (Zare & Ebler, 2013). Moulds can replicate diseases in detail and are considered “living” images of patients. As medical teaching aids, they embody the individual patient, but they also focus on what is typical. A study on medical students' perceived engagement in simulations suggests that the use of moulage does impact learner experience by improving learner satisfaction, confidence, and immersion within the task (Stokes-Parish, Duvivier & Jolly, 2020). Participants (medical students) have noted that the benefit of the moulage was that they did not need to “switch out” of simulation mode to gather cues from other sources.

Moulage provides physical prompts, conceptual prompts (e.g. bleeding means low blood pressure), and semantic prompts (e.g. moulage contributes to emotional engagement) (Stokes-Parish, Duvivier & Jolly, 2019). Contrary to the results of a systematic review on studies from medicine, nursing and other health disciplines where it was summarized that moulage did not improve knowledge attainment and performance (DCosta et al., 2024), in our study from the lower secondary level significant differences were found in the mean values of knowledge of first aid in sum before and after a first-aid course ($p < 10^{-17}$).

When the children of our study had to choose the most popular activity out of several, moulage received the highest rating (the mean grade 1.54 ± 0.85). Findings from other studies (Li et al., 2019; DCosta et al., 2024) showed improved participant satisfaction and confidence regarding clinical skills, and these findings support simulation as an effective learning technique to increase self-efficacy. Self-efficacy is an individual's perception of their ability to achieve a goal, and while it is not a reflection of their actual capabilities, it can positively affect performance and achievement, which is also desirable in teaching children.

As simulations with moulage after a theoretical explanation of correct first-aid procedures allow students to practice skills, decision-making and critical thinking in a safe, supervised environment, they also improve preparedness for crisis situations and develop empathic behaviour (Weller et al., 2012; DCosta et al., 2024). By providing realistic, hands-on experiences, these techniques enhance learning outcomes, boost confidence, and ultimately lead to better preparedness and more effective emergency care. As simulations have been found to improve empathy and communication skills in healthcare students (Levett-Jones, Cant & Lapkin, 2019), such simulation-based education is advantageous and essential for children due to the preparation for a crisis situation and communication during such situations. Moreover, in our study the assigned role (rescuer vs. rescued) in simulations with moulage does not affect the increase in knowledge level ($p = 0.53$) and children prefer the role of the rescued ($p = 0.04$). Teachers and parents of our children express 100% support for first-aid learning through simulations with moulage, although some teachers noted the time-consuming nature of this learning activity as in other studies (Kuba, Řiha, Zvěřinová & Krečková, 2019).

In our study we prove that the assigned role had no influence on the first-aid knowledge level ($p = 0.53$), but the popularity of the moulage activity was shown to be dependent on the assigned role when it was more popular with the Rescued group (those to which moulage was applied). Of course, teachers must design the time schedule carefully and choose enough simulations so that all children can take turns in both roles. However, it can be stated that in the first-aid course for children of the lower secondary level, we did not need another human resource to be "rescued", children prefer to be rescued.

4.3 Content and Language Integrated Learning (CLIL)

The term CLIL (Content and Language Integrated Learning) was coined in 1994 by David Marsh and Anne Maljers among others (Anderson, McDougald & Cuesta, 2015) as an umbrella term that could encompass a wide range of situations related to "the experience of learning non-language subjects through a foreign language" (Marsh, 2012). As a later study in the Czech Republic and Slovakia (Marcinekova, & Pavlasova, 2020) showed, only 32% of Czech teachers said that they applied CLIL, whereas only 13% in Slovakia. At the same time (Marcinekova & Pavlasova, 2019) it was found that English (85%) was the main CLIL language used by Czech teachers, while some teachers also used German, French and Russian. Teachers realize CLIL the most often in regular lessons, then in projects and laboratory lessons. Human biology is the most frequently used topic of teaching units they teach in CLIL. In our study, besides biology geography was the most frequently mentioned (mainly because of travelling; as in Hnátková, 2013), followed by "all subjects", physics, mathematics, physical education and history.

Evaluation of the CLIL method and activities for effective CLIL lessons are for the Czech Republic offered by e.g. the National Pedagogical Institute of the Czech Republic (NPI, 2012) and by Adamus (2024). In the Czech Republic there are some CLIL materials prepared for children of different language levels, e.g. Labyrinth (Pavlová et al., 2015), NIDV (2014) for Czech teachers, others are Lingo MINT (2020), Clemen (2009), Dale & Tanner (2012), Müller & Schroeder (2015), Quartapelle, Sudhoff & Wolff (2018), Goethe-Institut (2024a, 2024b), Haataja (2013) and CLIL-LOTE-START (2011).

As Šulista (2020) brought positive findings that in mathematics lessons the CLIL method in the classroom does not have to have a negative impact, our study showed pupils' positive preferences for learning of a foreign language and first aid together. Most children in our study proved CLIL with first aid to be important (83%) and useful in their life (87%).

Levels of knowledge in the CLIL method often diverge. Some studies have shown an improvement in the knowledge of children who complete CLIL compared to pupils taught only in their native language (Van de Craen et al., 2007; Huibregtse et al., 2000; Day & Shapson, 1996), others showed the close level of knowledge (Surmont et al., 2016; Zydatis, 2007), but for some classes, the implementation of CLIL is not met with enthusiasm by the children (Hořáková, 2012). A methodological limit when comparing different studies can also arise when determining the amount of language use in teaching, e.g. Betáková, Homolová & Štulrajterová (2017) state that if a foreign language is used in a professional subject for at least five percent, it is CLIL. However, teaching is usually designed for a higher amount of the language content even within hard CLIL.

In our study, the level of knowledge of first aid improved in CLIL as well as in non-CLIL statistically significantly ($p = 0.00$), the level of knowledge did not differ between the CLIL and the non-CLIL groups ($p = 0.76$), therefore we can conclude that the use of CLIL in teaching first aid will not worsen the level of knowledge and support. Moreover, the results show that the activating methods in CLIL teaching were received positively by the children, and they enjoyed them. Most children would like to take the same first-aid course again, with the CLIL method. It turned out that children perceive content-oriented CLIL (hard CLIL) well. Our finding is consistent with Ikeda (2013), who affirmed that Japanese students (16–18 years old) prefer hard CLIL and appreciated the cognitive activities, constructive learning, increased content knowledge and enhanced communicative competence (vocabulary and oral presentation).

The CLIL vs. the non-CLIL teaching of a co-author (PB) made it possible to compare the feelings of teaching in both groups. A more relaxed atmosphere prevailed in the experimental group. On the other hand, the control group was dominated by a rather discouraged atmosphere. This difference could have been influenced by the nature of the pupils, information about different teaching in both classes and, finally, perception of the teacher. We can also assume that the children were more open to learning the given topic thanks to the non-traditional concept of teaching. Our findings are in conformance with Binterová (2012) and Suchopárová (2012). Similarly, Muñoz-Luna (2013) sees the main benefit of CLIL for a vocational subject in that the pupil works harder when trying to understand a foreign language, and at the same time the teacher emphasizes the main ideas more. Both the students and the teacher have to cope with the language barrier. The basic principles of the CLIL methodology thus include the use of a wide range of aids and materials, the involvement of as many senses as possible. The teacher must find a way to make information available to as many students as possible, choose diverse strategies, repeat information more often, reformulate and vividly model and illustrate. This then leads to more effective learning.

However, there are also studies reporting that children after CLIL teaching have a lower level of knowledge than children taught in a traditional way (Vojtková & Hanušová, 2011). The cause of the last-mentioned case may be a misunderstanding of

the test questions or insufficient language skills needed to answer them, if the test is given in the CLIL language (Ball, 2014). This problem can be solved either by allowing pupils to use their native language during testing (Stohler, 2006), by using only the native language for content testing, as for example in the research of Van de Craen et al. (2007) or Rosi (2018), or by developing questions that can diagnose that the cause of failure is a misunderstanding (Hofmannová et al., 2008). In the years 2002–2004, Stohler (2006) analysed the causes of students' mistakes in teaching and in oral examinations. Her research confirmed that CLIL does not have a negative effect on pupils' performance in content learning if pupils are allowed to use their native language during testing (the task was in a foreign language, they were also allowed to use their native language when answering). According to Stohler (2006), when students were tested only in a foreign language (the tasks and their answers had to be in a foreign language), their results slightly lagged those of students in regular classes. Also, Day and Shapson (1996), Van de Craen et al. (2007) and Rosi (2023) confirm that CLIL students perform better in a non-language subject than their peers when tested in their native language. The same result is reached by Huijbregtse et al. (2000), whose research confirmed the better results of pupils from the bilingual program in all tested subjects. Hajer (2000) attributes the cause to a lack of understanding of the content of the curriculum already while teaching.

The results show that the activities were received positively by the children, and they enjoyed them; the potential rewards for the effort are very great (Anderson, McDougald & Cuesta, 2015). Already during the lesson itself, when e.g. an educational game was implemented, it became clear that the children were enthusiastic and that they enjoyed the game, which was reflected in their activity and interest during the game. In German/Czech CLIL they spoke Czech during the game only exceptionally, or they used English and therefore communicated almost exclusively in German. In the English/Czech CLIL they communicated in Czech only briefly and then only exceptionally when there was a mutual misunderstanding during the activity, but almost always in English. Children in both CLIL teaching used the vocabulary and language resources acquired in the previous activities. Although they did not always express themselves grammatically correctly, this did not hinder understanding. Although the level of language education was not the aim of the study, it was obvious that the activities are also effective in terms of language. In further studies, it would be appropriate to test both content and language. Appropriate for CLIL research is the factor rotation technique, which was implemented in other CLIL research (Wossala, 2017). Its disadvantage is the large organizational and time-consuming nature of the experiment.

4.4 Educational games

For secondary school children it is refreshing to learn through educational games. But the content of the games needs to be (a) professionally correct and (b) based on an appropriate knowledge level and (c) the principle of the game needs to be fun. First-aid content can be included within well-known and popular games, e.g. *Dobble* (Dobble, 2024), *Quartets* (card game), *Triominoes* (Trimino, 2024), *AZ-quiz* (Quiz, 2024), various board games with cards (Canva, 2024), puzzles (skeleton, organs), *pexesos* and *pexetrios* (concentration card games with pairs or triplets of images/information, which could be the same or could complement/belong to each other, e.g. symptoms for diseases or names of specialist doctors), crosswords (Crossword, 2024), word-search games (Word Search, 2024), *Guess Who/What Am I* games, riddles, etc. In the online space we could create interactive *Jeopardy!* (Jeopardy, 2024) Google slide games, virtual/online board games, *Kahoot!* Game, use QR codes or *Mentimeter*, etc. Games can be categorized into cooperative and non-cooperative games. In cooperative games, players can form coalitions and work together to achieve a common goal. This type of game involves collaboration, negotiation and the sharing of resources among players. On the other hand, non-cooperative games focus on strategic decision-making without cooperation or communication between players.

4.5 Further educational materials

The offer of materials for teaching first aid shows a great deal of variety. For effective teaching, the use of some materials can be limited by outdated procedures and an inappropriate level of difficulty. The level of difficulty should correspond to the educational path and not discourage the student too much by being too simple or too difficult.

a. Materials for first-aid teaching

For teaching first-aid in the lower secondary level in the Czech Republic, the following can be recommended: *Little Anne QCPR* (Laerdal, 2024), *ZdrSem* (2024), *První pomoc na PFF UK* (2024), *ČČK* (2024), *Skaut* (2024), *ZáchrankaApp* (2024), and possibly *Záleský* (2022) and *FSPS MUNI* (2024).

Educational materials for medics, paramedics, first responders as well as for the public interested in advanced first aid are offered by the educational portal *Akutne.cz* (2024). *Akutne.cz* as a part of the educational content of the MEDical FACulties NETwork (MEFANET, 2024) is a project aimed at building and strengthening the cooperation of medical and non-medical health faculties of the Czech Republic and Slovakia in the development of teaching using modern information and communication technologies.

b. Virtual reality, augmented reality and 5D cinema

Another possibility in first-aid learning is the use of virtual reality (VR), augmented reality (AR) and 5D cinema, but we must always keep in mind the goal of education, not just likeability. The distinctions between VR and AR come down to the devices they require and the experience itself: AR uses a real-world setting while VR is completely virtual. AR users can control their presence in the real world; VR users are controlled by the system. 5D cinema combines 3D movies, seats that move and various environmental effects to simulate odours, lightning and thunder, wind, frost, rain and snow, and explosion impact.

Paramedic students (García-Pereira et al., 2020) wore virtual reality headsets that immersed them in the shot and made it possible to collect basic clinical information and assign it and sort it. Although no difference in satisfaction between live or virtual reality was found, participants were found to experience a lack of human interaction and emotional immersion as a limitation of the virtual-reality technology. However, virtual reality can be a viable option for improving immersion given its minimal maintenance costs and the ability to expose students to situations that are difficult to imitate with traditional techniques, such as those that are dangerous or rare (Mills et al., 2020). Augmented reality (virtual objects seem to co-exist in the same space as the real world) can represent an interesting approach for moulage involving human interaction while maintaining desirable features of virtual reality simulations such as immersion and cost effectiveness (DCosta et al., 2024).

VR is a tool that allows the consolidation of a greater amount of knowledge in the short term and can be used for situations such as pandemics, where traditional formats are not available. Also, student satisfaction when using participatory methodologies in training such as VR or role-playing is very high (Figols Pedrosa et al., 2023; Nas et al., 2022). The use of VR could be recommended as a prequel to a live first-aid course with simulations as a teaching methodology due to the lower cost. A good training program with VR/AR/5D cinema seems to be (1) theoretical preparation (optionally with 5D movie), (2) VR/AR (saves time and salary for lecturers), (3) practical exercises and (4) tactical exercises of IZS (HZS ČR, 2023).

Experts (García-Pereira et al., 2020; Kent et al., 2016) have also pointed out that medical students or trainees of first-aid courses should get used to the presence of olfactory stimuli, for example by using a 5D cinema, VR and AR. However, odours/smells do not provide any benefit on the performance of manual dexterity tasks, but odours do have a positive effect on the performance of

some spatial reasoning tasks (Krueger, 1996). In the quasi-experimental study, which used a clinically relevant smell (mouldy cheese which suggested a diagnosis of wound infection), participants reported improved outcomes from the simulation (Kent et al., 2016).

A limitation of virtual reality due to the weight of VR headsets and subjective discomfort and pressure load on the head implies a potential for improving the physical comfort of VR headsets by reducing weight and designing headsets with an integrated shape (Yan et al., 2019). In addition, AR appears to be more advantageous for teaching a larger number of students, the time for teaching can be reduced and nausea (cybersickness/virtual-reality sickness) can be avoided.

VR may improve the quality of chest compressions (Trevi et al., 2024; Alcázar Artero et al., 2023) as well as the use of a defibrillator (Trevi et al., 2024) compared to instructor-led face-to-face basic life support (BLS) training. The virtual learning environment was perceived to be engaging, realistic and facilitated the memorization of the procedures (i.e. it can give feedback), but limited decision-making, team building, psychological pressure and a frenetic environment were underlined as disadvantages (Trevi et al., 2024).

c. The KID card and LOCIKA

For children and others, the KID card for children (KIDcard, 2024) is one of the projects of the SOFA organization (SOFA, 2024). The card is a very effective and easy-to-use tool that helps to detect a child at risk in time. The card is intended for all professions that may encounter children at risk (variants for teachers, health workers, social workers, policemen and firefighters, children, parents and the public). It provides guidelines for identifying acute or chronic threats to a child's life, safety and health. It also describes the procedure for ensuring the child's protection in case of danger.

For caregivers, LOCIKA (2024) bring a series of supporting articles, instructions and information on how to handle difficult situations with children (for parents, teachers, social workers and others) how to support them, how child protectors should take care of themselves, and how child protectors can deal with their own fear and anxiety.

4.6 Study limitations

The present study was limited in the willingness/unwillingness of the secondary schools to follow the requirements for dividing pupils into groups according to the results of the Pretest. If it was not possible to create knowledge-balanced groups of children, the Pretest was evaluated and if the pretest results did not differ statistically significantly, a coin toss was used to determine which class would be the experimental group and which class would be the control group. Another limiting factor could be the different number of children in the subgroups (e.g. children with German as the 2nd foreign language learning in the same grade by the same teacher/methods), which was reduced by appropriate statistical methods. Additionally, our results might not be generalizable about all types of activating methods and how their use in teaching affects other contexts.

5 Conclusion

It is important to teach first aid. Children are highly motivated and never too young to learn first aid. The earlier children are trained, the more likely it is that the provision of first aid will become a normal part of their lives. Repeated training provides them with a lot of knowledge and life skills, which leads to empowerment.

Children rate the first-aid courses highly, even slightly better, if it takes place through activation methods including CLIL, but the differences between the teaching of activation methods including CLIL compared to conventional teaching are not statistically significant. With regard to the fact that the

differences between activating teaching methods including CLIL compared to classical teaching are not statistically significant, activating methods including CLIL have another added value in that children find them fun and want to learn again.

Through a questionnaire, it was analysed whether the selected activating methods and the CLIL methods are effective in teaching first aid for secondary school children. An evidence-based educational pathway and current European Resuscitation Council guidelines were followed. The study was focused on the differences in the level of knowledge and attitudes of children educated partially/fully through activating methods/CLIL compared to common first-aid teaching (PowerPoint presentation, first-aid videos, worksheets). Significant differences in the level of knowledge in all subgroups with partial/fully teaching through activating methods/CLIL were found. Also, the assigned role (rescuer vs. rescued) in simulations with moulage does not affect the increase in knowledge level and children prefer the role of the rescued. From the perspective of organizing such a first-aid course, it turns out that no additional persons are needed for the simulations. In German/Czech CLIL as well as in English/Czech CLIL we can conclude that the use of CLIL in teaching first aid will not worsen the level of knowledge and support. Moreover, the children educated through activating methods/CLIL declare a higher attractiveness of teaching, a greater motivation to continue learning first aid using the same methods and a greater willingness to pass another first-aid course.

The authors thank the children, their parents and teachers for their helpfulness and willingness to participate.

The paper is published with the support of the grant of the GA JU (GA JU 042/2022/S and GA JU 123/2019/S).

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Primary Paper Section: A

Secondary Paper Section: AM, AQ, FQ

APPLICATION OF THE THEORY OF CONSTRAINTS IN THE SERVICE SECTOR

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This paper has been prepared with support with the support of the VSTE Institute of Corporate Strategy, Department of Management. Article ID: IDUPS24031.

Abstract: Innovations involve changes to strengthen the company's position in hugely competitive markets. McDonald's food chain has always sought to implement the Theory of Constraints (ToC), detecting global weak points to work on. This innovative approach comprises facilitating and cost reduction of production processes or expanding business services. In the article, we evaluate the impact of these innovations using the linear regression method in the McDonald's food chain in Czechia between 2007 and 2020. Our results show that the McCafé and McDelivery services are the most profitable businesses for the expansion of business activities, services and distribution channels. By following successful business models, the food chain reacts intelligently to new market trends in this global competition. Our findings agree with the further pursuit of ventures for expanding business activities.

Keywords: theory of constraints; services; gastronomy; quick service restaurant, innovation.

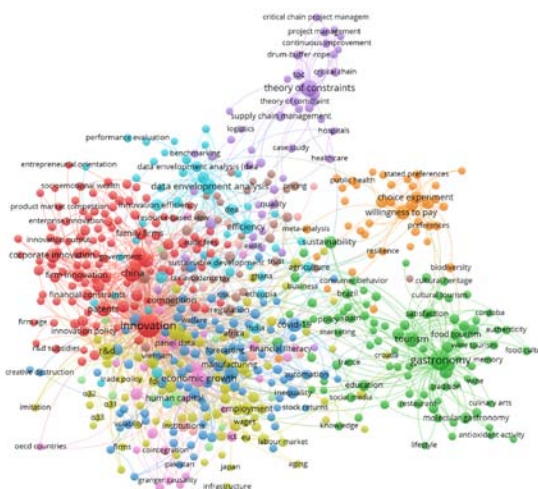
1 Introduction

Businesses today are faced with a number of management challenges (Pawliczek et al., 2022, Taliř, M. & Straková J., 2023). A wide range of tools and methods can be used to optimise decision making (Zimmermannová, J., & Čermák, P., 2014; Pawliczek A., & Navrátilová D., 2016; Taliř et al., 2023). This research study applies the methods and techniques of the theory of constraints to the business and service sector. The study focuses on the McDonald's fast food chain, a leading representative of Quick Service Restaurants and its activities in the Czech market.

The theory of constraints is an essential and universally applicable tool, developed in the 80s of the last century and used for production efficiency, which is used most often in the secondary sector of the economy (Watson, Blackstone & Gardiner, 2007). Especially in the new millennium, its elements penetrated the service sector, which was unusual until then (McCleskey, 2020). TOC is a robust tool, significantly interfering with established procedures and is usually very expensive to implement (Orouji, 2016).

An overview of selected studies that mention the application of the modified TOC for use in the service sector is given literature review by Kumar, Siddiqui & Suhail (2020), McCleskey (2020) and Miguel et al. (2017). Beylihan (2018) further states that TOC is a universal tool that can improve the functioning of any business regardless of the area of its operation. Janosz (2018) deals with the possibility of implementing universal steps (based on TOC) in SMEs. Franceschelli (2018) then deals with the possibility of implementing intended innovations in a small gastronomic enterprise. Figure 1 suggests, in professional literature, the connection between innovations in gastronomy and the theory of constraints is not too high.

Figure 1. Overview of ToC, Gastronomy and innovation in current professional literature



McDonald's France developed many international procedures for the global market. Bisson (2020) states that he uses knowledge from TOC when implementing new customer services at McDonald's France and has repeatedly applied them when introducing self-service kiosks or changing the production concept from Make-to-Stock to Make-to-Order. He adds that these techniques can simplify production and partially replace human work. The necessity of these steps then justifies the differences between the unification of the product and different staff approaches and habits anywhere in the world. Campos (2021) explores the innovations in Quick Service Restaurants (QSR), according to whom the sophisticated 3D - Digital, Drive-thru and Delivery system improved McDonald's position on the market.

Baba (2020) and Yaacob (2022) then mention ways of influencing customer behaviour through self-service kiosks. Musfiroh (2020) evaluates the loyalty of customers using kiosks. Bonadonna (2020) deals with a more general concept of phenomena that affect employees and customers of QSR upon implementing innovations. Puleka (2018) deals with the parameters of training new employees when comparing different approaches in individual QSR chains.

This article aims to identify the business procedures and methods applied in McDonald's Czech Republic between 2007 and 2020, based on the techniques of the theory of constraints, and to evaluate their overall influence and impact on the general restaurant business within the limits of monitored factors (McCafé, MTO system, ordering via Self-Order kiosks and McDelivery delivery).

In the horizon of the mentioned years, it is possible to obtain relevant input data, the data before 2007 are qualitatively insufficient, and the development in 2021 has yet to see its publication in many cases.

The Labor-to-sales ratio allows evaluation of this phenomenon, which should decrease with the realization of each monitored innovation. Due to the conducted research, it will be possible to evaluate which of the listed factors most influence this indicator or to decide whether it is better to implement innovations to increase sales (outputs and performance) or implement procedures for replacing employees with technologies.

RQ1: Considering the evaluation of influences in time series and the measurement of the resulting effectiveness, it is appropriate to identify which analyzed ToC-based procedures lead to maximum savings and can be considered the most effective or

decide if it is better to reduce the number of employees for the same services (for cost reduction) or retain employees and expand the portfolio of services (to increase revenues)? Solving the research question will provide prerequisites for solving RQ2. RQ2: Furthermore, it is advisable to find how to convert the mentioned steps into a universal format suitable for the gastronomy industry (or the service industry in general). Especially in the gastronomy sector, costly innovations do not usually speed up the production process, so it would be appropriate to identify a way of possible universal implementation. Answering the research question will fulfil our aim. At dignissim nisi. Nam viverra metus ut neque lacinia faucibus. Cras viverra sagittis lorem vitae ornare. Morbi euismod elementum orci. Donec ut aliquet ligula. In nibh lacus, facilisis ut ultricies id, porttitor ac dui. Curabitur ultrices lacinia ornare. Morbi eros ipsum, rhoncus sit amet congue in, vulputate id tellus. Nulla ipsum libero, vehicula vitae hendrerit at, ultrices nec nisi. Nullam vitae diam sit amet leo accumsan iaculis at sed urna. Nulla tincidunt aliquam laoreet. Vestibulum at ipsum metus. Sed mollis consectetur pellentesque. Sed fermentum hendrerit purus, vel facilisis urna fermentum quis.

2 Literature review

Innovation is a necessary part of any business that wants to achieve long-term sustainable growth or an established company that wants to maintain a strong position in today's highly competitive market. Like manufacturing companies try to improve their productivity by introducing innovations in production, companies in the service sector try to optimize their processes effectively. QSR food chains are no different, spanning the world with thousands of branches. QSR chains such as McDonald's, Subway, Burger King or Wendy's are constantly trying to use potentially suitable strategies to expand their service portfolio or to reduce costs.

The crucial factor for a successful business in the initial phase is the choice of location. Hladkyi (2019) analyzed the distribution method of McDonald's restaurants in Ukraine, where branches located in residential areas and housing estates achieved the highest sales. Wu (2021) emphasizes the factors behind choosing an appropriate location. He conducted his research in Beijing, China, where food chain branches span most commercial centres. This article does not deal with the issue of location, as it cannot be influenced or perceived as an innovation. Singh (2021) further examines innovation in QSR during normal operations, tracing the interrelationship between product innovation (PI), customer satisfaction (CS) and service innovation (SI). He concluded QSR's competitiveness rests on continuous innovation. Lubetsky (2020) further states the service area, especially QSR, has been lacking digital refurbishment for a long time even though the Covid-19 pandemic and consumer trends before the crisis forced restaurants to adopt the given system. One of the most fundamental innovations in the 21st century in the field of QSR (as well as in other industries) is the introduction of self-service kiosks for handling customer requests (Vakulenko, 2019). According to Leung (2021), self-service kiosks in QSRs can very well substitute cashiers, receiving consumer preferences over human-operated cash desks. On the other hand, cashiers can generate more revenue. Rastegar (2021) conducted a service analysis, exploring the advantages of self-service kiosks in QSR. He confirms that self-order stalls reduce costs, speed up customer service and increase order accuracy. The author conducted a survey covering 619 respondents, who expressed their preferences on a scale from 1 to 5, evaluating the experience of their last visit to QSR McDonald's. The findings suggest that customers would even be willing to pay \$2.47 for faster, more advanced service. Vakulenko (2019) analyzes the types of customer value derived from using a self-service kiosk. On a larger scale, Chua (2020) explored customer preferences in all types of restaurants, classifying them into full-service, quick-casual and quick-service. His survey of 617 respondents indicated price as the critical factor, followed by Word-of-Mouth, Personal Experience and Variety of Menu Items. On the contrary, the least significant aspects are Sales promotions and e-Reviews from customers.

Based on research conducted in Malaysia, Ahmad (2019) states that self-service kiosks do not reward all industries. While they can represent competitive advantages in the restaurant business, their implementation in hotels was not worthwhile, as it reduced the quality of the service provided. However, Lubetsky (2020) does not consider self-service kiosks the only key innovation, including delivery service, often with the participation of third parties, as equally vital. Campos (2021) also states that among the three main advantages of McDonald's in QSR is the "three D's": digital, drive-thru, and delivery, which made the restaurant a market winner during the Covid-19 pandemic. The issue of order delivery is dealt with more by Andari (2018), who, based on a questionnaire survey, compared data from 200 respondents in Europe, the USA and Indonesia, finding differences in customer loyalty. Chadwick (2018) highlights that QSR restaurants are easy to adapt to a delivery service and points to its advantages and disadvantages, which can be handled in-house or outsourced. Since McDonald's hires third-party import services, professional literature does not give much information. Likewise, very little research explores the new Market-to-Order (MTO) manufacturing model, increasing the average service time of one customer but significantly reducing waste and personnel costs. However, as early as 1993, the restaurant chain started opening McCafé cafes in Australia (Guerguis, 2019) and introduced the same service in the Czech Republic in 2007. Wright (2007) discusses the concept and co-branding arrangement of McDonald's/McCafé and determines the incentives of this joint initiative. We should note that the above does not capture all the possible factors and innovations according to which the financial results of QSR McDonald's can be monitored and evaluated. According to Guerguis (2019), a great novelty is serving the customer at the table, who does not have to wait in line to place an order. Nowadays, the Czech branches follow the abroad model (Panwar, 2017), adapting dishes and drinks to the local market.

Now it is appropriate to propose a suitable indicator for monitoring the development of the restaurant over periods. The service sector and especially restaurants are significantly different from other forms of business - unskilled labour, high employee turnover or relatively high employee costs compared to sales and other discrepancies in financial indicators (Mun, 2018). According to TGG Accounting (2021), the labour costs ratio (personnel costs) to sales should be 40-45% for gastronomic enterprises, even if we must tailor the final value to the specific business. This situation creates pressure to achieve better results with existing personnel costs or the same results with lower personnel costs. Bisson (2020) agrees with the idea, suggesting replacing workers with machines to reduce costs (among other things). An indicator of the working costs-sales ratio will help evaluate the business development, expressed as the Labour-to-Sales ratio (Kcard, 2020). An increasing value means deficiencies in resource allocation, while a decreasing value over time indicates improper use of resources. Chuang (2016) mentions the labour-to-sales ratio as a tool to monitor corporate business or economic development. TGG Accounting (2021) adds that this procedure is suitable for overseeing restaurant business development.

Furthermore, we must determine a suitable method of measuring factors of the above-mentioned monitored indicator, suggesting time series of advanced statistics and econometrics for the analysis and evaluation. This technique is essential mainly for covering a relatively large number of fluctuations in a small amount of data influenced by external conditions, especially economic cycles. We must note that modified time series methods for data processing currently span professional literature, e.g. Maharaj (2019). Our analysis favours a regression analysis method, which enables the prediction of future developments. The technique uses least squares to rewrite a linear function with superstructure elements of a polynomial and expresses the degree of reliability using a correlation coefficient (Kim, Lee and Kim, 2020; Ho, Ngo and Le, 2021). The development of a time series indicator can also be evaluated and analyzed based on forecasting-based methods, as reported by Cerqueira (2020) or Liu (2021). In this context, Sezer (2020)

provides suitable methods for analyzing time series of an economic nature. Wu (2020) further mentions a labelling method to explore financial time series.

Furthermore, it is necessary to focus on methods and procedures that allow completing (calculating) missing data in time series. Due to the nature of the data and the high number of sources, some data are unavailable, but this error rate is less than 3 % of the whole case. Van Buuren suggests general procedures and principles for replacing missing data (2018), while Little and Rubin (2019) provide a comprehensive overview of suitable solutions for specific statistical techniques. Both authors classify and explain basic methods (and specific procedures) involving data set reduction, imputation, multiple imputations or the maximum likelihood model. Madley-Dowd (2019) suggests avoiding Multiple Imputations (MI) if there is more than a negligible amount of missing data in the research sample. Due to the relatively small length of the time series, it is not appropriate to replace the missing data with a time series trend based on linear regression. Finally, Zhang (2022) recommends classifying the availability of neighbouring values and a small length of the time series to complete the data. This procedure is a linear interpolation of values.

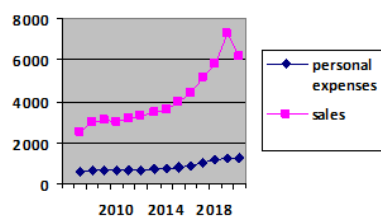
In order to collect and process data, the procedures below are used. Data for answering the first research question are obtained from the financial statements and annual reports of a total of 25 companies that are individual franchisees of the McDonald's chain in the Czech Republic. Data processing is carried out using the statistical method of linear regression, which enables the explanation of the influence of individual factors. Data to answer the second research question are obtained from the previous research question. The processing is subsequently carried out on the basis of qualitative procedures and synthesis of the knowledge obtained.

3. Data & Methods

This part suggests data, methods and procedures applied to answer research question RQ1.

The reliable Labour-to-Sales indicator requires relevant data that show the development of sales and the development of personnel costs. These data can be obtained from the annual reports, reflecting the 14 years of 25 relevant companies (24 franchisees and one parent company) operating in the Czech Republic in the observed time horizon of 2007 and 2020. Chart in Figure 2 suggests the development of the Sales and Personnel expenses indicators.

Figure 2. Development of personnel costs and sales of the McDonald's chain in the Czech Republic from 2007 to 2020.



The figure shows a high increase in sales, reliably outspeeding the cost increase, especially from 2014 to 2019. We can see a significant drop in sales in 2020, reflecting the period of the Covid-19 pandemic. As a result of this negative influence, the year 2020 is not further monitored or taken into account in research, as it causes a lower quality of data.

Another input value is the equipment of McDonald's restaurant branches in the Czech Republic measured by innovation factors. These include (1) Self-service ordering kiosks, (2) McDelivery delivery service, (3) implementation of the Make-to-Order (MTO) production process and (4) creation of a network of

McCafé cafes. The necessary information reflects the annual reports of individual restaurants, supplemented with data from our research.

Before using the mentioned data, we must find correlated variables - determine Pearson's Correlation coefficient using IBM SPSS software. Table 1 compares data covering only the period between 2007 and 2020.

Table 1. Correlation between individual factors - output from SPSS

		SOK	McDelivery	MTO	McCafé
SOK	Pearson correlation	1	614*	999**	650*
	Sig (2-tailed)		0.025	0.000	0.016
	N	13	13	13	13
McDelivery	Pearson correlation	614*	1	635*	0.380
	Sig (2-tailed)	0.025		0.020	0.201
	N	13	13	13	13
MTO	Pearson correlation	999**	635*	1	653*
	Sig (2-tailed)	0.000	0.020		0.015
	N	13	13	13	13
McCafé	Pearson correlation	650*	0.380	653*	1
	Sig (2-tailed)	0.016	0.201	0.015	
	N	13	13	13	13

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Before using the mentioned data, we must find correlated variables - determine Pearson's Correlation coefficient using IBM SPSS software. Table 1 compares data covering only the period between 2007 and 2020.

The above outputs from the IBM SPSS program point to a strong dependence between the MTO production system and the introduction of SOK, implemented in similar periods. Since Pearson's correlation coefficient reaches a very high value of 0.999, we must exclude one of these factors from further investigation for more reliable results. After the calculation, the variable with a lower p-value, which has a lower predictive value, is discarded, in this case, the information on SOK, but retaining the data on the MTO.

Table 2 below the text illustrates all analysed data over the period, dark-shading the irrelevant information, as it is unnecessary for our research for the reasons stated above.

Table 2. Development of financial data and investigated influences

Year	Financial data		Indicator Labour-to-Sales Share of value	Innovation and influences affecting results			
	Personal expenses (mil. CZK)	Sales (mil. CZK)		SOK	McDelivery	MTO	McCafé
2007	582,31	2 510,42	4,31	0,00	0,00	0,00	0,00
2008	661,81	3 012,78	4,55	0,00	0,00	0,00	0,00
2009	693,35	3 107,32	4,48	0,00	0,00	0,00	0,07
2010	648,58	3 010,63	4,64	0,00	0,00	0,00	0,09
2011	669,59	3 178,47	4,75	0,00	0,00	0,00	0,27
2012	696,05	3 306,26	4,75	0,00	0,00	0,00	0,45
2013	709,79	3 475,52	4,90	0,00	0,00	0,00	0,48
2014	717,15	3 613,87	5,04	0,00	0,00	0,00	0,54
2015	786,37	3 984,97	5,07	0,06	0,00	0,08	0,56
2016	883,78	4 374,49	4,95	0,43	0,00	0,41	0,6
2017	1 025,90	5 112,45	4,98	1,00	0,00	0,93	0,63
2018	1 195,93	5 811,18	4,86	1,00	0,15	1,00	0,64
2019	1 224,85	7 248,39	5,92	1,00	0,69	1,00	0,66
2020	1 241,65	6 190,57	4,99	1,00	0,74	1,00	0,67

2007	582,31	2 510,42	431	0,00	0,00	0,00	0,00
2008	661,81	3 012,78	455	0,00	0,00	0,00	0,00
2009	693,35	3 107,32	448	0,00	0,00	0,00	0,07
2010	648,58	3 010,63	464	0,00	0,00	0,00	0,09

In Table 2, it is appropriate to note the long-term increasing value of the Labour-to-Sales indicator (column 4), which confirms the company's efforts to reduce employee costs. The data on innovation effects shown on the right should be statistically evaluated and explained using the Labour-to-Sales indicator. These data were derived from the following resources available in the public domain: <https://or.justice.cz/ias/ui/rejstrik>

Next, we describe the data and procedures applied to answer research question RQ2.

RQ2 reflects the outputs and findings from RQ1, generalized by the generalization method. The information obtained in the investigated phenomenon is verbally generalized to a broad spectrum and confronted with other general discoveries within QSR-type enterprises. Furthermore, we analyse the text presented in literary research. As part of the subsequent analysis of findings, we explore dependencies between the application of monitored factors in gastronomy and other sectors. Subsequently, we synthesize the knowledge to formulate general conclusions.

4. Results

Below are the results of statistical analysis processing using the software tool and programming language "R", used for machine learning operations such as regression and classification. Individual findings are further commented on to explain them in this research.

First, it is appropriate to indicate the input call entered into the software tool, for the purpose of data processing. It is worth reminding that we removed the SOK variable from the solution in order to improve the quality of the outputs. Figure 3 shows the Call.

Figure 3. Call to R.

```
lm(formula = Coen ~ MCDeliv + MTO +
    McCafe, data = VD)
```

Further, we present a summary statistic. The output below in Figure 4 provides information about the symmetry of the distribution of the residuals.

Min	1Q	Median	3Q	Max
-0.18982	-0.03668	0.02164	0.07641	0.15000

Figure 4. Symmetry of the distribution of the residuals.

The median should be close to 0, the same as the mean of residuals is 0. For symmetric distributions, the median = mean. Furthermore, the values of 1Q and 3Q should be close to each other regarding magnitude. They would be equal under a symmetric 0 mean distribution. In the same way, the Min and Max values should be similar.

The output obtained by calling the linear regression summary is information about the individual analysed coefficients. This information includes coefficients estimates, standard errors, t-statistics and p-values, which determine the significance level and the importance of individual factors. Figure 5 shows the output.

Figure 5. Linear regression summary

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	4.4578	0.0626	71.214	1.07e-13	***
MCDeliv	1.4958	0.2366	6.322	0.000137	***
MTO	-0.2672	0.1318	-2.028	0.073202	.
McCafe	0.9906	0.1759	5.632	0.000321	***

Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'	
	0.1 ' '	1			

A key indicator in the output for evaluating the results is $\Pr(>|t|)$, indicating the individual p-value coefficient. The significance level allows us to confirm or reject the established hypotheses on the given indicator. Therefore, if we proceed from the standard significance level of 0.05, we can say that McDelivery and McCafé services influence the labour-to-sales rates. On the other hand, the Make-to-Order production system does not drag the given index or self-service kiosks, whose p-value was originally even higher.

The confirmation of these factors leads us to conclude that procedures for the extension of services are more effective than procedures leading to the replacement of labour by machines.

The last part of the output is Assessing Fit and Overall Significance, which indicates the residual standard error of the R^2 and the F statistic and test. Figure 6 indicates the model quality and the overall significance of the coefficients.

Figure 6. Assessing Fit and Overall Significance

```
Residual standard error: 0.1216 on 9 degrees of
freedom
Multiple R-squared: 0.9272, Adjusted R-
squared: 0.903
```

We applied a Durbin-Watson test using the `durbinWatsonTest()` function to indicate potential residual autocorrelations. Figure 7 shows the output.

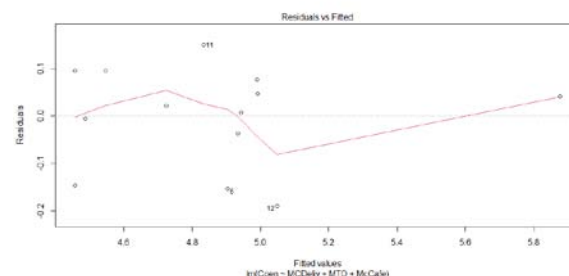
Figure 7. Symmetry of the distribution of the residuals

```
lag Autocorrelation D-W Statistic p-value
1 -0.3263609 2.478472 0.952
Alternative hypothesis: rho != 0
```

The output suggests that the test statistic is 2.478472, and the corresponding p-value of 0.952. The p-value is high, showing no residual autocorrelation. As a result, we cannot reject the null hypothesis that there is no correlation among residuals.

Chart in Figure 8 depicts the linearity assumption of the model.

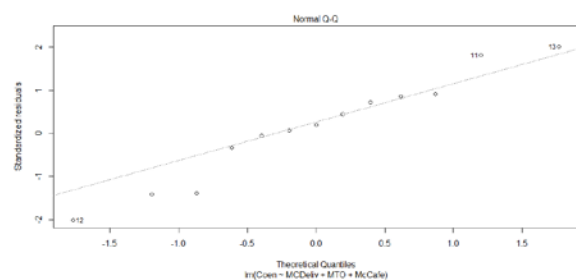
Figure 8. Linearity assumption.



The data are relatively linear, keeping the red curve close to the theoretical dashed line. The figure does not make any specific shape that would show a correlation.

The following Figure 8 observes normality assumption of the model.

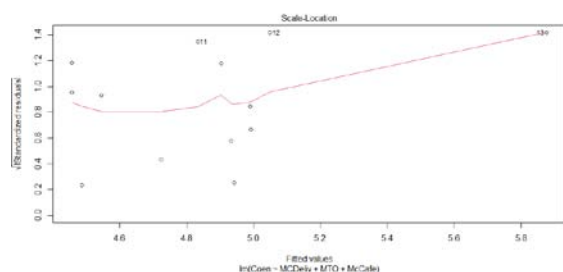
Figure 9: Normality assumption



The figure shows all points close to the theoretical line, indicating a relatively high percentile matching with the standard normal distribution. On the left, we can see variables below the line, partially caused by the standard deviation.

The Figure 10 below depicts a simplified analysis of assumption of homoscedasticity in the model, i.e. same variance in linear regression.

Figure 10: Assumption of homoscedasticity in the model



The constancy of the red function line (horizontal with a slight growing trend) scales with the average of standardized residuals. Since the dispersion around the function does not change with the interspersed values, we can consider the model homoscedastic.

5 Discussion

Procedures involved in the Theory of Constraints are costly, discouraging enterprises from their effective implementation. Strangely enough, the service sector has seen a surprisingly rare use of these techniques, whereas healthcare, among others, is reaping the fruits of their successful application (Bacelar-Silva, 2022). Bisson (2020) suggests implementing ToC in gastronomy, especially at McDonald's. The QSR food chain currently pays an arm and a leg to stay competitive, applying the Theory of Constraints to boost production and reduce costs. The presented article explored four decisive factors of implemented innovations over the period, including self-service kiosks to make an order, introducing a make-to-order production system, food delivery and opening McCafé.

Let's go back to the research questions suggested in the introduction.

RQ1: Considering the evaluation of a greater number of influences in time series and the measurement of the resulting effectiveness, it is appropriate to identify which analysed ToC-based procedures lead to maximum savings and/or can be considered the most effective, or decide if it is better to reduce the number of employees for the same services (for in order to reduce costs) or retain employees and expand the portfolio of services (in order to increase revenues)?

Our findings revealed a strong correlation between introducing self-service kiosks and the MTO production system. Although contributory to cost savings, neither factor proved general significance. Simultaneous and similar implementation of both procedures made an accurate identification impossible. Even

upon excluding the less relevant aspect, self-service kiosks, the MTO production system did not prove of utmost importance, despite higher significance levels. On the other hand, McCafé and McDelivery services largely contributed to increased sales, rendering cost-saving procedures economically inefficient.

We recommend that QSR gastronomic chains expand their product and service portfolio, grounded in the success of McCafé and McDelivery. On top of sales growth, the former has become highly competitive with Starbucks or Costa Coffee, while the latter uses existing delivery services like Uber Eats or Wolt. Attractive offers meet the seasonal customer demand for a quality gastronomic experience, becoming fiercely competitive with fine restaurants.

McDonald's could follow current culinary trends of healthy and vegetarian food. Although this idea is far from the original McDonald's concept of tasty yet often unwholesome processed meat, the fast-food chain must adapt to the new market conditions, offering (in the CZ and abroad) vegetarian and vegan sandwiches. McCafé may expand to a "McFresh" separated bar, selling fresh fruit and vegetable drinks, salad and wraps. This new venture would match current market conditions, satisfying the insatiable global demand for fresh products. Considering McDonald's numerous branches, integrating McDelivery services into the business model would cut the costs of external delivery services.

Let's focus on the second research question, formulated at the beginning of this article.

RQ2: Furthermore, it is advisable to find out how can the mentioned steps be generalized into a universally applicable format suitable for the gastronomy industry (or the service industry in general)?

Our findings revealed that expanding the portfolio of activities and employing effective production and distribution strategies will greatly reward gastronomic enterprises. The single steps include providing delivery services and processing their food rather than ready-to-cook or semi-finished products. On top of that, extending the product range using the same procedures will be time saving and benefitting from modern technologies. Rather than generally applicable, these recommendations relate to QSRs to remain competitive.

Although the suggested procedures do not directly apply to ToC methods, they significantly boost corporate profits and help fight off the competition.

6 Conclusion

The presented article uses statistical methods to consider effective implementation of selected innovations in the Czech McDonald's food chain, evaluating four independent novelties introduced to remain competitive in the cut-throat market. The business industry has recently seen ample modernization, determining corporate success. Innovations bring benefits like stimulating continuous processes, cost cuts, less time spent on projecting and implementing new products and high efficiency.

The innovations in the monitored QSR reflect the theory of constraints, aiming to eliminate the human factor from the production process. ToC usage spans the professional and business sphere, seeking to identify and exploit limiting factors. Although the techniques may be vital to business success and long-term profitability, the Labour-to-Sales parameter remains unchanged. On the other hand, innovations, i.e., applied theory of constraints, profoundly improve the Labour-to-Sales ratio. Our findings suggest effectively expanding the service portfolio to boost corporate incomes.

Although the suggested ToC methods do not fully reward our case in the gastronomy business sector, they may increase corporate performance. Our survey covered only 104 Czech restaurants (to 31st December 2020), limiting us to an observation of 14 consecutive years, from 2007 to 2020.

Although the total length is reliable, we would welcome measuring in shorter intervals, like a month or quartile. As self-service kiosks and extended (internal) delivery services rank among popular innovations throughout the QSR sector, confronting our findings with other QRSs in the Czech Republic or Europe would go a long way.

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Primary Paper Section: A

Secondary Paper Section: AE, BB

THE IMPACT OF MANAGEMENT ACCOUNTING ON BUSINESS COMPETITIVENESS

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The paper was prepared within the project VEGA 1/0499/22 - Sustainable Accounting in the Context of Strengthening Competitiveness.

Abstract: Given the ever-changing market environment, competitiveness is one of the essential characteristics of a business. A company must strive to position itself in the industry in such a way that it is best able to face competitive pressures or to turn them to its advantage. This is conditional on managers making the right strategic decisions. Management accounting can provide them with the information they need to do this.

Keywords: Competitiveness. Factors of competitiveness. Competitiveness assessment. Managerial accounting. Financial accounting.

1 Introduction

Businesses operate in a business environment that reflects a number of business changes, both positive and negative. Given the scale of change, a new competitive environment is also emerging. In order to be able to respond to these changes in the business environment and to be competitive, businesses can manage their business in a modern and efficient way using management accounting. Management accounting offers businesses tools and methods for better strategic decision-making. This will enable them to adapt to changing market conditions, identify new opportunities and ensure the competitiveness of the business in the market.

2 Competitiveness

Competitiveness is the response and reaction time to changes in the market in customer demand in the process of creating products or providing services. "Competitiveness is one of the pillar requirements in the ever-changing market environment of our time and is therefore considered one of the essential characteristics of an enterprise. A fundamental feature of a market economy is the freedom of the customer to decide not only what product to buy but, above all, from whom to buy it. This fact leads to competition between potential suppliers for customers. The supplier chosen by the customer can be said to be more competitive than the other competitors. Every undertaking should strive to create competitive advantages which increase the competitiveness of the products offered. The competitiveness of the products is mainly determined by their quality and the position of the company on the market is determined by the customer's interest in the offered products," (Krauszová, Janeková, 2008, p. 468).

Closely related to competitiveness is competition, which is competition in the market. It exists on both the demand and supply sides. On the demand side, it is an expression of the conflicting interests of buyers, as everyone wants to satisfy their needs at the lowest prices. On the supply side, it is the result of producers trying to maximise their profits. If the supply is insufficient, each buyer tries to obtain from a limited number of offers, which results in an increase in price.

2.1 Competitiveness factors

Competitiveness is influenced by external and internal factors. "External factors include those that are beyond the control of the enterprise, or where the enterprise's ability to influence these factors is limited or indirect. These include the bargaining power of suppliers and customers, competition, product market, corruption in the environment, interest in employment in the enterprise, and the support of local and state authorities," (Karpissová, 2008, p. 297). "Internal factors are considered to be those that the enterprise has the ability to influence and that are located inside the enterprise. These include factors of scientific and technological development, marketing and distribution factors, as well as factors of production and its management,

labour resources and financial and budgetary aspects of the business," (Karpissová, 2008, p. 294). Thus, internal factors include employee motivation and training, business performance and logistics, quality, innovation, cost reduction, advertising and information technology.

"Not all factors of competitiveness are objective and often not even measurable, but subjectively perceived by confronting customers with their requirements, values or just their moods. Broadly speaking, competitiveness is a superposition of the following factors:

- the product, its features, price, design, etc.,
- communication skills in relation to the customer,
- the reflection of the time dimension of the business - speed of response to customer requirements, speed of implementation of processes, speed of change,
- the aggregate effect of the business - geographical location in relation to the customer, tradition, goodwill, image,
- the ability to form strategic alliance relationships with both suppliers and customers,
- capital strength and financial capability - application of quality management systems, labour productivity, etc.

In some cases, competitiveness is also complemented by belonging to a region equipped with adequate infrastructure, legal environment and other macroeconomic criteria of the region. The uniqueness of any of these factors creates a competitive advantage that is valued by customers and the resulting motivation to establish a business relationship," (Borovský, 2005, p. 9).

2.2 Competitiveness assessment

Closely related to competitiveness factors is the competitiveness assessment. Several methods are used to assess competitiveness. The most used assessment method is the 5F method, also called Porter's analysis or Porter's 5 forces model. It comes from the American economist Michael E. Porter. It is based on analysing the factors that determine "the size and nature of competition of a particular firm in its industry of interest," (Mallya, 2007, p. 49). Michael Porter identified the basic five forces (factors) that affect the competitiveness of an enterprise in an industry. "These five forces are:

- the strength of rivalry in the industry,
- the possibility of product substitution by substitutes,
- bargaining power of customers,
- the possibility of entry of new competitors,
- bargaining power of suppliers.

The importance and relevance of each of these five factors for individual companies depends on the sector in which they operate. Each industry is characterized by its different features and character from the others," (Grasseová, Dubec, Řehák, 2012, p. 191).

"The strength of rivalry in an industry depends primarily on the number of competitors, their size and also their strength. The more competitors and the more they are equal in size, the greater the rivalry between the different actors in the competitive environment. Other factors that influence the strength of rivalry are market growth, barriers to exit (high costs may prevent exit from the industry) and irrational reasons," (Magretta, 2012, p. 54). "The ability to substitute substitutes for a product is influenced by the difficulty with which a customer can get to the substitutes. Of course, the price and quality of the offered substitute also have a significant influence. In countering the threat of substitutes, the firm should focus on maintaining or reducing the price of its products and on their developmental improvement," (Mallya, 2007, p. 51). "The bargaining power of customers is higher the more customers can organize themselves, the less product differentiation, the product price is a substantial

part of the cost, the difficulty of product substitution is not high, and the purchasing power of customers is not high. If the bargaining power of the customer is too high, the market becomes unattractive for businesses," (Grasseová, Dubec, Řehák, 2012, p. 192). "The ability of new competitors to enter the industry depends on the barriers to entry that prevent them from doing so. New competitors are mainly attracted to enter the industry by the price of products. What makes new competitors uninterested in entering is the level of costs associated with entering the industry and the costs associated with coping with firms already operating in the industry," (Magretta, 2012, pp. 52-53). "The bargaining power of suppliers depends on similar factors as the bargaining power of customers. The bargaining power of suppliers is directly proportional to the size of the suppliers and their ability to unite. Switching suppliers is usually associated with high costs. Finally, there is the non-negligible threat of the supplier itself entering the industry," (Magretta, 2012, pp. 48-50).

3 Business accounting

In market economies, corporate accounting as a structured information system consists of financial accounting and management accounting. Financial accounting has a legally prescribed content and form. Its purpose is to give a true and fair view of the assets, financial position and earnings of the enterprise, i.e. of the subject matter of the accounts. The information it provides is intended primarily for external users. It records data on a consistent and systematic basis for the enterprise as an accounting unit. It uses a monetary unit of measurement. Its maintenance is compulsory for the enterprise. Management accounting provides the economic information needed by the management of an enterprise for effective decision-making and control. It is a collection of diverse economic information relating not only to past events but also to information about the future possible development and strategy of the enterprise. It has no legally prescribed content and form. It uses different units of measurement to express economic phenomena. Unlike financial accounting, its information is intended for the management of the enterprise. Its maintenance is voluntary for the enterprise. Management accounting is made up of individual subsystems:

- cost accounting,
- costing,
- budgeting,
- inter-organisational accounting,
- tax accounting,
- environmental accounting.

3.1 Management accounting and financial accounting

"Management accounting is understood by us as accounting designed for management, which basically describes its main role. Thus, it should primarily serve the management of the enterprise to make the right decisions about its operation and further development," (Čechová, 2006, p. 3). Financial accounting provides the necessary financial information for management accounting. Therefore, "the basic task of management accounting, which consists of partial, interrelated tasks, can be divided into three groups:

- detecting actual phenomena and information,
- control of those phenomena, analysis of those phenomena and processing of the output information,
- the preparation of information for the decision-making process itself and the subsequent determination of the tasks arising from the decision-making processes.

While the first and second points also deal with financial accounting, where actual phenomena are captured in the books, financial controls and analyses are carried out, but mainly in relation to the needs of external users, the third point is part of management accounting. In management accounting, the detection of actual phenomena and information is done primarily in relation to the needs of internal management, i.e. in a different

way than in financial accounting. The analyses carried out are often common to both the needs of external users and the needs of internal management. However, some are for management only and are of no interest to the external environment. It is true that the first and the second group of tasks are very closely interrelated in management accounting; it is impossible to set precise boundaries when it is about detecting phenomena and when it is about controlling, analysing and processing them into output information," (Čechová, 2006, p. 5).

"In the context of the use of management accounting in tactical and operational management, the substantive differences from financial accounting can be concretised into five basic points:

- Financial accounting focuses mainly on the past; management accounting should provide a basis for comparing reality with the desired state, or for evaluating comparative possibilities for future developments.
- The subject of financial accounting is mainly the external relations of the holistically understood enterprise and its environment; management accounting shows not only the external but also the internal relations between departments and their processes.
- Financial accounting information is also available to competitors, so that financial accounting report preparers hide some important information, e.g. factors that affect sales results. Management accounting, on the other hand, provides detailed information on these results.
- Good management accounting is nodal responsibility accounting; any internal recognition of revenue by the selling unit should be matched by an assumption of cost or responsibility for the asset in the withdrawing unit.
- The basic, primary focus of management accounting is to provide the highest quality information about the factors that affect the amount of profit. This is reflected both in a differentiated view of how total actual and forecast profit is measured and, in an attempt, to express the contribution of individual performances, processes, activities and units to total profit and to quantify the variation in the level of incremental or opportunistic profit.

In conclusion, the focus of management accounting is the content, structure and detail of the information provided on costs, revenues and their variance. Compared to financial accounting, its main difference lies not only in the different content concept of costs and revenues, but mainly in the more detailed information about their internal structure and breakdown," (Král et al., 2012, p. 41).

4 The impact of management accounting on competitiveness

Management accounting affects its competitiveness through all the above subsystems. In terms of the most important factors, costing, costing and budgeting can be mentioned. Costs in management accounting are based on the characterisation of "as a value-laden, purposeful expenditure of an enterprise's economic resources, purposely related to economic activity. The following features are essential to this definition, which emphasises not only the need to show their real amount subsequently but, above all, the need for their rational economic use:

- efficiency: an expense is only an expenditure which is rational and proportionate to the results of the activity;
- purposiveness: the purpose of the expenditure of an economic resource is its appreciation; it occurs only when such a component of the asset is created which has brought, or will bring in the future, a greater economic benefit than the original cost; an important characteristic of a cost understood in this way is therefore its relatively close relationship to the outputs (products, works, services or other economic activities) which make up the enterprise's front-end activities. In this context, it is sometimes referred to as a cost driver," (Král et al., 2012, p. 48).

Costs are closely related to costing. "In the most general sense, costing is the ascertainment or determination of the cost, margin, profit, price or other quantity of value of a product, work or service, of an activity or operation to be undertaken in connection with its performance, of a corporate investment action or of a unit of output otherwise expressed in kind. It is the fact that costing displays the two basic poles of the business process - performance in kind and its value parameters - in a correlated way that makes it the most important tool synthetically displaying the relationship between the material and value aspects of business," (Král et al., 2012, p. 124). Costing and costing are the basis for a specific type of decision-making, which is pricing decision-making. The basic objective of pricing decision-making is to determine what costs associated with a given product (service, work) are bearable at the current price and what price could be offered under current conditions for production, sales and other activities associated with the production of the product or the provision of services and works. Pricing decisions are largely influenced by the market situation and the possibilities of competition. It is therefore necessary to assess the acceptability of the price to the purchasers of the product, service or work in such a way that the price covers all the supplier's costs and ensures at least a minimum level of profit. It is important that the price is accepted by the customer and is favourable for the supplier in the given circumstances. It is about finding the optimal price in the interface between the demand price and the supply price. Further, pricing decisions are influenced by the objective that is preferred by the business. If the objective of the firm is to build market position, to gain clientele in the long run, then pricing decisions will be less aggressive and more acceptable to customers. Conversely, if it is only about immediate profit (short-term effect), price decision-making may take full advantage of a favourable market situation (product shortage, weak competition at the moment) and set the maximum acceptable price for customers. In this case, customers will look for other suppliers for their next supply and profits will only be made until such competition emerges on the market.

Where costing methods are not sufficient there is a need for budgeting and enterprise budgets. "Budgeting is the determination of economic tasks such as revenues, sales, inventories, expenses, costs, income, etc. for a certain period of time in advance. Budget as a result of budgeting is the concretization of the revenues and costs of an enterprise for its anticipated activities over a period of time. Therefore, it is an essential tool for enforcing accountability for the level of the value aspect of the reproduction process. The need for budgeting and budgets arises wherever different products and outputs are created, which are produced in different places (centres), which participate in different degrees in different types of costs," (Kupkovič et al., 2000, p.175-176). "Taking into account the diverse conditions of business entities and the need to master the intra-enterprise management, different types of budgets have arisen in practice, which are classified in the literature according to several aspects, for example:

- by the length of the budget period,
- by level of budgeting,
- by subject of budgeting,
- by degree of completeness,
- by monitoring the progress of the reproduction process,
- by the degree of activity," (Kupkovič et al., 2000, p.177).

"In practice, the most used and also the most important budgets are by subject of budgeting, where they belong:

- revenue (sales) budget,
- purchase (inventory) budget,
- cost budget,
- profit and loss (profit and loss) budget,
- cash income and expenditure budget (cash flow)," (Kupkovič et al., 2000, p.185).

"The order of the most important budgets is not random. The revenue budget should be prepared first, as the volume of revenue is also the basic figure for determining the level of

inventories (purchases, work in progress and finished goods), accounts payable, etc. Budgeting is based on the enterprise's accounting and other documents, but above all on the development of market conditions and the enterprise's own possibilities. The following data are considered:

- the level of revenue in previous years,
- trends in sales in the various product groups,
- changes in customer requirements
- market share and the possibilities for market movement,
- inflation trends,
- seasonal trends,
- the development of competition or the launch of new lines,
- expected changes in the economy,
- the possibility of achieving the expected revenues without major expansion,
- the disposition of the company's resources," (Kupkovič et al., 2000, p.186).

5 Conclusion

"One of the characteristic features of the market economy is competition, it is possible to survive in it not only by increasing the technical level and quality of products, works and services provided, but also by improving the ability to compete from the position of costs, which, like costing and budgeting, belong to the subsystems of management accounting. Calculations and budgeting allow more specific cost tasks, better decision making, cost control and thus examining the conditions of success," (Kupkovič et al., 2000, p. 8).

Managerial accounting also influences the competitiveness of a business when deciding whether it should enter a different market, focus on a different customer segment, or invest more in advertising, promotion and marketing. Decisions along these lines can indicate whether a business should follow the competition or not follow the competition and try to gain its own competitive advantage and go its own way. Customers are very important to a business and therefore customer service can be improved with management accounting information. Customer advice, service, product quality or order handling can be streamlined. But everything depends on reliable information, which is the basis for good communication in a company. Especially between the finance, production, HR and sales departments. Information should be regular, clear, concise and to the point, so that it can be handled at short intervals. Information should be processed retrospectively on what has been achieved and what has not, whether what was planned has been achieved or whether something that was not planned has been done.

When something planned is not achieved, a thorough analysis of why it did not work out is needed. All this can help motivation for the next period, while it is also important to estimate the future development of finances. The management of the business needs to be sure of where it will incur costs, how to reduce them and where it will generate revenue (income). This is where various statistics and analyses of financial flows can help, e.g. through more efficient processing of receivables, better inventory management or optimisation of expenditure. Thus, management accounting will provide the company with information on which managers can effectively allocate work, responsibilities, duties and then positively or negatively evaluate the work of employees. Thus, in addition to business costs, time, quality and employees can be considered as the main factors that affect the competitiveness of an enterprise.

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Primary Paper Section: A

Secondary Paper Section: AH

INNOVATIVE APPROACH TO PREDICTING THE PRICES OF MAIZE: THE PURPOSE OF NEURAL NETWORKS

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Abstract: Maize prices can be significantly influenced by factors such as weather, demand, supply, pricing policies, and others. This article will provide a specific method for predicting maize yields using neural networks, which can be beneficial for farmers, commodity traders, and other market participants. The contribution aims to create and analyse a model based on neural networks for predicting maize yields and also to identify its position in the commodity market. The price development of maize is measured from 1959 to 2023, and neural networks are used for calculating the results, which are evaluated using Statistica software. It was found that only MLP networks (multilayer perceptron networks) were retained, and it was also found that the correlation coefficient value of all neural structures was higher than 0.959 in all cases. Furthermore, minimal differences were found between individual neural networks. Maize prices were also predicted 30 trading days in advance, and it was found that in practice, the 8th neural network performed best, as it exhibited the best results after validation, with its values closest to zero. In the future, this network should be further trained to achieve increasingly accurate results.

Keywords: Maize, commodity, artificial neural networks, prediction, validation

1 Introduction

Food is a fundamental component necessary for human sustenance. In addition to being consumed, it can also be a valuable commodity for economic purposes due to the productivity of food crops. Maize is globally the most cultivated and consumed crop and is also a significant commodity product that has a significant impact on the economies of many countries. Accurate price prediction can help farmers, traders, and other market participants plan their actions and minimize risks associated with price fluctuations (Macarena Arrien, Aldaya, and Iris Rodriguez, 2021). This is also agreed upon by Medina, Tian, and Abebe (2021), who state that accurate maize yield forecasts are crucial for decision-making in food and energy management strategies. Precisely predicting agricultural commodity prices is a challenging task due to the complexity of the trading market and the variability of influencing factors. Many studies have shown that combining forecasts is an effective strategy for improving forecasting performance compared to individual forecasts. In the field of forecast combination, determining appropriate weights for combination remains an open question (Zeng, 2022). Cheng et al. also agree, stating that accurate and timely crop yield forecasts on a large scale are important for food security and agricultural policy development. However, an adaptive and reliable method for estimating maize yield is currently not available. There is also an inherent trade-off between early yield estimation and forecast accuracy. Yield estimates are crucial for supporting government policy interventions and increasing global food security (Schwalbert et al., 2020). The achievement of state market policies partly depends on the extent to which commodity price changes are transmitted in supply chains (Armah, Kissi, & Fiankor, 2019).

Fluctuations in agricultural commodity prices attract considerable attention. However, the complexity of the futures market for agricultural commodities and the variability of influencing factors makes predicting agricultural commodity prices difficult (Wang et al., 2021). Price transmission between futures and spot prices is a relevant issue, addressing derivatives exchanges for price management practices and efficient price discovery. Given the increased market orientation of the common agricultural policy, the development of new market strategies for European farmers is crucial (Penone, Giampietri, and Trestini, 2022). Maize, which has the highest domestic production, acreage, and consumption, ranks first in China among grains in terms of demand and supply. However, China's comparative advantage in maize has been deteriorating in recent

years, and based on recent supply and demand situations and possible trends, it is generally acknowledged that achieving a 95% self-sufficiency rate in maize is difficult. Under current import restriction policies, maize may stand at the crossroads of reforms aimed at addressing its anticipated insufficient supply (Liu et al., 2022). Conversely, Brazil, a significant player in international commodity trade, is currently the third-largest exporter of maize, which is a key input in several food chains (de Souza et al., 2021). Kenya, on the other hand, has become a driving force for trade integration at regional and continental levels, although this process is still ongoing. Kenya, along with Ghana, was the first country to ratify the African Continental Free Trade Agreement (AfCFTA) in May 2018, as it was already engaged in negotiations with its major trading partners. Trade policy can have mixed effects across the economy and within the agricultural sector, reflecting differences between markets and commodities (Binfield et al., 2022). Berger, Dalheimer, and Brummer (2021) argue that the variable import levy on maize imports in the European Union aims to support European producers by isolating domestic prices from low international prices. Such price isolation policies have been associated with increased volatility in the global market. The removal of these distortions was one of the key issues in international negotiations on agricultural trade liberalisation, e.g., the commitment of WTO member states to adhere to the principle of tariffication under the Uruguay Round Agreement on Agriculture. However, the Blair House Agreement effectively allowed the EU to maintain a regime of variable import levies on cereal imports, although their level is substantially lower than in the past. Despite being a cornerstone of the EU's common agricultural policy, empirical evidence of the extent of its effects on price volatility is largely lacking. The income instability of smallholder farmers in developing countries caused by volatile agricultural product prices has been a problem for farmers and agricultural policymakers for many years. A permanent price stabilization mechanism is generally lacking. In some countries, support for production prices has been initiated to stabilize incomes and as an incentive for increased farmer investment and production (Abokyi et al., 2020).

Szerb, Csonka, and Ferto (2022) argue that globalization also has a significant impact on international agricultural trade, and despite globalization, distance has a greater negative impact on bilateral maize trade than on the processing sector. Distance seems to remain a significant factor in explaining trade flows in commodity markets, including maize. Technology, transportation, and global appetite have changed trading relationships between neighbouring and distant countries. The impact of distant food demand on local agricultural production and trade attracts considerable attention from scientists, although little is known about how distant trade affects trading relationships and production between neighbouring countries (Herzberger et al., 2019). Khan, Li, and Maimaitijiang (2022) further state that predicting crop yields before harvest is crucial for food security, trade, and policy-making. Several machine learning methods were used in the past to predict crop yields using various types of variables. Based on time series data, machine learning can also be used to predict future export developments in various states (Krulický, Kalinová, & Kučera, 2020). Šuleř, Rowland, and Krulický (2021) agree, finding that MLP networks have proven to be the most effective in predicting future export developments from the Czech Republic to China. They are also capable of predicting potential extremes.

Predicting commodity prices is important as farmers and commodity traders face various risks associated with price fluctuations. Accurate price prediction can help identify and mitigate these risks through appropriate strategies and hedging. Therefore, the contribution aims to create and analyse a model based on neural networks for predicting maize yields and also to identify its position in the commodity market. For this reason, the following two research questions were formulated:

- 1) How did maize prices evolve from 1959 to 2023 in response to global events in the commodity market?
- 2) How successful is artificial intelligence in predicting maize prices for the next 30 trading days?

The contribution is divided into the following sections: Section 1 summarises the demand for the topic. Section 2 provides references to the latest research by experts on the topic. Section 3 contains the methodology of the article. Section 4 summarises the results. Section 5 evaluates the research questions, and the final section summarises the findings.

2 Literature research

The summarising function of maize export from the USA and the bilateral function of maize import from the USA to Mexico, Japan, China, South Korea and the EU are estimated by ARDL estimation methods. Fosu a Wahl (2020) say that export price, technology and delayed export have a positive influence on maize export from the USA, whereas real effective exchange rate and ethanol production have a negative impact on maize export from the USA. Dutta et al. (2019) considers using the information content of the maize implied volatility index (CIV) to predict the yield volatility of the futures market in maize in the USA. Addey (2020), in contrast, examined the costs of the GMO regulation index of (GMORI) USA trading partners in terms of maize and soya export from the USA. The multi-layer model with mixed effects shows that a 1% increase in GMORI results in a loss of income from maize and soya exports from the USA in the amount of USD 71.8 million in fact. Increasing GMORI by 1% results in a USD 20 million loss in Japan, whereas it results in a USD 2.4 million loss in China and a USD 74 million loss of income sustained by the American sector of maize and soya export. Addey (2020) admits that GDP, geographical distance, rate of exchange and price situation are important factors, however, restrictions imposed on GMOs by states influence maize and soya export from the USA. Berger et al. (2021) used a multi-dimensional asymmetric volatility model to assess the effects on the maize market in the case of Argentina. Berger et al. (2021) maintained that variable import duty decreased the volatility of maize prices in the EU market, whereas it proportionally increased volatility in Argentina. Cao and Yuan (2022) selected four cereals – rice, wheat, soya, and maize. They analysed international trade of these commodities from 2002 to 2020 in the Chinese market. Cao and Yuan (2022) found out that Chinese grain was in a state of net import. Annual net import amounts to 62.25 million hectares, which equals the size of Chinese arable land for one crop. The contribution of net import of soya virtual soil resources represents 101 multiples of its crop area, whereas maize, rice and wheat represent approximately 10.42%, 11.69% and 74.66% respectively of its crop area.

The prediction of crop yields before harvest is essential for food safety, grain trade and policymaking. Several methods of machine learning have been used to predict crop yields with the help of several types of variables. Khan et al. (2022) suggests using a geographically weighted random forest approach (GWRFR) to improve the prediction of crop yields at the district level in the Corn Belt in the USA. Khan et al. (2022) trained GWRFR and five other popular machine learning algorithms (multiple linear regression (MLR), partial least-square regression (PLSR), support vector regression (SVR), decision tree regression (DTR) and random forest regression (RFR)). They compared GWRFR results with the results of the remaining five models. Khan et al. (2022) found out that GWRFR surpasses the other machine learning algorithms. The method suggested in this paper may be potentially used for improving the yield predictions of different crops in other regions. Etienne et al. (2023) examined the prediction of average seasonal maize prices in the USA and developed an alternative procedure based on futures. The new method achieves similar or better results than two widely monitored average seasonal price predictions, i.e., global agricultural supply and demand estimates. Etienne et al. (2023) attribute the robust performance of the suggested prognosis to its ability to use various coefficients for futures and

cash prices in dependence on basic market conditions. A better performance of suggested prognoses is especially notable during a marked market volatility. To sum it up, the method invented by Etienne et al. (2023) complements current prognoses and provides valuable information for executive bodies. Cheng et al. (2022) examined and used indicators, such as GPP, ET, surface temperature (Ts), LAI, soil properties and phenological information on maize to obtain estimates of maize yields with the help of random forest regression (RFR) and machine learning approaches, specifically, gradient boosted decision trees, in China. Cheng et al. (2022) found out that RFR estimated a maize yield more accurately than GBTD; Ts was the best independent indicator for yield estimate, whereas the combination of GPP, Ts, ET and LAI proved to be the best in the case of using more indicators and prediction accuracy was lower with time provided in advance, however, it remained relatively high in the period at least 24 days prior ripeness and the algorithm combination of machine learning with more indicators proved the ability to deal with space heterogeneity.

The fluctuations of exchange rates and certain other variables are important for maize trade flows between Mexico and the USA. Therefore, Luis Jaramillo-Villanueva (2021) analysed the cointegration analysis model and vector error correction model (VECM). Luis Jaramillo-Villanueva (2021) found out that the changes in the real rate of exchange have a positive impact on trade flows, whereas the volatility of the rate of exchange has a negative impact on maize trade flows between Mexico and the USA. Luis Jaramillo-Villanueva (2021) further established that both changes in the real rate of exchange and volatility significantly influence maize trade flows between Mexico and the United States. In contrast, Sayed and Auret (2023) researched maize trading at the South African Futures Exchange (SAFEX) and the impact of speculative activity on volatility. The dynamic relation between volatility and commercial activity was examined from April 2000 to May 2022 with the use of vector autoregression. Sayed and Auret (2023) shed light on the effectiveness of regulation concerning speculators in grain market futures and contributed to the credibility of price limits in terms of effective mitigation of volatility. A similar situation was explored by Xu (2020) on a set of daily maize prices in seven states: Iowa, Illinois, Indiana, Ohio, Minnesota, and Kansas. Xu (2020) evaluated thirty individual models of time series and ten combined prognoses based on six pruning strategies in three evaluation periods beyond time, seven horizons, and two systems (two-dimensional and multi-dimensional). Xu (2020) suggests limiting the recalibration period of the model to less than one month. Xu and Zhang (2021) adopted the same approach to predictions based on a data set of daily cash prices of maize from nearly 500 markets in sixteen states: North Dakota, Iowa, Minnesota, Illinois, Indiana, Ohio, Michigan, Missouri, Nebraska, Arkansas, Kentucky, Wisconsin, South Dakota, Kansas, Oklahoma, and Pennsylvania. Xu and Zhang (2021) specialise in one-dimensional modelling by a neural network (NN) and two-dimensional NN modelling including futures prices. Xu and Zhang (2021) found out that the arrival of new technologies for the analysis and synthesis of large data volumes increased the ability to accurately predict crop yields with the help of high-performance computers. Pinto et al. (2022) evaluated the performance of six models of machine learning in the course of predicting maize yield before harvest. Pinto et al. (2022) used these models: artificial neural networks (ANN), k-nearest neighbours (KNN), random forest (RF), and supportive vector machine (SVM). KNN algorithm achieved the best performance in terms of accuracy and correctness indicators for most of the scenarios examined in this study. In contrast, Asriani et al., (2023) modelled the prediction of maize productivity in Indonesia by Production and Operations Management-Quantitative Method software (POM-QM). Asriani et al. (2023) use a prognosis model based on time series, which consists of three methods, i.e., double moving average (DMA) method, weighted moving average (WMA) method, and simple exponential smoothing (SES) method. The selection of the best model was made based on median absolute deviation (MAD), mean square error (MSE), and median absolute percentage error (MAPE). SES with a lower MAPE value appeared to be the most

suitable. Prevailing imperfect transfer of prices in agricultural markets is still an important political problem for most African countries. Yami et al. (2020) dealt with the performance of wholesale markets in white maize in Ethiopia. Yami et al. (2020) determined that regional maize markets adapted to drops in prices faster than to price rises in the central wholesale maize market in Addis Adebaba, which indicates a lack of positive asymmetric price transmission.

Predicting the prices of agricultural products is one of the most important research points in the field of predicting time series due to its unique properties. Jaiswal et al. (2021) developed a model based on distributed long short-term memory (DLSTM) for an accurate prediction of non-stationary and non-linear series of agricultural prices. Jaiswal et al. (2021) compared the ability to predict the prices of the newly created DLSTM model with conventional TDNN models (time-delay neural network) and ARIMA, in the example of the international monthly price series of maize and palm oil. Jaiswal et al. (2021) prove the superiority of the DLSTM model over other models from the perspective of various criteria for prediction evaluating. DLSTM model also proved superior over other models in predicting a direction change of the price series. Sanusi et al. (2022) point out the specific and accurate methods of predicting the prices of normally consumed food in Nigeria. There were designed various models, which involved autoregressive integrated moving average (ARIMA), artificial neural networks (ANN), seasonal trend decomposition of time series using LOESS (STLM) and the combination of the three models (hybrid model), to predict the data regarding grain prices. Sanusi et al. (2022) found out that ARIMA is the best model for white maize and imported rice as it corresponds well to stationary data, which was proved in the monitored period. STLM is the most suitable for predicting white beans. Nedeljkovic et al. (2019) defined quantitative models for predicting the future development of maize production in the Serbian Republic. The research methods in use are descriptive analysis and analytical statistical methods, or Box-Jenkins, based on the ARIMA model. Nedeljkovic et al. (2019) found that maize production indicators would show an increase in the last year of the five-year prediction period (2018-2022) despite oscillations in comparison with the previously analysed twenty-two-year period (1996-2017). Moreover, Hašková et al. (2022) examined the business and economic predictions that provide valuable information for the parties involved (corporate owners and managers, investors and shareholders). Hašková et al. (2022) found out that the most frequently used predictions are ANN and GARCH in combination with ARIMA. These methods are sufficiently powerful to detect sector specifics for economic and commercial prediction. On the contrary, Rousek and Mareček (2019) researched the consideration of seasonal oscillations during the smoothing of time series with the use of artificial neural networks in the example of export from the United States to the People's Republic of China. Rousek and Mareček (2019) determined that it is possible to predict the effectiveness of export development with the use of artificial neural networks, namely, with a high degree of accuracy, especially in a short-term horizon, with regard to specific seasonal oscillations.

The Russian invasion of Ukraine on 24/2/2022 accelerated the price rise of agricultural commodities and increased global food insecurity. Ukraine and Russia are top global suppliers of wheat, maize, barley and sunflower oil. This was the purpose why Aliu et al. (2023) explored the relationship between the four agricultural commodities and predicted their future performance at the same time. The series includes a period from 1/1/1990 to 1/8/2022 based on monthly frequencies. The function of VAR impulsive response, variance decomposition, Granger causality test and vector model of error correction were used to analyse relations between variables. Aliu et al. (2023) ascertained that maize prices are an integral part of wheat, barley and sunflower oil price changes. To predict price changes ten months ahead was another aim of this study. Vector autoregression diagram (VAR) and vector error correction model (VECM) estimate an average drop in maize, wheat, barley and sunflower oil prices within the range of 10%.

As can be seen, in the literature review, the topic of predicting maize prices using neural networks is an interesting subject for many researchers, and as such, they are also investigating it. It has been found that a number of these researchers have used neural networks for their calculations, but many other methods have also been employed. Predicting maize prices using neural networks can provide insights into market dynamics and aid further research and development in the fields of agriculture, economics, and machine learning. Overall, accurate maize price prediction using neural networks can bring significant benefits to various market participants and help optimize their decision-making processes. As mentioned before, neural networks were among the methods that were used quite frequently, and that is why we have also chosen them for our research, where we will use them for RQ2 to determine how maize prices have evolved after validation.

3 Data and methods

The price of maize will be measured from 1959 to 2023 to determine if there are any price fluctuations during this long period, and for this purpose, data from the Macrotrends website will be used. Here you can find the prices of the given commodity during the whole day when this commodity is traded. The price of maize is indicated in USD currency per 1 bushel. The datasets for maize will consist of 16,165 input data.

The basic statistical characteristics of the maize price time series used are shown in Figure 1 and Table 1.

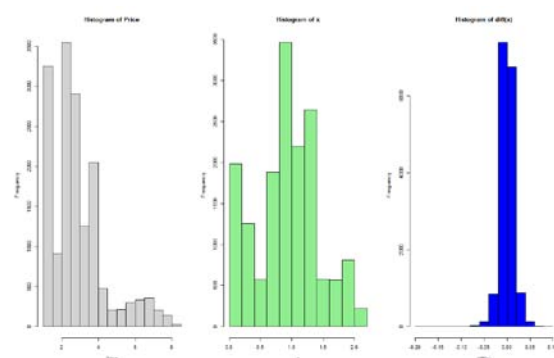


Figure 1 Indicate histogram distribution with raw, log, and log diff series

Figure 1 characterizes the distribution of data in three different histograms, which include the entire monitored period, i.e., from 1/7/1959 to 4/8/2023. A histogram is made up of vertical columns that represent different values of the variable on the horizontal axis (value axis) and their frequency (or relative frequency) on the vertical axis (frequency axis). Columns on the histogram are placed next to each other and their height will depend on the number of observations that fall into the respective interval. A histogram is a useful tool for fast visualization of the characteristics of a data set. The histogram in grey represents the distribution based on planar data, the green one is based on the logarithmic series, and the blue column represents the differential. Predictions are based on two types (level and logarithmic), while only the level prediction is shown in the results section for better clarity. As can be seen from the figure, the distribution of the data gets better when moving from the level prediction to the logarithmic one. The time series data does not show a normal distribution due to the width and length of the time series, but this does not prevent further calculations. The series has the same number of observations, 16,165, but differs in outliers. The following Table 1 presents the descriptive statistics.

Table 1 Descriptive statistics based on the level data

	vars	n	med	trimm	mad	min	max	skew	kurt	se
X1	1	16165	2.56	2.63	1.34	1.01	8.31	1.3	1.6	0.01

Table 1 presents basic statistical methods such as skew, kurtosis, minimum, maximum, and number of observations. Skew expresses the degree of asymmetry of the data distribution around its mean value. Thus, the skew value provides information about the shape and asymmetry of the data distribution. This indicator can be used to get a better idea of the nature of the data set and the distribution of its values. Kurtosis, in turn, provides information about the shape of the data distribution. It measures how significantly the peak (i.e., the highest part) of the data distribution differs from the normal distribution. The result of kurtosis is a numerical value that provides information about the "sharp" or "flat" shape of the data distribution compared to a normal distribution. The interpretation of the kurtosis result depends on the context and specific characteristics of the data set. As can be seen in Table 1, based on the skewness and kurtosis, our data does not have a normal distribution, as skew must equal zero and kurtosis must also equal zero, which is not the case. However, this is quite natural for time series with a daily frequency. Furthermore, Table 1 also shows that the lowest value of maize was 1.01, which occurred on 18/11/1960, and on the contrary, the highest value was 8.31, which was on 21/8/2012.

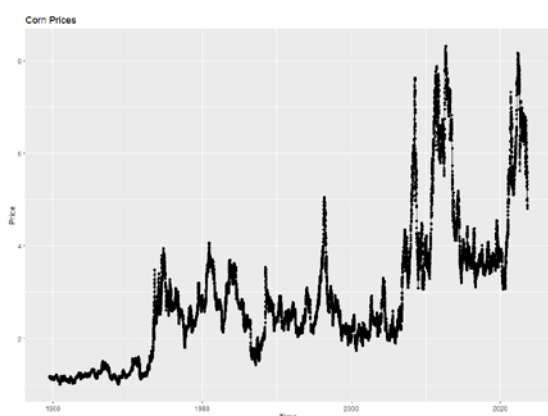


Figure 2 Level series time series

Figure 2 shows the level time series. It is possible to see in which year certain price shocks occurred. For example, in the 1970s one of the first big price shocks came when the price of maize went up. This was mainly caused by the war in Vietnam. Another price shock came between 2008-2009 when there was a global financial crisis. Last but not least price shock came with the war in Ukraine, i.e., in 2022. We will be dealing with this in Figure 5. Furthermore, it is possible to see that the price trend was constantly fluctuating throughout the period, there was no period with a constant price.

The data that will be obtained will then be evaluated through the Statistica 13 software from TIBCO. The first step will be to create a linear regression that will be used for artificial neural networks and then this analysis will be reviewed on a sample for which the following functions will be determined: Linear, polynomial, logarithmic, exponential, weighted distance polynomial, negative exponential smoothing polynomial. In the next step, we will calculate the correlation coefficient which represents the degree of dependence of the price of maize on time, and then we will work with a confidence level of 0.95. Regression will then be performed through neural structures, where multilayer perceptron networks (MLP) and radial basis function networks (RBF) will be constructed. To calculate neural structures, 16,165 data will be used. Time will serve as the independent variable and maize price as the dependent variable. The following Figures 3 and 4 graphically represent the MLP and RBF neural networks.

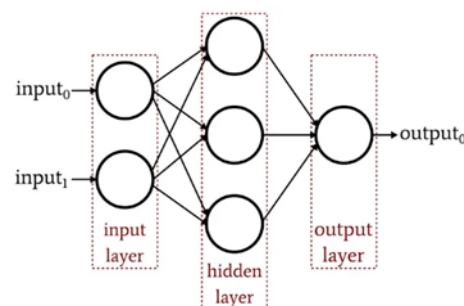


Figure 3 MLP neural networks
Source: Keim, 2019

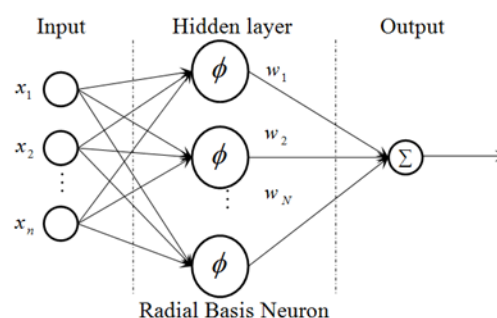


Figure 4 RBF neural networks
Source: He et al., 2019

The MLP neural network has the following mathematical expression (Kudová, 2001):

$$y(\vec{x}) = \sigma\left(\sum_{i=0}^n w_i x_i\right) \quad (1)$$

The RBF neural network has the following mathematical expression (Kudová, 2001):

$$y(\vec{x}) = e^{-\left(\frac{\|\vec{x} - \vec{c}\|}{b}\right)^2} \quad (2)$$

In the next step, the time series will be divided into three groups. These groups will serve for testing, training, and validation. The training group will contain 70% of the data which will then be transformed into neural structures. The other two groups (test and validation) will comprise 15% of the data. The test and validation groups will be used to verify the reliability of the neural network. 1,000 neural networks will be used for the calculations, but only 10 neural networks will be kept, namely those that will show the best characteristics. The hidden layer of Multilayer Perceptron Networks (MLP) will have a minimum of 2 neurons, but a maximum of 20. The RBF hidden layer will use a minimum of 10 neurons, but a maximum of 30 neurons. To activate the hidden layer and the output layer of MLP, the following functions will be used: linear, logistic, Atanh, Exponential, and Sine. The rest of the settings will be left as default (within the ATS tool - automatic network creation). To calculate artificial neural networks, the method of least squares will be used. If there is no improvement, i.e., the value of the square aggregate decreases, the network generation will be terminated. Only the neuron structures that represent the lowest possible set of squared residuals concerning the actual development will be retained. To compute neural networks, we will also use the BFGS algorithm, which is used to adapt machine learning algorithms such as logistic regression and which is a local optimization algorithm. Delays in the time series will not be considered due to demanding calculations and the

need for a subsequent additional experiment. A maize price prediction for the next 30 trading days will also be made. This prediction will take place from 4/8/2023 to 14/9/2023. After this prediction, a so-called validation will be created. This means that the difference between the predicted price of maize and the actual price of maize will be examined. This difference is called the residual. The formulas of individual functions are shown in Table 2.

Table 2 Activation function of hidden and output layers of MLP and RBF

Function	Definition	Range
Identity	a	$(-\infty; +\infty)$
Logistic sigmoid	$\frac{1}{1+e^{-a}}$	$(0; 1)$
Hyperbolic tangent	$\frac{e^a - e^{-a}}{e^a + e^{-a}}$	$(-1; +1)$
Exponential	e^{-a}	$(0; +\infty)$
Sine	$\sin(a)$	$[0; 1]$

Source: Šuleř and Machová, 2020

The least squares method will be used as the error function, which is represented by this formula:

$$E_{sos} = \frac{1}{2N} \sum_{i=1}^N (y_i - t_i)^2 \quad (3)$$

N is the number of trained cases, y_i is the prediction of the target variable t_i , t_i is the target variable of the i^{th} case.

RQ1 will be solved using a time series, looking at how the price of maize has evolved over the past 64 years. For RQ2, validation will be used, thanks to which it will be determined what the difference was between the actual price and the predicted price of the commodity. This difference is called the residual. Using this validation, it will be determined which neural network will be the most suitable for putting into practice. Both the predicted and actual values must be as close as possible to zero for the neural network to be evaluated as the best.

4 Results

Through the chosen procedure, i.e., artificial neural networks, 1,000 neural networks were created, from which only the 10 best networks were selected. These showed the best possible results for predicting the price of maize. Table 3 presents an overview of the mentioned 10 best neural networks.

Table 3: Summary of active networks (Maize – daily data 1959-2023)

Index	Net. name	Train. perf.	Test perf.	Valid. perf.	Train. error
1	MLP 1-14-1	0.96	0.97	0.97	0.07
2	MLP 1-17-1	0.96	0.97	0.96	0.09
3	MLP 1-20-1	0.96	0.97	0.97	0.07
4	MLP 1-19-1	0.97	0.97	0.97	0.07
5	MLP 1-19-1	0.96	0.97	0.97	0.08
6	MLP 1-15-1	0.96	0.97	0.96	0.08
7	MLP 1-17-1	0.96	0.97	0.96	0.08

8	MLP 1-14-1	0.96	0.97	0.97	0.08
9	MLP 1-20-1	0.97	0.97	0.97	0.07
10	MLP 1-20-1	0.96	0.97	0.96	0.08
Test error	Valid. error	Train. Alg.	Error fun.	Hidd. Act.	Output act.
0.07	0.07	BFGS 1196	SOS	Log	Exp
0.08	0.09	BFGS 539	SOS	Log	Log
0.07	0.07	BFGS 10000	SOS	Tanh	Iden
0.07	0.07	BFGS 5953	SOS	Tanh	Exp
0.09	0.08	BFGS 9999	SOS	Log	Log
0.08	0.08	BFGS 9999	SOS	Log	Log
0.08	0.08	BFGS 673	SOS	Tanh	Log
0.08	0.08	BFGS 600	SOS	Tanh	Log
0.08	0.08	BFGS 942	SOS	Tanh	Exp
0.08	0.08	BFGS 691	SOS	Tanh	Log

Source: Authors

Table 3 shows the top 10 neural networks. It is possible to notice that only the MLP networks are retained. It may mean that for this commodity, i.e., maize, perceptron networks (MLP) achieved greater performance than RBF networks, which did not appear in any of the mentioned neural networks. These best structures then ranged from 2 to 20 neurons in the hidden layer. The generation of MLP networks was also compiled using the BFGS variant training algorithm (Broyden-Fletcher-Goldfarb-Shanno). The input layer of all 10 neural networks contains one neuron and is made up of a variable represented by time. The output layer also consists of one neuron and the variable is the development of the maize price. The following two functions, logistic and hyperbolic tangent, were used to activate the hidden neural layer. The functions used to activate the output layer were the following: exponential, logistic, and identity functions. The performance of the neural networks is subsequently presented in Table 4.

Table 4: Correlation coefficients (Maize – daily data 1959-2023)

	Train	Test	Validation
1.MLP 1-14-1	0.964564	0.971125	0.967692
2.MLP 1-17-1	0.960195	0.966868	0.963884
3.MLP 1-20-1	0.964958	0.971554	0.968231
4.MLP 1-19-1	0.966122	0.972624	0.968742
5.MLP 1-19-1	0.960987	0.965754	0.966260
6.MLP 1-15-1	0.960266	0.966363	0.963893
7.MLP 1-17-1	0.961286	0.966881	0.964751
8.MLP 1-14-1	0.962363	0.968860	0.965496
9.MLP 1-20-1	0.965327	0.970116	0.967211
10.MLP 1-20-1	0.959736	0.966298	0.963687

Source: Authors

Table 4 presents the performance of individual retained neural networks. The values of individual datasets for specific neural networks are summarized here. It can be seen that all three sets represent a high degree of performance, as the closer the value approaches 1, the better. All three groups have similar values, which proves the relevance of the training set. This is also proved by the fact that the majority of correlation coefficient values did not fall below the value of 0.959. Specifically, it can be said that the values in the training set ranged from 0.959 to 0.966. In the test set it was from 0.965 to 0.972 and in the validation set the values ranged from 0.963 to 0.968. We can see

that slight differences can be found between individual networks, but this has still almost no effect on their overall performance. The following Table 5 presents individual MLP networks.

Table 5: Prediction statistics (Maize – daily data 1959-2023)

Statistics	1.MLP 1-14-1	2.MLP 1-17-1	3.MLP 1-20-1	4.MLP 1-19-1
Minimum prediction (Train)	1.12310	1.00700	1.11072	1.00886
Maximum prediction (Train)	7.50195	7.03628	7.74295	7.38414
Minimum prediction (Test)	1.12321	1.00700	1.11072	1.00886
Maximum prediction (Test)	7.50193	7.03618	7.74298	7.38385
Minimum prediction (Validation)	1.12309	1.00700	1.11072	1.00886
Maximum prediction (Validation)	7.50137	7.03627	7.74202	7.38100
Minimum residual (Train)	-1.68259	-1.72880	-1.80906	-1.65738
Maximum residual (Train)	2.47116	2.51816	2.36742	2.35024
Minimum residual (Test)	-1.48291	-1.53038	-1.60460	-1.45362
Maximum residual (Test)	2.44050	2.48806	2.33796	2.31911
Minimum residual (Validation)	-1.43885	-1.48473	-1.56647	-1.41467
Maximum residual (Validation)	2.17105	2.21576	2.06255	2.05208
Minimum standard residual (Train)	-6.20184	-5.91518	-6.70649	-6.24206
Maximum standard residual (Train)	9.10843	8.61602	8.77643	8.85153
Minimum standard residual (Test)	-5.51511	-5.26249	-6.00922	-5.54845
Maximum standard residual (Test)	9.07647	8.55564	8.75568	8.85202
Minimum standard residual (Validation)	-5.26820	-5.06496	-5.78658	-5.26246
Maximum standard residual (Validation)	7.94909	7.55878	7.61908	7.63358

5.MLP 1-19-1	6.MLP 1-15-1	7.MLP 1-17-1	8.MLP 1-14-1	9.MLP 1-20-1	10.MLP 1-20-1
1.00700	1.00700	1.00701	1.23174	1.14251	1.01203
7.22926	7.01171	7.06792	7.11324	7.08639	7.05317
1.00700	1.00700	1.00702	1.23174	1.14251	1.01203
7.22928	7.01171	7.06790	7.11323	7.08635	7.05305
1.00700	1.00700	1.00701	1.23174	1.14251	1.01203
7.22929	7.01168	7.06792	7.11300	7.08623	7.05318
-1.64751	-1.82025	-1.61925	-1.64039	-1.37162	-1.71129
2.86952	1.83692	1.93401	2.49228	1.98456	2.33720
-1.60751	-1.78023	-1.40180	-1.45568	-1.37574	-1.50421
2.83980	1.76879	1.90342	2.32218	2.10926	2.30695
-1.34346	-1.38942	-1.43399	-1.51736	-1.29621	-1.46937
2.56552	1.71492	1.63410	2.36896	1.98091	2.05657
-5.68977	-6.34342	-5.71579	-5.87128	-5.11128	-5.91914
9.91005	6.40150	6.82686	8.92035	7.39539	8.08408
-5.42641	-6.13991	-4.86938	-5.20713	-5.01630	-5.18004
9.58619	6.10048	6.61186	8.30666	7.69090	7.94445
-4.72164	-4.82378	-5.03687	-5.38599	-4.71790	-5.08499
9.01665	5.95385	5.73977	8.40880	7.21002	7.11709

Table 5 characterizes individual MLP networks and includes an analysis of prediction statistics. It is possible to see the residual

values here. The residuals should ideally be close to 0, which would mean that the input data value corresponds to the predicted value. It is possible to read from this table that the neural networks show some residuals, but it cannot be said that they are completely accurate. The following Figure 5 shows these residuals graphically, where all retained neural networks and the actual course of the value of the given commodity (in our case maize) are presented.

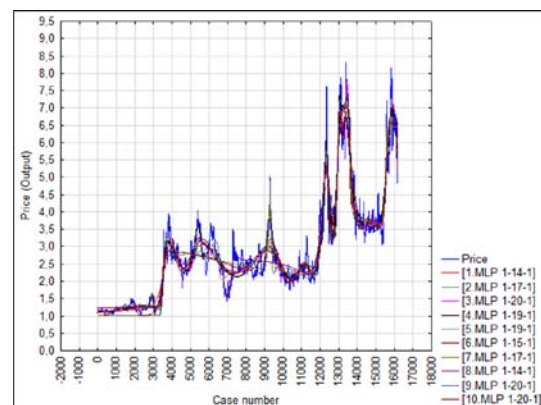


Figure 5: Maize price movement

Source: Authors

In Figure 5, we can see that all the retained neural networks were able to copy the real movement of the maize price almost identically. This article comprised a long-time horizon, using maize price data as far back as 1959, so it is possible to see how the price of maize has fluctuated over the past 64 years. It is possible to see that at the beginning of the observed period, the price of maize had almost constant values. We can only notice small price fluctuations that were not captured by the neural networks. A bigger jump in price came only at the value of about 3300, which was the 1970s. There was a war going on in Vietnam at that time. During this period, the oil crisis also occurred, which mainly affected the West, because life at that time was completely dependent on heavy industry and energy which was built on fossil fuels. After that, the price of maize had a pendulum trend, where the price of maize kept moving down and back up to the same values. It was not until the value of 7000 (1987) that there was a larger drop in the price of maize, and in the following few months, the price of maize returned to its original value. Another price shock (this time upwards) came in the 1990s when the Soviet Union was disintegrating and the Cold War, which lasted from 1947-1991, was reaching its end. Around 1995-96, the price peaked, and immediately after that, the price of maize began to fall sharply again. Another very significant price shock came between 2007-09, when there was not only a global financial crisis, but also the so-called tortilla crisis in Mexico, which caused the price of maize to skyrocket in 2007. The price of maize went up like this also due to flooding and increasing demand from ethanol producers, only to have the price plummet down subsequently. A price correction came during the following recession, but then there was even more rapid growth, driven by foreign demand and also by the catastrophic drought of 2011-2013. Scorching heat, a lack of moisture, and increasing demand kept prices more or less above \$6 a bushel during this period. Between 2015 and 2020, the price of maize kept a constant trend. Then the Covid 19 pandemic came, but in Figure 5 we can see that the pandemic had almost no effect on the price of maize. On the contrary, the war in Ukraine, which occurred in February 2022, had an immense effect on the price of maize. In the figure, we can see that the price of maize skyrocketed. Only now, in recent months, the price of maize has started to fall back to its original value. We will subsequently see what the future holds for maize prices. Table 6 presents the future development of the maize price for the predicted 30 trading days.

Table 6: Maize price prediction for 30 trading days

Date	1.MLP 1-14-1	2.MLP 1-17-1	3.MLP 1-20-1	4.MLP 1-19-1
04.08.2023	5.5	5.38	5.21	5.48
07.08.2023	5.49	5.37	5.2	5.48
08.08.2023	5.49	5.36	5.19	5.47
09.08.2023	5.48	5.35	5.17	5.46
10.08.2023	5.47	5.34	5.16	5.45
11.08.2023	5.46	5.31	5.12	5.43
14.08.2023	5.45	5.3	5.11	5.42
15.08.2023	5.44	5.29	5.1	5.41
16.08.2023	5.44	5.28	5.08	5.4
17.08.2023	5.43	5.27	5.07	5.39
18.08.2023	5.41	5.25	5.03	5.37
21.08.2023	5.4	5.24	5.02	5.36
22.08.2023	5.4	5.23	5	5.35
23.08.2023	5.39	5.22	4.99	5.35
24.08.2023	5.38	5.21	4.98	5.34
25.08.2023	5.36	5.18	4.93	5.31
28.08.2023	5.36	5.17	4.92	5.3
29.08.2023	5.35	5.16	4.91	5.3
30.08.2023	5.34	5.15	4.89	5.29
31.08.2023	5.34	5.14	4.88	5.28
01.09.2023	5.33	5.13	4.86	5.27
04.09.2023	5.32	5.11	4.84	5.25
05.09.2023	5.31	5.1	4.82	5.25
06.09.2023	5.3	5.1	4.81	5.24
07.09.2023	5.3	5.09	4.79	5.23
08.09.2023	5.29	5.08	4.78	5.22
11.09.2023	5.27	5.05	4.73	5.2
12.09.2023	5.27	5.04	4.72	5.19
13.09.2023	5.26	5.03	4.7	5.18
14.09.2023	5.25	5.02	4.69	5.17

5.MLP 1-19-1	6.MLP 1-15-1	7.MLP 1-17-1	8.MLP 1-14-1	9.MLP 1-20-1	10.MLP 1-20-1
6.46	6.23	6	5.09	5.69	5.37
6.46	6.23	6	5.08	5.69	5.36
6.46	6.23	5.99	5.06	5.68	5.35
6.46	6.23	5.99	5.05	5.68	5.34
6.46	6.23	5.98	5.04	5.67	5.33
6.46	6.23	5.97	5	5.66	5.3
6.46	6.23	5.97	4.98	5.65	5.29
6.46	6.23	5.97	4.96	5.65	5.28
6.46	6.23	5.97	4.95	5.64	5.27
6.46	6.23	5.96	4.94	5.64	5.26
6.46	6.23	5.95	4.89	5.62	5.23
6.45	6.23	5.95	4.88	5.62	5.22
6.45	6.23	5.95	4.86	5.61	5.21
6.45	6.23	5.95	4.85	5.61	5.2
6.45	6.23	5.94	4.83	5.6	5.19
6.45	6.23	5.93	4.79	5.59	5.16
6.45	6.23	5.93	4.77	5.58	5.15
6.45	6.23	5.93	4.76	5.58	5.14
6.45	6.23	5.92	4.74	5.57	5.13
6.45	6.23	5.92	4.73	5.57	5.12
6.45	6.23	5.92	4.71	5.56	5.11
6.45	6.23	5.91	4.68	5.55	5.09
6.45	6.23	5.91	4.67	5.55	5.08
6.45	6.23	5.91	4.65	5.54	5.07
6.45	6.23	5.9	4.63	5.54	5.06
6.45	6.23	5.9	4.62	5.53	5.05
6.45	6.23	5.89	4.57	5.52	5.01
6.45	6.23	5.89	4.56	5.51	5
6.45	6.23	5.88	4.54	5.51	4.99
6.45	6.23	5.88	4.53	5.5	4.98

Source: Authors

Table 6 presents the movement of the price of maize in the period from 4/8/2023 to 14/9/2023. It can be seen that the first four neural networks have a downward trend and that at the beginning of the period, they all predict a price of around 5-5.5 dollars per bushel. As the month progresses, the price goes down. What is interesting about the fifth neural network is that it has the same value of 6.46 until 18/8/2023, and the following day it has a value of 6.45 and it maintains this value until the end of the monitored period. In turn, the sixth neural network has the same value throughout the observed period. The remaining neural networks have the same downward trend as the first four neural networks. The table also shows which neural networks predict a higher maize price and which ones predict a lower price. The fifth, sixth, and seventh neural networks predict a higher price of maize, while the third and eighth neural networks predict a lower price of maize. Table 7 presents the real maize prices for August and September 2023.

Table 7: Real maize price

Date	Real price of maize
04.08.2023	4.8475
07.08.2023	4.8225
08.08.2023	4.8575
09.08.2023	4.81
10.08.2023	4.8325
11.08.2023	4.755
14.08.2023	4.7475
15.08.2023	4.64
16.08.2023	4.695
17.08.2023	4.73
18.08.2023	4.79
21.08.2023	4.6925
22.08.2023	4.665
23.08.2023	4.7625
24.08.2023	4.7225
25.08.2023	4.695
28.08.2023	4.785
29.08.2023	4.695
30.08.2023	4.6175
31.08.2023	4.61
01.09.2023	4.6525
04.09.2023	4.6475
05.09.2023	4.71
06.09.2023	4.715
07.09.2023	4.7075
08.09.2023	4.685
11.09.2023	4.7125
12.09.2023	4.6325
13.09.2023	4.64
14.09.2023	4.625
15.09.2023	4.7525

Source: Authors

In Table 7 we can see what the real price of maize was in the observed period. This monitored period started on 4/8/2023 and ended on 14/9/2023. It is evident that the price of maize was almost constant throughout the monitored period. In the beginning, the price hovered around 4.85 dollars per bushel, and over some time it went down. On 16/8/2023, the price of maize started to rise slightly again, and after a few days it fell a little lower again, but as you can see in the table, this drop and rise in the price always differed only in a few tenths. There was no major price shock throughout the observed period. Table 8 below shows the residuals between the real maize price and the predicted price.

Table 8: Residuals between the real and the predicted price

Date	1.MLP 1-14- 1	2.MLP 1-17- 1	3.MLP 1-20- 1	4.MLP 1-19- 1
04.08.2023	-0.65	-0.53	-0.36	-0.63
07.08.2023	-0.67	-0.55	-0.38	-0.66
08.08.2023	-0.63	-0.50	-0.33	-0.61
09.08.2023	-0.67	-0.54	-0.36	-0.65
10.08.2023	-0.64	-0.51	-0.33	-0.62
11.08.2023	-0.71	-0.56	-0.37	-0.68
14.08.2023	-0.70	-0.55	-0.36	-0.67
15.08.2023	-0.80	-0.65	-0.46	-0.77
16.08.2023	-0.75	-0.59	-0.39	-0.71
17.08.2023	-0.70	-0.54	-0.34	-0.66
18.08.2023	-0.62	-0.46	-0.24	-0.58
21.08.2023	-0.71	-0.55	-0.33	-0.67
22.08.2023	-0.74	-0.57	-0.34	-0.69
23.08.2023	-0.63	-0.46	-0.23	-0.59
24.08.2023	-0.66	-0.49	-0.26	-0.62
25.08.2023	-0.67	-0.48	-0.23	-0.61
28.08.2023	-0.58	-0.39	-0.14	-0.52
29.08.2023	-0.65	-0.47	-0.22	-0.61
30.08.2023	-0.72	-0.53	-0.27	-0.67
31.08.2023	-0.73	-0.53	-0.27	-0.67
01.09.2023	-0.68	-0.48	-0.21	-0.62
04.09.2023	-0.67	-0.46	-0.19	-0.60
05.09.2023	-0.60	-0.39	-0.11	-0.54
06.09.2023	-0.59	-0.39	-0.09	-0.53
07.09.2023	-0.59	-0.38	-0.08	-0.52
08.09.2023	-0.61	-0.40	-0.10	-0.54
11.09.2023	-0.56	-0.34	-0.02	-0.49
12.09.2023	-0.64	-0.41	-0.09	-0.56
13.09.2023	-0.62	-0.39	-0.06	-0.54
14.09.2023	-0.63	-0.40	-0.07	-0.55
Total value	-19.78	-14.45	-7.20	-18.34
Mean	-0.66	-0.48	-0.24	-0.61
Median	-0.66	-0.49	-0.25	-0.62

5.MLP 1- 19-1	6.MLP 1- 15-1	7.MLP 1- 17-1	8.MLP 1- 14-1	9.MLP 1- 20-1	10.MLP 1- 20-1
-1.61	-1.38	-1.15	-0.24	-0.84	-0.52
-1.64	-1.41	-1.18	-0.26	-0.87	-0.54
-1.60	-1.37	-1.13	-0.20	-0.82	-0.49
-1.65	-1.42	-1.18	-0.24	-0.87	-0.53
-1.63	-1.40	-1.15	-0.21	-0.84	-0.50
-1.71	-1.48	-1.22	-0.25	-0.91	-0.55
-1.71	-1.48	-1.22	-0.23	-0.90	-0.54
-1.82	-1.59	-1.33	-0.32	-1.01	-0.64
-1.77	-1.54	-1.28	-0.26	-0.94	-0.57
-1.73	-1.50	-1.23	-0.21	-0.91	-0.53
-1.67	-1.44	-1.16	-0.10	-0.83	-0.44
-1.76	-1.54	-1.26	-0.19	-0.93	-0.53
-1.79	-1.57	-1.29	-0.20	-0.95	-0.55
-1.69	-1.47	-1.19	-0.09	-0.85	-0.44
-1.73	-1.51	-1.22	-0.11	-0.88	-0.47
-1.76	-1.54	-1.24	-0.09	-0.90	-0.47
-1.67	-1.45	-1.15	0.02	-0.80	-0.37
-1.76	-1.54	-1.24	-0.06	-0.89	-0.44
-1.83	-1.61	-1.30	-0.12	-0.95	-0.51
-1.84	-1.62	-1.31	-0.12	-0.96	-0.51
-1.80	-1.58	-1.27	-0.06	-0.91	-0.46
-1.80	-1.58	-1.26	-0.03	-0.90	-0.44
-1.74	-1.52	-1.20	0.04	-0.84	-0.37
-1.74	-1.52	-1.20	0.06	-0.83	-0.36
-1.74	-1.52	-1.19	0.08	-0.83	-0.35
-1.77	-1.55	-1.22	0.06	-0.85	-0.37
-1.74	-1.52	-1.18	0.14	-0.81	-0.30
-1.82	-1.60	-1.26	0.07	-0.88	-0.37
-1.81	-1.59	-1.24	0.10	-0.87	-0.35

-1.83	-1.61	-1.26	0.09	-0.88	-0.36
-52.11	-45.40	-36.66	-2.91	-26.41	-13.84
-1.74	-1.51	-1.22	-0.10	-0.88	-0.46
-1.74	-1.52	-1.22	-0.10	-0.88	-0.47

Source: Authors

Table 8 presents the residuals between the actual maize price and the predicted maize price. In this case, the 8th neural network performed best. Most values came close to the actual price of maize here. Specifically, the following days were concerned: 18/08/2023 and then the period from 23/08/2023 to 14/09/2023. Next, the 3rd neural network performed excellently. Many days came very close to the actual price of maize. These days were: 28/8/2023 and then the period from 5/9/2023 to 14/9/2023. The 5th, 6th and 7th neural networks came out as the worst ones. These were the most distant from the real price. What we can also see in the table is the fact that the residuals between the real and predicted price were almost minimal. This means that almost all of the neural networks that predicted the price of maize hit the real price.

5 Discussion of results

A lot of countries grow maize and export it in the international market. Maize is an important export item, which contributes to trade balance of maize producing countries. Maize international trade has a significant economic influence on a global level. Maize is an important crop for farmers in the whole world. Growing and selling maize is an important influence on the income and profitability of agricultural enterprises.

It is possible to answer all the determined research questions based on results obtained with the help of time series analysis and neural network method.

RQ1: How did the price of maize develop in dependence on the world events in the commodity market from 1959 to 2023?

This issue was solved with the help of neural networks when a time series of data collected from 1959 to 2023 was created. This price development is displayed in Figure 5, where it is notable that all the retained neural networks were able to copy the real movement of maize price almost in the same way. Since the data have been taken in the past 64 years, it may be observed that the tendency of maize price resembled a pendulum. It is also shown that maize prices had almost constant values at the beginning of the monitored period. We can record only small price fluctuations that neural networks failed to detect. A more significant price shift occurred from the value of 3 300 onwards in the 1970s. After that the price of maize had a pendulum tendency, the price constantly moved down and back to the same values. Only when it reached the value of 7,000 (1987) there was a bigger drop in the price of maize, which gradually returned to its original value in the several following months. The next price shock (upwards this time) occurred in the 1990s when the Soviet Union was in the process of disintegration. There was a peak around 1995-96 and the price began to fall sharply right after that. The next significant price shock was between 2008-09 during the financial crisis, the consequence of which was the rocketing of maize price and a subsequent sharp fall of the price. It was immediately followed by another price shock, which remained till 2013 when another drop in maize prices occurred. There was a trend of constant maize prices from 2015 to 2020. It was followed by the COVID-19 pandemic; however, it is notable from Figure 5 that the pandemic little influenced the prices of maize. In contrast, the war in Ukraine, which started in February 2022, influenced the prices of maize enormously. The Figure shows there was a rocket rise in maize prices. The price of maize is falling back to its original values now. The future price of maize is yet to be seen.

RQ2: How successful is artificial intelligence in the prediction of maize price for 30 consecutive trading days?

Research question 2 dealt with the residue between the predicted maize price and the real price of maize. This difference is so-

called validation and it is a difference between the predicted price and the real price. This validation is shown in Table 8. It is obvious from our results that the 8th neural network worked the best and most of its values came near the real price of maize. There were the following days specifically in the case of this network: 18/8/2023, and a later period from 23/8/2023 to 14/9/2023. The next excellent result was the 3rd neural network, which included many days that came very near the real price of maize. There were the following days: 28/8/2023, and the following period from 5/9/2023 to 14/9/2023. The worst results were in the 5th, 6th, and 7th neural networks, which came furthest from the real price. It is notable in that table that the residue between the real and predicted prices was minimal, it can be claimed that almost all the neural networks, which predicted the price of maize, predicted the price correctly.

The summary is that all the 10 retained MLP networks for maize were able to copy the curve of real price development of this commodity, and, therefore, they can be deemed reliable and applicable in practice. This statement is confirmed by the research of Shahhosseini et al. (2021) who found that machine learning (ML) can provide adequate predictions faster and more flexibly in comparison with simulation crop modelling. However, one machine learning model can be surpassed by a 'selection' of models (machine learning sets), which can reduce the distortion of predictions, variance, or both, and is able to reflect data distribution better. Shahhosseini et al. (2021) explored machine learning for predicting maize yields in three states of crop belt (Illinois, Indiana and Iowa). Shahhosseini et al. (2021) determined that a suggested optimized weighted set and an average set are the most accurate models with RRMSE 9.5%. Roznik et al. (2023) examined the accuracy of predicting maize yields with the help of machine learning with the use of satellite and meteorological data. They further researched the incremental value of these predictions for expanding world agricultural supply and demand estimates (WASDE). They collected publicly available data from 1984 to 2021 to illustrate the potential of machine learning methods with the use of the XGBoost algorithm. Roznik et al. (2023) found out that the XGBoost model had approximately the same results, however, failed to surpass WASDE prediction of maize yields for a 12-year period beyond the set. Roznik et al. (2023) further indicate that XGBoost machine learning models can create quite accurate predictions of crop yields. It is evident that artificial neural networks and machine learning are ideal tools for predicting maize prices, as demonstrated by the aforementioned authors.

5 Conclusion

Changes in the extent of maize cultivation in different regions of the world can influence global supply. Furthermore, fluctuations in currency exchange rates can affect maize prices because it is often traded in dollars. Political events and government decisions can influence agricultural production, trade, and maize prices. The price of oil and its impact on transportation costs and fertilizer production can also affect maize prices because oil is a key raw material for chemical fertilizers. Overall, maize prices are the result of a complex and dynamic mix of these factors. Therefore, prices can change rapidly and are difficult to predict with certainty.

This work aimed to create and analyse a model based on neural networks for predicting maize yields and to identify its position in the commodity market. For this reason, research questions were formulated to achieve the set goal. Research question 1 was addressed using neural networks to create a time series of data for the period from 1959 to 2023. Research question 2 dealt with residuals between predicted maize prices and actual maize prices, which were then evaluated using Statistica software, employing artificial neural network methodology. Furthermore, a prediction of maize prices was made for the next 30 trading days, revealing that maize prices did not exhibit any extreme fluctuations. The prices of all networks during the observed period either slightly increased or decreased, but no significant price shock was recorded for any of the networks. After prediction, a validation of actual maize prices against predicted

prices was conducted, with the best-performing model being the 8th neural network, as it was the only one that closely approached a value of zero. The overall finding was that the residuals between actual and predicted maize prices were almost minimal, indicating that the neural networks used for maize price prediction almost accurately reflected actual prices.

Based on the results obtained, it was concluded that over the past sixty-four years, maize prices have predominantly risen. It is evident that during the historical price evolution, there have been many fluctuations caused by various factors, such as financial crises or various armed conflicts around the world. One of the limitations of the work is the lower number of neural structures. The more neural structures there are, the more accurate the results. If neural networks can further improve predictions, it may lead to greater accuracy in estimating maize yields, which is a key factor in decision-making in agriculture and commodity trading. Another limitation of this work is the limited scope of commodities, as only one commodity was examined. It would be better to examine maize prices in relation to other commodities. This article differs from others in that it focuses on the specific application of neural networks in predicting maize yields, which may be unique and targeted at the agricultural sector. It also utilizes a specific dataset related to maize yields, reflecting all international conflicts and crises over the past sixty-four years.

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Primary Paper Section: A

Secondary Paper Section: AH, BB, GA

DEMOGRAPHIC CHANGES AND DIPLOMATIC CHALLENGES: THE FUTURE OF U.S.-CHINA RELATIONS IN THE CONTEXT OF CHINA'S DECLINING BIRTH RATE

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Abstract: This study examines the sociopolitical and economic impacts of China's demographic shifts, focusing on how a declining birth rate and aging population affect U.S.-China trade relations. It explores how China's family planning policies have reshaped population structure and consumer behavior, influencing economic interactions with the U.S. These shifts could lead to intensified competition or renewed cooperation between the two nations as they navigate global challenges. This research contributes to the discourses of sociology, international relation, and political economy by highlighting the broader implications of demographic changes on international trade, offering valuable insights for policymakers and scholars.

Keywords: International Relation, Demographic Shifts, U.S.-China Relations, Family Planning Policies, Economic Interactions, Sociological Theory

1 Introduction

"We are the last generation." Via Tiktok, millions of Chinese saw a man respond to police in this way. Four years ago, the hashtag that many young people in China liked to use was #AwesomeMyCountry. (New York Times, 2022) Now, along with China's slowing economic growth, and strict political policies, more and more Chinese are resisting having children. In fact, in addition to the public's "willingness to procreate," China's long-standing family planning policy has been effective in lowering the country's birth rate. China's demographics have long been one of the many ties that bind the U.S.-China political and economic relationship, as they have given China its miraculous market size and trade structure. However, declining natural growth rates and an aging population raise the question of whether China's market size and trade structure can continue to reliably bind the U.S.-China relationship as its population declines.

The purpose of this paper is to explore the significant impact of China's declining population size on U.S.-China relations. In China, declining economic growth and longstanding political policies have led to resistance to childbearing and a decline in the Chinese birth rate. Given China's large market size and trade structure, China's population has long been recognized as playing an important role in U.S.-China political and economic relations. However, with current demographic trends pointing toward a shrinking and aging population, it becomes critical to examine how these changes will affect future dynamics between the two countries. This paper will delve into the potential impacts of China's demographic changes on the economic relations and political impacts between the two states. Through understanding and analyzing these impacts, we can gain insight into the future trajectory of U.S.-China relations in the context of China's demographic challenges. As China and the United States navigate the complex global landscape, this exploration will help us better understand the intricate interplay between population dynamics and international relations in the 21st century.

2 Literature Review

Regarding population, current international relations theory mainly uses international relations theory to explain China's population policy. There is a viewpoint that the demographic changes witnessed in China have been influenced by a complex interplay of ideologies. For instance, Liberalism is characterized by its emphasis on individual rights and limited government intervention, which has also left its imprint on China's population policies, especially as the state navigated its transition towards a more market-oriented economic structure. Also, Marxism has historically impacted China's demographic landscape through policies aimed at the equitable distribution of

resources, which has been rooted in the principles of social equality and economic transformation.

In 1978, Neo-Malthusianism came to China. The 1960s and 1970s witnessed swift worldwide population expansion, attributed to economic progress and the dissemination of medical and scientific knowledge that led to reduced mortality rates. During this period, Malthus' perspective became resurgent and became the principal driving force behind policies aimed at controlling population growth. In 1960, the global population reached the milestone of 3 billion, a number that escalated to 4 billion by 1975. Thereby, concerns emerged among the governments of affluent states that the burgeoning populations in poorer states might deplete the finite resources on Earth, as highlighted by development economist Betsy Hartmann of Hampshire College¹, which then marked the emergence of Neo-Malthusianism. Geert Jan Olsder, a Dutch professor, believed that *the Limits to Growth* report would shape the future of China's social structure. Thus, population control became an essential component of the state's pursuit of "socialist modernization," culminating in the implementation of the one-child policy². In other words, neo-Malthusian can be largely viewed as the theoretical impetus for coercive population control policy in China.

In contrast, Liberalism does not fully agree with this theory. Liberalism is an international relations theory emphasizing cooperation, individual rights, economic interdependence, and democratic governance³. In the context of population growth, liberalism often values individual freedom and human rights, including reproductive rights. It also focuses on economic growth, trade, and cooperation among states to achieve mutual benefits. Malthus' perspective could resonate with worries about sustainability and environmental impact, yet liberalism seeks to reconcile these concerns with the pursuit of development, freedom, and mutual benefits among nations. Neo-Malthusian apprehensions have been employed to rationalize curbing this freedom, occasionally with force. Neo-Malthusian theory, such as those implemented in China, violates individual liberty, which can further exacerbate issues such as sex-selective abortions and female infanticide⁴, and ultimately distorting the worldwide gender ratio at birth.

On the other hand, Marxism proposes different perspectives. Marxist theory emphasizes the intricate relationship between economic systems, social structures, and labor. At the core of capitalism is the exploitation of labor for profit, a process contingent upon the existence of a stable and adequate labor supply. The one-child policy's potential implications for the labor force, and thus capitalist production, warrant a closer examination: the distorted sex ratio. On one hand, such gender imbalance can inadvertently sustain a patriarchal structure that could be exploited to maintain the traditional division of labor within families⁵. This arrangement further aligned with capitalist goals, as it potentially kept labor costs suppressed by relying on unpaid or underpaid familial support for household and caregiving tasks. On the other hand, such imbalance further disrupts capitalist production processes⁶. Following the implementation of the one-child policy, a noticeable decline in

¹ Chelsea F. Neo-Malthusianism and Coercive Population Control in China and India: Overpopulation Concerns Often Result in Coercion. Available from: <https://www.cato.org/policy-analysis/neo-malthusianism-coercive-population-control-china-india-overpopulation-concerns> (accessed 1 July 2020).

² Greenhalgh S. Science, Modernity, and the Making of China's One-Child Policy. *China Q.* 2010;192:855–75.

³ Hindess B. Liberalism, socialism and democracy: Variations on a governmental theme. In: Foucault and Political Reason. London: Routledge; 2013. pp. 65–80.

⁴ Ayushi SA. Impact of China's One-child Policy on Women. Available from: <https://thegeopolitics.com/impact-of-chinas-one-child-policy-on-women/> (accessed 20 July 2021)

⁵ Johnson KA. Women, the Family, and Peasant Revolution in China. Chicago: University of Chicago Press; 2009.

⁶ Zhang H. From resisting to "embracing?" the one-child rule: Understanding new fertility trends in a Central China village. *China Q.* 2007; 192:855–75.

the birth rate emerged, especially after 1980. This phenomenon, while aimed at addressing population growth, inadvertently yielded a consequence that reverberated through the workforce and industries. With fewer young individuals entering the labor pool, sectors heavily reliant on a steady supply of affordable and ample labor confronted a new set of hurdles in upholding their profit margins. Moreover, the diminished pool of potential workers introduced the potential for wage hikes, as the demand for labor outpaced its availability. This shift in supply and demand dynamics could potentially reshape labor economics and the overall industrial landscape, necessitating adaptations to accommodate these evolving realities.

In terms of Sino-US relations, current literature reveals the interdependence dynamics of Sino-US relations. Kant argues that economic interdependence reinforces constraints and liberal norms by creating transnational relationships that encourage accommodation rather than conflict.⁷ A great example is The creation of the World Trade Organization (WTO). WTO 's advocacy of free trade illustrates the world's unilaterally positive view of trade as a deterrent to war.⁸ Besides, Gelpi and Grieco point out that not only can trade promote peace among democratic leaders, who see policy success as a necessary condition for extending their terms in office, but trade itself can promote peace among authoritarian rulers.⁹ For the world first and second largest economy, a primary reason for U.S.-China economic interdependence lies in their complementary economic structures. The United States, with its advanced technology, innovation, and consumer-driven economy, has been a major destination for Chinese exports.¹⁰ On the other hand, China's large and low-cost labor force, coupled with its robust manufacturing capabilities, has made it an attractive production base for U.S. companies seeking to access global markets.¹¹

On the one hand, extensive trade relations have played a pivotal role in fostering economic interdependence. Bilateral trade between the two nations has surged over the years, with China becoming the United States' largest trading partner in goods. This reliance on trade has linked their economies closely, making any disruptions in the trade flow have significant ramifications for both countries.¹² On the other hand, the financial markets of both countries are deeply intertwined, further strengthening their economic interdependence.¹³ The overall financial relationship is over US\$5 trillion, including nearly two trillion in Chinese listings on US stock exchanges and US\$1.3 trillion in Chinese official holdings of US government bonds. China's holding of U.S. Treasury securities, in particular, has implications for U.S. fiscal policy and interest rates. Conversely, U.S. financial institutions have a substantial presence in China, facilitating capital flows between the two economies. Whatever the strategic difficulties between the two Governments, it remains in the interests of both countries to maintain these arrangements.¹⁴

Nevertheless, the issue of how China's population changes affect Sino US relations remains unresolved. First, as a core factor of industrial sector, population, also affects the relationship between the two countries rooted in complementary industrial relations. Second, the interdependence of the above literature has been continuously challenged. Empirical studies have found that after the 2008 financial crisis, many industries between China and the U.S. gradually moved from interdependence to

competition with each other as China's economic structure shifted. Caporale, Sova, and Sova confirm a significant change in the structure of China's trade related to a shift from labor-intensive to capital- and technology-intensive exports.¹⁵ Scholars like Hamia states that after 2010, the competitiveness index of Chinese manufactured goods rose rapidly, overtaking American industry in international markets, and the gap would be expected to widen further if "Made in China 2025" is successfully implemented.¹⁶ Due to China's increasingly complex trade structure in recent years, its complementarities with industrialized countries (the United States, Japan, and Germany) have been weakening, and its competition with newly industrialized economies (India and Indonesia) and resource countries (Australia and Russia) has been decreasing.¹⁷

Certainly, that is not to say that the United States and China currently have no or little economic complementarities. Economic indicators, such as the volume of bilateral trade between the United States and China and China's holdings of United States Treasury bonds, suggest that the two countries remain very important economic partners for each other. The focus of this research is not on whether the debate has shifted, but on the trend. Not surprisingly, according to this trend, the United States is increasingly anxious about China's growing competitiveness. As realists have suggested, it is unlikely that politicians will be able to avoid considerations of relative gains, especially as economic relationships evolve from symbiotic to more competitive: "Each party considers not only its individual gains, but also how well it performs in comparison to the other party."¹⁸ Therefore, deconstructing the elements that more deeply affect the changing trends of China's industrial structure is particularly important for understanding U.S.-China economic interdependence.

3 Population, Labor, and Industrial structure

Population, as a factor of labor force, is considered as a core element affecting industrial structure in economics.¹⁹ By influencing labor supply, salaries and human resources, China's population has been pivotal in shaping China's industrial structure and industrial transformation.²⁰ Generally, the labor brought about by population growth is the simplest path to achieving economic growth²¹. A higher population within a state can result in a larger workforce and more convenient availability of labor. This increased labor force will subsequently contribute to the production of a greater number of products, thereby fostering economic growth. Therefore, the growth in population enables the expansion of both labor and products, and further grows the economy. Since China made market-oriented reforms in 1978, its economic performance becomes very productive. Up until the year of 2018, China has become the biggest trading country in the world²². It is found that the redistribution of labor and capital among manufacturing enterprises is an important source of productivity growth²³. Within this context, one of the significant factors is China's massive population, especially the population growth in working-age, which allowed China to become the world's factory in the past few decades.

¹⁵ Caporale GM, Sova A, Sova R. Trade flows and trade specialization: the case of China. *China Econ Rev.* 2015;34:261–73.

¹⁶ Hamia MA. The US and Chinese International Trade Indices: A Comprehensive Empirical Survey. *LinkedIn*; 2016 Nov 1. Available from: <https://www.linkedin.com/pulse/us-chinese-international-trade-indices-comprehensive-about-hamia>.

¹⁷ Kwan CH. Trade Structure of China Becoming More Sophisticated: Changing complementary and competitive relationships with other countries. *Res Inst Econ Trade Ind*; 2013 Jun 5. Available from: <https://www.rieti.go.jp/en/china13060502.html>.

¹⁸ Mearsheimer J. The false promise of international institutions. *Int Secur.* 1994;19(3):5–49.

¹⁹ Cui Y, Meng J, Lu C. Recent developments in China's labor market: Labor shortage, rising wages and their implications. *Rev Dev Econ.* 2018;22(3):1217–38.

²⁰ Xiao Y, Ma D, Cheng Y, Wang L. Effect of labor cost and industrial structure on the development mode transformation of China's industrial economy. *Emerg Mark Financ Trade.* 2020;56(8):1677–90.

²¹ David EB. Population 2020. Available from: <https://www.imf.org/en/Publications/fandd/issues/2020/03/changing-demographics-and-economic-growth-bloom> (accessed March 2020).

²² Christina Z, Bang X. China's 40 years of economic reform that opened the country up and turned it into a superpower. 2018

²³ Yan W, Yudong Y. Sources of China's economic growth 1952–1999: incorporating human capital accumulation. *China Econ Rev.* 2003;14(1):32–52.

⁷ Kant I. *Perpetual Peace: A Philosophical Essay*, 1795. BiblioLife; 2000.

⁸ The WTO. *economic interdependence, and conflict* (2008). Reference and Research Book News, 23(2)

⁹ Gelpi CF, Grieco JM. Democracy, Interdependence, and the Sources of the Liberal Peace. *J Peace Res.* 2008;45(1):17–36. DOI: <https://doi.org/10.1177/0022343307084921>.

¹⁰ Nye JS Jr. Power and interdependence with China. *Wash Q.* 2020;43(1):7–21.

¹¹ Wang Z, Zeng J. From economic cooperation to strategic competition: Understanding the US-China trade disputes through the transformed relations. *J Chin Polit Sci.* 2020;25:49–69.

¹² Nye JS Jr. US—China Trade Conflicts and the Future of the WTO. *Fletcher Forum World Aff.* 2009;33(1):27–48.

¹³ Nye JS Jr. Power and interdependence with China. *Wash Q.* 2020;43(1):7–21.

¹⁴ Rudd K. To Decouple or Not to Decouple? University of San Diego, Robert F. Ellsworth Memorial Lecture; 2019 Nov 4. Available from: <https://asiasociety.org/policy-institute/decouple-or-not-decouple>.

On the other hand, China's long-term abundant labor supply has also shaped the trade conflict between China and the United States. In fact, since the 1960s, the number of manufacturing employees in the United States has been steadily declining. From 2000 to 2008, that is, during the China shock, the number of people employed in the manufacturing industry dropped even faster.²⁴ Scholars who study the economic consequences of the China shock on the American economy found that part of the manufacturing employment loss is the result of China's trade expansion, and the trade expansion itself is due to the change of trade policy or China's productivity.^{25 26 27 28} The reason is that China's exports to the United States are mainly labor-intensive goods.²⁹

In order to reduce the growth rate of its vast population, the one-child policy was implemented by the Chinese government officially from 1980 to early 2016³⁰. However, the policy has made a great impact on both China's demographic and economic structure. It has unavoidably resulted in an aging population and a potentially shrinking labor force, which can further affect China's capability to maintain its competitive advantage in labor-intensive industries, as well as impact its exports of goods and types of services to other states, such as the United States. For instance, the shrinking working-age labor force could cause an increase in the cost of labor, which could potentially promote its trade transition from low-cost manufacturing industries to more technologically advanced industries. Even though this shift aligns with China's aspiration to become a global leader in emerging technologies, it influences the trading relationship between China and the U.S., and can further lead to technological rivalry with the U.S. concerning trade-related disputes, such as technology transfer and intellectual property protection.

More specifically, although the Chinese government started to change its family planning policy from a one-child policy to a two-child policy in 2016, and even to a three-child policy in 2021³¹, according to a survey made in 2022, there are two-thirds of more than 20,000 people show a "low birth desire", particularly urban women aged between 18 and 25³². On one hand, China's birth rates have kept declining, resulting in a smaller pool of young workers entering the labor force. This decrease in the number of new entrants could cause a shortage of skilled labor in certain industries, hindering technological innovation and higher value-added production. On the other hand, decades of the one-child policy and changing societal norms have caused a larger proportion of elderly citizens relative to the working-age population. Such demographic imbalances put pressure on social welfare systems, healthcare services, and pensions. The aging population can reduce the supply of workers available for labor-intensive industries and disrupt the dynamic that propelled China's industrial growth.

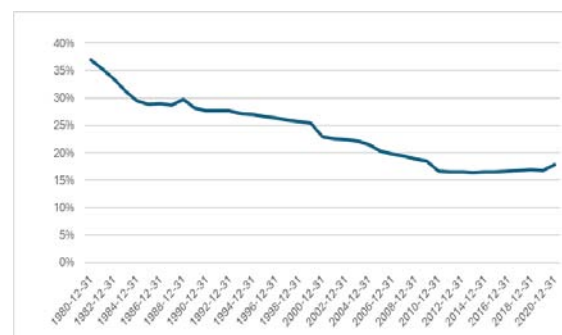
Therefore, with the significant changes in its demographic landscape, China starts to face many economic and political challenges. Currently, China's economic development has shifted towards becoming a knowledge-based economy driven by innovation and technology. Such a transition requires a

skilled workforce capable of contributing to research, development, and innovation. However, demographic changes, such as the aging population and decreasing birth rates, can make a negative impact on developing and sustaining a highly skilled workforce necessary for this transition.

4 China's Demographic Changes and Political Impact

The political effects of China's demographic changes on U.S.-China relations, intricate and multifaceted, warrant equal attention. Unraveling these complexities reveals that the interplay between demographic realities and geopolitics could decisively shape the trajectory of the most consequential bilateral relationship in the world. On China's side, it has both internal stability and external manifestations. From the internal dimension, the way the Chinese government addresses its profound demographic changes is very important. The Chinese Communist Party (CCP) derives much of its legitimacy from sustained economic growth. Therefore, any challenges posed by the demographic changes, could precipitate a legitimacy crisis for the CCP³³. Moreover, the effectiveness with which the government revamps its social welfare infrastructure will be another litmus test for the Party's leadership in the eyes of its populace. In other words, any perceived inadequacies could have made significant political repercussions for the Chinese government. A contracting workforce and potential economic deceleration may strain the social contract between the Party and its populace³⁴. If the Chinese government struggles to meet rising expectations, it may face domestic challenges, pushing it to divert attention externally. Therefore, it is important to China to fix its social support system as soon as possible.

Moreover, the decline in China's population growth rate may further increase the trade conflict between China and the United States. China's population structure has undergone significant changes over the years due to the implementation of family planning policies. China's evolving population structure, characterized by a decreasing proportion of children, has far-reaching implications for consumption patterns, the domestic market, imports from the U.S., and the overall trade balance between the two nations.



Graph 1 Ratio of population aged 0-14 years to total population
Source: National Bureau of Statistics of China

²⁴ Caliendo L, Parro F. Lessons from US-China trade relations. *Annu Rev Econ.* 2023;15:513-47.

²⁵ Autor DH, Dorn D, Hanson GH. The China syndrome: local labor market effects of import competition in the United States. *Am Econ Rev.* 2013;103(6):2121-68.

²⁶ Acemoglu D, Autor D, Dorn D, Hanson GH, Price B. Import competition and the great US employment sag of the 2000s. *J Labor Econ.* 2016; 34(S1)-98.

²⁷ Pierce JR, Schott PK. The surprisingly swift decline of US manufacturing employment. *Am Econ Rev.* 2016;106(7):1632-62.

²⁸ Caliendo L, Dvorkin M, Parro F. Trade and labor market dynamics: general equilibrium analysis of the China trade shock. *Econometrica.* 2019;87(3):741-835.

²⁹ Wang Z, Zeng J. From economic cooperation to strategic competition: Understanding the US-China trade disputes through the transformed relations. *J Chin Polit Sci.* 2020;25:49-69.

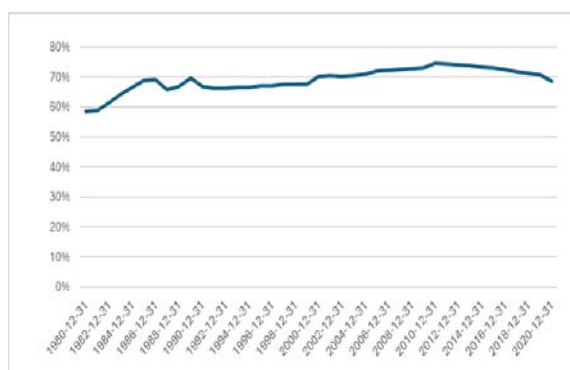
³⁰ Kenneth P. One-child policy Chinese government program. Available from: <https://www.britannica.com/topic/one-child-policy> (accessed 2023).

³¹ Jing W, Liu J, Ma Q, Zhang S, Li Y, Liu M. Fertility intentions to have a second or third child under China's three-child policy: a national cross-sectional study. *Hum Reprod.* 2022;37(8):1907-18.

³² Verna Y. 'The last generation': the young Chinese people vowing not to have children. Available from: <https://www.theguardian.com/world/2023/jan/20/the-last-generation-young-chinese-people-vow-not-to-have-children> (accessed January 2023).

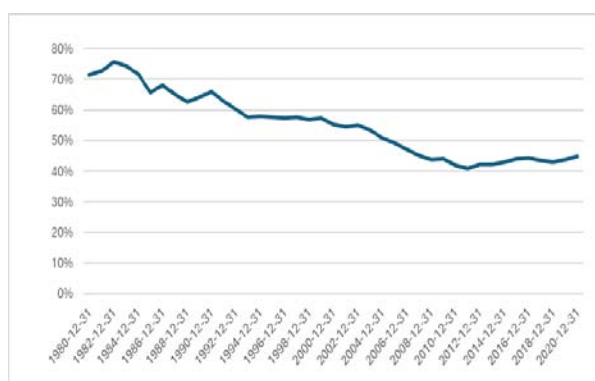
³³ Holbig H, Gilley B. In search of legitimacy in post-revolutionary China: Bringing ideology and governance back in. 2010.

³⁴ Gallagher ME. Authoritarian legality in China: Law, workers, and the state. Cambridge: Cambridge University Press; 2017.

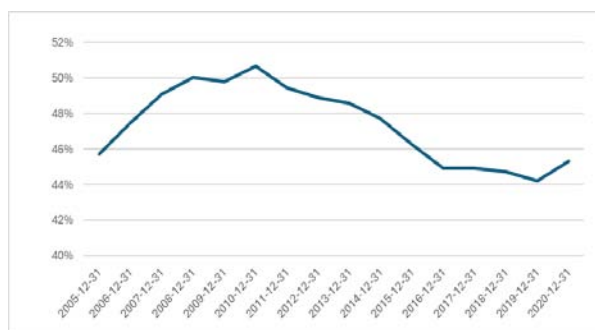


Graph 2 Ratio of population aged 15-64 years to total population
Source: National Bureau of Statistics of China

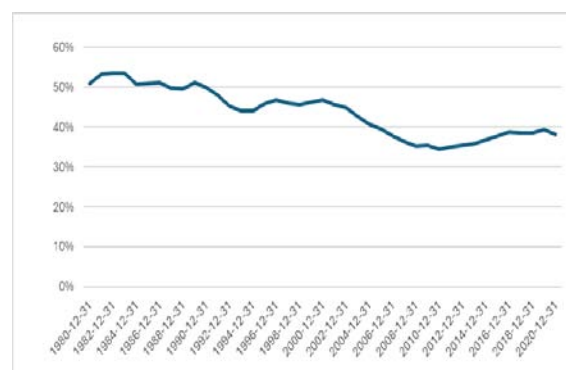
One key theory shows that the proportion of children in the population significantly affects a country's family consumption needs.³⁵ It is posited that Families with more children tend to have higher household consumption needs. In fact, China's family planning policies, including the one-child policy, have significantly reduced the proportion of children in the population. (See Graph 1 and Graph 2) At the same time, a larger working-age population typically leads to lower labor costs and potentially lower per capita income. (See Graph 3) Low incomes contribute to low savings rates as they accrue over time. (See Graph 4) The declining proportion of children in China's population suggests a higher proportion of working-age individuals but with relatively low per capita income. Given the low proportion of children and relatively low disposable income, China's consumption market may have yet to experience robust growth. Families with fewer children may have less incentive to spend on child-related products and services, contributing to slower consumption market growth. (See Graph 5)



Graph 3 Per capita disposable income
Source: National Bureau of Statistics of China



Graph 4 Resident Saving Rate
Source: National Bureau of Statistics of China



Graph 5 Resident consumption rate
Source: National Bureau of Statistics of China

China's relatively low consumption power, as suggested by the declining proportion of children and low disposable income per capita, implies limited demand for consumer goods and services, including imports from the U.S. This low consumption power may result in reduced interest in high-end or luxury imported products. Besides, it is implied that the country may not have a strong need for imports due to China's low consumption power. As such, the argument posits that China's import requirements may not be as substantial as those of a nation with a more robust consumption market. Thus, China's lower consumption power and limited import needs may limit the volume and types of goods and services the U.S. exports to China. U.S. exports to China may be constrained by the relatively weak demand for certain products, impacting export sectors such as consumer goods and luxury items. The low consumption power and import needs may contribute to China importing less than it exports to the U.S. This argument aligns with the persistent trade imbalance between the two nations, where China consistently exports more to the U.S. than it imports.

Indeed, with the decrease in the labor force, the main sector of China's exports to the United States--manufacturing--will continue to shrink, which may alleviate the deficit between China and the United States to some extent. However, it also means that the trade relationship between China and the United States is gradually decoupling: the manufacturing related trade is shrinking, but the other trade sectors of the two countries have remained relatively low. In addition, a shrinking labor pool in China suggests looming economic decelerations in the future. It seems that China may uphold its economic momentum by leveraging technological innovation and enhancing worker productivity. With a shrinking labor force, China's impetus of development will be turn to focus on technology and automation industry. China may intensify its efforts in artificial intelligence, quantum computing, biotech and other technological domains, which can lead to increase the US-China competition in high-tech sectors³⁶, potentially challenging the U.S. dominance in certain areas but also opening avenues for collaborations and investments. The specter of demographic dilemmas, however, could potentially be seen as harbingers of imminent financial fragility. The U.S. may view these prospective weak points as a golden opportunity to consolidate its foothold in the region. By reinforcing its alliances, the US aims to construct a more robust front against a China possibly keen on affirming its dominance before its demographic dividends diminish³⁷. However, domestic challenges often precipitate assertive foreign policies, especially among major powers. For instance, China may bolster its territorial claims in the South China Sea or intensify its Belt and Road Initiative project, both of which could challenge strategic interests the U.S. and escalate tensions between these two states. Therefore, concerns about a potentially more assertive China, driven partly by its internal demographic challenges, may prompt the U.S. to solidify its alliances in the Indo-Pacific

³⁵ Stewart K, Patrick R, Reeves A. A time of need: exploring the changing poverty risk facing larger families in the UK. *J Soc Policy*. 2023;1-25.

³⁶ Mori S. US technological competition with China: The military, industrial and digital network dimensions. *Asia-Pac Rev*. 2019;26(1):77-120.

³⁷ Roy D. Return of the dragon: Rising China and regional security. New York: Columbia University Press; 2013.

region, such as maintain stable relationship with South Korea, Japan, the Philippines, Thailand, Australia and New Zealand³⁸. Also, states sharing demographic similarities with China may find themselves aligning more closely with U.S. strategies.

5 Conclusion

The changes in the strength of the two countries brought about by the population decline in China will bring new opportunities and challenges to Sino-US relations. From a realist perspective, the primary driving force in international relations is power³⁹. On one side, with China's workforce shrinking and aging population, there will be a potential decrease in its economic productivity. Such demographic change can be initially regarded as an opportunity for the US to maintain its economic and political dominance, and an aging China can be perceived as less aggressive and expansionist, thereby realizing the rebalance of power dynamics. In addition, an aging China also means that China has a greater demand for old-age care, medical care and insurance. At present, the development of China's old-age care, medical care and insurance industry lags far behind⁴⁰, and the aging China will inevitably generate new demands in this field, thus increasing cooperation in related fields. However, on the other side, realism also recognizes that states do act based on their national interest⁴¹. Due to a declining young labor force, China has been rapidly developing and investing in technological industries such as artificial intelligence and semiconductor, aiming to sustain its economic capability. For instance, with a declining youth demographic, China potentially faces challenges in terms of manpower for its armed forces. Realism emphasizes the importance of military power in state actions and the international order⁴². If China anticipates a dip in its ability to amass large ground forces, it could strategically pivot to other forms of advanced technological power, such as cyber warfare, naval expansion, or advanced missile systems⁴³. This move towards tech dominance poses new challenges for the US, which has traditionally held the tech reins. Therefore, it is also interesting to explore whether an aging, but more innovative China maintain and enhance its power under technological driven.

In addition, realism implies the fluid nature of alliances that dictated by the prevailing balance of power⁴⁴. In other words, realism underscores that the fluid nature of alliances is shaped by the ongoing shifts in the balance of power. Therefore, China's demographic trajectory could lead to a recalibration of its alliances and partnerships, changing the geopolitical equilibrium. The implications could range from forming new alliances that serve its demographic and geopolitical interests, to reinforcing existing ones with shared demographic challenges or goals. As China navigates its demographic transitions, the attempts to reshape international norms and institutions can become more pronounced⁴⁵. Also, the alterations to global political institutions aimed at fostering a favorable environment for China's interests could alter international alignments and potentially facilitate the emergence of novel diplomatic configurations. On one hand, as China's demographics changes, its relationships with its neighboring states and other great powers could undergo recalibration. With its demographic transition, China might seek to reshape global political institutions to better serve its interests, ensuring that policies and frameworks are favorable to its unique challenges. Also, will it create opportunity for the US to strengthen existing alliances or forge new ones. On the other

hand, although realism primarily highlights hard power, it does not ignore the subtleties of soft power. Recognizing its demographic challenges, China may double down on its global soft power initiatives to maintain influence, such as investing in infrastructure projects, cultural exchanges, or educational programs overseas. By investing in soft power, China can mitigate the impact of its demographic changes and maintain its existing global influence and reach to a large extent⁴⁶. However, from the US side, such intensification in China's soft power play would necessitate a strategic response, either by countering with its own initiatives or by highlighting the drawbacks or strings attached to China's international endeavors.

Although demographic changes unfold progressively, their political impacts can be sudden and seismic. China's demographic trajectory is not merely an internal evolution⁴⁷. More specifically, it is a transformative process that can shape China's external behavior, especially with the U.S. therefore, it is important to recognize and understand how these changes work for both states as they chart their courses in this new era of geopolitical competition. However, whether such demographic-driven political impacts end in confrontation or cooperation between the U.S. and China is largely dependent on their respective domestic and foreign policymaking and diplomatic strategies. From the lens of realism, China's demographic changes weave a complex tapestry of power plays, strategic recalibrations, and potential areas of conflict and cooperation with the US. As both states continue to act in their national self-interest, it is important to view these changes as paramount in predicting the trajectory of the relationship between the US and China.

In conclusion, China's demographic changes characterized by an aging population and potential economic and political implications, which will invariably influence its geopolitical strategy and posture. Although these changes may suggest certain predictable patterns of behavior, the actual course of U.S.-China relations remains contingent on diverse factors. Also, the realist perspective implies that national self-interest will always be at the forefront of decision-making for both states. Therefore, as we anticipate the future of the relationship between these two states, it is always essential to constantly reassess the evolving demographic landscape and its intersection with the political and economic dynamics of both powers. In other words, whether these demographic-driven changes lead to intensified competition or renewed cooperation between the U.S. and China, proactive diplomacy, informed policymaking, and a deep understanding of these underlying changes are crucial for both states navigating and addressing the global challenges.

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Primary Paper Section: A

Secondary Paper Section: AD, AH, AO

EXAMINING THE ROLE OF DOGMATISM AS A PREDICTOR OF HAPPINESS AND HARMONY AMONG YOUNG ADULTS: A CORRELATIONAL STUDY

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This work is supported by Project "Theoretical Construction and Practical Exploration of Chinese Education Modernization" (Grant No. VAA230006) and "The Historical Logic and Contemporary Value of the Spread of Chinese Sericulture as 'Belt and Road'" (Grant No. SWU2403008).

Abstract: The current study was intended to explore whether dogmatism is a predictor of happiness and harmony in life among young adults 18-25 years of age. In addition, this research also intended to identify mean differences in study variables across demographic variables including gender, age, etc. The study was based on a correlational research design. Participants comprised young adults ($N = 300$) from the University of Sargodha Pakistan. Data was collected using a purposive sampling technique. Linear regression analysis was applied to test of hypothesis. The findings revealed that dogmatism negatively predicted happiness and remained non-significant for harmony in life. Happiness positively predicted harmony in life among young adults. The findings revealed that if the level of dogmatism is managed to be lowered in young adult levels of happiness can be raised in them which will have a high impact on their flourishing.

Keywords: Dogmatism, happiness, harmony in life, young adults

1 Introduction and Literature Review

Rokeach (1960) proposed the concept of dogmatism to discuss the notion of rigid-mindedness. According to him, individuals high in dogmatism do not welcome those ideas that do not belong to their intellectual boundaries. He discussed dogmatism as an individual difference variable in cognitive style. Rokeach conceives dogmatism as an ordinary style of handling information and forming ideas. From Rokeach's point of view, a person is dogmatic or has a closed mind to the degree that s/he opposes the sway of ideas that plunge outside her/his predestined intellectual limitations. He/she pays attention to the course of action of how individuals systematize and develop their viewpoints concerning others' viewpoints within their "belief system". The level of one's dogmatism is determined by the extent to which an individual lets his/her beliefs communicate with each other when these beliefs are interrelated and constitute a belief system. An open-minded person demonstrates "intercommunication" of viewpoints whereas one with a closed mind exhibits "segregation" of viewpoints.

1.1 Dogmatism

The background of dogmatism is related to monumental California research authoritarian personality (Mele, 2015). In the research of the California group, we explained that authoritarian personality includes fascist tendencies. According to Rokeach, the research conducted on the California group was related to a specific personality type ethnocentrism, and narrowness. The view of Rokeach was that authoritarianism was not bounded by fascist properties it can be related to a situation on the continuum fluctuating from extreme left (socialism) to extreme right (Fascism). He added that it is not bounded to political or economic consideration, but includes people with academic preferences in the civilization, the social and physiological sciences, and other religions. According to Rokeach prejudice on its own is not a predictor of authoritarianism.

He wanted to evaluate the tendencies found common in all the aspects of authoritarianism, irrespective of definite ideology

philosophical or scientific subject. The results of all these investigations were the basis of the concept of dogmatism. Rigidity refers to the idea or belief that refers to the extent to which a person is open to others' beliefs, ideas, and thoughts one person who accepts others' opinions, viewpoints, and ideas is considered to be less rigid than the person who does not accept others opinions, norms and beliefs.

A dogmatic person constructs his boundaries of beliefs and is not open-minded he/she sets his intellectual limitations and doesn't let others cross these limits or boundaries even dogmatic people who are high on rigidity don't even let others communicate their beliefs to them. Here two important phenomena intercommunication and segregation are there. Here intercommunication is higher in less rigid individuals and segregation is higher in more rigid and close-minded people. A personality attribute that is more closely related to adaptability and creativity is openness to experience. People with low levels of openness to experience tend to favor simplistic, non-intellectually challenging, black-and-white worldviews. In contrast, those with high levels of openness choose more nuanced perspectives and are at ease with complex concepts.

One of these qualities, openness to values, is prepared to "re-examine social, political, and religious beliefs" and is even thought to be "the antithesis of dogmatism" (Smith, Johnson, & Hathaway, 2009). The links between openness, dogmatism, and sympathy were studied in this study of master 's-level counselors-in-training enrolled in CACREP-accredited schools. The findings revealed that dogmatism and openness have a negative relationship and that openness and sympathy scores are entirely correlated. A survey of master 's-level students enrolled in the Council for Accreditation of Counseling and Related Educational Programs (Duenyas, 2023). certified program was conducted after receiving institutional review board approval. Dogmatism and rigidity are interrelated and interconnected phenomena that fluctuate directly and also affect mental health in the same way as it is proposed that nothing remains the same or static De-Sardan, J. P. O. (2008).

As there is a confounding concept of distress that fluctuates accordingly. When people are rigid to beliefs and ideas they don't allow others to interfere or disturb their belief system if we see the Buddhist point of view they believe that everything in the world is changing there is a constant state of change in individuals and life can never remain same for individuals here if people are rigid and don't allow changes in their life they will eventually have to face higher levels of distress in their life (Lama & Cutlers, 1998). While if we consider a flexible mindset they will be more open to new experiences or new changes in life and therefore will have lower levels of distress in their lives.

If we sum up the research poor mental health is associated with those who are rigid and inflexible to the point of view while good mental health serves flexible and open-minded people. Happiness is an enterprise and a positive force of life. A person textures well-being underneath different effective influences. Religious dogmatism that influences the whole world is one of the critical factors of happiness or well-being. The present study decided to examine the relationship between dogmatism and well-being. This research is a correlation research. The population of research comprises all individuals with 30-50 years old who lived in Tehran, Iran, in 2015. From all of the subjects, 180 subjects were selected as samples. The Oxford Happiness Questionnaire and Rokeach dogmatism scale were used in the research. Data were examined by the Pearson correlation test. Results show a significant negative correlation between dogmatism and happiness ($a=0.05$).

Dogmatism ads a negative effect on well-being. Religious dogmatism is the most hazardous issue in contradiction to well-being. Dogmatic persons have a stubborn cognitive system that

arises as an unchanging personality trait and declines their modification with the atmosphere. (Denier et al., 2014). If we consider dogmatism in the light of authoritarianism we will see that dogmatic people are those individuals who tend to appreciate authority figures in every and then a situation of life they are more likely to follow or obey the rules that are put forward by authority figures consider marketing psychology when they have to sell different products they market them through advertisement, therefore, they make their advertisements attractive by adding authority figures in it consider an advertisement of medicine if those medicines are endorsed by a doctor in the media they are more likely to get purchased by the people who are high on dogmatism as the doctor is the authority figure for medicines, this is so because highly dogmatic people have believed in the words of authority figures than non-authority figures (Harvey & Hays, 1972).

Harmony refers to the concept that serves the purpose of balance in stabilizing different aspects of life (Li, 2008a) When it comes to balancing different domains of life the most important and crucial part is mutual support and dependence without which things cannot go further nor flourish. (Li, 2008b). Considering a psychological well-being point of view to maintain a balance in life you don't need only personal well-being but social and environmental factors are also involved which takes things a step further when an individual focuses on their spirituality his own mental and physical well-being he has to take many things into account like maintaining and syncing oneself with its environmental factors. (Kjell, 2011). In 2011 Damburn and Ricard proposed that individual perception about oneself is as important as his understanding and a positive perception of the environment around him so that he can take and balance things side by side.

Balance and harmony are often used interchangeably but if we see things, in general, what it means to be a person in harmony (Coursey, et al. 2019), it is not a separate complete phenomenon but a portion of a broader notion if seen more commonly balance is used to illustrate the relationship between two related phenomena but it does not necessarily mean that just analyzing both phenomena will result in a balance for the aspects and situations it further involves many subconcepts and is a complex phenomenon in simple terms harmony can involve three major phenomena (a) analytical phenomena (b) motivational phenomena (c) axiological phenomena here analytical principles refer to the deeper understanding of different factors, situations and people in addition to which you should also have the ability to analyze and evaluate those phenomena on just grounds by having a positive perception. Motivational phenomena refer to the ideas of your choices and methods to act on a plan while axiological concepts illustrate the importance of valuing life outcomes.

All of these major concepts work together to serve the balance in life and its domains. Ideals of harmony were explained in classical Chinese and Greek philosophy they explained and stressed the importance of harmonizing and balancing features and subdomains of life (Li, 2008a). Here harmony can be conceptualized as the quality of relationships among multiple balancing acts around the world. Harmony and Affective Balance category have a wide range of literature support as when it comes to harmony emotions are the most important factor for balance in life it doesn't only include balance and equilibrium but also complexity and granularity now if we consider emotional balance there are two important domains to consider positive affect (PA) and negative affect (NA) (Bradburn, 1969).

Although positive and negative effects are considered as a continuum if we go further to have a deeper look they are even more complex than one could imagine. Mostly when it comes to harmony one might think that a person could have harmony in life if he could higher rate or score on positive affect and a lower score on negative affect but this is not the case on actual grounds. Here idea of harmony can be a balance in both PA and NA in such a way that if a person is in a state of highly charged emotions he could be in harmony by having high PA and NA

simultaneously similarly he could experience harmony by having low PA and NA when experiencing a low arousal state (Lomas, 2017c), balance is not only important when it comes to positive emotions pain is also a very important factor of life when it comes to endurance. (Nelson et al., 2014).

Cognitive balance is a very broad category that has a diverse range of concepts. Here a quite useful and worthy concept for cognitive balance was provided by Wallace and Shapiro (2006) in the Buddhist philosophy they divided the concept of cognitive balance into four forms Conative, cognitive, attitudinal, and affective. The next category to be included is balance between oneself and others which is of utter importance because a stable life needs balanced relationships whether it is family, friends, or intimate relationships (Levpušček, 2006). Here if we take an example of partnership whether it is professional or romantic both need harmony i.e. if one partner is doing something for the other partner he is also having some expectation from him which if not fulfilled leads to conflicts, toxicity in relationships, breakups and divorces. Ideal relationships are the ones that have practical implications of the rule of give and take (Salazar, 2015).

If we have to compare the two cultures then Western culture mostly focuses on individualism and in Eastern culture individuals have major concerns about the collectivist approach if we consider self-other balance eastern culture could be considered more in harmony than Western culture due to collectivist approach although western culture is not considered more indulgent in harmony domain but still western individuals also interact productively in a more healthy manner.

1.2 Happiness

Happiness is a broad term that is frequently used with well-being due to its similarity. Happiness represents a person's subjective gratitude for life. According to Mahipalan, & Sheena, (2019), it is an individual's positive psychological state. Happiness is an individual's positive potential and high productive level, to build and maintain social relationships, and the ability to gain more success. According to Deb, (2020), happiness is an individual's satisfaction with life. It is based on a person's affects and thoughts. According to Haybron (2008), happiness has two essential approaches; prudential pleasure and psychological pleasure.

Hence, it represents two conceptually different things, a powerful condition of mind and a lifestyle that is excellent for someone. Happiness is a positive, optimistic, and constructive feeling. When an individual has positive views about oneself and other individual's lifestyles and thinks that all things are good then the individual's psychological well-being level is high (Kang, et al. 2021). According to (Pfund 2023) six distinct extents of wellness are present i.e., personal growth, self-acceptance, autonomy, purposeful life, positive social relations, and environmental mastery. The most reliable components of happiness are self-progress, independence, self-confidence, and well-being. Stress tolerance, interpersonal relationships, problem-solving, and reality testing.

1.3 Theoretical perspective of happiness

Hedonism Theory. Happiness is the feeling of positive consistency of satisfaction over discomfort. It is a subjective sentiment. A pleased or satisfied lifestyle increases feelings of pleasure, reduces pain, and positive thinking about life, and has a high level of excitement (Fletcher, 2009). According to hedonic theory, an individual's psychological situation influences a person's satisfaction level. A satisfied person will be more confident, helpful, responsible, and enjoy life more (Layard, 2005). Happy individuals perform new tasks or activities in an energetic mood (Haybron, 2008). So, according to this theory, happiness is not only a condition of someone's awareness but a condition of well-being (Fletcher, 2009)

2 Research Design

The present study was conducted using a co-relational research design. In the presented study the data was collected by survey research method. The purpose of this study is to see the relationship between dogmatism, happiness, and harmony in life among young adults.

2.1 Sample

The sample of the present study consisted of $N = 300$ young adults including both men ($n = 51$) and women ($n = 249$). A purposive sampling technique was used to select the sample of the study. The age range of the sample was 18-25 years ($M = 20.5$, $S.D = 5.43$). Demographic variables such as gender, age, education, residence, and family system were also measured. The data was collected from students of the University of Sargodha (UOS) Pakistan.

Table 1: Frequency and Percentage of Participants

Characteristics	N	%
Gender		
Boys	51	17
Girls	249	83
Education		
BS	256	85.3
MSc	44	14.7
Age		
18-20	88	29.3
21-25	212	70.7
Residence		
Urban	168	56
Rural	132	44
Family System		
Nuclear	202	67.3
Joint	98	32.7

Table 1 reveals that a greater number of female young adults ($n = 249$, 83%) participated in the study compared to male young adults ($n = 51$, 17%). A higher number of participants from urban areas ($n = 168$, 56%) participated in the study as compared to rural areas ($n = 132$, 44%). The higher number of participants did BS ($n = 256$, 85.3%) as compared to Msc ($n = 44$, 14.7%). The high number of participants belong to the 21-25 age range ($n = 212$, 70.7%) as compared to the 18-20 age range ($n = 88$, 29.3%). The majority of participants belong to a nuclear family system ($n = 202$, 67.3%) as compared to a joint family system ($n = 98$, 32.7%).

Procedure

In the present study, the impact of dogmatism was investigated on happiness and harmony in life. The sample for the study was young adults and all of the young adults were university students. After getting permission from the Head of Department to conduct this study. All participants were assured that their information would be kept confidential and would only be used for research purposes. Informed consent was signed by the participant to keep their information confidential. Three scales were administered to participants in a relaxed environment. Complete guidance was provided to participants to avoid response bias.

After the completion of the questionnaires, they were thanked for their cooperation. Analysis for descriptive statistics, Pearson correlation, and linear Regression was used through IBM-SPSS. For the reliability coefficient reliability analysis was run which provided Cronbach's alpha and item-related correlation. To measure the demographic mean difference, an independent

sample t-test was also used. After that the results were analyzed through spss.26. Finally, the limitations of the studied variables were put forward.

Results

The goal of the present study is to investigate whether dogmatism is a predictor of happiness and harmony in life among young adults 18-25 years of age. SPSS-25 was used to carry out data analysis. Primarily, the demographic characteristics were identified through frequencies and percentages. Descriptive statistics and alpha reliability coefficient were calculated. Pearson correlation was calculated to find out the relationships between variables. Linear regression analysis was applied to calculate the effect of predictors on the outcome variables. Independent sample t-tests were applied to calculate mean differences across demographic factors.

Table 2: Psychometric Properties for Scales

Scale	M	SD	Range	Cronbach's α
Dogmatism Scale	27.75	4.17	19-43	.37
Oxford Happiness Scale	119.37	15.35	69-161	.80
Harmony in Life Scale	26.35	4.70	5-35	.75

The following table shows the psychometric properties of the scales which was used for the present study. Here Cronbach's α value for the dogmatism Scale was .37 indication of satisfactory internal consistency. The Cronbach's α Scale of Oxford happiness scale was .80 which represents high internal consistency. The Cronbach's α Scale value of harmony in life scale was .75 which shows good internal consistency.

Table 3: Pearson Correlations for Present Study Variables

Variables	1	2	3
1. Dogmatism	-		
2. Oxford Happiness	-.28**	-	
3. Harmony in Life	-.076	.56**	-

* $p < .05$. ** $p < .01$. *** $p < .001$.

The following table revealed that dogmatism has a significant negative correlation with construct happiness ($r = -.28$, $p < .001$) and happiness shows a significant positive correlation with harmony in life scale ($r = .56$, $p < .001$) while Dogmatism has a non-significant correlation with harmony in life ($r = -.076$, $p > .05$).

Table 4: Regression Coefficients of dogmatism on happiness

Variable	B	β	SE
Constant	148.6		5.72
Dogmatism	-1.05	-.29	0.204
R²	0.08		

Note. $N = 300$

** $p < .01$. *** $p < .001$

This table shows the impact of dogmatism on happiness in young adults. The R^2 value of .08 revealed that the predictor variable explained a .08% variance in the outcome variable with $F(1, 298) = 26.71$, $p < .001$. The findings show that dogmatism has negatively predicted happiness ($\beta = -.29$, $p < .001$).

Table 5: Regression Coefficients of dogmatism on harmony in life

Variable	B	β	SE
Constant	28.73		1.82
Dogmatism	-0.08	-.08	0.06
R²	0.006		

Note. $N = 300$

*** $p < .001$

The following table shows the impact of dogmatism on harmony in life among young adults. The R^2 value of .006 represents that the predictor variable explained .006% variance for the outcome variable with $F(1, 298) = 1.73$, $p < .001$ so therefore The findings prove that dogmatism does not predict harmony in life ($\beta = -.08$, $p > .05$).

Table 6: Regression Coefficients of happiness on harmony in life

Variable	B	β	SE
Constant	5.83		1.76
Happiness	0.172	.56	0.02
R²	0.31		

Note. $N = 300$

*** $p < .001$

The following table shows the impact of dogmatism on harmony in life among young adults. The R^2 value of .31 represents that the predictor variable explained a .31% variance for the outcome variable with $F(1, 298) = 137.12$, $p < .001$. Therefore, the findings revealed that happiness positively predicted harmony in life ($\beta = .56$, $p < .001$).

Table 7: Mean Comparison for Bs and MSc students graduate on happiness.

Variables	BS (M, SD)	MSc (M, SD)	t(298)	p	Cohen's d
Dogmatism	27.72, 4.24	27.90, 3.75	-2.73	.78	0.04
Happiness	118.5, 15.5	124.2, 13.41	-2.27	.02	1.16
Harmony in Life	26.1, 4.65	27.3, 4.91	-1.47	.14	1.09

* $p < .05$. ** $p < .01$. *** $p < .001$.

The following table indicated non-significant mean differences with dogmatism $t(298) = -.273$, $p > .05$. Result showed that Msc students have higher scores on dogmatism ($M = 27.90$, $SD = 3.75$) compared to Bs students ($M = 27.72$, $SD = 4.24$). Cohen's d was 0.04 (< 0.20) which indicates no effect size. These results showed significant mean differences in happiness with $t(298) = -2.27$, $p > .05$. Findings revealed Ms. C students displayed high scores in happiness ($M = 124.2$, $SD = 13.41$) compared to Bs students ($M = 118.5$, $SD = 15.5$). Cohen's d was 1.16 (> 0.20) which indicates a high effect size. Findings showed non-significant mean differences in harmony in life with $t(298) = -1.47$, $p > .05$. Results displayed that Bs students display lower scores in harmony in life ($M = 26.1$, $SD = 4.65$) compared to Msc students ($M = 27.3$, $SD = 4.91$). Cohen's d was 1.09 (< 0.20) which indicates a satisfactory effect size.

3 Discussion

The current study was interested in exploring the relationship between dogmatism, happiness, and harmony in life among young adults 18-25 years of age. Moreover, dogmatism has been studied as a predictor of happiness and harmony in life. In addition, this research also intended to identify mean differences in study variables across demographic variables including gender, age, etc. All three variables were important in their unique way as well as collectively. Initially, psychometric analysis was run on the SPSS to ensure that the instruments used

in the present research were reliable. The instruments were used on the sample of 300 young adults. For the measurement of dogmatism, the 11-item short scale of dogmatism was used. Its items are rated on a 5-point Likert scale ranging from 1-strongly disagree to 5-strongly agree.

The alpha reliability of the dogmatism scale originally found is .37 which shows satisfactory internal consistency and proves the scale as a reliable instrument. To measure construct happiness, an Oxford happiness scale was used. It is comprised of 29 items. Its items are rated on a 6-point Likert scale ranging from 1-strongly disagree to 6-strongly agree. The alpha reliability of the status consumption scale originally found is .80 which shows high internal consistency and proves the scale is a reliable instrument. For the measurement of harmony, the harmony in life scale was used. It is comprised of 5 items. Its items are rated on a 7-point Likert scale ranging from 1- strongly disagree to 7-strongly agree.

The alpha reliability of the consumer independence scale originally found is .75 which shows internal consistency and proves the scale is a reliable instrument. Furthermore mean, range, the standard deviation were also computed for the present research under the heading of psychometric properties (See Table 2) The data of 300 young adults which were all university students of UOS Pakistan, were further evaluated with the help of advanced statistics for the testing of the hypothesis. The first finding of the present research is that there is a significant negative correlation between dogmatism and happiness. The previous research supported similar results (Denier ED et al., 2014). also found that dogmatism negatively predicts Happiness.

People who are rigid regarding their beliefs and thoughts end up having a very low level of happiness in their life .when dogmatic people stick to an idea they don't allow any flexibility in it they are also not open to others' views and opinions and want others to confirm their beliefs and ideas this result in problems among their close relationships i.e their family and friends which lead to interrelationships conflict. These conflicts can also lead to social disapproval and loneliness. Taking it further when somebody is high on dogmatism they don't consider plans B and just stick to the same routine and motives although there are chances for their success for the benefit of consistency in their goals sometimes they become victims of burnout and are unable to continue further still they don't mold their ways and do not consider other options which increase their level of frustration which eventually decrease their level of happiness.

The second finding of the present study was that there is a significant negative correlation between dogmatism and harmony in life. Previously we assumed that harmony in life scale, happiness scale, and satisfaction with life scale have similar constructs where Dogmatism negatively predicted happiness which ultimately suggested lower levels of satisfaction with life with increased levels of dogmatism. Now here as satisfaction with life scale complements harmony in life scale it was hypothesized that dogmatism will negatively predict harmony in life scale people having rigid beliefs and thoughts are not open to others' opinions and ideas so are unable to keep balance in their life, individuals who are willing to achieve balance in their life are open to compromise in specific situations to maintain healthy relationships and to avoid stress in their life in contrary to that dogmatic people are not open to compromises as it is against their perfectionist mentality, they don't want to bow down their heads in front of others because of these egoistic approaches in their life, therefore, they ultimately lose that harmony and balance in their life.

The third finding of the present research was that there is a positive correlation between happiness and harmony in life, and happiness positively predicts harmony in life among young adults. As harmony in life refers to balance in different domains of life when an individual has a higher level of happiness his mind and body are relaxed without any stress and strain and therefore can work more efficiently to maintain and balance different domains of life i.e there is a person who awakes by

feeling happy so he will automatically indulge himself in healthy and productive activities in life i.e going for a walk doing a healthy breakfast and will happily complete his all to-do list which will eventually take him a step further to a more balanced life as his important duties will be completed in time and will lead a healthy life too but in contrary to that when the persons don't feel happy so whenever he will try to finish some unfinished work he will soon be annoyed by them and will feel lazy and depressive to complete his to-do list due to which he will end up having a more disturbed and unbalanced life.

The fourth finding of present study is that there is a low level of happiness among BS undergraduate students than Master's students ,now taking it into account when BS students get admission in university they have just completed their intermediates so when they join universities they all of sudden face a whole different environment in which they have to study and work independently they are not mature enough to do so and therefore for them it takes time to experience ,analyze and then expertise things and their environment while in contrary to that Master's students are comparatively more mature when they join universities as many of them have spent 2 years of their graduation in affiliated colleges and sub-campuses in which they didn't have to face as many issues as are to be faced by BS students in universities and by the time they are in universities they are mature enough experienced enough to understand things so are less involved interpersonal and inter-role conflict and can also better adopt to their environment. Therefore their (Master's students) level of happiness is higher than that of BS undergraduate students. The last finding of the present study is that there are no significant differences in the dogmatic level of boys and girls which was also supported by research findings as dogmatism is a personality trait so it doesn't matter if the individual is a male or female he can or cannot be dogmatic depending upon his other personality traits i.e authoritarianism and rigidity are both traits of highly dogmatic individuals. Similarly, openness and extroverted individuals are more open to opinions and suggestions and thus are less dogmatic in comparison.

4 Conclusion

The present study aimed to study the impact of dogmatism on happiness and harmony in life which was considered to be the main goal of the research while the additional goal was to study the impact of happiness on harmony in life among young adults. The findings revealed satisfactory and high reliability of instruments used in the research. Results indicated a significant negative correlation between dogmatism and happiness. Dogmatism also shows a non-significant correlation with harmony in life.

Happiness also showed a significant positive correlation with harmony in life. The results are supported by the literature review. Linear regression analysis was used to prove the positive and negative correlations between study variables. Differences were also found based on demographic variables. In addition, independent sample T-tests were applied to analyze relationships between demographic variables.

5 Suggestions for the Future Research

The researcher should collect data from several cities or try to collect data from every province in Pakistan to generalize research on the whole population of Pakistan. The future researcher should use more than one research design to reduce social desirability and response biases, resulting in a high level of internal validity in the study. Future researchers should also pay attention to the qualitative parts of the study.

For the validation of scales in the collectivist culture of Pakistan, Confirmatory factor analysis should be carried out for all scales. Similarly, all the scales were in the English language. Although the participants belonged to academia still it would be more appropriate in future research to carry out Urdu translation, adaptation, and cross-language validation of these scales. To

analyze cause and effect relationships, the future researcher should aim to eliminate all possible confounding factors. To have a deeper understanding of these variables, future studies should broaden this network of concepts.

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Primary Paper Section: A

Secondary Paper Section: AN, AO

EXAMINING PSYCHOMETRICS, SOCIO-ECONOMIC AND DEMOGRAPHICS DISPARITIES AMONG ADULT SMOKERS: ANOVA AND T-TESTS ANALYSIS

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This work is supported by Project "Theoretical Construction and Practical Exploration of Chinese Education Modernization" (Grant No. VAA230006) and "The Historical Logic and Contemporary Value of the Spread of Chinese Sericulture as "Belt and Road" (Grant No. SWU2403008).

Abstract: This paper investigates adult smoking in Pakistan by examining demographics, psychometrics, and socioeconomic disparities among smokers aged over 20 years. A cross-sectional design was employed with a sample of 300 adult smokers, using purposive sampling for data collection through self-report instruments: The Cigarette Dependence Scale, Novaco Anger Scale, Kessler Psychological Distress Scale, and WHO Quality of Life Scale. Key demographic factors, including area, socioeconomic status, family system, and marital status, were analyzed to identify trends in smoking behaviors. The study highlights psychological factors such as nicotine dependence and health-related quality of life. Additionally, it emphasizes disparities in tobacco use across income levels and regions, underscoring the need for targeted interventions to improve access to cessation resources and public health campaigns.

Keywords: Adult smoking, Pakistan, socioeconomic disparities, nicotine dependence, psychological distress, quality of life, cessation resources, public health interventions.

1 Introduction

Tobacco use remains a significant public health concern worldwide, contributing to a myriad of preventable diseases and premature deaths annually (Pérez-Warnisher, 2018). Despite extensive efforts to curb smoking rates, disparities persist among different demographic, psychometric, and socio-economic groups, particularly between urban and rural populations. Understanding the nuanced interplay of these factors is essential for designing effective interventions and policies aimed at reducing smoking prevalence and mitigating associated health burdens. This paper seeks to examine the multifaceted landscape of adult smoking behaviors, focusing on the disparities evident in urban and rural settings.

By delving into demographics, psychometrics, and socio-economic factors, we aim to uncover the complex dynamics influencing smoking prevalence and cessation patterns across diverse populations. Demographic characteristics, such as age, gender Area (Rural/Urban), socioeconomic (Low /Middle/ High), Family System (Joint / Nuclear), and Marital Status (Single/ Married), have long been recognized as influential factors in smoking behavior (Tseng, 2001). Understanding how these variables intersect with smoking prevalence rates can inform targeted interventions tailored to specific population groups. Psychometric factors, including stress, depression, anxiety, and addiction, play a pivotal role in shaping smoking behaviors (Bruijnzeel, 2012).

Exploring the psychological dimensions of smoking like Nicotine dependence, General Health, Physical Health, Psychological Health, Social Relationships, and Environment, within urban and rural contexts can elucidate underlying motivations and challenges associated with tobacco use, paving the way for more tailored cessation programs and support services. Furthermore, socio-economic disparities profoundly impact smoking behaviors, with income, employment status, access to healthcare, and geographic location serving as key determinants (Wang, 2018). Disentangling the socio-economic

factors contributing to smoking prevalence disparities between urban and rural areas is crucial for implementing equitable policies and resource allocation strategies aimed at reducing tobacco-related harm.

By synthesizing existing research findings and leveraging contemporary data, this paper aims to contribute to a comprehensive understanding of adult smoking behaviors in urban and rural settings. Through a multidimensional analysis encompassing demographics, psychometrics, and socioeconomic indicators, we endeavor to elucidate the intricate web of influences shaping smoking patterns and disparities across diverse populations. Ultimately, the insights gleaned from this examination can inform evidence-based strategies to reduce smoking prevalence, promote cessation efforts, and address health inequities among urban and rural communities. Through collaborative efforts grounded in empirical research and targeted interventions, we can strive towards achieving healthier, smoke-free environments for all individuals, regardless of their geographic location or socio-economic status.

2 Literature Review

Tobacco smoking is a significant public health concern, with a growing burden in low- and middle-income countries (Jha, 2006). Disparities in smoking prevalence exist, with vulnerable populations such as those with lower education and socioeconomic status, certain racial/ethnic groups, and those in the military being particularly affected (Drope, 2018). Rural residents are also at increased risk due to higher smoking rates and less protection from tobacco smoke (Weg, 2011). Understanding the barriers and motivations to quitting among urban adult smokers is crucial, with financial issues, social support, and social norms being key factors (Rosenthal, 2013). These findings underscore the need for tailored interventions and policies to reduce smoking prevalence and its associated health burdens.

This literature review aims to examine existing research on these factors among adult smokers in urban and rural contexts. Demographic characteristics such as age, gender, ethnicity, and education play significant roles in smoking behavior and prevalence rates. Research on smoking behavior among adults in urban and rural areas has identified several key factors. Weg (2011) found that rural residents are more likely to smoke and use smokeless tobacco, and are also more exposed to secondhand smoke. Pesko (2017) highlighted the influence of sociodemographics, tobacco control policies, and e-cigarette use on adolescent tobacco use, with e-cigarettes particularly impacting urban areas.

Poulson (1984) compared the use of smokeless tobacco in rural and urban teenagers, finding a higher incidence of oral lesions in rural users. Mitchell (2016) emphasized the need for smoking cessation interventions that consider the unique social and cultural factors influencing smoking among rural, low-income women. These studies collectively underscore the complex interplay of demographic, environmental, and social factors in shaping smoking behavior in urban and rural contexts.

Research has shown that the gender gap in smoking prevalence has narrowed over time, particularly in urban areas where female smoking rates have increased (Waldron, 1991). However, this gap is still significant, with men traditionally exhibiting higher rates of smoking than women (Doogan, 2017). In rural settings, this gap may be influenced by cultural norms and gender roles, which can impact smoking behavior differently compared to urban environments (Doogan, 2017). In Asian populations, women's smoking behavior is influenced by a desire to control weight and handle emotions, while men's smoking behavior is more sensitive to social and structural factors (Tsai, 2008).

These differences in smoking behavior between men and women are largely due to differences in coefficients, indicating substantial differences in smoking behavior (Göhlmann, 2006). Research has consistently shown that smoking disparities exist among different demographic groups, with minority populations and those in rural areas experiencing higher rates of smoking. These disparities are influenced by a range of factors, including targeted marketing by tobacco companies, cultural acceptance of smoking, and limited access to smoking cessation resources (Chen, 1993; Doogan, 2017). For example, South Asian communities in the USA use culturally specific tobacco products to preserve traditions and express ethnic identity (Mukherjea, 2011).

African American smokers may perceive smoking as normative and have mixed expectations for culturally specific interventions (Webb, 2007). These findings underscore the need for tailored interventions that address the specific needs and cultural contexts of different demographic groups.

Research indicates that psychological factors such as stress, depression, anxiety, and personality traits significantly influence smoking behavior and addiction susceptibility among adults (Ellaway, 2008). Urban and rural environments present unique psychosocial stressors that may contribute to smoking initiation and maintenance (Rosenthal, 2013).

For instance, urban residents may face higher levels of environmental stressors, while rural areas may experience isolation and limited access to healthcare services (Weg, 2011). Socioeconomic status is a key determinant of smoking prevalence and cessation outcomes in both urban and rural populations (Hiscock, 2012). Understanding the psychometric profiles of adult smokers in these settings can inform the development of targeted interventions that address underlying psychological factors contributing to smoking behavior. Rural communities face unique challenges in smoking cessation, including limited access to healthcare resources and tobacco control programs (Hutcheson, 2008).

These challenges are exacerbated by the higher rates of late-stage lung cancer and mortality in rural areas (Jenkins, 2018). Social and cultural factors, such as the influence of social networks and the transition from a pro-tobacco culture, also play a significant role in smoking behavior and cessation efforts in rural communities (Mitchell, 2016; Kruger, 2012). Addressing these challenges requires a multi-level approach that considers individual, community, and policy-level factors (Hutcheson, 2008).

In summary, examining demographics, psychometrics, and socio-economic disparities among adult smokers in urban and rural settings is essential for understanding the complex dynamics underlying smoking behavior and designing effective interventions to reduce smoking prevalence and improve public health outcomes. Future research should continue to explore these factors within diverse populations and contexts to inform evidence-based strategies for tobacco control and cessation efforts.

2.1 Socio-Economic Status (SES) Theory

Research consistently supports the SES theory, which posits that individuals with lower socio-economic status are more likely to engage in health-risk behaviors such as smoking. Reijneveld (1998) found that living in a deprived area contributes to a higher prevalence of smoking, even after accounting for individual SES. Hiscock (2012) further highlighted the challenges faced by disadvantaged smokers, including reduced social support for quitting and low motivation to quit. Jahnel (2018) added to this by showing that lower SES individuals are more likely to encounter places where smoking is allowed, which in turn is associated with higher smoking rates.

Harwood (2007) emphasized the need to consider psychosocial factors in understanding the relationship between SES and

smoking, suggesting that these factors may play a significant role in health disparities.

3 Research Significant

This research aims to investigate and compare the demographics, psychometrics, and socio-economic disparities among adult smokers residing in urban and rural settings. By examining these factors, we can gain a comprehensive understanding of the various influences that contribute to smoking behavior and its prevalence across different geographic areas. Demographic variables such as Area, socioeconomic, Family System, and Marital Status play a significant role in shaping smoking patterns, while psychometric factors like Nicotine Dependence, General Health, Physical Health, Psychological Health, Social Relationships, Environment, and Quality of Life can influence individuals' propensity to smoke. By analyzing these aspects, policymakers and healthcare professionals can develop targeted interventions and programs to reduce smoking prevalence and promote cessation strategies tailored to the unique needs of urban and rural communities.

4 Research Objectives

The research objective of this study is to analyze the demographics, psychometrics, and socio-economic disparities among adult smokers residing in both urban and rural settings. By examining these factors, the study aims to gain a comprehensive understanding of the characteristics and circumstances of adult smokers across different geographic areas. Through quantitative analysis, the research seeks to identify correlations and disparities that may exist between urban and rural populations of smokers. This objective provides valuable insights into the diverse factors influencing smoking behavior and informs targeted interventions and policies aimed at reducing smoking prevalence and addressing related disparities in both urban and rural communities.

5 Research Questions

1. what is the ratio of adult smokers in urban and rural settings?
2. Which psychometric factors have a high ratio of smoking behavior among adult populations in urban and rural areas?
3. Which Socioeconomic factors have a high ratio of smoking behavior among adult populations in urban and rural areas?
4. What is the difference in smoking rate across people from different Marital statuses and Family Systems?
5. How do environmental factors, impact the smoking rate in urban and rural settings?
6. How much do levels of tobacco addiction and dependence differ between urban and rural adult smokers?
7. What are the implications of demographic, psychometric, and socio-economic disparities for public health interventions targeting adult smokers in urban and rural areas?

6 Research Design

The present study employed a cross-sectional survey research design to conduct the study through a survey method. The participants included in this study were all adult smokers from different areas in Pakistan.

6.1 Sample of Study

The data was taken from (N= 300) adult smokers by using the convenient sampling technique. The demographics like age, family status, socioeconomic status, residential area, marital status, and monthly income were asked. Nicotine dependence was measured through the Cigarette Dependence Scale (Etter et al., 2003), anger was measured through the Novaco Anger Scale 1994 (Novaco, 2010), the Kessler Psychological Distress Scale (Kessler. et al., 2002), and WHO Quality of Life Scale, 1995

6.2 Demographic Form

The purpose of the demographic form was to seek the necessary information from the sample required for the current study. Informed consent was taken from participants before data collection which also indicates the rationale of the study with the promise of confidentiality of information.

Table 1: Demographic characteristics of sample (N=300)

Characteristics	N	%
Marital Status		
Single	236	78.7
Married	64	21.3
Socioeconomic Status		
Low	36	12.0
Middle	224	74.7
High	40	13.3
Family System		
Joint	167	55.7
Nuclear	133	44.3
Area		
Rural	166	55.3
Urban	134	44.7

Table 1 reveals that a lower number of participants from the nuclear family system (n=133, 44.3%) participated as compared to participants from the joint family system (n=167, 55.7%). A greater number of participants from the middle class (n=224, 74.7%) participated as compared to the lower class (n=36, 12.0%) and high class (n=40, 13.3%). A greater number of single participants (n=236, 78.7%) participated as compared to married ones (n=61, 20.3%) and divorced (n=3, 1.0%). A lower number of participants from urban areas (n=134, 55.3%) as compared to participants from rural areas (n=166, 44.7%).

6.3 Procedure

A questionnaire along with a demographic sheet was administered after getting the formal informed consent from participants. The questionnaire consisted of three sections: section one contained informed consent, section two consisted of demographic information and the third section consisted of research questionnaires.

Table 2: Psychometric Properties of scales

Scale	M	SD	Range	Cronbach's α
1. Nicotine Dependence	31.75	9.31	12-54	.82
2. Quality of Life	50.85	15.95	0-100	.83
3. Novaco Anger	30.45	3.06	19-40	.88
4. Kessler Psychological Distress	80.85	13.61	54-122	.80

Note: 1= Nicotine dependence, 2= Quality of life 3= Novaco anger, 4= kessler psychological distress

Table 2 shows the psychometric properties of the scales used in the present study. The Cronbach's α for the Nicotine Dependence Scale was .82(>.80) which indicates high internal consistency. The Cronbach's α for the WHO Quality of Life Scale was .83(>.80) which indicates high internal consistency. The Cronbach's α for Novaco Anger Scale was .88(>.80) which indicates high internal consistency The Cronbach's α for the Kessler Psychological Distress Scale was .80 which indicates high internal consistency.

Table 3: Mean Comparison of Adult Smokers of Rural and Urban Areas on Study Variables

Variables	Smokers of Urban Area (M \pm SD)	Smokers of Rural Area (M \pm SD)	t (298)	p	Cohen's d
Nicotine Dependence	33.08 \pm 8.98	30.67 \pm 9.45	2.24	.02	0.26
Anger	28.68 \pm 5.17	28.80 \pm 4.71	-.214	.83	0.02
Psychological Distress	52.28 \pm 15.68	49.69 \pm 16.12	1.40	.16	0.16
Quality of Life	7.17 \pm 2.02	7.03 \pm 1.86	.629	.53	0.07
General Health	22.44 \pm 4.60	21.69 \pm 4.29	1.45	.14	0.16
Physical Health	16.20 \pm 3.30	16.20 \pm 3.36	-.009	.99	0.00
Psychological	10.20 \pm 2.74	10.02 \pm 2.60	.59	.55	0.06
Social Relationships	26.14 \pm 5.05	25.49 \pm 5.28	1.08	.27	0.12

Table 3 revealed non-significant mean differences in nicotine dependence with $t(298) = 2.24$, $p > .05$. Findings showed that participants from urban areas exhibit higher scores on nicotine dependence ($M = 33.08$, $SD = 9.45$) as compared to participants from rural areas ($M = 30.67$, $SD = 9.45$). Cohen's d is 0.26 (>0.20) which indicates a small effect size. Finding exposed non-significant mean differences in anger with $t(298) = -.214$, $p > .05$. Findings showed that participants from rural areas exhibit higher scores on anger ($M = 28.80$, $SD = 4.71$) as compared to participants from urban areas ($M = 28.68$, $SD = 5.17$). Cohen's d was 0.02 which shows no effect size. Results exposed non-significant mean differences in psychological distress with $t(298) = 1.40$, $p > .05$. Findings displayed that participants from urban areas exhibited higher scores on psychological distress ($M = 52.28$, $SD = 15.68$) as compared to participants from rural areas ($M = 49.69$, $SD = 16.12$). Cohen's d was 0.16 (<.20) which indicates no effect size. Results exposed non-significant mean differences in quality of life with $t(298) = .629$, $p > .05$. Findings displayed that participants from urban areas exhibited higher scores on quality of life ($M = 7.17$, $SD = 2.02$) as compared to participants from rural areas ($M = 7.03$, $SD = 1.86$). Cohen's d was 0.07 which shows no effect size. Results exposed no significant mean differences in physical health with $t(298) = -.009$, $p > .05$. Findings displayed that participants from urban and rural areas exhibited the same score on physical health ($M = 16.20$, $SD = 3.30$) ($M = 16.20$, $SD = 3.36$) respectively. Cohen's d was 0 which indicates no effect size. Results exposed non-significant mean differences in psychological with $t(298) = .59$, $p > .05$. Findings displayed that participants from urban areas exhibited higher scores on psychological ($M = 10.20$, $SD = 2.74$) as compared to participants from rural areas ($M = 10.02$, $SD = 2.60$). Cohen's d was 0.06 which shows medium effect size. Results exposed non-significant mean differences in social relationships with $t(298) = 1.08$, $p > .05$. Findings displayed that participants from urban areas exhibited higher scores on social relationships ($M = 26.14$, $SD = 5.05$) as compared to participants from rural areas ($M = 25.49$, $SD = 1.08$). Cohen's d was 0.12 (<.20) which indicates no effect size.

Table 4: Mean, Standard Deviation and F-values for students of three levels of socioeconomic status on Study Variables

Variables	Low (M \pm SD)	Middle (M \pm SD)	High (M \pm SD)	F (2, 297)	η^2	Post-Hoc
Nicotine Dependence	30.14 \pm 9.40	31.49 \pm 9.44	34.65 \pm 8.00	2.59	0.01	
Anger	48.22 \pm 15.61	51.29 \pm 16.59	50.73 \pm 12.27	0.58	0.00	
Psychological Distress	28.13 \pm 5.29	28.77 \pm 5.02	29.15 \pm 3.84	0.41	0.00	
Quality of Life	79.94 \pm 11.82	84.96 \pm 14.40	83.68 \pm 12.05	2.07	0.01	

Variables	Low (M SD)	Middle ± (M ± SD)	High (M SD)	F (2, 297)	η^2	Post- Hoc
General Health	6.61 ± 2.12	7.23 ± 1.87	6.75 ± 2.03	2.34	0.01	
Physical Health	21.28 ± 4.42	22.20 ± 4.36	21.75 ± 4.88	0.75	0.00	
Psychological	15.83 ± 3.07	16.30 ± 3.38	15.98 ± 3.26	0.42	0.00	
Social Relationships	9.53 ± 2.78	10.28 ± 2.60	9.60 ± 2.85	2.06	0.01	

Table 4 displays the average, standard deviation, and F-values for the students who belong to three socioeconomic statuses: Nicotine dependence, Anger, Psychological distress, Quality of life, General health, Physical health, Psychological, and Social relationships. The findings indicate non-significant mean differences in nicotine dependence among students with $F(2, 298) = 2.59, p > .05$. The findings indicate that smokers who belong to high socioeconomic status exhibit higher scores on nicotine dependence as compared to middle whereas, students belong to low socioeconomic status exhibit lowest score on nicotine dependence. η^2 is .01 ($< .20$) which describes a small effect size. The findings indicate non-significant mean differences in anger among smokers with $F(2, 298) = .58, p > .05$. The findings indicate that smokers who belong to middle socioeconomic status exhibit higher scores on nicotine dependence as compared to high whereas, students belong to low socioeconomic status exhibit lowest score on anger. η^2 is .00 ($< .20$) which describes a small effect size. The findings indicate non-significant mean differences in psychological distress among students with $F(2, 298) = .412, p > .05$. The findings indicate that smokers who belong to middle socioeconomic status exhibit higher scores on psychological distress as compared to high whereas, students belong to low socioeconomic status exhibit lowest score on psychological distress. η^2 is .00 ($< .20$) which describes a small effect size. The findings indicate non-significant mean differences in quality of life among smokers with $F(2, 298) = 2.07, p > .05$. The findings indicate that smokers who belong to middle socioeconomic status exhibit higher scores on quality of life as compared to high whereas, students belong to low socioeconomic status exhibit lowest score on nicotine dependence. η^2 is .01 ($< .20$) which describes a small effect size. The findings indicate non-significant mean differences in general health among students with $F(2, 298) = 2.34, p > .05$. The findings indicate that smokers who belong to middle socioeconomic status exhibit higher scores on general health as compared to high whereas, students belong to low socioeconomic status exhibit lowest score on general health. η^2 is .01 ($< .20$) which describes a small effect size. The findings indicate non-significant mean differences in physical health among students with $F(2, 298) = .75, p > .05$. The findings indicate that smokers who belong to high socioeconomic status exhibit higher scores on physical health as compared to middle whereas, students belong to low socioeconomic status exhibit lowest score on physical health. η^2 is .00 ($< .20$) which describes a small effect size. The findings indicate non-significant mean differences in psychological health among students with $F(2, 298) = .42, p > .05$. The findings indicate that smokers who belong to middle socioeconomic status exhibit higher scores on psychological health as compared to high whereas, students belong to low socioeconomic status exhibit lowest score on psychological health. η^2 is .00 ($< .20$) which describes a small effect size. The findings indicate non-significant mean differences in social relationships among students with $F(2, 298) = 2.06, p > .05$. The findings indicate that smokers who belong to middle socioeconomic status exhibit higher scores on social relationships as compared to high whereas, students belong to low socioeconomic status exhibit lowest score on social relationships. η^2 is .01 ($< .20$) which describes a small effect size.

7 Discussion

This study delves into the multifaceted landscape of adult smoking in Pakistan by scrutinizing demographics, psychometrics, and socioeconomic disparities prevalent among smokers aged >20 years. At first, the reliability, normality, and construct validity of the scales were ensured. For unstandardized items, alpha reliability is based on covariance among the items (Coaches & Steed, 2003). The alpha coefficients for all scales were $\geq .70$, which pointed out that the scales used in the study are reliable (Kline, 2005). The construct validity is composed of discriminant and convergent validity (Anestessi, 2006).

Variables zero-order correlations were in the theoretically desired directions, which supported the scale's convergence validity. The finding reveals that a lower number of participants from the nuclear family system participated as compared to participants from the joint family system. Greater number of participants from middle class participated as compared to lower class and high class. Greater number of single participants participated as compared to married ones and divorced. A lower number of participants from urban areas as compared to participants from rural areas. Findings showed that participants from urban areas exhibited higher scores on nicotine dependence as compared to participants from rural areas. Findings showed that participants from rural areas exhibit higher scores on anger as compared to participants from urban areas.

8 Conclusion of the Present Research

In conclusion, the research findings suggest a significant relationship between nicotine dependence and both anger and psychological distress. Individuals who are dependent on nicotine are more likely to experience higher levels of anger and psychological distress. These findings highlight the impact of nicotine dependence on emotional well-being and psychological functioning. However, it is important to note that the research did not find a significant relationship between nicotine dependence and quality of life. This suggests that while nicotine dependence may have detrimental effects on emotional and psychological aspects, it may not directly influence overall quality of life measures.

Other factors such as social support, physical health, and personal circumstances may play a more significant role in determining quality of life outcomes. These findings underscore the importance of addressing anger and psychological distress in individuals with nicotine dependence. Interventions aimed at managing these emotional and psychological symptoms should be considered as part of comprehensive treatment approaches for nicotine dependence. Healthcare providers and addiction specialists must provide tailored support and interventions to address these specific needs in individuals struggling with nicotine dependence.

Further research is warranted to explore the complex relationship between nicotine dependence, anger, psychological distress, and quality of life. Longitudinal studies and comprehensive assessments incorporating various factors can provide a deeper understanding of the dynamics involved. This knowledge can contribute to the development of more effective interventions and treatment strategies for individuals dealing with nicotine dependence and its associated emotional and psychological consequences.

9 Limitations of Present Research

When a researcher conducts research there are certain limitations of every research which should be focused on because researchers act as a compass for the researchers to practically solve problems and add knowledge to the existing body of knowledge. Limitations are very crucial because they may weaken the relationship between research variables. The sample that was used in the present research was specific to only smokers from different areas of Punjab, KPK, and Islamabad so these findings cannot be generalized to the whole Pakistan population, hence

external validity is low. Present research is quantitative, it doesn't provide deep facts and details like qualitative research provides. That's why the data assembled was not enhanced and broad.

A convenient technique of sampling was used and that technique has some downsides like this technique unable the generalization of our data findings. This was survey research so it doesn't guarantee what was the cause of the change in dependent variables because in this research method, we are impotent in controlling external factors that can influence our results. Response bias or social desirability was not controlled in the present study. The present research does not clarify the cause-and-effect relationship it only describes the relation of one variable with other.

10 Suggestions for the Further Research

To address the above-mentioned limitations here are some suggestions for further research to get better results and study the relationship among variables more effectively. More than one research design should be used to overcome the response biases or decrease social desirability so that internal validity is high in the research. In order to generalize the research on the whole population of Pakistan the researcher will collect data from different cities or tries to collect from every province of Pakistan.

Future research will not just only on the relationship between quality of life and nicotine dependence but also on the health-related quality of life. Researchers should try to remove all possible confounding to study cause-and-effect relationships. Future researchers should focus on content analysis. The research should use some technique to verify that only participants from specific samples are filling the questionnaire, for instance, their email is made compulsory or the department in which he serves must be written. Further research should focus on qualitative aspects of research as well.

11 Practical Implication of the Present Research

The present research has numerous practical, empirical, and policy implications which are mentioned here. Smoking cessation interventions may need to address underlying psychological distress and anger. Given that nicotine dependence is a predictor of these negative affective states, interventions aimed at reducing smoking rates may need to address the underlying emotional factors that contribute to smoking behavior. Mental health screening and treatment should be considered for individuals with nicotine dependence.

The study's findings suggest that individuals with nicotine dependence may be more likely to experience psychological distress, which may warrant further evaluation and treatment. Public health campaigns aimed at reducing smoking rates may need to focus on the broader impact of smoking on quality of life. While reducing smoking rates is an important public health goal, it may be necessary to also consider the broader impact of smoking on quality of life beyond the physical health consequences. Efforts to address social determinants of health may be important in reducing the impact of nicotine dependence on quality of life.

Given that nicotine dependence may be associated with low quality of life, it should be important to address social factors such as poverty, social isolation, and lack of access to healthcare that can contribute to poor quality of life. Interventions aimed at reducing nicotine dependence may need to consider the role of negative affective states in maintaining dependence. By addressing the underlying emotional factors that contribute to smoking behavior, interventions may be better in reducing nicotine dependence and enhance quality of life.

This model suggests that persons with high levels of nicotine dependence may experience more negative affective states that may use nicotine as a coping mechanism to regulate these emotions. This can create a cycle of dependence in which

nicotine use is reinforced by the relief of negative affective states, leading to further dependence on nicotine as a coping mechanism.

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Primary Paper Section: A

Secondary Paper Section: AN, AO

DISCOURSE ON SELECTED TOPICS OF CONTEMPORARY SCHOOL EDUCATION IN THE CZECH REPUBLIC AND SLOVAKIA

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The paper is published within the frame of IGA grant Ambis University in Prague.

Abstract: The subject of education in our area as discussed in political and other circles does not take place in a vacuum but rather affects all of us. In this contribution we are presenting for consideration our reflections, the nature of which, as we acknowledge, may be influenced by the author's subjectivity and how he sees, understands and evaluates the matter at hand. Despite that fact, however, this is not a simple communication expressing an evaluative judgment. That is not what this is - we have not headed in that direction. We have focused on acknowledging this phenomenon at the level of its theoretical concepts, the theories that are thematically related, in whatever way, to the problem we are addressing. We have followed the published research findings, reviewed the research designs and procedures, and taken an interest in their empirical findings. The findings we arrived at when designing our own projects of a different character (be they research, development, applications, etc.) have understandably also been included in creating this reflection. We also did not forget about the area of the schools themselves, of field work, or the legitimacy of the methodology of our investigations. This aspect of our concept has aided and continues to aid us with investigating, verifying, experiencing, living through, and perceiving what the concepts actually are in the name of which we have designed all of these efforts.

Keywords: reflection, education, research, project, school, inclusion, integration, children, pupils, educator

1 Introduction

The subject of this contribution appears to touch on the particular area of quality of life that is school education, but the scope of general education is so significant for human life that it probably would not be impossible to exactly, statistically determine and calculate precisely how significant it is, how much it determines the existential career in different ontogenetic periods of a human life, or in which segments of a human life the force of school education is decisive and where it is less so.

If we were to design an instrument, a method, through constant, hard work, that would aid us in acquiring such a numerical result, then for the sake of correctness and fairness vis-a-vis science itself we would have to openly state that there are many big holes of the "don't-know-how-to-measure" category within this phenomenon, some of which we have not even been able to record. However, we have taken note of the presented research, in this country and abroad, pointing to the capital that education, in and of itself, constitutes, whether as an axiomatic entity, or as a market characteristic of the contemporary economy, or as a simplified feature of some sort of human capacity that serves people and is beneficial to them in different situations, or at least is subjectively perceived to be so, yielding sometimes a greater and sometimes a smaller benefit.

Comparing those benefits would be statistically irrelevant, as the intensity of their force and the scale of their value as grasped by each individual should be measured by that person's individual life context alone. For the general comprehension of the essential aspects of this entity, what aids us is the overall, relative establishment of an overall generalization about it. Thanks to that generalization, society, in its own perceptions, can better

embody this phenomenon, gain insight into it, work with it cognitively and interpret it. It is exactly in such generally generalized terms that trends in education are established in our country and in the world.

2 Methodology and description of methods of analysis and interpretation of theoretical secondary analysis

The following text, as already mentioned above, represents only a slice of our subjective perceptions in the frame of qualitative methodology of how society in general perceives the issue of inclusion in education, focusing on the analysis of key documents of a national nature in both countries (Czechia and Slovakia) and considering our personal experiences with pedagogical professionals working in different levels of school education system in both countries.

Secondary theoretical analysis is a form of research that uses existing data, or secondary data, collected previously to perform a new study. Indeed Career Guide website (online, published 27th January 2023, cit. 17th July 2024) says: *.....Researchers might use quantitative or qualitative data another research team or agency gathered or produced for different reasons and analyze it in a new way. That data might be publicly available, or the researcher or analyst might need permission to access and use it. The data they use typically comes from trusted government...."*

We can state in advance that our ambition is not to extract definitions for the terms comprising the framework of this text or their shorthand (re)presentation. Similarly, the intention of this communication is not to confront other authors, or their (re)interpretations, or their declared perceptions. We refer readers in any event to our previously published work (such as Kaleja, 2015, 2014, 2011) in which they are advised that they can certainly find such confrontations among those publications.

The main aim and motivation that has led us to **present this communication is a musing on and also a sharing of our own reflections about the societal phenomenon** that concerns us educators, teachers, pedagogues etc., or experts engaged with different areas of child-rearing and school education and which has for some time been profusely discussed in social circles. This is related to the current form of conceiving of or conceptualizing the scheme of education that the social space is calling "inclusion in education" or "inclusive education". The discussions being conducted are genuinely diverse, as the publicly accessible, published reports demonstrate, and the information submitted, the opinions or perspectives of those involved, has the nature of a broad spectrum of contrasting components that are, in places, misinterpretations or misleading. Sometimes they are inexact in terms of content. One way or another, this is a public matter, associated with the acquisition of awareness, experience, knowledge, and with the cultivation and development of the human personality. It affects all of us, therefore, whether as subjects or objects of education, as legal guardians or parents of children, or as experts – and not just those from the educational profession.

Institutional school education both in the Czech Republic and in Slovakia is regulated by legislative ordinances, and in the European area these are then further corrected through regulations, conventions and ordinances of different natures, or they are customized through strategies, concepts, action plans, etc. The education profession is bound by these circumstances and must follow them. At the same time, the profession must not forget about its own aims and paradigms, based in the facts of the field of pedagogy and most frequently or primarily stemming from the pre-graduate training that each fully qualified educator, teacher, pedagogue etc. must doubtless undergo.

We have to say that integrative or today better to say inclusive school education in both countries - even though at certain points

its interpretation by many domestic authors or coming from abroad has been too fragmented - does not essentially represent an absolutely new phenomenon in our society, as the lay public and some professionals believe. Both the connotative and denotative levels of this "big idea" differ over time, as we can observe from the documented school education field work – whether directly reported or observed by selected authors (Petrasová, 2023, Hlebová, 2018, Šotolová, 2011).

Differences have been and continue to be apparent in the interpreted concepts of such education, the conditions for its delivery, the requirements for pedagogical workers with respect to the objects of the education being realized, its mechanisms, procedures and methods, forms, ways, as well as other aspects of the integratively/inclusively established approaches to education. It is, therefore, logical that the curriculum and the entire previous civic and societal perception of the construction of difference was once perceived, understood, and viewed differently, and that this variation then appeared in the approaches and work of educators.

A crucial Czech national document that is related in terms of subject matter to the Czech Education Ministry is its **Strategy for Education Policy of the Czech Republic up to 2030+**, and many other significant conceptual, methodological and strategic documents at different levels are connected to its substantive framework, in some cases including the action plans for those documents. The previous document titled as Strategy 2020 has three key priorities: Reducing inequality in education; support for quality instruction by teachers, including introducing a career system and/or beefing up the quality instruction of future educators during pre-graduate training; and the effective, responsible management of the education system. The current **Strategy 2030+** has two objectives and a total of five lines. The objectives are:

- *focusing school education more on acquiring the competencies necessary for an active citizen, professional and personal life,*
- *reducing inequalities in access to quality school education and preparing the ground for maximum development potential of children, pupils and students*

The strategic lines of the document mentioned above are:

- *transforming the content, methods and assessment of education,*
- *equal access to quality education,*
- *support for teaching staff,*
- *increasing professional capacity, trust, and cooperation,*
- *increasing funding and ensuring its stability.*

Long-term plan for education and development of the education system in the Czech Republic 2023–2027 is an implementation document of Strategy 2030+, currently for the second implementation period. It lists the basic tendencies and goals of educational policy for the given period, establishes measures at the state level and defines the space for concrete solutions at the regional level. The key national document in Slovakia is the **Program Statement of the Government of the Slovak Republic 2023-2027**. In the field of educational policy, it defines priorities in the education and university training of teachers. The subsequent **National Program for the Development of Education and Training for the years 2018-2027** aims to achieve educational training at the level of European cooperation. The stated strategy is defined in the areas of:

- *improving the quality of education,*
- *inclusion in education and vocational training,*
- *lifelong learning and mobility,*
- *increasing the competences and motivation of teaching staff,*
- *strengthening European higher education,*
- *supporting green and digital transformation in education and vocational training.*

- *The context of the strategy declares the need for transparency, participation and support in education.*

The strategy of an inclusive approach in education until 2030 is a document aimed at improving the current state of education for all children, pupils and students in all types of schools without distinction. The document presents the basic philosophy of inclusive education in kindergartens, primary schools, secondary schools and universities in the Slovak Republic, in the system of counseling and prevention and in lifelong learning. In order to achieve an optimal state, the areas to be achieved by 2030 are defined. These are the areas of destigmatization, provision of support measures in the counseling system, desegregation in education, unbarriering of the school environment and education of teaching staff and professional staff in the issue of inclusion.

3 The framework for institutionalized preschool education as currently conceived

The Czech Republic, through its relevant legislative ordinances (inter alia Act No. 1/1993, Coll. and 2/1993 Coll., as amended) guarantees rights and freedoms and establishes them at the level of being inalienable, irrevocable, non-derogable and not statute barred. The state's legal code includes the right to education and the freedoms flowing from the letter of the law. The Czech legal order establishes attendance at school as compulsory. In the Charter of Fundamental Rights and Freedoms (Act No. 2/1993, Coll.) it is stated that: "*All persons have the right to education. School attendance is compulsory for the time established by law.*" An amendment to the Education Act defines compulsory attendance of education in the system of primary schooling as taking nine school years, and a one-year compulsory preparation for that school attendance according to an institutionally conceived scheme has recently been integrated into that framework. Another innovation is the state's guarantee of preschool education through the relevant curricular documents, which is to be delivered not just at nursery schools, as it was heretofore, but the delivery of which is also possible in the preparatory classes of primary schools or through home schooling.

In Slovakia, according to **Act No. 245/2008 Coll., on Education and Training** (School Act) and on Amendments to Certain Acts), education is compulsory and mandatory pre-primary education is also mandated for children who have reached the age of 5 by 31.8. of the relevant calendar year, which precedes the beginning of the school year. Currently, education in kindergartens takes place according to the state educational program, which is valid for all kindergartens, which establishes basic requirements such as communication, mathematical, digital, civic, work, social competences, solving problems, critical thinking, while these competences are developed in further education. Education and training of children with disabilities takes place in kindergartens and kindergartens for children with disabilities.

With the obligation to educate 5-years-old children in preschool institutions, there was a problem with the insufficient capacity of places in state kindergartens and the lack of teaching staff. Parents can place their children in private kindergartens, which becomes a financially demanding event for families. Municipalities and cities that establish kindergartens are looking for opportunities to expand spatial and personnel capacities to accept a larger number of children in kindergartens. Financial resources are created through transnational resources (Recovery and Resilience Plan), from the state budget and the budget of public municipalities.

The entire system of obligatory education, the conception, content and processes of it, including those who contribute to delivering it, must absolutely, certainly, permanently consider basic, constant paradigms that include the following (Kaleja, 2017):

- The child and pupil, during the period described by law, is obligated to participate in institutionalized, state-

guaranteed education, which counts on being delivered for that amount of time.

- The child/pupil enjoys rights in the process of education. They are enjoying their right to education, or rather, that right is being claimed for them by their legal guardians.
- The educational framework must present a concept that is designed and systematized. Those delivering the educational process and other entities contributing to that process must be fully competent and qualified to engage in this profession. There are, therefore, certain requirements placed on them by the state.
- The content, the means and methods, the forms and the nature of the education must lead to developing the child's and pupil's personality and must lead to the enjoyment of freedoms.
- Neither the personality profile of the child or pupil, nor the socio-educative profile, nor any other characteristic that encumbers the child-rearing and education process can be allowed to constitute a pretext for arguing that there is a reason to exclude such a child or pupil from education, nor can it be allowed to constitute a pretext for lowering the level or quality of that education.
- All children and pupils in the class collectives of all schools have duties, freedoms, and rights irrespective of the establisher, focus, profile, references or structure of the institution itself.

Practical work in the field shows that professional educators welcome the change associated with the introduction of compulsory preschool education. However, they are critically commenting on the visible drawbacks according to which the intention of the law cannot be delivered to the full extent. The implementation of this change:

- Did not provide all of the children affected by this innovation with backup in terms of physical space, as the capacities of the facilities offering institutionalized preschool education are insufficient. When the relevant part of the law took effect, the age of children in the ontogenetic preschool period was an indicator that could have been rather significant when choosing schools and including the appropriate units of education in them, or in requests for home schooling.
- The implementation did not provide for even adequate preparedness in terms of the personnel capacities of the schools or school facilities affected. The overall change to the content of the curriculum for education, including demarcating its educational outputs, took place quickly and in an unbalanced way from the standpoint of the adequate preparedness needed to perform this profession – there was not enough time for it. The procedure for the formal, technical implementation of the curricular changes at issue approximated the standard formal, technical tasks that accompany activities of the regular (school) administration.
- The implementation caused a time-bound, temporary transformation of part of one unit of the system of primary education. More concretely, it affected the preparatory classes of primary schools when, according to the intention of the established changes, their educational aims and principles, and considering the fact of who was meant to access this education and for whom it was being designed, the form, so to speak, of that education was changed.
- The implementation essentially counted on the automatic, latent approval of requests for home schooling submitted to institutions by parents or legal guardians. It is, therefore, a matter for discussion and investigation what this state-established legislative change is meant to achieve and what purpose it is meant to serve.
- In the curriculum of preschool education, when it comes to delivering requests for home schooling and then having them approved by a school principal, no indicators, parameters or standards exist according to which a school, as a child-rearing, educational institution, would be able, through its own educators, to test the (undefined) framework and level of the educational outputs at issue.

4 The framework of institutional primary and secondary school education at present

Obligatory primary education of nine school years is delivered at a primary school, the structure of which is differentiated into two levels: The first is grades one through five (ISCED 1) and is oriented primarily toward achieving literacy and numeracy. The next level comprises grades six through nine (ISCED 2) and its concept inclines toward acquiring the defined key competences for that educational level. The Appendix to the Framework Educational Program for Primary Education, regulating the education of pupils with mild mental disability (RVP ZV - LMP) has been abolished by the ministry. The compulsory primary education of pupils with mild mental disability is, therefore, delivered according to an individual education plan on the basis of a recommendation by a counseling facility. The ISCED 2 level of education, in accordance with the Education Act, can also be acquired by fulfilling compulsory school attendance at a multi-year gymnasium (college preparatory school), or by graduating from a conservatory with the corresponding scope of study. Education at a gymnasium is perceived by educators and parents to be systemized preparation of a pupil to successfully complete education at the general secondary level (ISCED 3) with the assumption of subsequently beginning the first level of college study (ISCED 6), then a second level (ISCED 7), and eventually a third level (ISCED 8), the highest possible level of educational attainment) of various focuses. When a pupil graduates from primary education in a primary school (ISCED 2) specially designed for pupils with moderate to severe mental disability, or with multiple disabilities, or with autism, the law counts on extending the length of time to 10 school years. In such a case, it is differentiated into two levels, the first of which comprises grades one through six and the second, grades seven through 10. If the education in such a school is preceded by preparation, that preparation is delivered over the course of three school years at the preparatory level of a special primary school.

In Slovakia, school education is compulsory for ten years, which is provided at primary school, and secondary school until the end of the school year in which the pupil turned 16 years old (§ 19, paragraph 2 of Act 245/2008 on education and training (school law) and on amendments to certain laws). Primary school education has nine grades formally divided into primary school education (ISCED 1) and lower secondary education (ISCED 2) (Act 245/2008 on Education and Training (School Act) and on Amendments to Certain Acts). Compulsory school attendance of students with disabilities takes place in elementary schools in an inclusive form, in elementary schools for students with disabilities. Pupils with mental disabilities or in combination with other disabilities are educated according to variant A, variant B, variant C. Education according to variant A is intended for pupils with a mild degree of mental disability, variant B for pupils with a moderate degree of mental disability and variant C for pupils with a severe, profound mental disability.

The system of secondary schooling in the Czech Republic facilitates selection in relation to the demands and focus of the concept of the education delivered and in relation to its outcomes and the level of education acquired. Secondary education (ISCED 2) with a professional orientation is delivered at secondary school or secondary vocational school. In the case of pupils with combined and more severe forms of disability, it is delivered in a practical school. In both cases, the length is a maximum of two school years. Secondary education with an apprenticeship certificate (ISCED 3) is delivered over a maximum of three school years at a secondary vocational school with a professional focus and with differentiated content in the curriculum that either does or does not reflect the potential for further study leading to the acquisition of a diploma. Secondary education with a graduation exam (ISCED 3) is delivered at a secondary professional school, is focused on a profession, in standard cases lasts four school years, is associated with the performance of professional activity, and its successful completion involves competencies required for lower management functions.

Depending on the type of field studied, professional training may be a component of the curriculum. Gymnasium (college preparatory) education leading to the same level of education, unlike these other types of secondary schools, has a general, not a professional, focus. Successfully passing gymnasium graduation examinations is the prerequisite for study at colleges, universities, or conservatories with a relevant educational program. Graduating from conservatory means development of the knowledge, skills and other capabilities already acquired by a pupil in primary and primary arts education has been provided. This includes preparation to perform ambitious artistic or arts-educational activities in the fields of music, dance, singing and the musical dramatic arts. In association with the length of a pupil's education, the study ends with the performance of examinations (minimally after four school years) and acquisition of a secondary general education, or by being discharged after a minimum of six school years, thanks to which higher professional education is acquired (ISCED 6).

Inclusion, in the context of those whose socio-educative profiles indicate a need for support measures so they can adequately access all of the relevant aspects involved at the level of social justice, lags significantly in the Czech Republic when it comes to arts education. Educators have earmarked (primary) arts education as excluded from the obligatory curriculum, in accordance with regulations of a legal nature. The intention of those legal regulations does not address issues of (social) justice. Children and pupils with special educational needs are still included in this education system and are designated as needing support measures although the letter of the law does not count on such measures in such settings.

Secondary school education with baccalaureate is higher secondary education (ISCED 3) in Slovakia takes place in gymnasiums, secondary vocational schools, conservatories, schools of art industry, secondary sports schools. If a student has been admitted to a secondary school while completing compulsory schooling, he/she continues to complete it until its completion or turning 16 years of age. Gymnasiums prepare students for university studies, but also for activities in administration and culture. Secondary vocational education prepares pupils for pedagogical, social, health, economic, technical, cultural and other activities. The conservatory prepares students for pedagogical and artistic activities. Art industry schools provide comprehensive artistic education in the field of art and design. Pupils with sports talents are prepared in secondary sports schools for professional sports activities (§ 32 paragraphs a) to e) of Act 245/2008 on Education and Training (School Act) and on Amendments to Certain Acts). Pupils with mental disabilities receive professional education in a vocational school and a practical school. In a vocational school, students prepare to perform simple work activities that they perform independently under the guidance of another person. The practical school prepares students to perform simple practical work under supervision.

5 Selected crucial problems of contemporary institutional school education

The contemporary school grapples with many requirements related to different legislative, societal, social, pedagogical and other aspects of education in the schools. In the foreground, among others, is the concept of the child-rearing and educational processes, their content, and procedural questions of quality, including the instituted requirements for the pedagogical workers responsible for managing those processes. Some components of the political and professional pedagogical discussions are the phenomena of integration and inclusion, the systems and mechanisms of the support measures, the system of educational psychological counseling, etc. The main topic of Czech education in total is the issue of equal, fair access to education by all children and pupils irrespective of their socio-educative or other characteristics. (Kalejka, 2015, 2014)

The inadequate approach taken by educators themselves toward this issue, their negative attitudes toward such access, as well as their discriminatorily established schemes, insufficient

orientation, ignorance, or ignoring of legislative ordinances and methodological instructions regulating the education of those affected, signals the existence of a societal problem. On the front line, this problem is projected into the life of the individual impacted by this fact.

A second line comprises those who constitute the individual's educational space and enter it. This includes those with whom the individual becomes part of an educational context after the processes of secondary socialization end and the tertiary ones begin in parallel. Because this is an across-the-board phenomenon that contradicts both the stated aims of pedagogical science and the uncoded ethics of the profession of an educator, as well as essentially impacting the entire population, this phenomenon must be critically perceived, critically assessed, and adequately corrected through statewide intervention. What is at issue is a basic deficiency of the scholastic system, or the educational policy system, that the Czech Republic should begin to address as soon as possible, and far more effectively and systematically than it has so far. It is not possible to state that many such steps have been undertaken. The perspective taken of the changes instituted, their intentions, their contents, and the outputs of each individual step are what has, among other things, brought about the state in which our education finds itself today.

Table 1 *Comparison of society's perception of school inclusion - the past state*

PAST STATE
A disunity among the implemented approaches, procedures and ways of interpreting the content of educational careers occurred in relation to the subject of that education, whether in respect of individuals or institutions. A lack of consistency , an inconstancy of the attitudes, opinions, and procedural matters that coordinate, direct, enter into, regulate and even determine the character and form of educational careers was recorded to a great extent.
Transition from dominant support for integration in education to minimal advocacy of inclusion in education.
The state of affairs can be perceived as a shift from an individualistic perspective to a collectivist one. This happened despite resulting in differentiating what was individual and establishing an individualized perception of the context.
Openness toward criticism, in the form of objective reflection about oneself and others, was then replaced by subjective, uncritical assessment of the relevant facts involving proxies for the representation being aimed at. In this context, we can describe this as the development of a collective, elevated egotism.

Table 2 *Comparison of society's perception of school inclusion - the past state*

PRESENT STATE
Not only does the public not know what inclusion (in education) means, what it contributes, what its importance is and whom it serves, even the pedagogical community itself does not perceive inclusion clearly or favorably. Among pedagogues there is inconstancy of opinion about the content, form and importance of inclusion.
In practice, integration in education is being implemented, but even professionals perceive this step as constituting inclusive education and are unaware of the difference between inclusion and integration.
Social irritation has appeared toward the inclusively attuned steps that essentially serve all, not just those for whom education is primarily implemented.
The attitudes of society toward those for whom the inclusive processes are beginning - to also arrange for them what others can achieve and handle without the existence of such processes - will contribute to support for those inclusive aims. However, an elevated, undesirable animosity and antipathy toward such persons is becoming associated with these processes. A negativistic perspective is growing in society toward persons living with disabilities, or disadvantage, or persons who are different in any way.

Schooling, its crucial conceptions, the content of its child-rearing and educational mechanisms and processes, as well as those who are responsible for it, involves many steps that have demonstrable impacts not just on the educational careers of the objects of education, but that also represent an input, with a certain potential for change, into the overall life course of a person and contribute to shaping the form of that person's quality of life.

This actual school education practice in the field demonstrates that pedagogical workers are not sufficiently prepared to educate all children, pupils and students as part of a concept of educating all kinds of children, pupils and students together. While the state-guaranteed curriculum counts on differences and latently encourages the implementation of educational processes, assuming that those delivering instruction will be aware of and maintain their own pedagogical and professional correctness, it cannot be said that those aspects of managing instruction that form educators' attitudinal schemas and opinions toward difference are shaping up favorably. The child-rearing and educational aims stated in the relevant curricula are binding. Pedagogical workers are, therefore, obligated to respect them and to create contents for educational units accordingly, to apply approaches and strategies the intentions of which will lead to fulfilling what those educated in institutional schooling are meant to acquire.

We see a problem in inclusive education in Slovakia in the formation of support teams in schools at a time when Slovakia will not be able to use funds from operational sources. State administration, founders will have to find funding to maintain and create support teams from public funds.

6 Big challenges and recommendations

It is a big challenge to plan the entire schooling period responsibly and systematically in terms of time. The framework of that time must include defined phases, or stages; the workers to be entrusted with it must be identified; their competences, work tasks and duties must be defined; and everything must be balanced with a view toward the scope of work and the ambitiousness of the workers, including in terms of time.

The framework must adequately include controllable outputs and a process that is defined in terms of the course and character of the direction of that process, its consequences, and its form.

The work-related needs of pedagogical workers, especially the needs directly associated with their pedagogical activity with children and pupils, must be monitored.

A professional pedagogical team must be put together critically and prudently, and in addition to fulfilling the formal requirements related to their education achieved and the relevant qualifications in accordance with the letter of the law on educational workers and related legislative regulations, the team must be characterized by actual erudition when it comes to working with children and pupils, the socio-educative characteristics of whom are known to the team. The team must comprehend the canvas before them and see meaning in their own work.

The team must be rid of those attitudinal schemas, the contents of which reproduce the principles of discrimination, ethnocentricity, racial superiority, or any other distinction through which an individual or individuals in the class collective can be labeled.

The team must frame its activity within the intentions of child-rearing and education and, through its declared models of behavior, support the heterogeneity of society. The team must not interact with the children's and pupils' integrity, either that of their family or that of their person, with the aim of adversely affecting, harming or hurting the child. On the contrary, the educator must care about communicating with the family of the child who is being educated and raised and must perceive that

communication as a crucial link in the chain which, if it is mutually optimally established, will support the educator's pedagogical activity in the children's family environment.

An essential condition for successful pedagogical work by a subject with the target group that is the object of child-rearing and education, whatever their socio-educative profile, is the constant perception of one's own, actual, pedagogically oriented activity. This means the pedagogical worker is able, in practice, to set aside pedagogical scientific paradigms for conducting this activity because the worker is now controlling his or her own work process systematically, connecting that theoretical knowledge with the actual field.

The worker must use the appropriate communications channels, must deliver, as part of the child-rearing and educational processes, appropriate, current, and valid content that supports the interests and the overall development of the personalities of those being educated.

When delivering the content of education, the worker must pay attention to cultivated speech and its form, to procedures, to verified methods and techniques, including undertaking regular monitoring of academic achievement, both in aggregate and at the individual level, followed by the processes of analyzing and internalizing the findings acquired thereby. In addition, the worker must perform an ongoing evaluation of his or her own performance.

The worker must assess curricular content in terms of how they were developed for the class collective and understood, and what ability that content had to have implications for the regular course of the lives of those being educated. (Štech, 2009, 2007)

The factors and mechanisms of formative impact and socialization processes must be kept in mind by the educator, who must develop communication potential and provide room for the self-realization of the entire class collective, respecting individuality and support social skills development. Scholastic difficulties must be addressed coherently, constructively, and in some cases in consultancy with the colleagues and experts concerned with the facts and procedures of the matter.

The educator must strive for family participation in the relevant activities organized by the school. The educator must take an adequate interest in the children's home environments, in the context of that environment in relation to education at school, and in the consequences of that environment for that education.

The educator must never, through his or her opinions, incite class collectives of children and pupils to follow attitudinal schemas, axiomatic structures, or models of behavior that would endanger any of levels or phases of their ontogenetic development.

The educator must take into consideration the children's biological attributes, the formation of their morality and spirituality, their psychological characteristics, and their social fitness and skills.

The educator must maintain active communication with parents and take an interest in the legal guardians and parents' interest in their children's education. The educator must provide guardians with advice within the scope of the educator's own institutionalized activity.

When speaking, the educator must be adequately and authentically balanced and open, and must refrain from aggressive, denunciatory, impulsive or negativistic approaches.

The educator must be aware of the entire scope of his or her competences with respect to both the job and the profession. The former competences are related to performing the function, the position in which the educator is hired at that particular workplace, while the latter competences immediately flow from performing the function of a pedagogue, or rather, their basis

consists of the very ethos of the profession itself (the professional ethics of an educator). (Šiler, 1999)

The educator must perceive the gravity of performing this profession, must participate in events in the continuing education system, and must choose from the courses, programs, seminars or other educational events on offer that aim to support the development of his or her competencies for the job and the profession or that yield either an extensive or intensive, favorable benefit for all involved. Specifically, this has to do with:

The individual dimension of the pedagogical worker, where the benefit targets the structure of the development of his or her personality as an individual, or indirectly as an individual pedagogical worker who, when performing the profession, will construct, have available, integrate and use the benefits acquired.

The dimension of the class collective, which is created individually, just as it is for the educator – both in the case of the pupils as individuals, and then created in aggregate (collectively, or as a group) in the case of an entire individual class.

The benefit, and it is not a small one, for the school as a child-rearing, educational institution, of the pedagogical faculty members and work teams comprising its professional capacity. The prestige of the school will grow because of its educators, not just in the eyes of legal guardians and parents, but also among the broader public. The attitudes of civil society, legal guardians and parents, as well as the mutual attitudes of the pedagogues involved toward each other will subsequently be transformed and this change will be projected into the mutual interactions of all those involved and their perceptions of the axiomatic value associated with the outcomes of both their job and their profession.

7 The Ideal Conditions as a Conclusion

What is characteristic of any society is its heterogeneous variety, and differences that do not harm the health of a group or individuals, that do not deny anybody his or her rights, that do not limit anybody in his or her freedoms, and the displays of which do not negatively interfere either with the lives of others or the life of the individual characterized by the difference, are accepted by society.

Class and school collectives, family-member communities, hobby and recreational groups, work teams, or any other groups of people that come together must not differentiate others on the basis of any naturally existing, spontaneously arising characteristics that are determined by different causalities. This abuse of the social context in interactions and interpersonal communications causes a social stratification tied to social inequality, on the basis of which either covert or overt discrimination arises from which flows feelings of inferiority and superiority, and on that basis others are denied their rights, their lives are negatively impacted, limits to their freedoms are erected, and barriers arise thanks to which the person labeled as different will not receive what the rest are receiving, through no fault of his or her own.

In pedagogical practice, the principle of equal treatment is not being enforced. Pedagogical workers must be aware of their not inconsiderable role in the process of secondary socialization, a role played by those who, while exercising their profession, are performing a public service for which the founder of the institution where they operate adequately guarantees their continued income and takes care of their professional development given the extent of their competence. Educators must be, in their work, proactive about their own lifelong learning, about caring for the development of their own personalities, taking an interest in innovative approaches, methods, procedures and ways for forming those who attend school under the terms that are legally defined (as well as other terms), those for whom, during their processes of (self) evaluation, they are constructing the content and form of the

child-rearing, educational and educative reality. When it comes to certain periods, these realities are not being reproduced to the full extent from the perspective of their content and the overall scheme – on the contrary. While the content, the instruction and the scheme are formally declared to be a whole with an unchanged form, educators well know that they must take into consideration all crucial, legitimate attributes when delivering education in practice.

In the schools, people who are different from each other encounter one other – their ages, cultures, languages and other aspects all differ. The family of each person is different, although for some it can be assumed that they share one or more characteristics. For that reason, it is essentially necessary and socially strongly desirable to transform the general (generally academic, generally factual) level of the content of the curriculum at all levels of education in such a way that its context takes into consideration the existing diversity of Czech/Slovak civil society, instead of constantly establishing the perspective of the ethnic majority population as an ego-dominating, nationally superior, stratified population living on the territory of the Czech/Slovak Republic, because the citizens of this state are not a nation, but citizens holding state citizenship of the Czech/Slovak Republic. The degree of gravity, the force, the weight of any state citizenship is, from a statistical standpoint, absolutely irrelevant and misleading. At its core, it is established by a qualitative perspective that is measured by different standards.

The above-mentioned transformation may be perceived as radical by groups or individuals. It requires an across-the-board intervention and transformation of the establishment not just of the systemic mechanisms of education, but also a significant change in the ranks of the pedagogical personnel who should be the first, in the processes of institutional scholastic education, to implement this change in a prepared fashion. That should prevent any attitudinal or cognitive incoherence with respect to accepting the heterogeneity of individuals and of the whole.

Quality education must be effectively, systematically supported and effectively implemented, in accordance with the defined aims of the curriculum, assuming the heterogeneity of the socio-educative characteristics of those being educated, including those who are the subject of the scholastic or school-related processes of integration/inclusion as part of the concept of educating everybody together.

We must fully arrange for the scholastic institutions in which lawfully-required education is being implemented within the terms of the state-guaranteed curricula that affect those subject to the Constitution of the Czech/Slovak Republic and the Education Act to represent prepared environments for school socialization, with completely, fully qualified pedagogical personnel, including completely staffed scholastic advisory workplaces and the provision of all the necessary conditions and requirements for an equal, fair, quality education for all.

It is necessary to precisely define what needs changing in contemporary education. The adaptation needs to be comprehended, seen in a hierarchically designed scheme in which all the entities impacted by this area of endeavor are involved. What is desirable for that input is the definition of its extent, including the degree of its activity and the weight of its impact on this or that change.

We must intentionally ignore and set aside the declared slogans that have been appearing for several decades now in the different conceptual, methodological or strategic documents, which the public does not absolutely comprehend. Materializing those slogans is difficult for the actors of the political adaptations at issue, as the political pressures and tendencies known to us all are adding to the problems associated with discovering the essence of what we are addressing, with comprehending its circumstances and structures. At the conclusion of a long attempt, of a willingness to quest for this problem, its solution has just been the creation of a new problem, or rather, the

transformation of the original problem into a form that is put together differently, but that of course is having an identical - or sometimes even a worse - impact.

Ignorance of the conditions of the school education of children and pupils with special educational needs among pedagogues in the primary schools may be an indicator of educators' laxity, or of their lack of interest, or of an uneven distribution of competencies in the workplace, or of the educators external or internal motivations, or of a lack of control on the part of the school management, as well as other relevant circumstances. However, all these determinants are able to have a significant influence on the course and outcomes of the educational trajectories of the pupils affected by them.

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Primary Paper Section: A

Secondary Paper Section: AM

THE POLICY OF REPRESSION OF THE SOVIET AUTHORITIES TOWARDS THE ROMAN CATHOLIC CLERGY IN THE TERRITORY OF WESTERN UKRAINE DURING THE GREAT TERROR

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Abstract: The article examines the policy of repression of the Soviet authorities against the Roman Catholic clergy in the eastern territories of the Second Polish Lithuanian Commonwealth, in particular Volhynia, during the Great Terror. The main attention is paid to the reasons and prerequisites of the anti-religious policy of the Soviet authorities, the analysis of the instruments of the systematic destruction of the material and spiritual base of the Church, including the closure and destruction of churches, repressions against priests and active parishioners, as well as the distribution of propaganda materials with the aim of discrediting the Catholic religion. The relevance of the topic is due to the insufficient development of the problem of repressions against the Roman Catholic Church in domestic historiography, which especially concerns the Volyn region. The article uses an interdisciplinary approach that allows combining the analysis of archival documents, scientific works and conclusions from declassified materials. The results of the study highlight the scale of repressive measures, methods of liquidating religious structures and leaders, and demonstrate the consequences for the religious life of the region.

Keywords: repressions, Roman Catholics, clergy, great terror, Polish operation.

1 Introduction

The anti-religious policy of the Soviet Union was part of the overall strategy of building a totalitarian society, where religion was seen as the main threat to communist ideology. Therefore, the fight against religion was systemic and multi-level in nature, encompassing physical repression, propaganda activities, destruction of church infrastructure and discrediting the clergy.

The prerequisites for the extermination of Poles and Catholic clergy in the USSR, especially during the Polish operation of the NKVD in 1937–1938, stemmed from the general policy of the Soviet authorities to combat religion, national minorities and "enemies of the people". This policy was deeply rooted in the ideology of the Stalinist regime, which saw religion and national identity as threats to the communist system (Байдич 2008, 294).

2 Materials and Methods

The article uses the historical-genetic method to analyze the origins and development of the repressive policy of the Soviet authorities towards the Roman Catholic Church, which made it possible to trace its evolution in the context of the annexation of Western Ukrainian lands. The archival method was based on the study of documents from the Central State Archive of Public Associations of Ukraine and the State Archive of the Volyn Region, which contributed to the reconstruction of the mechanisms of repression and specific cases of persecution of the clergy. Content analysis was used to study propaganda materials that discredited the Catholic clergy, and the comparative method allowed to compare the Soviet anti-religious policy with similar practices in totalitarian states. The historical-descriptive method helped to recreate a holistic picture of repressions in Volyn, and the interdisciplinary approach provided a comprehensive understanding of the topic through the integration of historiographical sources, archival materials and socio-cultural analysis.

3 Results

The Polish NKVD operation, which became one of the key episodes of the Great Terror, was aimed at eliminating real and fictional "spies" and "counter-revolutionaries" among the Polish population. The reasons for such repressions were the historical enmity between the Soviet Union and Poland, which in the interwar period was considered the main enemy of the USSR in the West (Гайоз, 2022). The Soviet authorities perceived the Polish population as a potential "fifth column" that could be used for espionage activities in favor of Poland. A special role in this

was played by order No. 00485 of August 11, 1937, issued by Mykola Yezhov (Ленинградский мартиролог 1996, 454-456), which defined the categories of persons subject to arrest and destruction. Representatives of the clergy, intelligentsia, political emigrants, former military personnel and ordinary peasants and workers of Polish origin fell under repression. In particular, a wave of repression was caused by the resolution of the Politburo of the Central Committee of the All-Union Communist Party (Bolsheviks) "On Anti-Soviet Elements" of July 2, 1937 (Нікольський, 2003, 90) and J. Stalin's telegram to the secretaries of regional committees, the Central Committees of the republican communist parties and regional committees, which stated the following: "take into account all kulaks and criminals who have returned to their homeland, so that the most hostile of them are immediately arrested and shot in the order of administrative proceedings of their cases through troikas..." (Нікольський, 1995, 40-45).

The Soviet Union's anti-religious policy was part of a broader campaign to combat religion as a social and spiritual institution (Бистрицька, 2011, 40). The Soviet authorities systematically discredited Catholic priests, portraying them as spies, reactionaries, and enemies of the Soviet system (Яроцький, 2001, 151; Горбач, 1998, 73; Бондарук, 2021, 58; Wierzbicki, 2017, 17-24). This was accompanied by mass arrests of the clergy, confiscation of church property and the closure of churches. Propaganda played a special role in the destruction of the Catholic Church. The Soviet media systematically portrayed Catholic priests as enemies of the people, engaged in subversive activities and "exploiting" the population. Through the educational system and cultural events, the authorities sought to eradicate religion from public life, instilling in the population the ideas of atheism and contempt for religion as a "relic of the past" (Пивоваров, 2022).

In the western Ukrainian lands that were part of the Second Polish-Lithuanian Commonwealth, where the Catholic Church had significant influence, the anti-religious policy proved to be particularly destructive. The closure of churches, the confiscation of property, and the arrest of priests led to the practical destruction of religious communities. At the same time, ethnic repression continued against Poles, who were accused of "bourgeois nationalism" and collaboration with foreign powers. Such a policy had not only an immediate destructive effect, but also long-term consequences for the cultural and religious heritage of the region (Гайоз, 2022).

Repressions against the Catholic clergy and the Polish population became part of a large-scale policy of Stalinism aimed at total control over society. They were accompanied by physical terror, ideological pressure and discredit, which deprived the community of its spiritual identity and forced it to survive in conditions of constant fear and repression. Already on September 1, 1937, I. Leplevsky reported to Moscow on the first results of the "kulak operation", in particular on the results of the struggle "on the religious front", and also provided statistical data, which included the following: "174 sectarians" (of which 93 in the 1st category were to be "shot"; 81 in the 2nd category), 101 representatives of the clergy (55 in the 1st category; 46 in the 2nd category), 132 persons of the counter-revolutionary church active (67 in the 1st category; 65 in the 2nd category), 17 persons of the monastic order (8 in the 1st category; 9 in the 2nd category) (ГДА СБ, 1937).

The ideological justification for the fight against religion was an integral part of Soviet propaganda. The Soviet authorities positioned religion as the "opium of the people", which hindered the development of a progressive socialist society. Religious values were opposed to materialism, and faith in God was opposed to atheistic upbringing. Propaganda was spread through books, newspapers, films and lectures. The central aspect of this

campaign was to convince the population that religion was a vestige of the feudal past, which contradicted modern "scientific" reality. In schools and higher education institutions, students received mandatory lectures on atheism, which emphasized that belief in God was a sign of weakness and ignorance.

Anti-religious propaganda carried out by the Soviet authorities during the Great Terror and in the context of the Polish Operation of the NKVD in 1937–1938 was a tool not only to discredit religious institutions, but also to manipulate mass consciousness in order to strengthen the totalitarian regime. The Catholic Church, as a symbol of the national identity of the Poles and one of the main spiritual centers, became the object of a systematic campaign of destruction.

The Soviet authorities actively disseminated theses about the Catholic clergy as the main agents of anti-Soviet conspiracies that threatened the stability of the USSR. In particular, on October 31, 1944, V. Merkulov, the People's Commissar of State Security of the USSR, sent to the People's Commissars of State Security of the Union republics and regional departments of the NKVD Directive No. 140 (ЦДАОУ, 1944) to which was added the following document "Review of the anti-Soviet activities of the Vatican and the Roman Catholic clergy", which stated that "with the beginning of hostilities between Germany and the Soviet Union, the Vatican began to send its agents to the territory occupied by the Germans to conduct espionage and subversive activities against the USSR." (ГДА СБУ, 1944). In propaganda materials distributed through newspapers, radio, educational institutions, and cultural events, Catholic priests were constantly portrayed as spies for Polish intelligence. Their actions were interpreted as attempts to "undermine" Soviet statehood, which became an important pretext for repression (ЦДАОУ). The main emphasis of this propaganda was to assert the idea that religion was not only a relic of the past, but also a direct threat to the "bright future" promised by Soviet socialism.

The Catholic Church, which had strong traditions in the eastern territories of the Second Polish-Lithuanian Commonwealth, in particular in Volhynia, was perceived as a center of resistance to Soviet power. Because of this, youth organizations were involved in anti-religious propaganda, in particular the Komsomol and pioneer movements, which organized public lectures, demonstrations and even theatrical performances that portrayed Catholic priests as exploiters or enemies of the people. Educational programs aimed to "educate the new generation" in the spirit of atheism, which reduced religion to an "anti-scientific superstition" and formed stereotypes that justified the state's aggressive actions against believers (Бородін, 2018, 345).

Particular attention was paid to discrediting the clergy through coverage of the so-called "trials" of Catholic priests accused of collaboration with Poland, espionage, or anti-Soviet propaganda. These show trials were often accompanied by open sessions, in which "confessions" from the defendants were obtained through torture (Герман 2019, 298). All this was broadcast as evidence of the "anti-state nature" of religion, creating the impression in the public that the Catholic Church was an obstacle to social progress.

The large-scale anti-religious campaign also included the active destruction of the material base of the Church. Propaganda materials constantly emphasized that religious buildings could be used with greater benefit, for example, as clubs or warehouses. This not only destroyed the church infrastructure, but also deprived believers of the opportunity to freely participate in divine services. At the same time, "clarification" campaigns were carried out, aimed at convincing people of the unnecessaryness of religious rites and the importance of atheism for personal development.

Thus, anti-religious propaganda in the USSR was not just an ideological campaign, but part of a large-scale policy of repression aimed at destroying traditional institutions and eradicating religion as a component of society's identity.

Propaganda had a particularly significant impact on young people, who were brought up in a spirit of contempt for religion. In books and films, the clergy were often depicted as cruel exploiters or enemies of progress. The Soviet authorities actively discredited the clergy, portraying them in a negative light. In propaganda materials, priests were portrayed as parasites who live off the labor of ordinary people and spread reactionary ideas. Such stereotypes were aimed at undermining the authority of the clergy among the population.

Discrediting the clergy in the Soviet Union was an important component of the anti-religious policy aimed at undermining trust in religious institutions and forming a negative attitude towards priests among the population. Particular attention was paid to Catholic priests, who in the Polish-Ukrainian and Soviet contexts were perceived as bearers of national identity and potential participants in anti-Soviet activities (ЦДАОУ).

Soviet propaganda systematically portrayed Catholic priests as enemies of the people, spies and reactionaries working against the interests of the state. During the Polish Operation of the NKVD in 1937–1938, the Catholic clergy became the target of large-scale repressions, accompanied by public trials. These trials were an important propaganda tool: they were widely covered in the press, presenting the priests as agents of Polish intelligence or organizers of counter-revolutionary activities. The use of torture and psychological pressure ensured the extraction of "confessions", which were then presented as evidence of the criminality of the religion and its leaders (ДАВО, 1937).

The anti-religious campaign also had a social dimension: in the mass consciousness, an image of the clergy as exploiters of ordinary people was formed. The Soviet press and cultural events actively covered cases when priests allegedly profited from their parishioners, organized anti-Soviet conspiracies, or concealed crimes. In films and plays created in the spirit of atheistic propaganda, priests were often shown as cruel, corrupt, or hypocritical characters.

The actions of the Soviet special services to spread provocative rumors about the moral imperfection of priests became particularly public. They were accused of collaborating with the occupiers, financial fraud, anti-Soviet agitation, and even ties to criminal elements. Such actions not only undermined the authority of the Church, but also created an atmosphere of distrust and fear among believers, many of whom avoided contact with the clergy, fearing repression.

The central element of the discrediting was an ideological campaign aimed at demonstrating the "negative" influence of religion on the development of society. Priests were portrayed as opponents of education, science and progress, which became an important aspect of atheistic education in schools and youth organizations. This allowed the Soviet authorities not only to justify repression against the clergy, but also to involve young people in active participation in anti-religious campaigns.

The discrediting of the clergy had long-term consequences. It undermined trust in religious institutions, contributed to a decrease in the number of believers and created conditions for the further strengthening of anti-religious policies. The example of the Catholic clergy during the Soviet occupation shows how propaganda combined ethnic, political and ideological aspects, which made the campaign particularly destructive for the religious community. Show trials of priests and bishops were used as a tool to demonstrate the "anti-Soviet essence" of religion. During these trials, the priests were accused of collaborating with Polish secret services, espionage, and anti-Soviet propaganda. At the same time, their testimonies were mostly fabricated. Such measures contributed to the formation of an atmosphere of fear and distrust of religious institutions. As a result, many parishioners refused to participate in religious life, which further weakened the communities.

Thus, the Soviet anti-religious policy was a purposeful campaign that sought to destroy religion as a social institution and part of

the national culture. This had devastating consequences for Catholics and their spiritual heritage, especially in the territories of Volhynia, which became the object of double pressure - ethnic and religious.

The policy of the Soviet authorities regarding religion is explained by several factors. First, the communist ideology saw in religion a competitor that could influence the consciousness of people and undermine the party's monopoly on ideological power. Second, the Church, having significant international ties, could be perceived as an object of espionage activity, which also increased the suspicions of the authorities. Thirdly, the anti-religious policy was part of a broader campaign of terror aimed at eliminating social groups that could potentially pose a threat to the regime.

The policy of the Soviet authorities in Volhynia had a clearly expressed anti-Catholic character. To implement this policy, special anti-religious committees were created, which were engaged in organizing propaganda and carrying out repressions. Orders and instructions were issued aimed at the physical destruction of the clergy, as well as the destruction of church institutions, which were the embodiment of the religious and national identity of the Poles (ДІАБО). Particular attention was paid to priests who continued their religious activities even during the war, which made them targets for persecution.

The nationalization of church property was one of the main tools in the fight against religion. Temples, churches and monasteries, which had not only religious but also cultural significance, were confiscated from the church community. A significant part of these buildings was converted into warehouses, clubs, cinemas or barracks.

The destruction of the material foundation of the Church in the Soviet Union was one of the key components of anti-religious policy. This activity was aimed not only at depriving religious communities of their material base, but also at destroying their cultural and spiritual heritage (ЦДАГОУ). Particular attention was paid to Catholic churches, which were associated with Polish national identity and were considered by the Soviet authorities as centers of potential resistance.

In the western Ukrainian lands, after their annexation in 1939, the Soviet authorities began a mass closure of Catholic churches. Many religious buildings were confiscated by the state and converted for the needs of Soviet society. They were used as warehouses, barracks, clubs or schools, as a result of which the churches lost their sacred function (Калішук, Стрільчук, Кучереп, Разиграв, 2021, 414). A significant part of these buildings underwent architectural changes or were simply destroyed. It is known that before the war in Volhynia there was an extensive network of Catholic churches, which practically ceased to exist after the Soviet repressions.

The policy of destroying the material base of the Church was justified by Soviet propaganda, which spread the idea of a more "economically beneficial" use of religious buildings (ЦДАГОУ). For example, Catholic churches, which played an important role in the local community, were called "bourgeois relics" that hindered the creation of a new socialist society. Along with the physical destruction of churches, the Soviet authorities confiscated religious artifacts, including icons, crosses, and liturgical books (ДІАБО), which were later destroyed or transferred to museums as "exhibits of the past".

Against the backdrop of the physical destruction of temples, the persecution of the clergy continued, depriving the community not only of religious buildings but also of leaders. The closure of temples was accompanied by repressions against priests, who were arrested, deported, or executed (ДІАБО). This policy contributed to the demoralization of the religious community and its gradual weakening. In the case of Catholic parishes in Volhynia, this led to the complete disappearance of many of them, leaving thousands of believers without access to places of worship.

Thus, the destruction of the material foundation of the Church became an important mechanism of oppression aimed at the liquidation of religious communities. This had not only an immediate impact on the Catholic population, but also long-term consequences for the cultural heritage of the region. For the Catholic community, this meant the loss of the opportunity to hold services, and parish life declined. Churches that remained open were under close surveillance by the NKVD, and their services were often recorded in reports on "suspicious activities".

Religious communities were deprived not only of their buildings, but also of the material resources that were used to support educational and charitable initiatives. This significantly reduced their influence on society.

One of the most tragic aspects of Soviet anti-religious policy was the mass repressions against the clergy. As part of the policy of "militant atheism," the state arrested, imprisoned, and destroyed representatives of all religious denominations, including Orthodox, Catholic, and Protestant. In particular, the Catholic clergy in Western Ukrainian lands suffered particularly badly because of their association with Polish national identity. During the Polish Operation of the NKVD in 1937-1938, Catholic priests were among the group of persons subject to repression as "counter-revolutionary elements." They were accused of espionage for Poland, counter-revolutionary activities, and "inciting national enmity." These accusations were often based solely on testimony obtained under torture. For many priests, these repressions ended in years of imprisonment in the Gulag or death. A total of 143 810 people were arrested, of whom 111 091 were shot (Коваленко, 2023, 47-55).

Catholic priests and active parishioners were among the main targets. They were often accused of anti-Soviet activities, espionage for Poland, or propaganda of religion as a "bourgeois ideology." Arrests were accompanied by fabricated cases in which confessions were extracted under torture. One example is the "Polish Club case" in Kharkiv, where 28 people were convicted, most of whom were shot (Коваленко, Серякова, 2021, 264).

In addition to physical terror, the Soviet authorities systematically destroyed Catholic infrastructure. Churches were closed, turned into warehouses or clubs, and believers were left without the opportunity to hold religious services. All this took place against the backdrop of a propaganda campaign that accused the clergy of exploitation and anti-Soviet agitation.

Arrests and imprisonment were often accompanied by psychological and physical violence. The scale of repression was so significant that even individuals who had no connection with the resistance or religious activity were targeted simply because of their Polish origin or participation in church ceremonies. The procedures for considering cases were simplified as much as possible: sentences were passed by extrajudicial bodies, the so-called "twos" or "threes", and were carried out immediately (Бачинський, 1994; Білас, 1994; Білокінь, 1999; Шаповал, 1993).

These measures became part of the USSR's broader policy of combating religion as a threat to the communist regime. Terror not only physically destroyed religious figures, but also destroyed the spiritual and cultural connection between generations of believers. The systematic liquidation of the clergy also included the physical destruction of church leaders who had significant influence on communities. Catholic priests often became victims of public trials aimed at intimidating the rest of the faithful. During the annexation of Western Ukrainian lands in 1939, the Soviet authorities began to actively purge religious communities, repressing not only priests but also active parishioners.

It should be emphasized separately that an important aspect of these repressions was their intertwining with interethnic confrontation (ДІАБО). In the difficult political conditions that arose after the collapse of the Russian Empire, sharp

confrontations arose between various national groups, in particular between Ukrainians and Poles. The Polish clergy, which played an important role in the life of local Polish communities, became the object of special persecution by the Soviet authorities. Since Poles were often equated with "enemies", their repressions acquired a clear national connotation. Mass arrests, deportations and executions of Polish priests became part of a broader policy aimed at the physical and moral destruction of the Polish population and any influence of the Catholic Church. In this context, many of those who became victims of repression not only belonged to a religious minority, but were also ethnic Poles, which further complicated their situation under Soviet occupation (Instytut pamięci narodowej, 2018, 35).

4 Discussion

Using the example of the priests of the Lutsk diocese, the tragic consequences of the Soviet Union's policy towards the clergy of the Roman Catholic Church are examined.

Fr. Alexander Chaban was born in 1896 in Porytsk (now Pavlovka, Ivanychiv district, Volyn region). In 1914, he entered the theological seminary in Zhytomyr, which he successfully graduated from in 1919. After receiving his priestly ordination, Father Chaban began his ministry as a vicar at the Cathedral of St. Sophia in Zhytomyr. According to the testimony of Father Kazimierz Konopka SJ, in 1921, due to constant persecution by the Chekists, Father Chaban was forced to leave Zhytomyr and in June of the same year fled to Poland. During World War II, Father Chaban became a victim of Soviet repressions. There is conflicting information about the circumstances of his arrest: some sources indicate that he was detained in October 1939 in Rivne, others - on the territory of the Belarusian SSR. The further fate of the priest remains unknown, but there is evidence that in 1940 he was transferred to Ukhtizhim (Ukhta, Komi Republic), where he probably died before the amnesty was announced for Polish citizens in August 1941. The fate of his family was no less tragic, when in April 1940 the closest relatives of Fr. Chaban were deported to Kazakhstan. However, in addition to these versions, there are also others, according to which the priest could have been killed by Soviet soldiers during his escape in October 1939 or shot on June 23, 1941 in Lutsk prison (Dzwonkowski, 2003, 178).

Another prominent representative of the Catholic clergy who fell victim to the Soviet regime was Fr. Józef Churko, born on July 7, 1906 near Szczerc (now Lviv region). On June 10, 1933, he was ordained a priest and, thanks to his intellectual abilities, was sent to study in Rome. With the beginning of the Soviet occupation, his ministry acquired a new meaning. Fr. Churko actively participated in conspiratorial activities, helped military deserters and produced documents for those who needed it. His activities did not go unnoticed by the Soviet authorities, and as a result, in the fall of 1940, he was arrested on charges of "Polish counter-revolutionary activities." During the trial on November 6, 1940, Fr. Churko was sentenced to death and was on death row in Lutsk prison until the sentence was carried out. His life was cut short on June 23, 1941, during a mass execution of prisoners carried out by Soviet troops before their retreat (Dzwonkowski, 184; Dębowska, Popek, 2010, 54-55; Szawłowski, 1996, 227; Чаплицкий, 2000; Archiwum Instytutu Pamięci Narodowej (AIPN); Peretiankiewicz, 2010, 22; Krętosz, 2007, 48-49; Dębowska, 2008, 140, 424; ADŁ, 61; Dąbkowski, 2006, 71; Dębowska, 2015, 125).

Fr. Bronislav Galitsky was born on November 29, 1884 in Zhuromin (Mlava County). He entered the theological seminary in Zhytomyr and studied at the Academy in St. Petersburg. In 1908 he was ordained a priest. With the occupation of Volhynia by Soviet troops, Fr. B. Galitsky, together with Fr. Churko, began active conspiratorial activities helping those in need. At the end of April 1940, he was arrested by the NKVD and was in prison in Lutsk. In November 1940, he was sentenced to death in accordance with Articles 54-2 and 54-11 of the Criminal Code of

the Ukrainian SSR. Like Fr. Churko, he was on death row. He was shot on June 22, 1941 in the Ukrainian courtyard of the Lutsk prison (Dębowska, Popek, 2010, 71-71; Szawłowski, 1996, 227-229; Dzwonkowski, 2003, 231; Dębowska, 2008, 140, 427; Krętosz, 2007, 64-65; Peretiankiewicz, 2010, 23; AIPN; Dąbkowski, 2006, 71; Archiwum Generalne Zgromadzenia Sióstr św. Teresy od Dzieciątka Jezus w Podkowie Leśnej (AGCST), 1926; AGCST, 1936).

Fr. Francisk Rutkovskiy was born in 1882. He was ordained a priest in 1906, belonged to the Mogilev Archdiocese. Since 1933, he worked in the Lutsk diocese and served as vicar in Klevan. In 1935-1936, he was a vicar in the parish of Guta Stepanska. And in 1938, he was appointed abbot in Litowizh, and in 1940, abbot in Ustylug. It is worth emphasizing that Ustylug performed an important function in conspiracy activities, since he was responsible for the crossing of the Bug. On December 21, Fr. F. Rutkovsky was arrested by the NKVD. During the investigation, he was in Lutsk. On February 17, 1941, he was sentenced to death. Shot by the NKVD on June 22, 1941 (*Miesięcznik Diecezjalny Łucki*, 1926, 137; 138, 258; Dębowska, Popek, 2010, 130-131; Krętosz, 2007, 124-125; Dębowska, 2008, 443; Dzwonkowski, 2003, 524-525; Wnuk, 2007, 176-187; Peretiankiewicz, 2010, 25; Dąbkowski, 2006, 72; Dębowska, 2015, 132; AGCST).

Fr. Bronislav Fedorovich was born on October 3, 1901 in Podillia. He was educated in Buchach. In 1922 he began studying at the theological seminary in Łomża. However, on October 18, 1926 he moved to Lutsk, where on June 11, 1927 he was ordained a priest. He worked as a vicar and catechist in Korka. From 1930 to 1932 he was the rector of the Velyka Hlusha parish. In the following years he worked as a vicar in Lyuboml and Olytsia, and from December 1934 he was the rector of the Vyshenki parish. Before the outbreak of World War II he worked in the Skrundzi parish. On September 19, 1939, together with the organist, he was murdered by a Soviet sabotage group (*Miesięcznik Diecezjalny Łucki*, 1927, 198; Dębowska, Popek, 2010, 67-68; Dzwonkowski, 2003, 222; Krętosz, 2007, 58; Dębowska, 2008, 427; Michajlik, 2008, 37-270; Tararuj, 79-85; Dębowska, 2015, 126).

Father Kazimierz Voznitskyi was born on August 16, 1898 in Puchava, Volyn near Sukhodolsko. He graduated from high school in Zhytomyr, and in 1916 he entered the theological seminary in Zhytomyr. After its closure as a result of the Bolshevik Revolution, he moved to Lutsk. In June 1920, he was ordained a priest.

After the Soviet occupation, the authorities repeatedly persuaded him to cooperate. On June 2, 1940, he was arrested by the NKVD and sentenced under Article 84 of the Criminal Code of the USSR to 3 years of hard labor in the Kargopolag camp (Arkhangelsk region). He served his sentence from November 26, 1940 to October 21, 1941. He was released under the amnesty for Poles in August 1941. At the end of November he reached the troops of General Anders in Buzuluk. He died on December 11, 1941 (Dąbkowski, 2006, 74; Dzwonkowski, 2003, 647-648; Dębowska, Popek, 2010, 165-166; Dębowska, 2008, 140, 453; Krętosz, 2007, 334-335; Wesółowski, 2004, 8, 98; Peretiankiewicz, 2010, 26).

Father Stanislav Zientara was born on March 14, 1886 near Tarnów. In 1905 he joined the Congregation of the Salesian Fathers. In 1915 he was ordained a priest. In 1926 he moved to the Lutsk diocese, where he worked as a catechist in Mosurów. From 1928 he worked in Mlynów, and later in Satyów. Later he was the administrator of the parish in Radów. From September 1934 he worked as a catechist in Rivne. In September 1939 he was appointed vicar of the parish in Rivne. With the beginning of the Soviet occupation he began active activities in the conspiracy, namely: he prepared clean metrics, with the help of which it was possible to leave Rivne. On April 23, 1940 he was arrested, and already on December 14, 1940 was sentenced to death under Articles 54-2 and 54-11. He was shot on April 8, 1941 in prison in Rivne (*Miesięcznik Diecezjalny Łucki*, 1926,

33; Dębowska, 2008, 140, 341, 454; Dzwonkowski, 2003, 672; Dębowska, Popek, 2010, 171-172; Dąbkowski, 2006, 74; Peretiankiewicz, 2010, 26-27; Krętosz, 2007, 177-178).

Fr. Marian Tokazhevsky was born on February 2, 1873 in Shepinky in Podillia, in the family of Wilhelm and Eleonora from the Smolinsky family. He entered the theological seminary in Zhytomyr. Ordained a priest in 1896. During 20 years of priesthood, he changed over 27 parishes due to constant conflicts with the tsarist authorities. As a result, in 1909 he was exiled for 5 years of isolation in a liquidated monastery in Zaslavye. In 1913 he was released from the Lutsk-Zhytomyr diocese and left to work with other Poles in the Russian Empire: Yaroslavl on the Volga, Kostroma, Volgograd, Turkmenistan.

In 1917, Fr. Tokazhevsky returned to Podillia. One of the merits of Fr. Tokazhevsky is that he opened the first Polish school, which on September 10, 1918, he requalified as a gymnasium. In June 1940, he was arrested by the NKVD. At first, he was imprisoned in Kovel and Lutsk. In the Lutsk prison, he was in inhumane conditions, because his feet were constantly in water. The death sentence was replaced by 10 years in camps. It is more likely that on April 1, 1941, he was transported from Lutsk to Kyiv. There is an unconfirmed version that due to illness he was unable to march and therefore Fr. Tokazhevsky was pushed into a pit with lime. Although he could probably have died on the way from Lutsk to Kyiv (Dębowska, 2008, 140, 337, 341, 450; Dzwonkowski, 2003, 595-596; Peretiankiewicz, 2010, 25-26; Dąbkowski, 2006, 74; Krętosz, 2007, 158-160; Cabanowski, 1999, 71-82; Stowarzyszenie Pamięci Kapelanów Katyńskich, 2018, 7; Dębowska, Popek, 2010, 158-160; Dębowska, 2015, 134-135; Miesięcznik Diecezjalny Łucki, 1933, 55-56).

Fr. Michał Tyszkowski was born on January 7, 1906, to Adolf and Józefa from the Czeszkowski family. In 1926, he entered the theological seminary in Lutsk. On January 19, he was ordained a priest. From 1931 to 1938, he worked as a catechist in Zdobuniv. On September 1, 1938, he was appointed chaplain of the Zdobuniv Regional Religious Center. On September 18, 1939, he was immediately arrested by the NKVD. On March 28, 1940, he was transported from Rivne to Dnipropetrovsk. There is no further information about Fr. Tyszkowski. There is an assumption that he could have been killed in Katyn, since he was found on the Ukrainian Katyn list under number 2928 (Dzwonkowski, 2003, 606; Dąbkowski, 2006, 74; Peretiankiewicz, 2010, 26; Dębowska, Popek, 2010, 161-162; Krętosz, 2007, 331-332; Dębowska, 2008, 140, 451).

Fr. Vladyslav Shpachynsky was born on March 13, 1887 in Chudnov to the family of Raimund and Francisca of the Ogiński family. He graduated from the theological seminary of the Lutsk-Zhytomyr diocese. He was ordained a priest in 1910. In connection with the seizure of Ukraine by the Bolsheviks in 1919, he moved to Poland. In April 1923, he was appointed vicar in Rivne, and in August 1923 he served as a catechist at the gymnasium in Volodymyr-Volynsky.

In June 1940, he was arrested together with Fr. M. Tokazhevsky for conspiratorial activities. The death sentence was replaced by a long stay in labor camps. There are two versions of his death: one says that he died during transportation to the place of serving his sentence, the other says that he died in Lutsk prison in June 1941 (Dębowska, 2008, 140, 332, 337, 448; Dzwonkowski, 2003, 568-569; Krętosz, 2007, 149-150; Dąbkowski, 2006, 74; Peretiankiewicz, 2010, 25; Dębowska, Popek, 2010, 152-153).

Fr. Tadeusz Bonczkowski was born in 1877. In 1900, after completing the necessary training courses, he was ordained a priest and began his ministry as a vicar in Bila Tserkva until 1904. With the beginning of the Soviet occupation, Fr. Bonczkowski showed his courage when, realizing the threat to important historical documents, he decided to hide the Acts of the Senate of the Polish-Lithuanian Commonwealth. However, his act did not go unnoticed by the Soviet authorities, and he was soon arrested by the NKVD. After his arrest, he was imprisoned

in Lutsk, and later transported to another place, and according to legend, he was executed in Bykivna on November 18, 1940 (Peretiankiewicz, 2010, 21; Dąbkowski, 2006, 71; Dzwonkowski, 2003, 117; Dębowska, Popek, 2010, 41; Dębowska, 2008, 140, 420; Krętosz, 2007, 28-29).

Fr. Stanislav Galetsykyi, born in 1895. After graduating from the Zhytomyr Theological Seminary, he was ordained a priest in 1919 in Lutsk. His first place of service was the parish in Skirch. Later, from 1935 to 1937, he was the rector in Sofiivka, and from 1937 he served in Kolky. However, the tragic events of World War II did not bypass him. On July 1, 1941, when Soviet troops occupied these lands, Fr. Galetsykyi was shot for his devotion to his duty and protection of parishioners who turned to him for help (Dębowska, Popek, 2010, 71; Dębowska, 2008, 140-141, 427-428; Dzwonkowski, 2003, 231; Krętosz, 2007, 66; Dębowska, 2005, 44).

Fr. Leon Khudy was born on April 12, 1906 in Recklinghausen in Rhineland-Westphalia (Germany). On June 20, 1931, he was ordained a priest. With the beginning of World War II, he was a military chaplain and participated in the September military campaign. In the fall of 1939, he remained in the Lutsk diocese. He served as the administrator of the parish in Antonivka, Volodymyrets'kyi deanery. On June 24, 1941, Fr. Khudy was arrested by the NKVD in Dubrovysia with several parishioners. They were sent to Sarny. One of the charges was that Fr. Khudy was a spy for the German troops. He died on July 7, 1941 in Sarny. At the end of July 1941, an exhumation was carried out (there were about 70 people in one grave). All the bodies were transferred to the parish cemetery (now a sports field). According to eyewitness accounts of the exhumation, the remains of a "priest in a cassock from Salesia" were there (Dębowska, Popek, 2010, 51; Dębowska, 2008, 141, 459; Krętosz, 2007, 308-310).

5 Conclusion

Thus, Soviet policy towards Poles and Catholics was systemic and aimed at the complete elimination of both religious and national identity. The Polish operation of the NKVD in 1937–1938 was one of the most tragic manifestations of the Great Terror, during which repressions were carried out on ethnic and religious grounds. The destruction of the Catholic clergy and believers consisted not only in physical repressions, but also in large-scale discrediting aimed at undermining trust in the Church among the population. Anti-religious propaganda and the destruction of the material foundation of the Church became important mechanisms in the eradication of religious life. The Stalinist regime perceived religion as a threat to communist ideology, and the Catholic Church as a stronghold of Polish identity. As a result, the clergy and believers were subjected to repressions, confiscation of property and the destruction of religious buildings. The propaganda that accompanied these actions portrayed Catholic priests as enemies of the people and agents of foreign intelligence. At the same time, the closure of churches and the physical liquidation of the clergy contributed to the destruction of religious communities and their cultural heritage.

This policy had catastrophic consequences for the religious and cultural heritage of Western Ukrainian lands. The destruction of the Catholic Church was not only part of an anti-religious campaign, but also an element of the fight against Polish national identity, which was perceived by the Soviet authorities as a threat. Repressions against Poles and Catholics became one of the most striking examples of the cruelty of a totalitarian regime that sought to destroy any opposition.

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Primary Paper Section: A

Secondary Paper Section: AB

POSSIBILITIES OF INCLUSIVE ASSESSMENT AND STIMULATION OF PRESCHOOL-AGED CHILDREN IN THE SLOVAK REPUBLIC

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The research is published as part of VEGA project No. 1/0114/23 "Possibilities of inclusive education of students with special educational needs".

Abstract: The issue of inclusive education is one of the most current and discussed theoretical and empirical topics. The scientific study focuses on the process of diagnosis and stimulation of preschool children's development, which is a key component of inclusive education in kindergartens. The aim of the research was to verify the effectiveness of the Depistage-Stimulation Programme for three- and four-year-old kindergarten children by means of input and output diagnostics. The results of the input and output orientation assessment of 3–4-year-old children were analysed, and then the effectiveness of a stimulation programme designed to train areas of deficit in sub-functions and symptoms was tested. Finally, the authors of the research formulated recommendations for educational theory and practice in inclusive approaches at the pre-school level of the school system. The research showed: Children scored statistically significantly better on the Output Depistage than on the Input Depistage assessment.

Keywords: assessment, inclusion, partial cognitive functions and symptoms, pre-school age, stimulation.

1 Introduction

The issue of inclusive education is a hot topic today. The countries of the European Union, including Slovakia, have committed themselves to the implementation of inclusive education. Booth & Dyssegaard have designed the education system to respond to all differences, which will contribute to the improvement of the school environment (2008). Therefore, there is a need to address issues of inclusion in education, which should reflect not only the implementation of the work of school support/inclusion teams in the nursery setting, but more importantly, the development of the potential of all children and pupils. Inclusive education of children with special educational needs, with emphasis on children from socially disadvantaged backgrounds, becomes an integral part of the work of pedagogical and professional staff, which consists of close contact with the child and with other actors in the educational process. In a humanistic society, it is necessary to promote a new philosophy of education - education for all, without distinction, without exclusion, so that diversity becomes the norm.

The European Agency for the Development of Special and Inclusive Education (2014) identified five key conditions for the successful implementation of inclusive education:

1. *As early as possible:* the positive impact of early detection and intervention and proactive measures.
2. *Inclusive education benefits all:* the positive educational and social impact of inclusive education.
3. *High quality professionals:* the importance of high-quality professionals in general and teachers in particular.
4. *Support systems and funding mechanisms:* the need for effective support systems and related funding mechanisms.
5. *Reliable data:* the important role of data - benefits and limitations of its use.

These key requirements summarise much of the work of the European Agency over the past decade and address key issues related to inclusive education. We see inclusion as an evolving philosophy, a concept within which issues of diversity and democracy are increasingly important. Implementing a rights-based approach to education to achieve a higher quality of inclusion requires a comprehensive reform of the education system, including adjustments to constitutional guarantees and attitudes, curricula, teacher training systems, materials, learning environments, methodologies, resource allocation, etc. Above all, it will require a change in the attitudes of everyone in the system to embrace diversity and difference and see it as an opportunity rather than a problem.

1.1 Theoretical framework

The rate of segregated education of socially and medically disadvantaged children in the Slovak Republic is one of the highest in the world, while much research and practice has shown that ethnically and socially mixed schools are much more suitable spaces for the acquisition of human (social and cultural) capital than homogeneous environments. Human capital also depends on a variety of relationships with people from different backgrounds, cultures, and social statuses, among whom there is trust and rules. The greater the heterogeneity, the better a person is able to integrate into society. Children who are educated in a segregated way and who have contact only with people from socially excluded groups do not have the ability to adapt and identify themselves as belonging to the "second category". The essence of creating the conditions and prerequisites for building an inclusive society in Slovakia lies in the social inclusion of the most vulnerable groups. The key to the solution is the introduction of an inclusive way of education, especially in kindergartens. The main goal of education and training in kindergarten is to achieve an optimal cognitive, sensorimotor, and socio-emotional level as a basis for further education in primary school and for life in society.

We see inclusive assessment and developmental stimulation of pre-school children as part of inclusive education for these children. We start from the philosophy of humanistically oriented educational processes, which is based on the following premises:

- children have more in common, that which unites them, than they have in differences, whatever their abilities.
- children are part of families and communities which, in the pre-school years, have a significant impact on their development and learning.
- children learn best from each other in shared activities that support the experience of everyday life.
- children develop best in an environment where their specific individual abilities and needs are considered and met.

According to Šilonová & Klein (2023, p. 31), diagnostics and stimulation are important prerequisites for effective inclusive education and training in kindergartens in order to create an environment that respects differences. This includes not only the inclusion of children with disabilities, but also the inclusion of children growing up in different social and cultural environments, immigrant children, gifted children, and children from socially disadvantaged backgrounds.

The inclusive perception of special education diagnostics places demands on the diagnostic competence of the special educator as one of his/her professional competences. In this context, we encounter a new approach to diagnostics with the so-called dynamic diagnostics, which is perceived as both supportive and individualised diagnostics. It is an approach that combines elements of diagnosis and intervention. The aim is to find answers to questions such as what the child's cognitive and metacognitive skills are, how do affective and motivational factors influence the learning process, how does the child respond to interventions and how can we help the child to make the learning process more effective. We see assessment in an inclusive perspective as an important tool for children, pupils, parents, and teachers to discover the child's strengths, to provide possibilities for future directions in his/her education and consequently his/her application in the labour market. Diagnostics in an inclusive environment should primarily serve as a tool for the teacher to learn about the specific and individual learning processes and teaching conditions of the diagnosed child. Inclusive special education diagnostics is a long-term process, the results of which must be consulted with other actors involved in the child's education and diagnostics (teachers, parents, school counselling and prevention staff). At present,

inclusive diagnostics should be seen as a potential change in the education of socially and medically disadvantaged children of preschool and younger school age, which consists in the application of progressive, innovative methods. One of them is the ambition of the authors of the paper to create a tool of depistage orientation diagnostics and stimulation that can contribute to accelerating the development of intact, socially, and medically disadvantaged preschool and younger school-aged children.

We selectively present the results of publications that are relevant to the topic of the paper. Valachová (2009) is the author of a study that we consider to be a methodological material for teachers at the pre-school level of the school system. The scientific monograph focuses not only on the theoretical treatment of the issue, but also offers practical information on the possibilities of its use in the educational practice of kindergartens in the field of pedagogical diagnostics. Brťková & Bahurinská (2012) developed a stimulation programme for the prevention of specific developmental learning disorders in preschool children. The aim of the programme is to help children (and teachers working with them) to develop weakened or disrupted basic skills (subfunctions) of cognitive development, and thus to prevent possible problems that may occur in the acquisition of reading, writing and arithmetic due to underdeveloped functions in school activities. In 2014, the Human Development and Sustainable Development teams focused on diagnostics and advice to promote Roma inclusion in Romania. Within the results-oriented framework of preschool education, the authors cited a study by Kendall et al. (2008), which found that Roma children who benefited from preschool and parental stimulation had significantly better outcomes. Roma children aged 4 to 6 who attended preschool in Romania had more developed skills in identifying the ten letters of the alphabet, reading four simple common words, writing their name, distinguishing numbers 1-10 and recognising simple sentences in the local language. Comparisons were made between groups of Roma children who attended a local preschool and those who did not. Research has shown that preschool attendance by disadvantaged groups increases an individual's chances of socio-economic integration later in life. In Poland, the diagnosis and stimulation of pre-school children is primarily the domain of psychologists. Kwiatkowska, from the Institute of Psychology in Lublin, published a remarkable scientific study, *Spontaneous Drawing in the Diagnosis of Disorders in the Adaptation of 3–4-Year-Old Children to Kindergarten* (1996), in which she described the importance of spontaneous drawings made by preschool children in the diagnosis of their adaptation disorders and kindergarten conditions. She applied empirical research to 240 children (4- and 5-year-olds). The colour pyramid test and the spontaneous drawing activity were used in three time periods. The results showed that children's spontaneous drawings are effective in diagnosing adaptive disorders in 3–4-year-old children. In order to assess the vocabulary of preschool children, the authors (Haman, Fronczyk & Miękisz, 2010) developed a new diagnostic tool. The authors validated the tests - Picture Vocabulary and Mental Vocabulary as the basis of language and communication competence. Vocabulary significantly influences other aspects of language development. The tests are used to assess the level of understanding of words in preschool children. The study involved 351 children aged 2-6 years. The aim of the *Children's Task Persistence in Relation to Stimulation at Home* study was to examine the relationship between cognitive stimulation at home and children's task persistence. Using a sample of 60 children and parents, with an equal number of low- and high-income families selected, the researchers validated the researchers' findings on the level of cognitive stimulation in the home environment using parental control records. The results showed that children from low-income families who had less cognitive stimulation completed fewer tasks than their peers from high-income families (Orr, 2020). The impetus for our research in the field of diagnosis and stimulation of preschool children was the familiarity with the ideas of Brigitte Sindelar (2009a, 2009b) - the author of a methodology aimed at identifying deficits in sub-functions. Sindelar (2009a, 2009b,

2014) identified not only the child's weaknesses but also the child's strengths. This means that her methodology focuses on what the child knows, not just what he or she does not know. According to B. Sindelar (2009a), sub-performances can be viewed as "*sub-functions of a holistic information processing network, representing specific modal and intermodal processes of attention, perception and memory, as well as their serial integration. Information processing, in turn, is a prerequisite for complex cognitive performance as well as for executive functions such as mentalisation*". These basic functions underpin the proper development of speech, writing, reading and arithmetic. The effectiveness of the Sindelar Method has been confirmed by the results of research carried out as part of its standardisation in Austria, Switzerland, and Germany. Pre-school children were diagnosed and then trained according to the Sindelar Method for the whole school year. At the end of the research, a rediagnostics was carried out which showed that the deficits in the sub-functions had been eliminated in these children (2009b).

David Pérez-Castejón (2023) published a scientific study analysing the level of teacher education and training, with an emphasis on the direction of inclusive education based on social justice. The author states that in the pre-service phase of the study, teachers can look at inclusive education and the diagnosis of students with special educational needs through the lens of special education. The paper presents a contextualised ethnographic study that focuses on the production of data from the author's own institution and educational space, working with students at a university in northern Spain. The aim of this reflective article is to identify the practices and intellectual demands that contribute to early childhood teacher education acting in the interests of social justice and inclusive education. Data is gathered through participant observation, text analysis and interviews. The analysis highlights three conditions to consider: destabilising common sense, creating space for theoretical reflection and learning experiences, and research scenarios for rethinking the possibilities of inclusive education. These findings are supported by a review studies by Kožárová (2022a, 2022b), who, when analysing the curricula of individual countries, emphasises the need for early diagnosis and stimulation for children with special educational needs.

The authors Šilonová, Klein, & Rochovská (2021) conducted research in the area of diagnosis and stimulation of preschool children, which is a crucial component of inclusive education. The aim of the research was to experimentally verify the effectiveness of a stimulation programme for 5–6-year-old kindergarten children by means of input and output orientation diagnostics. The results of the input and output orientation diagnostics of 5–6-year-old children from the experimental and control groups were analysed. The authors tested the effectiveness of a stimulation programme designed to train areas of sub-functional deficit and symptoms in the experimental group and formulated conclusions and recommendations for educational theory and practice in the field of inclusive approaches at the pre-school level of the school system. The research showed that the experimental group of children performed statistically significantly better than the control group in the post-test on the symptom areas measured by the t-test. It was also confirmed that both groups of children (control and experimental) performed statistically significantly better on the post-test targeting the area of sub-functional deficits than on the pre-test.

2 Methodology

Research Issue

The main topic of research is orientation diagnosis and stimulation of preschool children. Current perceptions of diagnosis reflect changes in perceptions and attitudes towards children in relation to inclusive trends. Emphasis is placed on the area in which the individual excels, which can be built upon in the context of further intervention. He or she is seen as a personality with potential for further development. Based on the theoretical background, the research question became whether the use of a depistage-stimulation instrument with 3–4-year-old

children would contribute to their better results in the output depistage.

The Aim and Hypotheses of the Research

The aim of the research was to test the effectiveness of the stimulation programme for 3–4-year-old kindergarten children using input and output orientation diagnostics.

In this context, the following objectives have been formulated:

1. To analyse the results of the initial and final orientation test of 3–4-year-old children.
2. To verify the effectiveness of the stimulation programme designed to train the areas of sub-functional deficits and symptoms in the experimental group.
3. To formulate conclusions and recommendations for educational theory and practice in the field of inclusive approaches at the pre-school level of the school system.

Based on the theoretical background, the field experience, the research problem and the research objectives, a hypothesis (H) was formulated.

H: We predict that the results of the output orientation diagnostics of 3- and 4-year-old children will be statistically significantly better than the results of the input orientation diagnostics of 3- and 4-year-old children.

General Background

The Depistage-Stimulation Programme for Three- and Four-Year-Old Kindergarten Children (Šilonová, Klein & Šinková, 2019) is a concrete guide for educational and professional staff in kindergartens on how to successfully conduct orientation diagnostics and stimulation for the readiness of preschool children. After identifying individual areas and mapping possible partial impairments, a well-conducted input depistage thus directs the further care of the child by applying a specific stimulation programme, so that by the time the children start school they are adequately prepared to cope with the demands placed on them in the primary school environment. The essence of the Depistage Stimulation Programme is to achieve the most accurate identification and subsequent stimulation of the child's basic functions, in line with the Early Childhood Education and Care (ECEC) programme offered by the OECD in identifying key elements and approaches to early childhood education and care. The authors emphasise the prevention of the causes of learning and attention disorders in line with current trends in inclusive pedagogy and inclusive educational (special) and psychological diagnosis. They present concrete procedures - how to put into practice a stimulation programme for a child in a kindergarten environment. The stimulation programme serves as a concrete guide for pedagogical and professional staff in kindergartens to successfully stimulate and accelerate the development of preschool children, directly based on and building upon the results of the input orientation diagnosis.

Instruments and Procedures

The authors selected the test method. In the depistage area, 67 kindergartens participated in the research. 425 children took part in the input orientation diagnosis and 390 children were diagnosed in the output orientation diagnosis. The selection of the kindergartens from which the participants (3–4-year-old children) were deliberately recruited for the research was based on the following criteria:

- Kindergartens where both input and output depistage of 3–4-year-olds was carried out by educational and professional staff,
- Kindergartens where a stimulation programme was implemented for diagnosed 3–4-year-olds.

Depistage (orientation diagnostics of 3–4-year-old children) was carried out in kindergarten premises on two dates according to the following schedule: in September/October 2022 - input orientation examination and in May/June 2023 - output orientation diagnostics. The *Depistage-Stimulation Diagnostic*

Instrument for three- and four-year-olds in kindergarten was used (Šilonová, Klein & Šinková, 2020). The research population consisted of all diagnosed 3–4-year-olds (390 kindergarten children) who underwent an input and an output orientation diagnosis. We had a sample with n-pair measurements, with $n = 390$.

In Tables 1, 2 we present the domains and items of the assessment instrument that are identical to the domains of the *Kindergarten Depistage-Stimulation Programme for 3–4-year-olds*. Depistage 1 focuses on the domain of sub-functions and Depistage 2 on the domain of symptoms.

Data Analysis

A paired t-test was used to test hypothesis H for items with more than one binary score. A Pearson chi-squared test (for a four-way table) was used for binary scored items for the hypothesis and its sub-hypotheses.

3 Results and Discussion

Verification of the hypothesis

We hypothesised that the results of the output screening of 3- and 4-year-olds would be statistically significantly better than the results of the entry screening of 3- and 4-year-olds. Descriptive statistics of the distributed data from the baseline and output orientations are reported in Tables 3 and 4. The data recorded on the depistage sheets in the baseline and output kindergarten measurements were distributed across classes according to the domains being developed.

Results were processed for significance within each domain using a paired t-test. We formulated null hypotheses of equality of means, which were tested against the two-tailed alternative hypothesis at the 0.05 significance level. An overview of the means and standard deviations measured in each domain is presented in Table 3, which shows the statistically significant results from the input and output orientation diagnostics, focusing on the sub-functional domain (Depistage 1) and the symptom domain (Depistage 2).

In the areas of Depistage 1, which focuses on the area of sub-functions, *all 8 areas of interest are statistically significant*. In the *Tactile-Kinesthetic Perception* item we calculated a t-statistic ($t = -7.293$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input measure ($\bar{x} = 3.82$) and the output measure ($\bar{x} = 4.72$) in favour of the output measure. In the item *Auditory Memory*, we calculated the t-statistic ($t = -8.031$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input ($\bar{x} = 2.84$) and output measure ($\bar{x} = 3.86$) in favour of the output measure. Statistical significance was also confirmed for the *visual discrimination* item. By calculating the t-statistic ($t = -6.351$) at the significance level ($p = 0$), we found a statistically significant difference between the results of the input measurement ($\bar{x} = 3.86$) and the output measurement ($\bar{x} = 4.76$) in favour of the output measurement. We also confirmed statistical significance in the *Visual Seriality* item. By calculating the t-statistic ($t = -6.906$) at the significance level ($p = 0$), we found a statistically significant difference between the results of the input measurement ($\bar{x} = 3.12$) and the output measurement ($\bar{x} = 4.24$) in favour of the output measurement. In the item *Auditory Differentiation*, we calculated the t-statistic ($t = -7.116$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input measurement ($\bar{x} = 2.66$) and the output measurement ($\bar{x} = 3.69$) in favour of the output measurement. Statistical significance was also confirmed for *visual-auditory and auditory-visual intermodality*. By calculating the t-statistic ($t = -7.268$) at the significance level ($p = 0$), we found a statistically significant difference between the results of the input measurement ($\bar{x} = 1.18$) and the output measurement ($\bar{x} = 1.88$) in favour of the output measurement. In the *Auditory Figure-Background Differentiation* domain, we calculated a t-statistic ($t = -7.969$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input measurement ($\bar{x} = 2.09$) and the output measurement ($\bar{x} = 3.31$) in favour of the

output measurement. In the area of *auditory and background seriality*, we calculated the t-statistic ($t = -8.040$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input ($\bar{x} = 3.35$) and output ($\bar{x} = 4.54$) measurements in favour of the output measurement. Statistical significance was also confirmed for the item *Visual discrimination of figure and background*. By calculating the t-statistic ($t = -4.507$) at the significance level ($p = 0.001$), we found a statistically significant difference between the results of the input ($\bar{x} = 4.96$) and output ($\bar{x} = 5.40$) measures in favour of the output measure. In the *Visual Memory* item, we calculated the t-statistic ($t = -6.669$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input ($\bar{x} = 1.84$) and output ($\bar{x} = 2.32$) measures in favour of the output measure.

In the symptom-focused domains of Depistage 2, *all 8 domains of interest are statistically significant*. In the item *Graphomotor: figure drawing*, we calculated a t-statistic ($t = -7.007$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input measure ($\bar{x} = 2.59$) and the output measure ($\bar{x} = 3.62$) in favour of the output measure. Statistical significance was also confirmed for the *Speech, Language, Communication: Articulation* item. By calculating the t-statistic ($t = -4.727$) at the significance level ($p = 0$), we found a statistically significant difference between the results of the input measure ($\bar{x} = 2.41$) and the output measure ($\bar{x} = 2.95$) in favour of the output measure. In the *Vocabulary* domain, we calculated a t-statistic ($t = -6.568$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input measure ($\bar{x} = 4.31$) and the output measure ($\bar{x} = 5.04$) in favour of the output measure. In the *Categorisation* domain, we calculated a t-statistic ($t = -6.646$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input ($\bar{x} = 0.67$) and output measure ($\bar{x} = 1.10$) in favour of the output measure. In the domain of *Mathematical Skills: ascending number series up to 5*, we calculated a t-statistic ($t = -9.207$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input measurement ($\bar{x} = 1.16$) and the output measurement ($\bar{x} = 1.66$) in favour of the output measurement. Statistical significance was also confirmed in the domain of *mathematical ability: descending number series up to 5*. By calculating the t-statistic ($t = -6.429$) at the significance level ($p = 0$), we found a statistically significant difference between the results of the input measure ($\bar{x} = 0.16$) and the output measure ($\bar{x} = 0.46$) in favour of the output measure. In the domain *Mathematical ability: determining the number up to 5*, we calculated a t-statistic ($t = -7.669$) at the significance level ($p = 0$) and found a statistically significant difference between the results of the input measure ($\bar{x} = 0.65$) and the output measure ($\bar{x} = 1.15$) in favour of the output measure. In the item *Dimension, quantity, order*, we found a statistically significant difference between the results of the input ($\bar{x} = 2.81$) and output measurement ($\bar{x} = 3.42$) in favour of the output measurement by calculating the t-statistic ($t = -6.861$) at the significance level ($p = 0$).

A total of 18 items were measured by T-test, all of which were statistically significant. In the results of the output measurement, we register higher average scores achieved in all 18 areas studied, which shows that the level of knowledge, skills, and abilities of the 3–4-year-old kindergarten children has increased, thus confirming the effectiveness of the depistage-stimulation programme for three- and four-year-old children in kindergarten.

Further processing of the results of the input and output orientation diagnostics was carried out using the Pearson chi-square test. This test was used to detect relationships between two nominal variables. This includes a group of non-parametric tests based on the contingency table. The test was used to test the null hypothesis that the variables are independent. Comparing the calculated scores across all 14 items, we observed statistically significantly better scores in 7 of the items achieved by the children in the Output Orientation Diagnostic than those

achieved by the children in the Symptom Domain Focused Entry Orientation Diagnostic - Depistage 2 (Table 4).

In the area of *self-knowledge*, we found statistically significant improvements in scores for all four items:

- *First Name and Last Name* ($\chi^2 = 11.62$; $p = 0.001$). These results indicate that more children scored yes on the output assessment (from 71% of children at baseline to 90% of children at follow-up),
- *age* ($\chi^2 = 13.56$; $p = 0.001$). The results above show that more children scored yes on the output depistage assessment (from 62% of children at entry to 85% of children at the input),
- *Name of town/city* ($\chi^2 = 90.00$; $p = 0.002$). The above results show that more children scored 'yes' on the output depistage assessment (from 40% of children at input to 62% of children at output),
- *parents' names* ($\chi^2 = 14.72$; $p = 0.001$). These results show that more children scored yes in the output depistage assessment (from 48% of children at input to 74% of children at output).

There was only one statistically significant improvement in *Speech, language, and communication*:

Speech Intensity ($\chi^2 = 4.49$; $p = 0.034$). More children scored 'yes' on the output assessment (from 45% of children at baseline to 60% of children at baseline). In the other two monitored points: 1. *Difficulty understanding written instructions* and 2. *Pronunciation*, the scores did not improve statistically. There was a statistically significant improvement in *Colour* ($\chi^2 = 17.60$; $p = 0$). These results show that more children scored 'yes' on the output assessment (from 45% of children at baseline to 74% of children at baseline). Using a Pearson chi-squared test, we measured one area of *Mathematical ability*, basic geometric shapes, in which there was a statistically significant improvement ($\chi^2 = 16.08$; $p = 0.0001$).

The t-test was used to measure 18 items, *all of which were statistically significant*.

In the Depistage 1 domains, which aim to identify deficits in sub-functions, there are statistically more items at the output than at the input, and in all 10 domains. In the Depistage 2 domain, which focuses on identifying symptoms, all the 8 domains measured were statistically significantly better. Using the Pearson chi-square test, we measured 14 domains (stage 2 symptoms), 7 of which were statistically significantly better.

Of the 32 areas surveyed, 26 were statistically significant. Based on the results, it can be concluded that the application of the incentive programme was justified.

In this sense, our hypothesis H was accepted. It was hypothesised that the results of the output orientation diagnostics of 3- and 4-year-old children would be statistically significantly better than the results of the input orientation diagnostics of 3- and 4-year-old children (Tables 3 and 4).

4 Conclusions

The objectives of the integrative diagnosis and stimulation of 3–4-year-old children were to raise the educational level of children from marginalised communities, with a focus on pre-school education. The aim of the research was to obtain information on the results of the initial and final orientation diagnostics of preschool children and how the application of the stimulation programme manifested itself in kindergarten children. The research problem was formulated as follows *"Does the use of a depistage-stimulation tool with 3–4-year-old children contribute to their better performance in the output depistage?"*

The design of the diagnostic-stimulatory instrument allowed us to identify several categories, according to which we conducted the analysis of the data obtained from the input and output orientation diagnostics of socially disadvantaged kindergarten children. We evaluated 32 criteria obtained from the results of the input and output orientation diagnostics, taking into account the possibility of qualitative data processing. The presented research results are part of a longitudinal study conducted in the period 2019-2023 (we conducted 4 stages of diagnostics and stimulation of kindergarten children). For the sake of clarity, we present a summary of the results for the period 2019-2023 in Table 5 below.

Based on the above data, we can formulate the following conclusion:

The results of the input and output diagnostics and subsequent stimulation of kindergarten children in the period 2019-2023 clearly demonstrated the high effectiveness of the diagnostic-stimulation programme applied to 3–4-year-old kindergarten children. Overall, the selected kindergarten children scored statistically significantly better in the output orientation diagnostics than in the input orientation diagnostics. The partial evaluation according to stimulation areas also showed that the children from the kindergartens involved in the research *scored statistically significantly better on the output measure than on the input measure*.

In order to improve the efficiency of inclusive education of children at the preschool level of the school system, which results from the long-term experience of the authors of the paper during the solution of scientific projects, and also from the implementation of activities of national inclusive projects, we propose:

1. Implement effective mechanisms for early diagnosis and stimulation of 3–6-year-olds in the nursery environment.
2. To experimentally validate the effectiveness of diagnostic and stimulation programmes.
3. Establish inclusive/supportive teams in nursery schools, including support teams of both educational and professional staff.
4. Strengthen family-school collaboration through diagnostic-stimulation programmes.
5. Make pre-school education compulsory from the age of 3.
6. Carry out a self-evaluation of kindergartens regarding their readiness for inclusive education.
7. The need to change the approach to the diagnosis of children and pupils: a child (pupil) will be recommended for education as a child (pupil) with mental disability only after confirmation of this diagnosis by a child psychiatrist or child neurologist.

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Primary Paper Section: A

Secondary Paper Section: AM, AN

TABLES

Table 1: Areas and Items of the Diagnostic and Stimulation Instrument 3-4 - Depistage 1 Partial functions

Areas and items	Score
Tactile-kinaesthetic perception	Max. 6 points
Auditory memory	Max. 6 points
Visual differentiation	Max. 6 points
Seriality: visual	Max. 6 points
Auditory differentiation	Max. 6 points
Intermodality: visual-auditory and auditory-visual	Max. 4 points
Auditory differentiation of figure and background	Max. 6 points
Seriality: auditory	Max. 6 points
Visual differentiation of figure and background	Max. 6 points
Visual memory	Max. 3 points

Table 2: Areas and Items of the Diagnostic and Stimulation Instrument 3-4 – Depistage 2 Symptoms

Areas and items	Score	Criteria
Knowledge about yourself	Max. 4 points	Name and surname of the child Age of the child Exact address Parents' names Graphomotrics
Graphomotrics	Max. 6 points	Pronunciation Articulation Intensity of speech Difficulty understanding instructions in written language
Speech, language and communication	Max. 4 points	
Vocabulary range	Max. 6 points	Vocabulary range
Categorisation	Max. 2 points	Categorisation
Mathematical abilities	Max. 7 points	Ascending numeric series up to 5 Descending number series up to 5 Determination of the number up to 5 Basic geometric formations Size, quantity Colours
Size, quantity	Max. 4 points	
Colours	Max. 1 point	Unable to separate from loved ones/acquaintances Unfocused/inattentive Independent/uncertain Emotionally out of tune Negativist
Behaviour during screening	Max. 5 points	

Table 3: Comparison of results of input and output orientation diagnostics of 3-4-years-old children by area (t-test)

Area	Access	Output	\bar{x}	t	p	Access	Output
Tactile-kinaesthetic perception		3,823	4,720	-7,293	0	1,874	1,452
Auditory memory		2,838	3,864	-8,031	0	1,924	1,616
Visual differentiation		3,859	4,758	-6,351	0	2,117	1,715
Seriality: visual		3,121	4,242	-6,906	0	2,387	2,064
Auditory differentiation		2,663	3,689	-7,116	0	2,070	1,971
Intermodality: visual-auditory and auditory-visual*	1,183		1,877	-7,268	0	1,246	1,387
Auditory differentiation of figure and background		2,098	3,314	-7,969	0	2,174	2,107
Seriality: auditory		3,350	4,540	-8,040	0	2,291	1,733
Visual differentiation of figure and background		4,961	5,401	-4,507	0	1,655	1,243
Visual memory		1,835	2,321	-6,669	0	1,095	0,895
Graphomotrics		2,589	3,617	-7,007	0	2,102	1,916

Speech, language and communication: Articulation	2,406	2,946	-4,727	0	1,718	1,659
Vocabulary range	4,314	5,044	-6,568	0	1,732	1,275
Categorisation*	0,668	1,100	-6,646	0	0,841	0,887
Mathematical abilities: Ascending numeric series up to 5	1,165	1,656	-9,207	0	0,846	0,634
Mathematical abilities: Descending number series up to 5*	0,165	0,455	-6,429	0	0,506	0,750
Mathematical abilities: Determination of the number up to 5*	0,653	1,147	-7,669	0	0,856	0,886
Size, quantity	2,810	3,422	-6,861	0	1,464	1,014

* We observed a reduction in the standard deviation scores on the output measure. That is, the children's recorded responses to each item were similar and the variance of the scores was smaller on the output, except for the labelled data.

Table 4: Comparison of the results of input and output orientation diagnostics of 3–4-year-old children by areas (Pearson chi-square test, df - number of degrees of freedom = 1/ t crit. 3,841)

Area	χ^2	p
Knowledge about yourself : Name and surname of the child*	11,62	0,0007
Knowledge about yourself : Age of the child *	13,56	0,0002
Knowledge about yourself : Exact address *	9,00	0,002
Knowledge about yourself : Parents' names*	14,72	0,0002
Speech, language, and communication: Pronunciation	2,08	0,15
Speech, language and communication: Intensity of speech *	4,49	0,034
Speech, language and communication: Difficulty understanding instructions in written language	2,81	0,09
Mathematical abilities: Basic geometric formations*	16,08	0,0001
Colors *	17,60	0
Behaviour during screening : Unable to separate from loved Ones/acquaintances	1,56	0,22
Behaviour during screening : Unfocused/inattentive	2,75	0,1
Behaviour during screening : Independent/uncertain	0,60	0,53
Behaviour during screening : Emotionally out of tune	1,70	0,27
Behaviour during screening : Negativist	1,07	0,29

* Statistically significant differences

Table 5: Diagnostic and stimulation results for 3–4-year-old kindergarten children (2019-2023)

National project	School year	Number of kindergartens	Number of kindergartens	Overall success rate (%)
Project of inclusion in kindergartens (PRIM I)	2019/2020	25	397	100
Project of inclusion in kindergartens (PRIM II)	2020/2021	54	414	81,25
	2021/2022	68	421	78,13
	2022/2023	67	390	77,94
Total			1 622	84,33

THE SOURCE FACTORS IDENTIFICATION OF HEALTH PERSONNEL MIGRATION IN TERMS OF EDUCATION - ISSUES AND FALLOUTS

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This paper was written within the project funded by the Scientific Agency of the Ministry of Education of the Slovak Republic VEGA "Economic Aspects of Emigration of University Graduates in Health Professions in the Context of Sustainability of Staffing of Health Care Institutions in the Slovak Republic" [reg. no. 1/0691/22]

Abstract: the paper deals with the comparison of the attitudes of doctors and nurses towards education, professional development, and career advancement during and after the Coronavirus Disease 2019 (Covid-19) pandemic in hospitals in Slovakia, and to identify sentiments related to emigration. In the study, we employed fundamental statistical techniques, including the calculation of sums and the determination of proportions. It is notable that the perception of education, professional, and career growth among healthcare personnel declined during the pandemic, with a notable 0.8-point difference between the pre- and post-pandemic periods. The primary factors motivating medical professionals to leave the Slovak Republic for another country are typically related to their working conditions and work organization.

Keywords: emigration sentiment, doctors, professional and career development, education and training, nurses.

1 Introduction

The conditions necessary for the proper functioning of a health system can be broadly classified into two categories: those pertaining to the system itself and those pertaining to the personnel who operate within it. The former category includes such factors as financial, material, technical and technological security, access to innovation, and many others. The significance of personnel management in the healthcare sector hinges on the delivery of quality and efficient healthcare services. This is contingent upon the effective and optimal utilization of human resources. Human resources management (HRM) constitutes an essential aspect of organizational governance. Personnel processes are subdivided into two categories: management processes and support processes. The function of management processes is to guarantee that the organization and its employees conduct themselves in an effective and productive manner, thereby ensuring that the established objectives are met. Training is included among the management processes (Grasse, 2008). In 2022, the Ministry of Health introduced three new measures with the objective of enhancing the quality of education provided to health professionals. The measures pertain to alterations in the domains of education and recognition of education. For instance, practical training has commenced in universities and teaching hospitals for undergraduate courses, specialization fields, and certified work activities across all health professions. The mandatory six-month training period for prospective professionals such as psychologists, speech therapists, therapeutic educators, physicists, and laboratory diagnosticians has been eliminated. Non-nationals will be permitted to pursue temporary vocational training in all health professions, provided that their educational qualifications have been duly recognized. A further measure pertains to the recognition of educational qualifications obtained outside the country in question. The third measure pertains to specialization studies and certification training (MoH SR, 2022).

2 Literature Review

In terms of the global shortage of health professionals and the concomitant rise in healthcare demand, it is anticipated that migration trends will intensify (Stokes et al., 2021). The extant literature demonstrates that the decision of physicians and other healthcare professionals to migrate is a complex phenomenon, influenced by a multitude of factors (Milner, Nielsen, Norris, 2021). Migration is influenced by a multitude of macro-level (environmental, social, economic, political) and micro-level (personal characteristics) factors that give rise to cross-border movements (Pinto da Costa, Moreira, Castro-de-Araújo, da

Silva, dos Santos, 2021). The decision to migrate is made by the particular person at a personal level; however, the specific circumstances of migration, including the choice of destination and the timing of the move, appear to be determined by a complex interplay of professional, local, national, and international factors (Davda, Gallagher, Radford, 2018). However, there is a lack of knowledge regarding the factors that influence new graduates' entry into employment at the hospitals where they were trained, as well as their intentions to migrate (Deasy et al., 2021). The primary factors influencing nursing students' decisions to migrate are socio-political factors and working conditions, particularly with regard to salaries at entry, career development, and subsequent salary increases (Öncü et al., 2021). Either way, migration represents a significant aspect of human resource mobility within the health sector, as evidenced by predictions from the World Health Organization (WHO) (Ferreira et al., 2020).

The human resources manager in healthcare institutions is responsible for all activities and tasks related to recruitment, training, motivation, remuneration, and so forth. The regulation of personnel management in the healthcare sector is defined by the provisions set forth in Act No. 576/2004 Coll. on Healthcare, Services Related to the Provision of Healthcare and on Amendments and Additions to Certain Acts, as well as Act No. 578/2004 Coll. on Healthcare Providers, Healthcare Workers, Professional Organizations in Healthcare and on Amendments and Additions to Certain Acts.

With regard to this legislation, its primary focus is on the conditions that employees must meet in order to practice the healthcare profession. Additionally, it regulates aspects such as the training of healthcare staff, which is provided by the human resources department and, therefore, constitutes one of the key responsibilities of the human resources manager. It is incumbent upon HR managers to prioritize training and development. Furthermore, it is evident that HR activities can exert a considerable influence on the phenomenon of labor migration of health workers abroad. Training and development impact a number of key areas, including the incidence of medical errors and the technical proficiency of health workers. The Kirkpatrick scale, which measures investment in training in terms of attitude, knowledge, behavior, and outcomes, is a useful tool for this purpose. In the Industry 4.0 era, digital forms of learning, including online lectures and training, videos and short videos, and digital forms of learning management through online applications (such as Totara) and PM ERP systems (such as Success Factors from SAP), have become a common part of education (Stachová, Blšáková, Stacho, 2021)üthy (2018) proposes measures to enhance the HRM landscape within the healthcare sector, including a commitment to ongoing education and career development, as well as a work-life balance. A study from Germany concludes that a hospital is not an attractive workplace; however, it can become one if the opportunity for personal development is improved (Udák, Šušňáková, 2018).

Thompson and Kapila (2018) highlight the detrimental impact of inadequate human resources in healthcare on the long-term sustainability of healthcare systems, as evidenced by the findings of Yakubu et al. (2022a). Yakubu et al. (2022b) propose that countries could adopt a unified public value proposition for source and destination countries. This indicates that the migration crisis resulting from the pandemic has not significantly impacted the migration patterns to Slovakia (Prívar, Rievajová, 2021). It is crucial to ascertain the most pivotal and less significant factors influencing the migration intentions of medical personnel.

3 Research Objective and Methodology

The principal objective of this paper is to compare the attitudes of doctors and nurses towards education, professional

development, and career advancement during and after the Coronavirus Disease 2019 (Covid-19) pandemic in hospitals in Slovakia, and to identify sentiments related to emigration. In the study, we employed fundamental statistical techniques, including the calculation of sums and the determination of proportions. Additionally, a Student's t-test was employed in the study. The conditions of education, professional development, and career growth were rated as the least favorable. It is notable that the perception of education, professional, and career growth among healthcare personnel declined during the pandemic, with a notable 0.8-point difference between the pre- and post-pandemic periods. The mean scores for education, professional development, and career growth were higher for the group of health personnel with less than five years of experience. The Student's t-test yielded statistically significant results, indicating a notable discrepancy in the evaluation of educational, professional, and career development conditions as motivating factors for pursuing international opportunities.

4 Findings

Education and training represent one of the key personnel activities with the potential to influence the migration of health personnel. The research employs a quantitative methodology and aims to compare the attitudes of doctors and nurses towards education, professional development, and career advancement during and after the pandemic in Slovak hospitals. Additionally, it seeks to identify sentiments related to emigration. In order to achieve the research objective, a research question was formulated. What personnel activities influence the propensity of doctors and nurses to emigrate abroad for work? In formulating the research question, we drew on the findings of the Slovak Medical Chamber (2020), which indicated that the propensity of doctors and nurses to migrate abroad for work is mainly influenced by remuneration and working conditions. Additionally, Jankelová (2021) asserts that medical personnel are motivated to migrate for more favorable remuneration and working conditions.

In accordance with the methodology proposed by Jaskova (2021), the empirical data is collected from the respondents at the stage of obtaining empirical material. The questionnaire was distributed online via Google Forms. The research population consisted of 119 healthcare workers, including 88 nurses and brothers and 31 doctors. In items pertaining to working conditions, respondents provided their responses using a Likert scale, with the following options: 1 = very satisfied, 2 = rather satisfied, 3 = neither satisfied nor dissatisfied, 4 = rather dissatisfied, and 5 = very dissatisfied. The point method was employed, whereby one point was assigned to the response "very satisfied," two points to the response "rather satisfied," three points to the response "neither satisfied nor dissatisfied," four points to the response "rather dissatisfied," and five points to the response "very dissatisfied." In the study, the fundamental statistical techniques were employed, including the calculation of sums and the determination of proportions. Additionally, the Student's t-test was utilized. The arithmetic mean was employed, with scores ranging from 1 to 5 assigned to each response. A higher average score indicates a higher level of dissatisfaction, while a lower average score indicates a higher level of satisfaction.

Table 1. Satisfaction of healthcare workers with working conditions in the hospital

Working conditions after Covid-19	Average score	Working conditions during Covid-19	Average score	The Difference	Student's t-test
Training, Professional and Career Development	4,1	Training, Professional and Career Development	4,9	+0,8	0,001

Source: own elaboration by the questionnaire survey conducted from 11/2022 till 12/2023

As illustrated in Table 1, training, professional development, and career advancement were among the most poorly rated conditions. In addition to education, professional and career development, the research also focused on remuneration for work, work organization, workload, and other working conditions. In formulating the items, we drew on the findings of Beutner et al. (2022). According to these researchers, the working conditions of doctors and nurses have deteriorated significantly as a result of the pandemic. It is noteworthy that the perception of training, professional, and career development among health professionals declined significantly during the pandemic, with a notable 0.8-point difference between the pre- and post-pandemic periods. The t-test yielded no statistically significant evidence of a difference in satisfaction ratings for the items "education," "professional and career growth" during and after the pandemic.

Table 2. Working conditions as a reason for going abroad (contingency table - length of experience)

Working conditions during Covid-19/Practice	Average score up to 5 years	Average score 6 - 15 years	Average score 16 years and more	Total
Training, professional and career development	4,5	4,2	3,9	4,2

Source: own elaboration by the questionnaire survey conducted from 11/2022 till 12/2023

Table 2 illustrates that the assessment of education, training, and career development exhibits elevated mean scores among the cohort of health professionals with less than five years of experience. The results suggest that opportunities for education, professional development, and career growth abroad are a significant motivating factor for individuals, particularly young doctors and nurses, to pursue international opportunities. This may have a detrimental impact on the population for whom healthcare will be inaccessible due to a lack of personnel supply.

Table 3. Working conditions as a reason for going abroad

Working conditions during Covid-19 with up to 5 years' experience and more than 5 years	Student's t-test
Training, professional and career development	0,001

Source: own elaboration by the questionnaire survey conducted from 11/2022 till 12/2023

Table 3 shows that the Student's t-test yielded statistically significant findings regarding the ratings of conditions as reasons for pursuing international opportunities. Education and professional development with the prospect of career advancement are the primary motivations for pursuing international opportunities, particularly among younger medical professionals with up to five years of experience, such as doctors and nurses.

In order to address the research objective, a research question was formulated. What factors influence the likelihood of doctors and nurses emigrating abroad for work? Our findings indicate that among the working conditions, education and professional development with career advancement are the most influential factors in shaping the emigration sentiment of health professionals (mean score 4.2). The issue of education and professional development with career growth was also identified by respondents as a potential means of addressing emigration propensity. Our findings are consistent with those of Jankelová (2021).

5 Discussion

Generally speaking, a survey was conducted on 80 junior doctors and nurses with the objective of comparing the methods of teaching medical and nursing students in eight common practical procedures. A greater proportion of nurses reported having received formal instruction and being supervised when initially performing a procedure. A total of 42% of doctors surveyed reported feeling inadequately trained to perform a practical procedure safely when doing so for the first time without supervision, compared to only 7% of nurses. The findings of this study corroborate the observation that a significant proportion of medical practitioners receive training in practical procedures through informal channels, in contrast to the approach employed for nursing professionals. Furthermore, the study indicates that a considerable proportion of doctors perceive the training they receive in practical procedures to be inadequate (Mason, Strike, 2003). It is our contention that the training of young doctors and nurses should be conducted on a formal basis. The health sector is characterized by a high level of human resource intensity, which is intrinsic to the nature of the work it performs. The working conditions, remuneration, and other factors that contribute to a lower interest in studying and training for the health professions may also result in a significant number of health professionals departing to work abroad. The lack of opportunities for further training also compels health professionals to seek employment in neighboring countries. To prevent the skilled workforce from emigrating for work abroad, it is necessary to address the underlying issues. Medium-term solutions (up to four years) include a comprehensive revision of specialized training for doctors and a comprehensive revision of nurses' training.

A total of 55 on-the-job training seminars, each comprising three hours of instruction, were conducted. The seminars encompassed a range of activities, including brief lectures, experiential exchanges, group discussions, role-playing exercises, work-related self-experience, and communication training. An effort was made to form interdisciplinary groups, with each group consisting of eight to 14 participants, primarily comprising nurses, doctors, and physiotherapists. The seminars primarily addressed the following topics: "demanding/aggressive patients" (18 seminars), "coping with illness" and "depression" (8 seminars each), "communication" and "compliance/patient motivation" (6 each), and "anxiety" (4). A total of 529 professionals participated in the seminars, with 30% identifying as nurses, 18% as physiotherapists, and 15% as medical doctors. A one-page evaluation questionnaire was completed by each participant. The results indicate that 80% of each professional group expressed satisfaction with the organization and conduct of the seminars. The highest satisfaction rates were found for the following aspects: "interdisciplinarity" and "comprehensiveness" (86% each), "mutual exchange of personal experiences" and "feedback by the group leader." Ninety percent of respondents indicated that they found the program useful for clinical work. Other benefits included improved competence in dealing with patients, greater knowledge about cooperation within the team, improved relations with patients, and improved cooperation within the professional team. There was considerable consensus among the groups with regard to the perceived effectiveness of the program. Nurses, however, found the seminars to be more effective with regard to improved ability to establish contact with patients as well as increased stress tolerance (Muthny, Mariolakou, 2003). It may be reasonably concluded that a well-executed training workshop is beneficial for health personnel, and that well-trained health personnel demonstrate a reduced propensity to migrate.

The migration of nurses has been a global phenomenon, and the integration of overseas-qualified nurses within host countries has given rise to a great deal of debate worldwide. The evidence indicates that the support provided by organizations can vary considerably, and that there is a paucity of information regarding the nature and extent of the organizational support required to facilitate a seamless transition of overseas-qualified nurses into the nursing profession. This exploratory study tour examined the

organizational support provided to facilitate the transition of overseas-qualified nurses into the nursing workforce in two countries. The various support mechanisms provided to overseas-qualified nurses in different organizations include transition assistance, acculturation support, mentoring programs, and initial settlement assistance. The successful integration of overseas-qualified nurses into a host country is a complex issue. A comprehensive support system for these nurses should be founded upon ethical principles and a collaborative approach, with a clear leadership structure in place. Furthermore, it is imperative that existing staff receive adequate education and support to ensure a smooth transition of overseas-qualified nurses into practice. The insights gained from this study tour may also be pertinent to the transition of other overseas-qualified health professionals, such as doctors and allied health professionals, in host countries (Ohr, Jeong, Parker, McMillan, 2014). It is our contention that, once health professionals migrate, there must be a range of support mechanisms in place for numerous professions that encompass transition, acculturation, mentoring programs, and initial assistance with settling in.

6 Conclusion

To put it in a nutshell, the findings of the quantitative research indicate that, from the perspective of health personnel, training, professional development, and career advancement have declined during and in the wake of the pandemic. Those with up to five years of experience in the field of health are more likely to consider pursuing opportunities abroad. The area of training, professional, and career development is the focus of this study, and it is this factor that influences the emigration sentiment of doctors and nurses to work abroad. It can be concluded that the Slovak healthcare sector requires measures to enhance the appeal of healthcare professions, establish favorable and motivating working conditions, or implement stabilization instruments to ensure the sustainability of healthcare personnel in Slovakia. The primary objective of personnel management in healthcare is to guarantee an adequate supply of qualified personnel, with the secondary objective being to provide healthcare personnel with suitable working conditions. In conclusion, it can be stated that any changes to the system of training, professional and career development will be futile unless accompanied by modernization of hospitals, improvement of instrumentation and material provision. This issue requires a systematic investigation with a view to identifying systemic solutions at the state level. The objective is to stabilize human resources in the health sector and ensure the long-term sustainability of staffing health facilities in the country, with a view to replicating examples of good practice.

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Primary Paper Section: A

Secondary Paper Section: AH, AE

PREDICTING ACCIDENT RATE IN CR AND EU

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Abstract: Predicting accident rates is vital for preventing road accidents and effectively planning safety measures. Our study focuses on forecasting the movement of the accident rates in the Czech Republic and EU countries. Using ETS statistical models for data analysis, our goal is to indicate underlying trends in the volume and gravity of road accidents. Our research tackles the main issues that could affect future accident rates. Although our results show a likely downward trend in road crashes in the Czech Republic and the EU in the following years, the rate of road accident decline may vary throughout the countries. The research findings help impose practical safety measures and strategies adapted to local conditions.

Keywords: Road accident rates, Prediction, The Czech Republic, The European Union, ETS, Safety measures

1 Introduction

Road accidents happen because of heavy traffic, taking their toll on human lives, social sentiments and economic stability [1]. Countries and global organizations pursue strategies for diminishing the volume of road accidents and their negative impacts, as preventing road deaths is the primary goal when implementing safety measures. Strategies like using modern technologies, providing decent education and assuming ultimate responsibility in the transport area led to a decline in fatalities [2].

Accident rates depend on many factors, including human failure, technical condition of the vehicle and roadway [3]. State organizations may profoundly affect these areas; state technical inspections and legislation govern the vehicle technical condition, and infrastructure investments supervise roadway conditions. Human error is proportional to the drivers' education, knowledge and toughening of the rules for driving offences [4]. Interventions like regulations on the technical conditions of the vehicle may immediately decrease accident rates, while drivers' education requires a long time to be effective. For example, motorcyclists' risky behavior, one of the critical factors, can be controlled by long-term educational campaigns [5].

Although many countries have seen a decrease in road accident rates [6], we cannot predict if the European Union will achieve its ambitious goal within its 'Vision Zero' strategy, aiming to halve the number of fatalities through 2030 and zero the death toll out through 2050 [7]. This decade has focused on educating drivers about road safety, monitoring vehicle construction safety and healthcare development [8].

Traffic density, a significant contributor to road accidents, increases with better economic conditions, allowing low-income classes to buy their own vehicles. The COVID-19 pandemic saw a sharp decline in road accidents throughout the countries [9], caused by the restriction of movement and decreased traffic density. This phenomenon shows that reducing road traffic, e.g. by using public transport or car sharing, would effectively cut long-term road accident rates.

The findings suggest that the factors influencing accident rates are interwoven, requiring unorthodox methods in terms of technologies, education and infrastructure [10]. Effective prevention involves taking precautionary steps on the national and global scale.

The study aims to predict accident rates in the Czech Republic and the EU, exploring their frequency within the following years. We formulated the following research questions:

RQ1 involves forecasting the accident rates in the Czech Republic based on the historical data from 2011 to 2024. It aims

to predict and analyze underlying trends and seasonal fluctuations in the accident rates influencing the development of transport policies and preventative measures.

RQ1: What will the accident rates be in the Czech Republic within the following 18 months?

RQ2 involves forecasting the accident rates in the EU within the following two years (2024 - 2026), using historical data from 1999 to 2023.

RQ2: What will the accident rates be in the EU within the following five years?

2 Literary research

[11] analyzed road casualties in time using year-over-year variance, revealing a slightly decreasing trend in road deaths. [12] explored 11-year trends in accident rates using descriptive statistics, disclosing a continuous, yet too slow to meet the goals, decline in road casualties. [13] examined road accidents outside rush-hour traffic, where road collisions indicated a growing tendency, contrasted to a downward trend in the rates during rush hour. [14] supports the claim of lowering road death rates by an ETS road accident overview, revealing a falling number of road accidents and casualties over the monitored period.

Reliable prediction requires an effective method of data processing. [15] used an LSTM-GBRT model implemented into road accident rate data, finding higher fit accuracy than regression models using neural networks. The model requires normality, structure and more data to be reliable. [16] analyzed the data fit of road accident rates on an ETS model. The authors found that the model is ideal for predicting from historical data, revealing a slight increase in road casualties in India. Not requiring linearity or normal distribution, the model can handle less data. [17] conducted similar research using an ARIMA model fitted to handle extensive historical data. The predicted values mimicked the increasing road accident rates in India. [8] applied seasonality to the ARIMA, achieving a good data fit only during seasonal fluctuations. [18] explored an RF model implemented into historical data to predict the future gravity of road accidents. The authors revealed a very accurate model fit, successfully identifying the driver's experience, lighting conditions, the driver's age, the day of the accident, and vehicle age as distinguishing factors between slight, critical and fatal injuries.

[19] explored factors, prediction algorithms and explanatory methods of predicting the risks of road accidents based on driver behavior using a systematic literature overview. The authors revealed that speed and acceleration are the most frequent determinants. A different factor influencing the results of prediction methods may be the COVID-19 pandemic, cutting road accident rates because of tight movement restrictions [20]. [21] used regression models, neural networks and ARIMA for modelling road accidents, injuries and deaths, revealing a dramatic decline in road accident rates by 35%, injuries by 50% and deaths by 37% during the pandemic. [22] applied an ARIMA model, Holt-Winters, Bayesian structural time series and generalized additive models, finding that the COVID-19 pandemic had decreased road injury tolls that prevailed until post-pandemic periods. The severity of traffic accidents also affects the wearing of protective equipment when riding two-track vehicles, which was addressed by [23] who investigated the safety habits of users of shared e-scooters, where the results found zero protection for users of this mode of transport.

[24] used machine learning and field research to identify hot spots (places with high accident rates), unveiling that street furniture and geometric elements significantly contribute to road safety. [25] applied Regression Analysis, Correlation Analysis, and the Ramsey RESET test to data about dangerous situations,

revealing that the data helps identify the hotspots. [26] evaluated motorway traffic using a time series-based ARIMA model, disclosing an unsteady increase in safety. Although low accident rates substantially contribute to fulfilling ‘Vision ZERO,’ they are not enough to achieve a zero death rate, which largely depends on motor vehicle safety. [27] tackled the issue using content analysis and neural networks, uncovering a steady increase in motor vehicle safety. Neural networks, such as LSTM (Long Short-Term Memory), play a crucial role in prediction approach [28].

[29] explored speed as another threat to passenger safety using a SARIMAX model. Although the authors found an inverse relationship between speed and accident rates, speeding and fatalities are positively correlated. On the other hand, some factors do not give us an obvious clue whether they contribute to accident rates and road safety. [30] analyzed how weather influences road accident rates using a two-dimensional model of a discreet time series BINAR (1), revealing ambiguous results. What significantly increases road accident rates is alcohol consumption. [31] explored the impacts of intoxicated driving on health during road crashes. Using the Shapiro-Wilk test and descriptive analysis, the authors found that drunk-driving accidents extend the hospital stay and increase the risk of disability.

Understanding the factors influencing accident rates and exploring the accuracy of previous predictions may be imperative for conducting research and imposing measures for reducing road crashes.

Based on previous data analyses, we use the Shapiro-Wilk test and Ramsey RESET test to understand the data structures, including ERROR, Trend and Seasonality model (ETS model) for making analysis and predictions.

3 Data and methods

In this section, the results of the analysis of this research will be published and discussed.

3.1 Data

The first research question involves the data from the Czech public database containing information about accidents [32], filtering the data on monthly accident rates from January 2011 to September 2024. The data from March 2020 through December 2021, distorted by the COVID-19 pandemic, are ruled out of the calculation using a dummy variable to avoid misrepresentation.

The second research question draws on the Eurostat database [33] using a data pack (Road accidents by NUTS 3 region) containing total road accidents in the EU states from 1999 through 2023. As in the previous case, a dummy variable rules out the variables from 2020 and 2021 to avoid information bias caused by COVID-19.

3.2 Methods

An accurate prediction within the first research question (RQ1) depends on taking reasonable steps and statistical tests that help understand the data structure. When this is fulfilled, we can choose an effective method for predicting future road accident rates in the Czech Republic.

The first step involves normality tests for the data, which is imperative for selecting the convenient method. When normality is proven, we choose ARIMA to forecast road accident rates when the data is linear. Ramsey The RESET test confirms or rejects data linearity, assessing whether the model specifications are correct and detecting non-linearity. Its results can be interpreted by the resulting p-value. A p-value higher than 0.05 confirms, whereas the opposite rejects it.

Formula according to [34]:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \gamma_1 \hat{Y}^2 + \gamma_2 \hat{Y}^3 + \epsilon$$

Where:

- Y is dependent variable.
- X_1, X_2, \dots, X_k are independent variables
- \hat{Y} are the predicted values of the original model.
- \hat{Y}^2 a \hat{Y}^3 are quadratic and cubic values added into the model.
- ϵ is error

The Shapiro-Wilk test involves the second control examination, confirming or rejecting normal distribution. Symmetric (normal) distribution of the data is imperative for choosing the correct prediction model. When interpreting the results, a p-value higher than 0.05 confirms normality.

Formula according to [35]:

$$W = \frac{(\sum_{i=1}^n a_i x_{(i)})^2}{\sum_{i=1}^n (x_i - \bar{x})^2}$$

Where:

- W is the Shapiro-Wilk test value
- $x_{(i)}$ are values in the ascending order
- \bar{x} is the mean of the data values
- $a_{(i)}$ are pre-calculated weight coefficients dependent on the size of the sample
- n is the size of the sample

In the event of non-linear data distribution, we use ETS (Error-Trend-Seasonality) to smooth previous time series values, assuming future values based on exponentially decreasing weights of the prior values. The model is perfect for the time series based on trendiness and seasonality, where previous values are of less weight when estimating future trends.

Formula according to [36]:

$$Y_t = (l_{t-1} + b_{t-1}) \cdot s_{t-m} + \epsilon_t$$

Where:

- Y_t is a time series value in time t
- l_t is an estimate of the level in time t
- b_t is an estimate of the trend in time t
- s_t is seasonality in time t
- m is the number of seasons in the year
- ϵ_t are residues in time t

4 Results

According to the research questions, we made visualized predictions in RStudio program.

4.2 RQ1 results

We use structured data analysis as a base for selecting comprehensive analysis of the prediction.

Figure No.1: Basic data structures for RQ1

Date		Accidents	
Min.	: 2011-02-01	Min.	: 4800
1st Qu.	: 2014-06-16	1st Qu.	: 7045
Median	: 2017-11-01	Median	: 7974
Mean	: 2017-10-31	Mean	: 7833
3rd Qu.	: 2021-03-16	3rd Qu.	: 8646
Max.	: 2024-08-01	Max.	: 10066

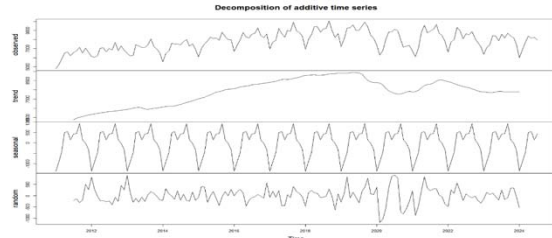
Source: author

The data spans the period from February 2011 through August 2024, reaching a median in November 2017. The accident rates

range from 4800 to 10066, marking the average at 7833 and the median at 7974. The highest values appear in the last quartile, indicating a growing trend. The time series shows a steady accident rate development with a seasonality for potential analysis and prediction.

To better understand the data structure, we visualize the decomposition of additive time series, which is an effective method for decomposing time series into different components.

Figure No.2: Decomposition of additive time series



Source: author

The decomposition of the additive series suggests the trend, seasonality and random components. The trend grows until 2019, followed by a decline. Seasonality reveals regular annual fluctuations, indicating cyclical changes in yearlong accident rates, with lower numbers in winter months. Random components reflect unusual deviations beyond the explanations of the trend or seasonality.

The Shapiro-Wilk test will confirm or reject normal distribution of data.

Figure No.3: Results of the Shapiro-Wilk testu for RQ1
shapiro-wilk normality test

```
data: data$Accidents
W = 0.98814, p-value = 0.1853
```

Source: author

The Shapiro-Wilk test with a p-value higher than 0.05 and W close to 1 suggests no deviations from normal distribution, indicating normal distribution of data.

The final step involves the Ramsey RESET test applied to the basic linear model to check the residues.

Figure No.4: Results of the RESET test for VO1

```
RESET test

data: model
RESET = 41.943, df1 = 2, df2 = 158, p-value = 2.447e-15
```

Source: author

The results of the Ramsey RESET test show a low p-value (lower than 0.05), indicating data non-linearity, which makes the ARIMA model inefficient. We chose a non-linear ETS model.

As the non-linear ETS model effectively handles trendiness and seasonality, it makes accurate predictions despite non-linear relationships.

Table No.1: Results of ETS model for RQ1

Parameter	Value
Alpha	0.4968
Beta	1.00E-04
Gamma	1.00E-04
Phi	0.9799
Level (l)	6007.5675
Slope (b)	51.5918
Seasonality (s)	0.9612, 1.0012, 1.0161, 1.1183, 1.0549, 1.0489, 1.0216, 1.0642, 1.0601, 0.9406, 0.8873, 0.8256
Sigma (Error)	0.0508
AIC	2797.466
AICc	2802.216

BIC	2853.153
ME	-8.51241
RMSE	376.9489
MAE	269.2139
MPE	-0.2799843
MAPE	3.51011
MASE	0.5438518
ACF1	0.1412163

Source: author

Table 1 illustrates the results of the ETS model used to predict road accident rates. The key values involve the following smoothing parameters: Alpha (0.4968), Beta (1e-04), and Gamma (1e-04). The model reaches AIC values (2797.466), RMSE (376.9489) and MAPE (3.51011). seasonality changes between 0.9612 and 1.1183, indicating a very accurate data prediction.

Table No.2: Prediction of ETS model for RQ1

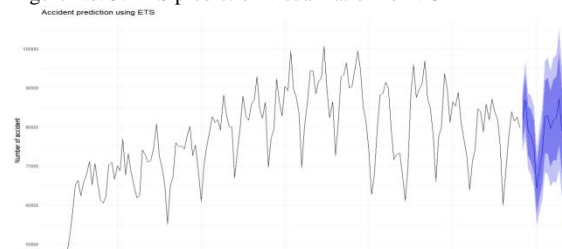
Month-Year	Point Forecast	Lo 80	Hi 80	Lo 95	Hi 95
Aug 2024	8198.182	7664.142	8732.222	7381.439	9014.925
Sep 2024	8692.992	8060.519	9325.464	7725.709	9660.275
Oct 2024	7900.448	7271.166	8529.730	6938.045	8862.851
Nov 2024	7786.350	7116.731	8455.970	6762.255	8810.445
Dec 2024	7476.168	6789.007	8163.328	6425.247	8527.088
Jan 2025	6423.211	5797.121	7049.301	5465.689	7380.733
Feb 2025	6904.140	6194.837	7613.442	5819.355	7988.924
Mar 2025	7320.622	6531.860	8109.383	6114.315	8526.928
Apr 2025	8252.482	7323.790	9181.175	6832.169	9672.795
May 2025	8285.804	7315.269	9256.339	6801.499	9770.109
Jun 2025	7955.379	6988.332	8922.425	6476.408	9434.349
Jul 2025	8169.682	7141.668	9197.697	6597.470	9741.894
Aug 2025	8217.768	7149.696	9285.840	6584.292	9851.243
Sep 2025	8713.338	7545.901	9880.774	6927.898	10498.778
Oct 2025	7918.563	6826.748	9010.379	6248.776	9588.351
Nov 2025	7803.841	6698.242	8909.441	6112.973	9494.710
Dec 2025	7492.621	6403.412	8581.829	5826.820	9158.422
Jan 2026	6437.060	5478.074	7396.045	4970.418	7903.702

Source: author

Table 2 depicts the prediction of road accident rates from August 2024 to January 2026, suggesting that road accident rates could oscillate between 8,000 and 8,700 cases, except for January, when they should move around 6,400 crashes. The Lo 80/95 and Hi 80/95 ranges provide confidence intervals, estimating the lowest number around 5,500 and the highest around 10,000 cases.

Figure 5 illustrates historical data on accident rates, highlighting the prediction in blue; light blue represents high confidence intervals (95%), and dark shade depicts low confidence intervals (80%).

Figure No. 5: ETS prediction visualization for VO1



Source: author

The prediction shows a slight decrease in road accident rates in the following months compared to the previous period, ranging from 6,400 to 8,700 accidents. The most accurate forecast oscillates between 7,500 and 8,000 collisions. Wider confidence intervals for lengthy periods reflect the reduced reliability of the prediction, namely for 2026.

4.2 RQ2 results

The procedure for obtaining the results of RQ2 is the same as for RQ1, starting with data analysis.

Figure No.6: Basic data structure for RQ2

Year	Accidents
Min. :2000	Min. : 749227
1st Qu.:2006	1st Qu.: 936844
Median :2011	Median : 973055
Mean :2011	Mean :1017395
3rd Qu.:2016	3rd Qu.:1125738
Max. :2022	Max. :1258878

Source: author

The database illustrates annual road accident rates from 2000 to 2022, with an average of 1,017,395 and a median of 973,055. The accident rates peaked at 1,258,878 in 2000 and hit a trough of 749,227 in 2020. The data are identically distributed, with the mean close to the median.

A lack of empirical observations prevents us from visualizing decomposed additive time series. Therefore, we use the Shapiro-Wilk test to select an efficient method and better understand the data structure.

Figure No.7: Results of Shapiro-Wilk test for VRQ2

Shapiro-wilk normality test

```
data: data$Accidents
W = 0.95104, p-value = 0.3075
```

Source: author

The Shapiro-Wilk test confirmed the normal distribution of databased on a p-value higher than 0.05 and W close to 1. Following the same procedure, the Ramsey RESET test will confirm or reject the linear relationships between the data.

Figure No.8: Results of the RESET test for RQ 2

RESET test

```
data: model
RESET = 2.4176, df1 = 2, df2 = 19, p-value = 0.116
```

Source: author

The RESET test showed a value of 2.4176 with a p-value 0.116. The p-value is higher than 0.05, indicating a correctly specified model with no significant non-linearity. Although the ARIMA model would be ideal for the used methods, not enough empirical observations made us choose the same model as for RQ1 (ETS), which is better for processing less data.

Table No.4 Result of ETS model for RQ2

Parameter	Value
Alpha	0.4791
Beta	1.00E-04
L	1279069.9585
B	-21087.7702
Sigma	50343.94
AIC	575.7472
AICc	579.2766
BIC	581.4247
ME	3071.436
RMSE	45757.26
MAE	31853.51
MPE	0.2122024
MAPE	3.477423
MASE	0.9509206
ACF1	0.163085

Source: author

The ETS model achieved an Alpha of 0.4791 and Beta of 1.00E-04, indicating stability with few changes in the trend. Values of AIC (575.7472), AICc (579.2766) and BIC (581.4247) suggest a

decent model fit. The errors (RMSE 45757.26 and MAE 31853.51) are within the expected range, indicating high model stability. The MAPE of 3.48% implies a slight standard error, confirming high model accuracy for the prediction.

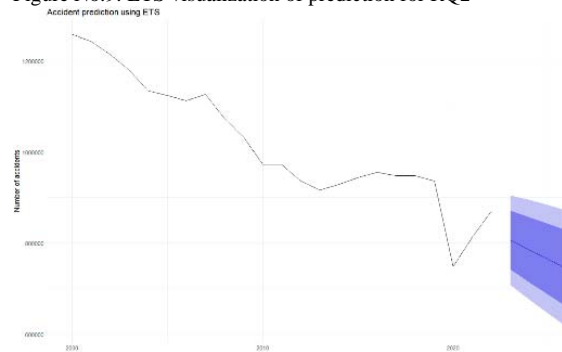
Table 4: ETS model prediction for RQ2

Year	Point Forecast	Lo 80	Hi 80	Lo 95	Hi 95
2023	806757.6	742239.3	871276.0	708085.3	905429.9
2024	785676.9	714134.1	857219.8	676261.6	895092.3
2025	764596.2	686656.9	842535.5	645398.3	883794.1
2026	743515.5	659663.9	827367.2	615275.5	871755.5

Source: author

The prediction of the accident rates for 2023-2026 shows a declining trend, with a point forecast of 806,757.5 accidents per 2023 falling to 743,515.5 in 2026. The confidence intervals suggest expected accident rates ranging between 659,663.9 and 827,367.2 in 2026, with a higher likelihood.

Figure No.9: ETS visualization of prediction for RQ2



Source: author

Our visualization illustrates a long-term decline in road accident rates from 2000 until now, marking the sharpest decrease in 2020, caused by severe movement restrictions during the COVID-19 pandemic. The following predictions for 2023-2026 indicate a slight drop in accident rates over a lengthy period. Blue confidence intervals suggest a possible distribution of predicted values, indicating the most unreliable predictions for more distant years. The annual nature of the data ignores seasonality, predicting only potential road accident rates without seasonal fluctuations.

5 Discussion

RQ1: What will the accident rates be in the Czech Republic within the following 18 months?

The results of the first research question suggest remarkable trends in the accident rates in the Czech Republic, indicating upward and downward tendencies in road accident rates from 2000 when 2020 marked the sharpest decline. [14] arrived at the same results in her study, attributing the decrease in road accidents and deaths to reduced traffic volumes and severe movement restrictions during the COVID-19 pandemic, influencing long and short-term trends. The accident rates from 2000 to 2018 significantly increased due to higher traffic density and insufficient preventative measures. As of 2019, we have witnessed a downward trend in road accident rates cut by effective defensive measures. Although results show an overall decrease in accident rates, the trend is not strong enough for the Czech Republic to fulfil 'Vision ZERO'. [11] and [12] reached the same conclusion, pointing to the insufficient strength of this welcome tendency. Opposite results were found by [37], who predicted a steady slight increase in the accident rate in the Czech Republic using neural networks. This increase is attributed to the increasing number of vehicles and the impact of pandemic.

Given the significant non-linearity of the data, we used an ETS model, which was more effective for this type of data [16]. Our results predicted road accident rates for the consecutive 18 months, indicating a slight decrease compared to previous months. The prediction between August 2024 and January 2026 shows average accident rates of about 8,000 per month. The model forecasts a seasonal drop in winter months, mimicking historical data. This seasonal divergence may reflect adverse weather conditions in winter when worsening road conditions make drivers more cautious and traffic less dense.

The model indicates a steady or slightly downward trend in road accident rates in the following months. The estimated accident rates range between 7,000 and 9,000 collisions per month, reflecting the long-term efficiency of preventative measures. The model accuracy may be questioned when an emergency or changes in traffic conditions occur, e.g. the COVID-19 pandemic. Our results are therefore suitable for monitoring trends and potential planning of new measures for increasing road safety.

RQ2: What will the accident rates be in the EU within the following five years?

Our results show that road accident rates in the EU have been declining for a long time, as confirmed by [14]. On the other hand, [17] and [16] arrived at a contrary conclusion by doing similar research in India, suggesting that the measures for reducing road accident rates had been insufficient. Like in the Czech Republic, the COVID-19 pandemic significantly cut the accident rates in the EU, imposing severe movement restrictions and limiting mobility, as confirmed by [21]. The post-pandemic period still keeps road accident rates below the limit of previous years, indicating a continuous improvement of preventative measures on European roads.

Not enough empirical observations made the ARIMA model inapplicable. We chose an ETS model, highly suitable for this type of data fitting [16]. Useful for the data with fewer observations, the model has outstanding parameters for making robust predictions. The resulting AIC, RMSE and MAPE values confirm high model accuracy, proving it suitable for determining long-term goals in the EU road safety sector.

Like in the previous case, the predictions for 2023 – 2026 show a continuous yet slight decline in road accident rates, minimizing the likelihood of fulfilling 'Vision ZERO', as confirmed by [11] and [12]. The EU and its member states' initiatives focused on road safety, like innovating the automotive industry, improving the infrastructure and adopting new legislation, may hugely contribute to the trend. Although the ETS model tries to estimate future tendencies, widening prediction intervals over lengthy periods indicate increased uncertainty in the more distant future.

6 Conclusion

The study focused on predicting road accident rates in the Czech Republic and the EU countries in the following years. We formulated two research questions, answered by an in-depth analysis, fulfilling our research aim.

To answer the first research question, we used an ETS model to deal with non-linear regression of the historical data in the Czech Republic. The model predicted a slightly decreasing trend in the following months, indicating a favorable effect of the measures on reducing accident rates. The prediction showed steadiness and consistent seasonal fluctuations, all considered within the model. Our findings reflect the expectations and public demand for road safety and fulfilling Vision ZERO, a European strategy for regulating accident rates. However, the deadline for meeting the requirements for Vision ZERO is particularly tight, considering the pace at which the Czech Republic cuts its road accident rates.

The second research question explored road accident rates in the EU, revealing a declining trend. We used an ETS model to deal with the lack of empirical observations. Although our results

indicate wide intervals over long periods, they provide fertile ground for strategic planning on the European level. Low accident rates significantly reduce negative sentiments road collisions echo in the economy and society. However, like in the previous case, the pace at which the rates decrease will probably be too slow to fulfil Vision ZERO.

Although our study reveals positive findings in the declining trend, zero death rates cannot happen without adopting relevant legislation and raising awareness.

We also had to overcome obstacles like a lack of detailed monthly data from the EU and the model's incapacity to consider emergencies like the COVID-19 pandemic. On the other hand, our analysis provides precious findings for imposing safety measures to reduce road accident rates in the Czech Republic and the EU. The study offers a theoretical and practical model to support effective transport policies meeting the requirements for reasonable road safety.

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Primary Paper Section: A

Secondary Paper Section: AQ

ACTIVATING SENIORS WITHIN THE ACTION ART SPACE

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This article is a partial output of the project KEGA 001KU-4/2023.

Abstract: The paper investigates the role of action art in promoting social participation and inclusion among seniors, particularly those with health disadvantages. Aligned with the National Programme for Active Ageing 2021-2030, the study emphasises action art's potential to enhance sociability, self-actualisation, and emotional well-being by empowering seniors to engage meaningfully with their environments. The findings underscore the multifaceted nature of creativity in older adults, shaped by individual traits, environmental contexts, and social influences, advocating for a holistic therapeutic approach that recognizes and affirms the dignity of older individuals in the face of challenges in action art space.

Keywords: Action art, inclusion, self-actualisation, emotional well-being, art therapy, therapeutic potential, social bonds, creativity, cognitive processes, life satisfaction.

1 Introduction

Throughout their lifetime, individuals encounter a myriad of life experiences that significantly influence their psychological, emotional, and social development. Their life can be compared to a trajectory in his socio-historical space and time. In the field of promoting social participation and inclusion of older people, a strategic objective is stated in a strategic document (National Programme for Active Ageing 2021-2030), which we consider to be also relevant to the intention of the present paper. Specifically, it is a strategic objective that declares that it is necessary to use the potential of older people to participate in various socially beneficial activities that contribute to their development and at the same time promote social cohesion and intergenerational exchange (p. 27-30). Action art is becoming one of the alternative ways to support seniors, which provides opportunities for eliminating negative feelings of seniors and at the same time increasing social contacts, i.e. strengthening the sociability of seniors/seniors.

In the process of action, changes take place in seniors with disabilities that affect social and individual life roles. In this space, the senior can overcome his/her limits, to transcend his/her own boundaries. He is aware of these realities because they are often emotionally pleasurable and socially enriching for him (Kováč, 2013). However, there are also situations that he cannot cope with, or that require some help and support to cope with. It can come precisely through active participation with the support of a special pedagogue who becomes a guide in dealing with such a situation, for example through action art. One of the possibilities for self-realisation of a senior citizen with a disability is to be (and remain) active (Balogová, 2008; Vavříková & Hudecová, 2018; Határ, 2021).

2 Activation of a senior citizen with disabilities in action art

The purpose of senior activation is to comprehensively support and empower seniors in their ability to take care of themselves and remain active despite their age. Kováčová (2015) argues that a person should be perceived as such in their uniqueness and uniqueness. Action art is meant for a person at every stage of their life. Its use tends to foster a sense of belonging for all participants involved, promote and develop social bonds and eliminate negative feelings (Kováčová, 2023). Thus, action art can be implemented in a variety of spaces, as outlined in the attached diagrammatic treatment.

In the realization of action art, the senior with a disability should have an open way to (re)saturate and affirm his/her needs regarding stimulation, orientation and learning, activity, emotional security and safety, self-actualisation and an open future. Creating opportunities for cooperation and verbal/non-verbal expression of experiences and feelings through a particular type of art is also important in overcoming difficulties and problems related to this developmental stage of life. Chmelárová et al. (2010) and Határ (2011) argue that a person in this period calmly and contentedly experience old age.

On the contrary, there is also a group of seniors who have failed in the previous stages of their life journey, who have failed to cope with challenges and crises, who cannot find meaning in their lives, who are unhappy and desperate, who feel the proximity of death, which they are afraid of. This group is at risk because in the event of a sudden life event, the elderly may be identified as having a health disadvantage in the sense of a threat to their psychological health. The inclusion and activation of the elderly in activities and activities concerning their limits and possibilities is a real help. In the case of inclusion of the elderly in outpatient or institutional care, it is essential to respect the principles that take into account the current state of health and at the same time (co-)work as much as possible with family members. When implementing action art as one of the possible development strategies, it is not required that the senior presents his/her artistic expression at the level of a professional artist. Rather, it is about the possibilities of using a combination of several types of art (not only visual art) within his/her abilities, either in an individual or group form. There are of course many activities that can be pursued by people of advanced age, especially if they wish to maintain not only good physical but also mental fitness. Sensory perception in action art is one of the initial ways to engage, motivate and activate seniors. At the same time, it is also about opening space for minimizing rigidity in behaviour with the possible pessimistic view of the events around. The activities or program itself are significant in that they are intended to be beneficial to their health, with an emphasis on promoting optimism as well as essential well-being. This article explores the role of action art as a therapeutic tool for seniors with health disadvantages. The authors highlight how engaging in artistic activities can evoke positive memories and facilitate self-expression, particularly in individuals facing cognitive decline, such as dementia. By integrating expressive therapies into the therapeutic-formative process, the potential for improved quality of life is significantly increased. Moreover, the article underscores that action art serves not only as a non-pharmacological intervention but also as a means of fostering communication and emotional release, ultimately contributing to the holistic development of seniors regardless of their physical or cognitive limitations.

3 Discovering creativity in the seniors

A person in the senior age has a significant potential, the fulfilment of which, however, is considerably differentiated by his/her possibilities and limits (depending on health, financial and other possibilities). It should also be noted that a person's creativity is influenced by a number of factors that underwrite the extent to which it is developed. The four factors described above are also involved in the development of creativity in a person in seniors.

Table 1: Factors of creativity in seniors

Factors of creativity in seniors	individual factors
	environmental factors
	social development factors
	other factors

Source: Hudecová, Kováčová (2021)

- The first group of factors are **individual factors**, which are varied in each senior. They can be said to be authentic and non-repeatable. They include genetic aptitude, giftedness,

imagination, current intellectual ability, memory, and general health. In many cases, the senior's own diligence and activity in the activities offered is also counted.

- The second group of factors are the **environmental factors** in which the senior exists and lives. These include living space, climate, housing, family, upbringing, education, status and current employment. The components of this group of factors themselves are also strongly influenced by the senior's current health and life situation. Specific changes in family, housing or the general climate of the environment also need to be taken into account here.
- The third group is made up of **social development factors**, which include social structure, historical development, level of technology, aesthetics, tradition, religion, etc.
- The last group is made up of a group of **other factors**, which are specific to each senior citizen based on the above factors. They are considered complementary but are often part of the saturation of the previous groups of factors (Hudecová, Kováčová (2021).

While many activities that are traditionally considered creative, such as painting, and embroidery are encouraged in a senior's activity, many useful interventions are not traditionally labelled creative, but are creative nonetheless. Cropley (1995) argues that creativity itself needs to be viewed quite differently when it comes to activities with older people. The author argues that creativity should not be viewed as the production of products that are labelled as creative (objects, artworks, ideas, techniques and methods) but rather as a psychological process involving cognition (thinking, reasoning, problem-solving), motivation (willingness to take risks, persistence, desire for novelty) and personality (resilience, self-confidence, flexibility). Lindauer (1992) and Valachová (2021) that there is a causal link between creativity and mental health precisely at the level of everyday creativity. Creative productivity in seniors is influenced by certain psychological characteristics that are necessary (or at least favourable) for creativity in later life. Preparing for aging in the context of self-care itself is becoming a common part of a process that Baltes (2009) has referred to as the **vitalization of aging**. This is the process of activation of old age as one of the cranks in the care of the elderly in the sense of activation in the process of action art (Juhász Muchová & Valachová, 2022).

4 Action art in the therapeutic-formative process with the participation of seniors with health disadvantages

Hátlová et al. (2013) emphasise the importance of an individual approach to a person in the elderly age group. Expressive therapies and therapeutic approaches should be an important part of quality care for the elderly. The mentioned authors proclaim that during the mentioned activities, the senior with a health disadvantage forgets about his/her worries and pains. Peruzza & Kinsella (2010) argue that the mere presence of artistic activities in therapy has several potentials (Table 2) that help seniors to increase their quality of life.

Table 2: Potential of art activities in therapy

Potential of art activities in therapy	improving perceptios of self-control
	building up a sense of own self
	self-expression
	illness experience transformation
	gaining a sense of a life's reason
	building up social support

Source: Peruzza, Kinsella (2010)

Expressive therapies and therapeutic methods carry the potential to integrate diverse treatment modalities with an emphasis on self-expression, self-reflective behaviour, relaxation, support and activation also through creative activities. *A ballerina (confirmed dementia) raises her arms gracefully and experiences the music through movement when hearing a familiar piece of music that she has been exposed to in her professional life. The music brought back memories from her days as a prima ballerina. The moment, the gracefulness of the movements and the experience is one in which the happiness displayed is indescribable in words.*

Expressive therapies and their integration into the therapeutic-formative (healing) process are considered an integral part of the client's development, regardless of their age and health difficulties (Fábry Lucká, 2018). They are those that have a significant position as non-pharmacological interventional means that are complemented (may or may not be) by alternative means. Müller (2005) argues that this is where the possibility of working with artistic expressivity arises. According to Liebmann (2005), it is appropriate to use art as a means of personal expression in individual, peer or group communication, which the senior with a disability will appreciate and capitalize on in the process of his or her recovery. The use of art and art making is suitable for people with dementia or other health complications, where they have the opportunity to express through action and colour their own inner experience. The period of old age also brings with it the emergence of serious neuro-cognitive disorders, which are characterised by a regression of psychological functions. Their manifestation is often problems with memory, behaviour or in the performance of everyday activities. There is an opportunity to integrate action art into the daily routine and to improve the quality of life and the quality of the senior's experience (Valachová, Repiská, Weisová, 2024).

4.1 Action art as part of lifelong learning for seniors with health disadvantages

Active arts engagement in seniors can improve health and experience well-being, but the scientific evidence is not well supported. It is for this reason that we consider this section of the publication to be both unique and primary in addressing the issue of action arts in the senile period (Kováčová, 2024). Almost anyone who cares for or is around a person in the elderly age group can empathize with their inner world. Together with him or her, they can create a space for creative work and consequently experience together the feelings of satisfaction and pride when action art is something special. Even though the action creation in question becomes part of leisure time, it does not have to be so commonplace. Cordell (2021) argues that creative expression itself improves overall physical and emotional well-being. Senior participation in creative arts programs can offer many physical, mental, and social benefits for the person in seniors.

According to Cordell (2021) and the Mayo Clinic study, these are specifically as follows and are included in the table below.

Table 3: Benefits of creative production in the senium period

Benefits of creative work in the senium period	Specification of the individual benefits
Improved mood	Creative activities and participation in art-action programmes can reduce feelings of anxiety, depression and loneliness. As a whole, seniors may feel more positive and display a more positive mood to those around them.
Improvements in thinking, memory and judgement	Creative activity provides the senior with stimulation of thinking, memory, decision-making, or judgment. A Mayo Clinic study confirms that active participation in art-action programs can also reduce the risk of developing dementia.
Improving overall mobility	Overall, the creative work requires various movement acts that ensure the stimulation of the senior's overall mobility.

Source: Cordell (2021)

Action art creates a space for everyone **to create, to experience, to rediscover or correct** a certain difficulty that one does not know or cannot sufficiently process in the senium period. Therefore, it can be said that every human being has the latent capacity to create.

In the beginnings of creating with the elderly, it is advisable to start with themes that are also suitable for a therapeutic activity with the elderly. In this regard, Campbell et al. (2000) lists specific themes suitable for making with older people:

- **Shared memories of the past:** Draw, paint or model a fruit that is typical of your country. It can also be your favourite fruit. Focus on its colour, surface and typical characteristics. Talk to the group about your memories you have of the fruit.
- **Reminiscing:** Everyone brings a photo from their childhood (young) years. Attach the photo to the paper you will be working on. Using your chosen colours, paint designs around the photo that reflect your memories of that time.
- **A celebration of life:** Artistically represent (by drawing, painting or modelling) the most important achievement of your life. Artistically represent your ideas about your future. Art can be attributed a kind of international communication status, which is a language of colours, lines, shapes and art. It can speak of the reality, experience, relationships, desires, feelings and attitudes that a person in the senium period expresses in his or her work. Through this communication, they get to know each other in different aspects of life (from this aspect one can speak of the communicative-cognitive function of art in a prophylactic or therapeutic context, note, Hudecová, Kováčová, 2021; Kováčová, 2024).

Mutual communication activates the emotional experience from the perception of the art-product, fills a person in the senium period with the feeling of joy of beauty and develops it. At the same time, it stimulates his psychological well-being and creates a space for positive experience (Dimová & Brendza, 2019). One section addresses the role of action art as a pivotal component of lifelong learning for seniors with health disadvantages, emphasizing its potential to enhance well-being and creative expression. While scientific evidence supporting these benefits remains limited, active engagement in the arts fosters physical, mental, and social improvements for the elderly. The publication Kováčová, Hudecová (2021) outlines therapeutic themes for artistic creation, such as reminiscing and celebrating life, which facilitate meaningful communication and emotional expression. By providing a platform for creativity, action art nurtures joy, beauty, and psychological well-being among seniors, helping them navigate their inner experiences and connect with their past (Kováčová, 2023; Kováčová, 2024).

4.2 A break in the senior age with reflection in action art

Overcoming a life situation that is identified as a turning point can also be helped by the use of action art. There are a number of ways that, using different media and context, are realistically applicable to working with seniors (Magová, Kováčová, 2023). Many seniors will tell their life story in which they describe their breaks, barriers, or changes, but there is a smaller group who will step up to the plate to take advantage of the opportunity for catharsis and express themselves through the medium (Valachová, 2020; Bergerová, 2020, Bergerová & Ševčívič, 2022).

Such actions may be planned in terms of the environment in which they exist, or they may be spontaneous, where a moment of supply is enough and an action takes place by which the senior displays the turning point in his or her life. If we use the selected aspects that we have used to characterize external and internal break, it is possible (and realistic) to outline the possibilities of depicting a break in action, in action art itself, with the outline of an illustrative break in action.

Table 4: Turning situations in old age

Expression of turning point in action art	social aspect-change of creation within sociability
	emotional aspect (change in the interpretation of depicted action)
	somatic aspect (change in body movement)
	technical aspect (change in continuity)
	visual aspect-change (in contract, in symbolism)

Source: own elaboration

Turning situations are described from several aspects and in the following we will give some characteristics (Kováčová, 2024).

- **The social aspect of a turning point (break)** allows the actor to step into action and present a perception of the turning point within their experience. This creates the possibility to portray the fracture from the perspective of two lives, from the perspective of two experiencing, from the perspective of creation in a couple.
- **The emotional aspect of the turning point** is characterized by the possibility of achieving a change in the expression of the action depicted. It is a transition from one emotional experience to another. Colours, symbols or a change in the dominance of the motif are helpful for this. It may be a change (a turning point) from joy to sadness; from anger to reconciliation; from depression to a manic state.
- **The social aspect of a turning point** is characterized by achieving a change, e.g. stopping in motion, as it were, by a stasis in movement of expression (in dance, in walking, in performance in general). By interrupting the expected fluidity of the action, a moment with a charge of drama is created. It may be a change (a break) from fast to slow movements, from a small space to a space that often overwhelms one.
- **The technical aspect of the break** is specific in that it is possible to achieve change using techniques and strategies in breaking continuity. It can be changed by using glitch effects or by abruptly interrupting animations. Although the aspect of visibility has not been defined in the characterisation of the break, it is worth defining because it is so obviously associated with action art.
- **The visual aspect of the turnign point** is made possible by the fact that changes are applied using strong contrasts, symbols, or changes in imagery. This can be a change in the representation of the fragment as a symbol of impermanence, in the representation of the contrast between the image of the artwork and the image that "follows" and is also a marked contrast to the original. An example may be a change in the appearance of a person who has undergone a turning point is possible and at the same time related to the somatic aspect (Kováčová, 2024).

When working with seniors, it is essential that professionals (special and therapeutic educators, therapists, and other helping professionals; Magová, 2022) implement this creative possibility of catharsis into holistic support for their quality of life. The senior at this time is already taking stock of the life he or she has lived and believes that he or she has gained perspective on it. The balance sheet itself opens a space for him/her, as it were, to find and come to terms with what life stories label as a turning point, a turning point event. And it is action art that has the space and the possibilities of expressing oneself in action and opens up the person in old age to coming to terms, to gaining homeostasis in experiencing (Hátár, Jedličková, 2020).

5 Life story in action art

The activation of a senior citizen with a disability into artistic activity is carried out in such a way that his needs are met and the problems or difficulties that may be related to feelings of non-acceptance, non-respect of his opinions are eliminated, which is associated with his feelings of uselessness, unnecessary, lowering his dignity and self-esteem (Špatenková, Směkalová, 2015; Hudecová, Kováčová, 2021).

One option is to work with mosaics. Mosaic can be imagined as an (old)new artistic medium that allows for employment with very concrete, tactile materials that present new opportunities and challenges for seniors as participants (Stoddart et al., 2013). Art **using mosaics** also has therapeutic potential for everyone involved. Bathje (2014) argues that in mosaic making, the first phase is considered the most creative. Mosaic is also a rewarding method in taking stock of a senior's life for the reason that the material offered is quite easy to grasp and also symbolizes many realities for the senior. It also provides stimulation of fine motor

skills such as lifting small objects with the thumb and index finger, manipulation of objects with concrete fingers, finger control and dexterity, coordinated use of both hands, etc. The pieces used as part of the mosaic (e.g., from clay or porcelain vessels) are materials that are already ready in their colour, shape, or material treatment to develop various themes with the senior.

From Research: With Mrs. Albina (66, diabetes mellitus) it was about “composing” life from real shapes. Each shape she chose represented a particular event, experience or period that she had lived through and recalled in different polarities of emotional experience. Each piece of the mosaic that Ms. Albina inserted had its own fixed position and was characterized as a piece of the mosaic of life. Due to the scope of the paper, we select only a few of them, as creating with the mosaic was the content of as many as six meetings with Mrs. Albina. Overall, the grouping of the selected shapes formed a thicker fairly straight line. This was commented on by Mrs. Albina after choosing the right piece.

Table 5: This is my life, the path I am following – part I.

My childhood		
Mrs. Albina 66 years old, (diabetes mellitus)	A handful of tiny pebbles forming the beginning of a path named my childhood .	<i>I still had to be the wiser one because I was older. I was always the one who had to go to work, even when I wasn't feeling medically well. My father told me I was older than my brother and I had to help them ... My brother was sickly from birth, my parents protected him and that protection remains to this day. Eventually, I understood that he was fine with it and didn't want to "get well". But I found this out much later. He was damaged by the disease; he became a bad and calculating person. In fact, those childhood memories still linger because those protective wings never disappeared.</i>

Source: own elaboration

A handful of tiny pebbles forming the beginning of a path named **my childhood**.

Table 6: This is my life, the path I am following – part II.

College life		
Mrs. Albina 66 years old, (diabetes mellitus)	A piece of sandstone depicting college life.	<i>Those were wonderful years, I like to remember the faculty, the dormitory, also of climbing mountains, skiing, or swimming with the leeches in the lake. We always had shoes full of sand and blisters, but they were good times in spite of everything. On one of those trips I met a man (who later became my husband) and then I met him two years later at a friend's wedding. And that meeting was fateful, for both of us. I graduated, I started as a pioneer leader, because I couldn't get a teaching position at that time (my father wasn't in the party, it was so, how shall I say, difficult then). After a year I got married and my father-in-law, after knowing me, got me a teaching position in the village. So that was the school of life (laughs). My class</i>

		<i>consisted of second graders, third graders and one fourth grader who always came for the second period, ...</i>
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Source: own elaboration

Table 7: This is my life, the path I am following – part III.

My marriage		
Mrs. Albina 66 years old, (diabetes mellitus)	An oval piece of clay shard represented marriage.	<i>Mrs. Albina characterized the marriage as fairly good without much turbulence. She and her husband had lived 35 years together and had two children who have given them joy to this day.</i>

Source: own elaboration

Table 8: This is my life, the path I am following – part IV.

Health problems		
Mrs. Albina 66 years old, (diabetes mellitus)	The five stones, different in shape and size, symbolized incipient health problems, stacked side by side.	<i>This was the toll of a lifetime of work. In my 50s I was confirmed to have high blood pressure, heart problems, diabetes with a diet that then forced me to inject myself with insulin.</i>

Source: own elaboration

Working with seniors with disabilities is about giving them the space to be heard while showing respect and understanding. A senior is not, despite possible cognitive difficulties, a small child. This fact needs to be considered and explicitly “handled” during special education support (Határ, 2008; Határ, 2020; Kováčová, 2023).

In life assessment of seniors through action art, the focus should be on creating a space for seniors to express their personal life experiences, emotions, and memories through creative activities that allow them to reflect on their lives and engage in the artistic process (Határ, 2013; Kováčová, 2020; Kováčová, 2023).

Table 9: Action of the senior as part of life assessment

Interactive performances	Interactive performances seniors become active participants who depict different phases of their lives, important moments or turning points through movement, gestures and simple actions. Symbolic movements can also be used to capture their life journeys.
Reminiscence sessions	Action art could be used to depict important memories. Choosing a specific event or emotion that is connected to the event, with a collective expression of a vivid image, or using another kind of performance.
Joint creative processes	Joint creative processes seniors could collaborate with younger participants, encouraging dialogue between generations. This approach would not only help to take stock of their lives, but also to connect their experiences with the perspectives of young people.
Symbolic visualisation	Symbolic visualisation through visual elements - colours, shapes or props - seniors are encouraged to create works that express their inner world, values or messages for future generations. This would be more of a quiet, introspective action art where physical activity is not a priority, but rather expressive symbolism.

Source: own elaboration

Action art can become a bridge to self-expression for seniors, giving them the opportunity to give meaning to their experiences while actively engaging in the creative process.

Many seniors are also interested in creating, but their health often does not allow them to go outdoors, or to stay in a particular position for a long time in one activity, or they are bound by fears that they will not be able to do it, or they do not know how to do it. In action art, the boundaries are blurred, only the person, his or her experience and creation remain. Nothing else is important to the creator. While working with one senior, we received feedback that was very thought-provoking and also confirmed the importance of action art even at a senior's age.

Table 10: This is my life, the path I am following – part V.

My action creation		
Mr. Teodor 68 years old (cardiac arrhythmia, diabetes mellitus, dementia)	My action creation.	<i>I am not, a painter, nor have I been an artist. But I was somebody in my profession, and believe me I have accomplished a lot, ... but that's in the past. We old ones are living out our lives, and that's the way it should be. The young are replacing the old. But I wanted to see what could be done with an old man like that. I laughed that I was so curious about it, because the young are now a bunch of bums. But you, you gave me so much in that time that I became a painter, even that artist. At least for a while. You gave me the opportunity to be free, to not be old, to see it differently, with your young eyes. I'm so glad I could be here and help a good cause. And to please myself.</i>

Source: own elaboration

6 Conclusion

The action art can also be part of satisfying the social needs of a person in senior age. Kasanová (2008) claims that social needs affect not only the possibility of belonging to a specific group, but also having the opportunity to conduct equal communication. We agree with Hangoni et al. (2014) that the social environment is a very strong determinant of mental health and mental health is a very strong determinant of physical health (ibidem, p. 109).

In relation to seniors, we can state that action art can help in adapting to new living conditions. It helps them adapt to a new life situation related not only to age, but also to changes in the health, economic and social areas. The main goal is to achieve a meaningful experience of life and strengthen the sense of dignity through artistic means. At the same time, to rebuild an environment that is/was disrupted for various reasons, through art in an experiential environment. This also opens up space for seniors who, as a result of their health condition, have lost their natural dispositions associated with creativity, spontaneity, sensory experience, as well as the ability to communicate with themselves and with other people in their environment.

The action art helps individuals navigate transitions related not only to age but also to changes in health, economic stability, and social dynamics. The main goal is to create meaningful experiences that strengthen a sense of dignity through artistic expression. Additionally, it provides a platform to rebuild connections that may have been disrupted for various reasons, fostering an environment rich in creativity and spontaneity (Ševčovič, 2023).

As we embrace the role of action art in seniors' lives, it becomes clear that these creative engagements open avenues for self-

discovery and personal growth. They help individuals reconnect with their inner selves and with others, sparking joy and fulfilment in their lives. Through these artistic experiences, seniors can reclaim their narratives and redefine their roles within their families and communities. Ultimately, action art is not just an artistic endeavour; it is a powerful means of enhancing quality of life, instilling a sense of belonging, and celebrating the enduring spirit of creativity that exists at any age. By recognizing and nurturing this potential, we affirm that art can be a transformative force for seniors, enabling them to not only express themselves but also to thrive in their later years.

Such initiatives serve as vital reminders that creativity knows no age. They highlight the fact that the capacity for artistic expression and innovation remains alive and vibrant in individuals regardless of their stage in life. By encouraging seniors to engage with creative practices, we not only validate their experiences and emotions but also enrich our landscape with their unique perspectives and values. The wisdom, insights, and talents of seniors offer invaluable context and depth to our artistic dialogues, reminding us that every generation has something significant to contribute. These contributions can foster intergenerational understanding, inspire younger artists, and strengthen the fabric of our communities, creating a more inclusive and diverse cultural narrative that honours the richness of human experience across all ages.

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Primary Paper Section: A

Secondary Paper Section: AL, AM

ATTITUDES OF TEACHING STAFF TOWARDS INCLUSION AND OF STUDENTS TOWARDS THE INCLUSION OF PEERS WITH SPECIAL EDUCATIONAL NEEDS IN THE CLASSROOM

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Study is partial outcome of the research project VEGA 1/0280/22 Identification of psycho-social factors of inclusive environment for students with special educational needs in the period of their school attendance.

Abstract: The inclusion of the school environment is an indicator of the humanisation of this environment and of society as a whole. The evaluation of the attitudes of all school actors is a good indicator of it. The aim of this paper is to map the attitudes of teaching staff and intact students towards pupils with special educational needs in schools. The present paper argues through two sets of research - teaching staff and intact students - for positive developments in creating inclusive school environments in primary schools.

Keywords: student with special educational needs, intact student, teacher, attitude.

1 Introduction

According to the current Slovak legislation, every student, without distinction, has the right to access to education that respects his or her diverse educational needs, abilities, aptitudes, capabilities, talents and health status. A student with special educational needs (hereafter referred to as SEN) in the educational process will use specific forms and methods that correspond to his/her needs (Education Act 245/2008 Coll.). An inclusive approach in education responds to the diversity of pupils. This means that the educational process is designed with the individual strengths and needs of students in mind so that they can be actively involved in the learning process (Woodcock et al. 2022, Lukáč & Hlebová, 2023). The goal of an inclusive approach to education is not to abolish differences between students, but to give everyone the opportunity to develop their skills as much as possible alongside their peers. The main purpose is therefore to establish equal educational opportunities for all students and to provide the necessary support for each student to develop his or her individual potential. This implies that the basis of inclusion is the openness of schools and their accessibility to all pupils regardless of their differences (Beláková 2022; Zilcher, Svoboda 2019), and the idea of inclusiveness is to become an integral part of the whole society (Daněk, Klugerová 2023).

2 Theoretical framework

There are and always will be high demands on an inclusive school. In order to make inclusive education as successful as possible in schools, we must inherently take into account such important factors as the continuous education of pedagogical and professional school staff on the topic of inclusive education, the creation of a safe environment, the cooperation of pedagogical and professional school staff in a multidisciplinary team, and work with the family. The supporting subject in a heterogeneous classroom is the teacher, who applies professional competences to create a universal design in the classroom (Zilcher, Svoboda 2019; Vančíková et al. 2018). Being a member of a peer group is incredibly important for primary school students. We must keep in mind that the peer world is an important social environment in which a child develops socially, intellectually, morally and emotionally (Grljušić, Kolak 2018). Peer contact with intact classmates is one of the main motives for parents to send their child with special needs to mainstream schools. Parents assume that peer contact will have a positive impact on their child (Koster et al. 2009). The attitudes of intact students towards peers with SEN are an important aspect of successful inclusive education. Many times, the indicator of success is determined by the extent to which a student with SEN is accepted by intact peers and how involved he/she is in the peer group (Freer 2021;

Bizova 2021; Laat et al. 2012, Trellová & Hlebová, 2020). Negative attitudes of intact students towards peers with disabilities are considered to be one of the key barriers to inclusive education (Szumski et al. 2020). Intact students have more positive attitudes towards inclusion precisely if they have had some previous social interaction with students or adults with disabilities (Bizova 2021). Pettigrew and Tropp (2006) found that contact between people from different social groups reduces their prejudice against 'difference' (Zilcher, Svoboda 2019). According to Hajkova and Strnadova (2010), students' attitudes are noticeably shaped by the attitudes of teachers and school management. Based on further research, Zilcher and Svoboda (2019) have come to this conclusion, pointing to a direct correlation between educators' and students' attitudes. According to Horňáková (2014), it is essential that attention is also paid to the formation of individual attitudes towards inclusion at the family level. Parents play an important role in a child's life and, whether consciously or not, demonstrate their own values and beliefs about other people, which can influence children's attitudes towards other people (Hong et al. 2014). Parents can express their attitudes explicitly - through discussion - or implicitly - by modelling their values. Some researchers report that children's attitudes were related to the explicit expression of their parents' attitudes; other authors show the exact opposite from their findings. Although the results do not match exactly, it is clear from several studies that there is a relationship between parents' attitudes and their children's attitudes towards people with disabilities (Babik, Gardner 2021).

In Slovakia in 2014, students' attitudes towards inclusion were surveyed by the National Institute of Certified Educational Measurements (NUCEM) as part of the national project Improving the Quality of Education in Primary and Secondary Schools. The research focused on the attitudes of pupils in grades 5 and 8 towards inclusion and students with SEN. According to the research report, attitudes were measured using a modified version of the Chedoke - McMaster Attitudes Towards Children with Handicaps (CATCH-R) questionnaire with a sample of 7486 primary school students (Valovič 2015; Galová et al. 2014). Zilcher and Svoboda (2019) similarly focused their research on the attitudes of intact students towards students with SEN. Their aim was to test the assumption that an inclusive school environment can have a positive impact on students' attitudes. Attitudes were measured on a sample of 1948 students. The authors of the study agreed that more positive attitudes towards students with SEN were held by those students who had a person with a disability (a friend or family member) in their close circle. However, according to the results, the mere sharing of educational space with students with SEN did not have a significant impact on the attitudes of intact students (Zilcher, Svoboda 2019; Galová et al. 2014). This may also be due to the fact that in a shared school environment only purely formal relationships may emerge, and close relationships may not develop between students (Zilcher, Svoboda 2019). In their research, Cairns and McClatchey (2013) compared the attitudes of students from two selected schools, but only one of them was an inclusive school. They found that intact students educated in an inclusive school environment had more positive attitudes towards students with disabilities and were more understanding of their needs compared to students not educated in an inclusive environment. Therefore, in line with these results, the authors hypothesize that inclusive school environments may positively influence the formation of positive attitudes towards students with disabilities. These results are shared by Freer (2021), Armstrong et al. (2015), and Hong et al. (2014). MacMillan et al. (2013) analysed 35 studies which generally suggest that students' contact with people with SEN is associated with more positive attitudes towards inclusion and disability. Hellmech and Loeper (2018) report that students' attitudes towards inclusion and towards peers with SEN are largely determined by educators and the overall school climate. This assertion is also made by McDougall et al. (2007). According to the authors, these

attitudes were conditioned by a school environment that supported the learning of all students without distinction. And they add that positive teacher- student relationships were inversely related to positive student attitudes.

The principles of inclusive education should be fulfilled by all schools and thus they can become open to all children without distinction. The valence of positive attitudes towards students with SEN among all actors in the school environment can reinforce the idea of inclusive schools.

3 Methodology

Research objectives and hypotheses

According to Babik and Gardner (2021), the perception of disability not only affects the internal experience of an individual with a disability, but also has an impact on our society as a whole. Despite the obvious benefits of inclusive education, students with SEN are often not accepted by their peers. They face negative attitudes and sometimes even isolation among their classmates. We consider the successful integration of the student into the classroom team as an important pillar of inclusive education. The teaching and professional staff of a school is a relevant factor influencing the attitudes of intact students towards their peers with SEN (McDougall et al. 2007) and it is against this background that we have defined our aim. The aim is to investigate the attitudes of teaching and professional staff towards inclusion and their behaviours towards students with SEN that can influence the attitudes of intact students towards the inclusion of their peers in mainstream classes at Key Stage 2 of primary school.

Research question 1: What is the correlation between the attitudes of teaching staff (TS) and professional staff (PS) towards inclusion and the attitudes of students towards their classmates with SEN?

Hypothesis 1: There is a positive relationship between the attitudes of the school's TS and PS towards the inclusion of students with SEN and the attitudes of intact students towards students with SEN.

Rationale: Among the factors that influence students' attitudes towards inclusion, we can also include educators. Several authors and their studies point to a direct correlation between teachers' and students' attitudes (Zilcher and Svoboda 2019; Hellmech, Loeper 2018; McDougall et al. 2007). Heyder et al. (2020) similarly point out that mainstream teachers' attitudes towards inclusive education are reflected in the creation of learning environments that support students with SEN in mainstream classrooms.

Research Question 2: In a shared learning space, what is the relationship in the attitudes of intact students towards their peers with SEN?

Hypothesis 2: Intact students who have a classmate with SEN have more positive attitudes towards students with SEN than those students who do not have a classmate with SEN.

Rationale: The hypothesis focuses on the determinants influencing students' attitudes towards their classmates with SEN. The independent variable causing the effect is social contact and the classroom environment in which the student is educated. The dependent variable that changes under the influence of the independent variable is the attitudes of intact students (Gavora et al. 2010). According to Hong et al. (2014), social interaction with a student with SEN in the school environment promotes the emergence of more positive attitudes towards students with SEN.

Research methods

To answer the questions and the objective, we used research questionnaire methods, namely a questionnaire for teaching and professional staff and a questionnaire for intact students called

CATCH. In this paper we present the partial outcomes of the research.

The questionnaire for pedagogical and professional staff was addressed to teaching staff (hereafter referred to as TS) and professional staff (hereafter referred to as PS) of primary schools in Slovakia in the period October - December 2023. It was anonymous and the respondents filled it out via Google Forms[®]. The aim of the questionnaire was to find out whether there is a correlation between their attitudes towards inclusion and education of students with SEN and the attitudes of their intact pupils towards their classmates with SEN. We divided the questionnaire into two parts. The first part consists of items from the questionnaire by Kazmi et al. (2023), who focused on teachers' attitudes towards the education of students with SEN in their study entitled *The effect of teachers' attitudes in promoting inclusive education by accommodating diverse learners*. For the purpose of our questionnaire, we have selected 8 items (items 1 to 8) that focus on attitudes towards inclusive education. We replaced the term "students with mild learning disabilities" in the questionnaire with "students with SEN". Respondents commented on the statements on a 5-point Likert scale with values from 1 (not at all agree) to 5 (completely agree) (Kazmi et al. 2022). We proceeded with the scoring of individual responses. The response "I completely agree" has a maximum score of 5 and the response "I do not agree at all" has a score of 1. In this section, respondents could score a maximum of 40 points and a minimum of 8 points. The second part of the questionnaire consists of questions 9 to 15, which are constructed by us and are aimed at finding out the attitudes of intact students in their class towards their classmates with SEN. It is made up of 7 items, respondents express their opinion on a 5-point Likert scale with values 1 (do not agree at all) to 5 (strongly agree) (Gavora 2010). These questions are used to find out how intact students behave towards their classmates with SEN in the school environment. In the second part, respondents could score a maximum of 35 points and a minimum of 7 points. For scoring, we proceeded by scoring individual responses. The answer "I completely agree" has a maximum score of 5 and the answer "I do not agree at all" has a score of 1. Items 10, 12 and 13 are scored in reverse because of the position of the question. The attitudes between TS and PS towards the education of students with SEN and the attitudes of students towards students with SEN were evaluated using the statistical procedure of correlation. We worked with the JAMOVI[®] program and used Pearson's correlation coefficient for the calculation.

Students' attitudes towards inclusion were measured with the CATH - Questionnaire of Inclusion for the Pupil (CATCH - R - Slovak adaptation) (Chedoke - McMaster Attitudes Towards Children with Handicaps) questionnaire by Rosenbaum, Armstrong and King (1985). The questionnaire was addressed anonymously to primary school students of senior school age, who completed it in print at school in February 2024. The original questionnaire contains 36 items, which are divided into three components: cognitive - verbal expression of beliefs about inclusion and pupils with SEN, emotional - reflecting feelings towards students with SEN, and behavioural - includes statements about what the pupil would be able to do for a student with SEN. Items are arranged in random order. The CATCH is rated on a 5-point Likert scale with values 1 (do not agree at all) to 5 (strongly agree) (Rosenbaum et al. 1987). As the original version of the questionnaire contained outdated terms, like Gálová et al. (2014), we also replaced the term 'disabled child' with "student with SEN". At the same time, according to the authors Boer et al. (2012) and Gálová et al. (2014), who tested the reliability of the questionnaire and the monotonicity of the items, we reduced the length of the questionnaire to the number of items 15. In order to process the questionnaire in the best possible way, we carried out a pilot test on a total of 12 pupils of grade 5 in order to see whether the wording of all items was understandable to the students. After this trial, we decided to replace the word 'friend' with the word 'mate' as some students found this wording confusing. In scoring the questionnaire, we proceeded by scoring the individual responses. The answer 'I completely agree' has a maximum score of 5 and the answer 'I do

not agree at all' has a score of 1. For items 8 and 12 the scoring is reversed because of the position of the question. The evaluation of the questionnaire was carried out by summing up all the scores of the items afterwards. The maximum possible number of points that respondents could obtain in the whole questionnaire was 75 points. In contrast, the lowest possible score was 15 points. The calculations were performed using the Student's t-test statistical method. Using the test, we calculated the p value (statistical significance) at the level of 0.05. Statistical evaluation of individual hypotheses was done in Excel and JAMOVI®.

Research sample

The first research set, with which we conducted the questionnaire, was made up of teaching and professional staff of the second level of primary schools and consisted of 119 respondents from all over Slovakia. Among the respondents, second level primary school teachers were the largest group of respondents with 85 respondents, followed by teaching assistants with 19 respondents and the smallest group was school special educators with 11 respondents.

The second research population consisted of second grade primary school students with a total number of students (n) of 254. A total of 261 students completed the questionnaire. The age of the students ranged from 10 to 15 years. Students who have a classmate with SEN made up the largest group of the sample overall with 209, which accounted for 82.3% of the total research sample. The management of each primary school agreed to allow the research to be conducted.

4 Interpretation of research results

Responses to research question 1 were sought using a 15-item questionnaire where each item contained a scored response on a 5-point Likert scale. The aim of the questionnaire for the 119 teaching and professional staff was to find out whether there was a correlation between their attitudes towards inclusion and education of students with SEN and the attitudes of intact students towards their classmates with SEN. Before the actual correlation analysis, we also present brief evaluations of the questionnaire. After summing the scores in each questionnaire, the arithmetic mean (hereafter AM) came out to be 53.5, which is 21.5 points less than the maximum possible score. The highest score we recorded for our respondents was 62. On the other hand, the lowest score was 42 points. For the items in the first part of the questionnaire (questions 1 to 8), we focused on the attitudes of TS and PS towards inclusion and the education of a student with SEN. After processing answers 1 to 8, the AM of all respondents came out to be 28.8 points, which is 12.2 points less than the maximum possible score. The lowest score we recorded in this section of the questionnaire was 23 points. The highest score was 33 points, which we recorded for five respondents. The items in the second part of the questionnaire (questions 9 to 15) were used to investigate the relationships between students and students with SEN in the respondent's mainstream classroom. Analysis of these items yielded an AM of 24.7 for all respondents, which is 10.3 points lower than the maximum possible score. The lowest score for this section of the questionnaire was 21 points and the highest score we recorded for this section was 29 points.

To calculate the correlation, i.e. the tightness of relationships between variables, we will use Pearson's correlation coefficient (Budíková, Železnáková 2018):

$$R(X,Y) = \frac{E((X-E(X)) \sqrt{\text{Var}(X)} \times (Y-E(Y)) \sqrt{\text{Var}(Y)})}{\sqrt{\text{Var}(X)} \times \sqrt{\text{Var}(Y)}}$$

In correlation analysis, we focus on the strength of the relationship between the variables to be examined. The correlation coefficient can range from -1 to 1. The closer the value of the coefficient is to 1 (or -1), the stronger the relationship, and the closer the value is to 0, the weaker the relationship. To indicate the strength of relationships, Ball Mikušová (2021) provides the following scale:

$r = 0 - 0.1$ (or $-0.1 - 0$) - no relationship

$r = 0.1$ (or -0.1) - weak positive (or negative) relationship

$r = 0.3$ (resp. -0.3) - moderate positive (resp. negative) relationship

$r = \text{above } 0.5$ (resp. -0.5) - strong positive (resp. negative) relationship.

The Pearson correlation coefficient was computed in JAMOVI® and the results are presented in Table 1, where the value of the correlation coefficient is shown.

Table 1 Results of correlation coefficient

Correlation matrix

		teachers' attitudes	students' attitudes
teachers' attitudes	Pearson's r	—	
	df	—	
	p-value	—	
	N	—	
students' attitudes	Pearson's r	0,461	—
	df	115	—
	p-value	< ,001	—
	N	117	—

Source: (own procession in JAMOVI)

The value of the correlation coefficient r came out to be 0.461. This means that the value is positive and according to the scale it is at the level of a moderately strong relationship. As mentioned earlier, the p-value or significance value represents the probability of getting the result by chance and if the value is less than the significance level, 0.05 by default, the test is considered statistically significant (Ballova Mikusova 2021). In our case, the p-value came out <.001 and thus the relationship can be considered statistically significant. N represents the number of data (117 respondents) and df represents the degree of freedom, which is calculated as $Df = N - P$, where P is the number of relationships, in our case the attitudes of the staff and the attitudes of the intact students (Ganti 2024).

With the correlation coefficient, we can also calculate the extent to which the variance in one variable can be explained by the other variable. The coefficient of determination R^2 is used for this purpose, which we have also calculated in JAMOVI and the results are presented in Table 2 below.

Table 2 Coefficient of determination R^2

MODEL FIT MEASURES		
MODEL	R	R^2
1	0,461	0,212

Source: (own procession)

In our case, where we have $r = 0.341$, R^2 came out to be 0.212, i.e. 21.2%. According to Ballova and Mikusova (2021), at a coefficient of determination of 21.2%, we are talking about a weak effect. A coefficient of determination of 21.2% means that the attitudes of the school's TS and PS towards inclusion contribute 21.2% to the change in students' attitudes towards students with SEN (weak effect). We can say that through Pearson correlation analysis, we found a positive, moderate and statistically significant relationship between TS and PS attitudes of the school and intact students' attitudes towards inclusion, with the attitudes of school staff influencing students' attitudes towards their classmates with SEN at a rate of 21.2%.

We predicted (H1) a positive correlation between TS and PS school attitudes towards inclusion and intact pupils' attitudes towards pupils with SEN. The value of the correlation coefficient came out to be 0.461, which means that the value is at the level of a moderately strong relationship. We found a moderately strong positive and statistically significant relationship between the attitudes of TS and PS of the school and the attitudes of the intact students towards inclusion and the attitudes of the intact students towards the students with SEN. From the above results, we can also include the attitudes and

external behaviours of teaching staff and professional staff among the main factors that influence students' attitudes towards inclusion (McDougall et al. 2007).

From the above, we accept H1, which states that there is a positive correlation between the attitudes of teaching and professional staff towards inclusion and the attitudes of intact students towards students with SEN.

The second research question asked whether sharing the same learning space has a positive effect on the attitudes of intact students towards their peers with SEN. We hypothesized (H2) that intact students who have a classmate with SEN have more positive attitudes towards students with SEN than those students who do not have a classmate with SEN. The response was obtained from the CATCH questionnaire from 261 respondents (second stage primary school students). After summing all the scores in each questionnaire, the final mean score came out to be 47.7. The smallest possible score from all questionnaires was 21 points and the largest possible score was 72 points. In the third table, we present the scale scores and a summary in the number of each questionnaire.

Table 3 Overview of the scores obtained for each questionnaire in relation to the scoring scale

Points scale	Number of answers	Percentage expression (%)
75 – 50 points (positive attitude towards a student with SEN)	102	40,2%
49 – 35 points (ambivalent attitude towards a student with SEN)	97	38,2%
34 – 15 points (negative attitude towards a student with SEN)	55	21,6%
Total	254	100%

Source: (own procession)

According to the above table, as many as 102 questionnaires are in the range of "positive attitude towards students with SEN", which accounts for 40.2% of all respondents. Thus, we can conclude that the positive attitude towards students with SEN was held by most of the respondents. On the contrary, the least number of respondents was recorded in the range of "negative attitude towards students with SEN", more precisely 55 students, which is 21.6%.

In Table 4, we present the resulting counts based on the presence of a student with SEN in the classroom.

Table 4 Results based on the presence of a student with SEN in a classroom

Respondents	N	AM	SD	Median	Modus	df	p
Students with a classmate with SEN	209	50,9	9,31	50,5	50	252	0.0403
Students without a classmate with SEN	45	47,0	11,55	48	48		

Source: (own procession)

Legend: N (number of pupils), AM (arithmetic mean), SD (standard deviation), median (mean), modus (most frequent value), df (degree of freedom), p (statistical significance value).

A larger AM, which was 50.9 points, came out for respondents who are educated in a classroom with a student with SEN. For this group of respondents, we also observed higher modus, but it was only 2 points higher than it was for students without a classmate with SEN. The p-value in this case came out to be 0.0403 and hence statistically we can talk about differences between the respondents and their responses.

Hypothesis 2 was confirmed. The p-value showed that there was a statistically significant difference between the respondents and their responses, at the same time AM and analysis of the results showed that students who had a classmate with SEN had more

positive attitudes towards students with SEN than students who did not have such classmates.

5 Discussion and conclusion

The mental well-being of the students and the overall climate of the classroom significantly influence the educational process of the students and its results, regardless of whether the student has an individual special educational need or not. Students' well-being is an important factor in a pro-inclusive school environment. Our aim was to analyse the perception of school inclusion by teaching staff and students. The research questionnaire method was used to establish a correlational relationship between the attitudes of teaching and professional staff and the attitudes of intact students towards inclusion. Using the school staff questionnaire, we found a positive, moderate and statistically significant relationship between the attitudes of TS and PS of the school and the attitudes of the intact students towards inclusion. From the above results, we can include the attitudes and external behaviours of teaching staff and professional staff among the main factors that influence students' attitudes towards inclusion (McDougall et al. 2007, Hlebová, 2020). In the case of sharing the learning process, we found that students who have a classmate with SEN in their classroom display more positive attitudes towards their classmates with SEN. The findings concur with those of Freer (2021) who states that sharing a learning space with a student with SEN contributes to the development of positive attitudes towards inclusion and peers with SEN. Armstrong et al. (2015) similarly report that regular contact with a peer with SEN in intact students increases empathy, respect and understanding, reduces fear of contact with a peer with SEN, and contributes to the formation of positive attitudes towards inclusion and the creation of a safe school environment. It also highlights an important pillar of inclusive education, which is the inclusion of intact students who, through their attitudes and behaviour, can greatly influence the inclusion of a student with SEN in a mainstream classroom.

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Primary Paper Section: A

Secondary Paper Section: AM, AN

THE CONNECTION OF THE RESULTS OF SELF-ASSESSMENT OF THE QUALITY OF SOCIAL SERVICES IN SOCIAL SERVICE FACILITIES FOR SENIORS IN SLOVAKIA WITH THE ESTIMATION OF THEIR RECIPIENTS' SUBJECTIVE PERCEPTION OF THE QUALITY OF THEIR OWN LIFE

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This study is one of the results of the scientific research project "The impact of the implementation of the conditions of the quality of social services and their evaluation in the ZSS for seniors on the quality of life of their recipients". (VEGA 1/0339/22)

Abstract: This study was devoted to the comparison of the results of the internal (own) evaluation of the implementation of social service quality conditions in social service facilities for seniors with an estimate of the subjective perception of the quality of their own life of their recipients. It came to the conclusion that there is a statistically significant effect between the investigated variables. In social service facilities for seniors, which achieved a higher score in the internal (own) evaluation of the implementation of the conditions of the quality of social services, seniors declared a higher point evaluation of the subjective perception of the quality of their own life. The only component in which we did not notice significant differences in the mentioned contexts was the component of close relationships.

Keywords: Quality, social services, quality of life, senior, evaluation, comparison

1 Introduction

The quality of social services for seniors is a key factor affecting their quality of life. With the increasing number of elderly people, it is essential to ensure that these services are provided at the highest level, taking into account the biological, psychological and social needs of seniors. It is important that the recipients themselves are included in the processes of determining the quality of social services. The following study dealt with the comparison of these two factors (1. self-assessment of the quality of the social service and 2. estimation of the subjective perception of the quality of one's life) in facilities for seniors.

1.1 Quality of social services

Matoušek (2011) defines the quality of the social service through the possibilities of guaranteeing verification according to predefined – best measurable – parameters. Brichtová and Repková (2014), referring to the research team of the study *Contracting for Quality* implemented within *European Social Network* state that in public services, especially in long-term care services, quality cannot be perceived only as a question of internal quality management at the given service provider or only as a relationship between the financing and providing parties, but as a systemic issue. Within the system, the relationships between actors occupying different roles (legislative and regulatory authorities; providers; those who assess service needs and plan their provision; benefactors) and how their relationships lead to quality assurance and its improvement towards increasing the quality of life of the recipients of services are examined.

We can define the quality of social services as a set of properties and signs of certain activities that relate to the fulfillment of defined requirements. We could define the quality measure as a positive difference to the given standards. The definition of the quality of social services is an important aspect, because through measurement it can directly lead to improvement. *"If something cannot be measured, it cannot be purposefully and effectively improved. If we don't know how to measure improvement, then it's an art and not a science or a technical profession."* (Horecký – Lusková, 2019, p. 8).

1.2 Quality of life of seniors

The term quality of life itself was not originally a scientific term, despite the fact that it was relatively sporadically mentioned in

several socioeconomic works in the past. It came into general awareness only in the 1960s as a metaphorical term that summed up the socio-political goals of the American political establishment. It was only later that it began to be elaborated upon more thoroughly and entered the terminology of several fields. Its definition naturally varies according to how many distinct disciplines work with this term (Mareš, 2014).

It follows from the above that the term quality of life is used in many areas of life. It can include characteristics of internal and external influences (psychological state, questions of the meaning of life and values, personal well-being, satisfaction, but also physical condition, natural environment, etc.) (Dragomirecká - Prajsová, 2009).

In the field of research, 1974 was a breakthrough year, when the magazine was founded *Social Indicators Research*, later also *The Journal of Happiness Studies* and the periodical *Applied Research in Quality of Life*. Under the management of the *European Foundation for the Improvement of Living and Working Conditions* the *European Quality of Life Surveys* (EQLS) was implemented. It is a multidimensional tool, which in 2003-2016 contained a set of factors that contribute to respondents' overall life satisfaction, as well as indicators of economic growth and living standards (e.g. GDP per person or income) and overall life satisfaction. Due to the specific population groups, the World Health Organization measurement techniques are mainly used.

The World Health Organization set up a working group which, after negotiations, finally reached a consensus and proposed a definition that emphasizes above all the quality of life of the individual: *"This is an individual perception of his position in the life of an individual, in the context of the culture and value system in which he lives; expresses the individual's relationship to his own goals, expected values and interests... includes his somatic health, psychological state, level of independence, social relationships, individual's beliefs, faith - all in relation to the main characteristics of the environment. Quality of life expresses a subjective evaluation that takes place in a certain cultural, social and environmental context... quality of life is not the same as the terms "state of health", "life satisfaction", "mental state" or "wellbeing". It is primarily a multidimensional concept (WHO, 1996)."*

Quality of life is a multi-layered concept that includes physical, psychological, social and environmental aspects (Uher, 2014):

1. Social factors play a significant role in determining the quality of life of seniors. These factors include social isolation, which is often associated with negative effects on mental health. On the contrary, engagement in public affairs and participation in various activation programs can significantly contribute to a sense of belonging and meaning in life.
2. Physical health is one of the key determinants of quality of life. Regular physical activity and healthy eating habits are essential for maintaining good physical health. Prevention and management of chronic diseases is also important for seniors, which can significantly affect their daily life and ability to be active.
3. Psychological aspects such as a sense of wellbeing, life satisfaction and the ability to manage stress are equally important for the quality of life of seniors.
4. The environment in which seniors live has a significant impact on their quality of life. Research shows that seniors living at home often have a higher quality of life compared to those living in social service facilities.

Several authors have different views on the possibilities of measuring the quality of life. If, for example, Dragomirecká (2013) perceives such possibilities as important for monitoring the effectiveness of various types of social services, such as Repková (2016) states that in this case it is a normative rather than a scientific concept, in which the quality of life is defined more operationally.

We include the most widely used quantitative tools for determining the subjective assessment of the quality of life of seniors *WHOQOL-OLD*, which was created under the auspices of the international working group of the World Health Organization - *WHOQOL (World Health Organization Quality of Life)*, which started its activity in the 1990s. *WHOQOL* created several questionnaires for measuring the quality of life, which can be used especially with adults. A 100-item instrument was constructed (*WHOQOL-100*), which examines 6 domains (physical health, mental health, independence, social relationships, social and physical environment, spirituality), and these are further divided into 24 subdomains. Later, a shortened 26-item version of this questionnaire was created – *WHOQOL-BREF*. Due to questions about the validity of the questions used on the older population, a task force was initiated *WHO* work on the module *WHOQOL-OLD*. First, focus groups were conducted with seniors, family members, nurses and other professionals working in geriatric facilities. Based on the content analysis of these interviews, 40 items were created. Subsequently, pilot testing was carried out with 7,401 people over 60 years of age, for the purpose of modifying the instrument based on its psychometric properties. This was followed by field testing with more than 5,500 respondents. The result of the analysis of data obtained from international testing is the module *WHOQOL-OLD* with 24 items divided into 6 areas/domains, each of which consists of 4 items (Kačmarová, 2013).

2 Methodology

The primary method of collecting empirical data was a battery of questionnaires composed of a questionnaire of one's own provenance and a questionnaire integrating domains 1. independence, 2. fulfillment, 3. social involvement and 4. close relationships from the *WHOQOL-OLD* research tool (Dragomirecká – Prajsová, 2009). Due to the lack of use of the comprehensive research tool *WHOQOL-OLD* and the related *WHOQOL-BREF*, we speak of "estimation of the subjective perception of the quality of life of seniors". The choice of the mentioned domains was related to the economy and efficiency of the method. The content, as well as the formal side and linguistic correctness of the questionnaire items, were monitored. The questionnaire of its own provenance was addressed to an employee who is familiar with the processes of evaluating the quality of the service provided in the given facility. It consisted of 11 items and space for additions. Five questions focused on the characteristics of the subject. The others were devoted to the results of an external or own assessment of the implementation of the quality of services provided. In this study, we will focus on those questionnaire items of our own provenance, which are devoted to the estimation of our own assessment of the implementation of the quality of services provided. Complex results will be part of a separate monograph.

The battery of questionnaires was physically sent to those facilities of social services for seniors that agreed to participate in the research in advance and in writing (by e-mail). For statistical evaluation, we used SPSS software.

2.1 Research objective and hypothesis

In accordance with the research problem, we defined the goal and the hypothesis derived from it.

Research goal: To analyze the connection between the results of the internal (own) evaluation of the implementation of social service quality conditions in social service facilities for the elderly and the estimation of the subjective perception of the quality of life of their recipients.

Research hypothesis: In a social service facility for the elderly that achieves a higher score in the internal (own) assessment of the implementation of the conditions of the quality of social services, seniors will declare a higher point assessment of the subjective perception of the quality of their own life than in a social service facility for the seniors that in the internal (own) assessment of the implementation of the conditions of the quality of social services, it will achieve a lower score.

2.2 Structure of respondents

Considering the complexity of the research, we differentiate the structure of the respondents into two different, but in the context of the set goals, inseparable sets. One is the facilities of social services for seniors in the analyzed complexity and depending on the monitored variables (according to the instructions, only an employee who is familiar with the processes of evaluating the quality of the service provided in the given facility always provided information) and the other is their recipients.

From the total number of social service facilities for seniors participating in the research, we were able to include six out of ten participating respondents in the analyses. Three facilities belonged to the Košice self-governing region, and one each participated from the Trnava, Banská Bystrica, and Žilina self-governing regions. In terms of sectoral distribution, we have identified a homogeneous distribution. Three respondents belonged to the public and three to the non-public sector. All respondents provided services for more than seven years.

Each facility of social services for seniors was represented by exactly 20 recipients. 120 respondents - seniors - participated in the research estimating their subjective perception of the quality of their own life. 34.17% of the respondents were men and 65.83% were women.

3 Results

We asked all social service facilities for seniors that participated in the research to try to implement a self-evaluation of the implementation of social service quality conditions on a scale from 0% to 100%, where 100% understandable meant the highest possible quality of implementation. We also asked these respondents to carry out a partial self-assessment in the following areas: 1. the area of compliance with basic human rights and freedoms (human rights, freedoms, social status, relationships, recipient's family, etc.), 2. the area of procedural conditions (vision, mission, procedures applied in the facility, etc.), 3. area of personnel conditions (qualification prerequisites of employees, their number, competences, further education, system of supervision, etc.), 4. area of operating conditions (material equipment, lighting and thermal comfort, equipment of social devices, etc.).

Tab. 1 Results of the internal (own) evaluation of the implementation of social service quality conditions in social service facilities for seniors participating in the research

Average	Median	Min.	Max.	p
87%	92,5%	53%	100%	17,58%

Tab. 2 Results of the internal (own) evaluation of the implementation of social service quality conditions in social service facilities for seniors participating in research in individual areas

Basic human rights and freedoms	93%
Procedural conditions	93,3%
Staff conditions	91,16%
Operating conditions	82,83%

In the last correlation, we were interested in the relationship between the self-assessment of the implementation of the conditions of the quality of social services of social service facilities for seniors participating in the research and the estimation of the subjective perception of the quality of their own life of their recipients. We divided the facilities on the basis

of the identified median of self-assessment results - up to 92.5% and above 92.5% and compared with the comprehensive score of the results of the estimation of subjective perception of the quality of life, as well as with its individual components.

Recipients of social service facilities for seniors participating in the research, who reached 92.5% in the self-assessment, achieved an average score of 50.58 points in the estimation of the subjective perception of the quality of their own life. Recipients of social service facilities for seniors participating in the research, who scored above 92.5% in the self-assessment, scored an average of 60 points in the same estimate.

Tab. 3 Comparison of the results of the internal (own) evaluation of the implementation of social service quality conditions in social service facilities for seniors with an estimate of the subjective perception of the quality of their own life of their recipients

Up to 92,5%	Above 92,5%
50,58	55,62

n=120; p=0,02; t= -2,16

Tab. 4 Comparison of the results of the internal (own) evaluations of the implementation of social service quality conditions in social service facilities for seniors with an estimate of the subjective perception of the quality of their own life of their recipients in the component - independence

Subjects up to 92,5%	Subjects above 92,5%	t	P
12,97	14,42	-2,10	0,02

Tab. 5 Comparison of the results of the internal (own) evaluation of the implementation of social service quality conditions in social service facilities for seniors with an estimate of the subjective perception of the quality of their own life of their recipients in the component - fulfillment

Subjects up to 92,5%	Subjects above 92,5%	t	P
12,68	13,85	-1,88	0,031

Tab. 6 Comparison of the results of the internal (own) evaluations of the implementation of social service quality conditions in social service facilities for seniors with an estimate of the subjective perception of the quality of life of their recipients in the component - social involvement

Subjects up to 92,5%	Subjects above 92,5%	t	P
11,93	14,02	-3,18	0,0009

Tab. 7 Comparison of the results of the internal (own) evaluations of the implementation of social service quality conditions in social service facilities for seniors with an estimate of the subjective perception of the quality of their own life of their recipients in the component - close relationships

Subjects up to 92,5%	Subjects above 92,5%	t	P
13,33	14,52	-1,58	0,058

We state verification of the hypothesis. In the social service facility for the elderly, which achieved a higher score in the internal (own) assessment of the implementation of the conditions of the quality of social services, the seniors declared a higher point assessment of the subjective perception of the quality of their own life, than in the social service facility for the elderly, which in the internal (own) assessment implementation of social service quality conditions achieved a lower score. The only component in which we did not notice significant differences in the mentioned contexts was the component of close relationships. Conversely, the highest differences were identified in the social engagement component.

4 Discussion and conclusion

Aware of the limitations of the processed research, we note that we have identified several valuable findings. The average

internal (own) assessment of the conditions of the quality of social services provided in social service facilities for seniors was 93%. We remind you that the estimate was made by competent persons (director, quality manager, social worker or other authorized worker). This estimate expresses a certain degree of self-reflection, which is always based on the perspective of the competent person in question. From their perspective, this is an estimate of the real state of preparedness, which, however, may not correspond at all to the perspective of the external evaluation.

Research by Mátl and Kuzyšin (2020), which analyzed the perspective of 437 workers who represented one social entity, or one type of social service provided by a social entity, states such a subjective estimate at 63.66% on average. The authors interpreted this situation through the identification of subjective and objective barriers in readiness for the assessment of the quality of social services. Four categories were included among the subjective barriers: 1. employees, 2. time options, 3. uncertainty and 4. team and management. In the employees category, occupational stereotyping was communicated - stubbornness of employees, negative attitude towards changes, and hesitance. The second most numerous category pointed to time options and staff workload. The category "uncertainty" integrated the elements of apprehension about the correct preparation of the relevant documentation and fear of approaching this activity. The last category identified by them reflected on the issue of team cooperation and management systems. Mátl and Kuzyšin (2020) included the following as objective barriers in readiness for the assessment of the quality of social services: 1. bureaucratic complexity, 2. financing, 3. methodical management, 4. legislation, 5. operating conditions. Bureaucratic burden was identified as the most frequently occurring category related to administrative overload and administrative burden for staff who work directly with the client, which has a direct impact on the lack of time for direct work with beneficiaries. The issue of financing social services was reflected in the contexts they monitored, as the second strongest category of objective barriers, in which the long-term economic undersizing of social services was a clear content dominant. Methodological leadership and uniform methodological support was mostly associated with the expectation of document unification and establishing standard procedures. In the case of legislation, respondents' suggestions were aimed at emphasizing the quality of laws, their inconsistency with practice, frequent amendments and complex terminology. Operating conditions were linked to spatial conditions (older buildings) and lack of funds.

The identified median self-assessment of service quality in social service facilities for seniors was 92.5%. Beneficiaries who were provided with the service in the facility, which reached 92.5%, achieved an average score of 50.58 points in the estimation of the subjective perception of the quality of their own life. Recipients of social service facilities for seniors participating in the research, who scored above 92.5% in the self-assessment, scored an average of 60 points in the same estimate. The only component in which we did not notice significant differences in the mentioned contexts was the component of close relationships. Conversely, the highest differences were identified in the social engagement component. We are not aware of the facts about the implementation of similarly oriented research. We can see certain signs in the research of Kohútová (2018), who compared the quality of life and environment with the satisfaction of seniors with the facility's services. She stated that the quality of life in the functioning of the senses, independence, fulfillment, close relationships, attitudes towards death and the overall quality of life is not related to the senior's satisfaction with the facility's services. The only statistically significant positive relationship at a moderately strong level was recorded in the domain of social involvement - the more satisfied a senior is with services, the higher his or her quality of life in social involvement is.

The quality of social services for seniors is a critical component of ensuring a dignified, active and satisfied life in old age. The

importance of quality services becomes even more important in the context of demographic changes and increasing average life expectancy. It is a challenge that requires a systematic approach, the cooperation of all stakeholders and a constant effort to improve.

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Primary Paper Section: A

Secondary Paper Section: AE, AN

PREPARATION FOR INCLUSIVE EDUCATION OF STUDENT TEACHERS AT UNIVERSITIES IN SLOVAKIA

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This article is a partial output of the project KEGA 007KU-4/2024 Team approach to the education of a child with dyspraxia in preschool age: from identification of difficulties to successful inclusion.

Abstract: The paper deals with the preparation of university students in the conditions of the Slovak Republic. The authors analyse the extent of implementation of the inclusive strategy in the undergraduate teacher training in Slovak Universities and specify objective indicators in the framework of this training. In particular, they focus on the readiness of future teachers to work with pupils with special educational needs.

Keywords: Special Educational Needs, Inclusive Approach, Inclusive Education

1 Introduction

Integrated/inclusive education has been part of education in Slovak schools for more than thirty years. In this context, Slovak colleges and universities that prepare future teachers have had to adapt their pre-graduate preparation so that future graduates are prepared to meet the special educational needs of pupils in regular schools (Belková, 2019; Belková, Zólyomiová, 2019). These requirements were also based on considering the above-mentioned policies, in which incentives for greater efficiency in education must also be applied, taking into account the needs of all learners.

The readiness of the environment from the point of view of the pupil, the classroom, the teacher and the school as an educational institution is more than important (Rakap et al. 2017; Benčíč et al., 2023; Kováčová, 2023). Also, for this reason, it is necessary to prepare in parallel schools as educational institutions (from primary school to college) and colleges as those who are jointly involved for the readiness of the educator, the college graduate (Kováčová, 2022). In this article, we present objective indicators of pre-graduate preparation in the field of inclusive education in Slovak colleges and universities (Kraska, Boyle, 2014; Belková, 2019; Belková et al., 2020; Belková et al., 2021).

2 Research design

The Organisation for Economic Co-operation and Development (OECD) indicators are the leading source on the state of education worldwide. They provide data on the structure, finances and performance of education systems in OECD countries and a number of acceding and partner countries (Sharma et al., 2015). Key information on the outputs of educational institutions; the impact of education in each country; access, participation and progression in education; the financial resources invested in education; and teachers, the learning environment and the organization of schools. Increasingly, governments around the world are taking international comparisons of educational opportunities and outcomes into account as they develop policies to improve the social and economic perspectives of individuals, as they apply incentives for greater efficiency in education, and as they help mobilize resources to meet increasing demands.

To find out the objective indicators of pre-graduate preparation we used the method of content analysis, we analysed the content of the information sheets of the subjects of pedagogical-psychological, social-scientific basis from both the first and second level of university teacher studies (Belková, Zólyomiová, 2019; Osvaldová, Vrabcová, 2020). Based on the analysis of the theoretical background regarding the issue of objective indicators of pre-graduate preparation, our research aim was to map the current state, the scope of the

inclusive strategy in the pre-graduate teacher preparation (Sharma et al., 2015; Jablonský et al., 2019a, Jablonský et al., 2019b). The aim of the research was to find out the explicit scope of inclusive strategies in the pre-graduate teacher preparation in Slovak universities. That is, to find out whether within the subjects of pedagogical-psychological and social-scientific basis (the so-called common basis) there are teaching subjects that focus their content on the preparation of teacher students to work with pupils with special educational needs (Belková, Vrabcová, 2021).

The following **research questions** emerged from the research objective to map objective indicators of pre-graduate preparation in inclusive education (Table 1).

Table 1: Research Question

Research question	Specification of the wording of the question
1	At what level of university studies is attention paid to the subject of education?
2	What subjects in terms of obligatory choice (obligatory, obligatory elective and elective) are prevalent in the subject education issue?
3	What is the preferred form of teaching (lecture, seminar/practice) of the subjects devoted to the subject matter and what is their time allocation?
4	What is the content saturation of the individual courses on the given educational issue?

The basic research set designed for mapping objective indicators of pre-graduate preparation in the field of inclusive education consisted of 366 information sheets of subjects from the pedagogical-psychological and social-scientific basis, which is made up of obligatory, obligatory elective and elective subjects. The subject information sheets were obtained from all universities operating in Slovakia and involved in pre-graduate teacher preparation. The research set itself consisted of 38 information sheets, which were related to subjects related to inclusive education and work with pupils with special educational needs. To gain access to the information sheets of all colleges and universities providing teacher education, we used the academic information systems AIS, MAIS - in particular their public access; colleagues of individual colleges who provided us with access to this system.

3 Findings: objective indicators of pre-graduate preparation for working with pupils with SEN

Objective indicators of pre-graduate preparation were measured by analysing the information sheets of the courses from the so-called common core of courses of teacher education programmes. We were interested in the current state of objective indicators of pre-graduate preparation for working with pupils with special educational needs at Slovak universities and their faculties that provide pre-graduate teacher preparation. The results of the findings are presented in Table 2 and Table 3.

Representation of subjects dedicated to the issue of working with pupils special educational needs of their classification in the degree of university study, the obligation of their selection, the form of teaching and time allocation

We consider the classification of these subjects in the common pedagogical-psychological and social-scientific basis to be important objective indicators of the pre-graduate preparation of teachers for work with pupils with special educational needs, not only in terms of the level of study at which they are offered, but especially in terms of the obligation to select them (i.e. whether they are compulsory subjects, obligatory electives or electives), the form of their teaching (lecture, seminar/practice), but also their time allocation within the framework of their offer. The

findings from the information sheets of subjects of nine Slovak universities are presented in Table 2.

Table 2: Summary evaluation I.

	Level of study	Type of subject			Number of subjects TOTAL		Form of teaching		Hourly subsidy	
		C	CO	O	For each level of study	For both levels of study	Lecture	Seminar /exercise	For each level of study	For both levels of study
U1	I	1	0	0	1	3	1	0	1	3
	II	0	0	2	2		2	0	2	
U2	I	1	0	0	1	1	1	1	2	2
	II	0	0	0	0		0	0	0	
U3	I	-	-	-	-	3	-	-	-	3
	II	1	2	0	3		1	2	3	
U4	I	0	0	0	0	4	0	0	0	6
	II	2	2	0	4		4	2	6	
U5	I	0	2	2	4	9	1	3	4	9
	II	3	2	0	5		1	4	5	
U6	I	1	3	0	4	8	4	1	5	9
	II	0	4	0	4		0	4	4	
U7	I	1	0	0	1	4	1	1	2	5
	II	1	2	0	3		1	2	3	
U8	I	1	1	1	3	4	2	2	4	6
	II	0	1	0	1		0	2	2	
U9	I	0	0	0	0	2	0	0	0	2
	II	0	2	0	2		2	0	2	
Σ	I	5	6	3	14	38	10	8	18	45
	II	7	15	2	24		11	16	27	

Legend:

C - compulsory subject

CO - compulsory optional subject

V - optional subject

U - University

I - Bachelor's degree of higher education

II - Master's degree in higher education

By content analysis of 38 information sheets of subjects from the so-called common basis we found that the ratio of subjects dedicated to the issue of inclusive education and work with pupils with special educational needs in the first and second level of university studies is in favour of the second level of study.

The highest number of subjects for both study levels (9) is provided by U5, the lowest number of subjects for both study levels (1) is provided by U2. Two universities within the first level of universities (U4, U9) do not offer subjects in the Common Core curriculum that pay attention to inclusive education and work with pupils with special educational needs within their content. One university (U2) does not offer subjects with the subject matter in the Common Core curriculum in the second level of universities, and one university (U3) does not offer teacher education at all in the first level. We found that out of the 38 subjects dedicated to the issue of working with pupils with SEN and inclusive education, 12 subjects are obligatory, 21 are obligatory elective and 5 are elective. Based on the data provided in the ILP, we found that 24 subjects are organised in the form of seminars or practices. The remaining 21 subjects are organised in the form of lectures. The total number is higher than the actual number of teaching subjects and this is because some

of the teaching subjects have a combined form of teaching P/S (4 subjects) or P/C (1 subject) (Osvaldová, Vrabcová, 2020).

Table 3: Summary evaluation II.

University	level of study	type of subject with special educational needs	% representation of topics related to SEN	performance standard
U1	I	C1	100%	1,2,3
	II	C2	-	-
		C3	100%	1,3
U2	I	C1	8,33%	1
	II	0	0	0
U3	I	-	-	-
		C1	100%	1
		C2	8,33%	1
	II	C3	30%	1
U4	I	0	0	0
	II	C1	33,33%	1,2,3
		C2	12,5%	1,2,3
		C3	36,36%	1,2,3
		C4	18,18%	1,2,3

Legend:

C - compulsory subject

U - University

I - Bachelor's degree of higher education

II - Master's degree in higher education

Courses dedicated to the issue of working with pupils with special educational needs in information sheets of subjects according to their content saturation with the issue of working with pupils with special educational needs and their credit load at individual Slovak universities (continued)

Content/curriculum of individual subjects we have identified 18 out of the number of all teaching subjects dedicated to inclusive education and preparation of students for work with pupils with special educational needs, which devote their entire content and scope capacity to the subject. We accepted the remaining subjects (20) in the preparation for inclusive education and work with pupils with special educational needs, as part of their content is necessary for students of teacher education programmes to identify the norm, sub-norm and supra-norm of pupil development. In the information sheets of subjects in learning outcomes, we observed large differences in the quality of processing. In some information sheets of subjects we encountered only a very general indication of what is required of the student, and it was very difficult to identify in them, in relation to the taxonomy above, at what level the subject develops the knowledge, skills, competences of the students. The sixteen information sheets of subjects in the learning outcomes section were developed regarding three levels: 1. to know, 2. to understand, 3. to be able to. In the content focus section of the information sheets of subjects, we can state that the pre-graduate preparation is not focused on the students' performance as teachers in an inclusive school, but the core focus is on the integrated education of the pupils (Osvaldová, Vrabcová, 2020).

Representation of subjects concerning work with pupils with special educational needs in the information sheets of subjects in terms of their classification in the degree of university study, the obligation of their selection, the form of teaching and time allocation

By content analysis of thirty-eight information sheets of teaching subjects of the so-called common core we found that the ratio of subjects dealing with the issue of inclusive education and work with pupils with special educational needs in the first and second

level of university studies is in favour of the second level of study. Another of our findings was that two of the nine colleges in the first cycle of university do not include subjects in the Common Core curriculum that pay attention to inclusive education and working with pupils with special educational needs within the content. One university does not provide subjects in the common core curriculum with the subject matter in the second cycle of university studies, and one university of the universities surveyed does not provide teacher education at all in the first cycle of university studies.

The profile of individual study programmes is made up of obligatory, obligatory elective and elective subjects. We have found that out of 38 subjects focusing on the issue of working with pupils with special educational needs and inclusive education, 12 subjects are obligatory, 21 subjects are obligatory elective and 5 subjects are elective. The obligatory elective and elective subjects are of great importance as they are chosen by the student in relation to his/her own preferences - profiling, fulfilling the requirements of the accreditation dossier on the minimum number of obligatory elective and elective subjects and finally as a means of achieving the necessary number of credits in the individual stages of study. However, these subjects carry the risk that students may not include them in their enrolment list or, in the event of unsuccessful completion, may replace them with another subject. This may lead to a situation where subjects dealing with the subject matter are offered but may not be studied in a given academic year. Therefore, the high number of obligatory electives and elective subjects is rather negative in terms of general preparation for the teaching profession.

University education in Slovakia is delivered through a variety of methods. In teacher preparation, traditional methods include lectures, seminars, internships, but we also encounter practices, trainings, courses. Although these are methods that have a deep tradition in university education, changes and innovations have affected them as well. Based on the data given in the subject information sheets, we found that 24 subjects are also organized as seminars and practices, thus we assume that students are actively involved in the teaching process. The remaining 21 subjects are delivered through lectures. The total number of course hours is higher than the number of teaching subjects themselves and this is because some teaching subjects have a combined teaching method of P/S (5 subjects) or P/C (1 subject). The most preferred teaching method is lecture. This finding need not only be viewed negatively. When creating accreditation files, the Ministry of Education and Science issued recommendations on the creation of the files themselves, which recommend implementing lectures in an interactive way, i.e. by involving the students themselves in the teaching process, e.g. by preparing suggestions, questions for the teacher, studying the set texts, articles on the subject, etc. According to these recommendations, lectures should not only be a monologue of the lecturer. Taking these recommendations into account, we believe that the lecture as a method of teaching is as beneficial to students in their preparation as the seminar or practise. Lectures are very important to get acquainted with new and complex issues, but in this case (the issue of teaching pupils with special educational needs) it is necessary to gain real experience, and seminars should certainly not be skipped. We can state that on average there are 4.2 subjects per university devoted to the topic of pupils with special educational needs.

The contents or curricula of the individual subjects were important information in the information sheets. From the number of all teaching subjects focused on inclusive education and preparing students to work with students with special educational needs, we identified 18 (out of 38) that devote their entire content and scope to the subject. We accepted the remaining subjects (20) in the preparation for inclusive education and work with pupils with special educational needs, as part of their content is necessary for students of teacher education programmes to identify the norm, sub-norm and supra-norm of pupil development.

A compulsory part of the information sheets of subjects is the "learning outcomes", which define the main learning outcomes that the student will gain from completing the subject and a description of what the student should know, understand and be able to do after successful completion of the learning process. In this component of the information sheets of subjects analysed, we observed large differences in the quality of the workmanship. In some information sheets of subjects we encountered only a very general indication of what is required of the student, and it was very difficult to identify in them, in relation to the taxonomy mentioned above, at what level the subject develops the knowledge, skills, competences of the students. We also encountered an incompatibility between the content focus and the learning outcomes, which did not reflect all the topics that make up the content of the subject. Very often we identified that part of the learning outcomes was not processed in the view of the student, but in the view of the teacher of the subject. Teacher actions were named and not student outcomes. The sixteen information sheets of subjects in the learning outcomes section of the information sheets of subjects were developed with respect to all three levels: knowing, understanding, being able to. Based on the analysis of the individual information sheets of subjects (in the content focus section), we can conclude that the pre-graduate preparation is not focused on the performance of student teachers in an inclusive school, but the core focus is on the integrated education of pupils. We are aware that teacher education is not only made up of subjects of the so-called common core, but also of subjects of individual study-subject combinations, whose curricula can compensate for these shortcomings of the common core. However, this area was not the subject of our research (Osvaldová, Vrabcová, 2020; Belková, Vrabcová, 2021).

Bansal (2016) also examined the curriculum for inclusive teacher education in thirteen universities in the northern part of India using the content analysis method. He found that the subject of Inclusive Education is not compulsory in some universities and completely absent in some universities, this finding is consistent with ours. The author further found that the subjects that cover content on Inclusive Education are theoretical knowledge based and lack linkage with practical skill building, we found this in 22 subject fact sheets.

In the new description of the profile of the graduate of the study field of teaching, the requirement of preparation for inclusive education is already incorporated. It is therefore essential in the context of pre-graduate preparation that teacher education students are trained in a variety of areas, including through the use of activating methods. Priority will be given to subjects that deal 100% of their content with the issue of working with pupils with special educational needs. In particular, the subject "Special Pedagogy", in which the students of teaching learn about the objectives, content, methods of special pedagogy. They acquire knowledge about the causes of disabilities, developmental anomalies, the characteristics and specifics of individual types of defects, the personality of pupils with disabilities, disorders, the possibilities of their upbringing and education, possible limitations that the disability or disorder brings with it. They are also introduced to the basics of inclusive education (Information sheet Special Education). Another subject is "Inclusive Pedagogy", after completing it the student will gain relevant theoretical knowledge and practical skills related to the concept of inclusive education for all pupils without distinction in mainstream education. (Information sheet Inclusive Pedagogy).

4 Discussion: Results of findings

For the objective indicators, based on the content analysis of the individual information sheets of subjects (in the content focus section), we found that the undergraduate training is not focused on the teachers' performance in an inclusive school, but the core focus is on the integrated education of pupils, and the most preferred teaching method is lecture. We found that out of the 38 subjects devoted to the issue of working with pupils with special educational needs and inclusive education, 12 are obligatory, 21 are obligatory elective and 5 are elective. From the number of all

teaching subjects devoted to inclusive education and preparation of students for work with pupils with special educational needs, we identified 18 (out of 38) that devote their entire content and scope to the subject. We accepted the remaining subjects (20) in the preparation for inclusive education and work with pupils with special educational needs, as part of their content is necessary for students of teacher education programmes to identify the norm, sub-norm and supra-norm of pupil's development.

5 Conclusion

The issue under study is currently topical and requires more attention not only in the aspect of pre-graduate preparation but also in the postgraduate preparation of in-service teachers (Lechta, 2012b).

This will not only contribute to the quality of preparation of graduates for their profession as teachers, but also to the growth of the level of perceived professional proficiency in inclusive practice. We consider it important that not only the preparation of teachers themselves, but also the preparation of the environments they enter, is addressed not only by support measures, but also by the preparation of children and pupils themselves from an early age (Kováčová, 2019).

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Primary Paper Section: A

Secondary Paper Section: AM

MACROECONOMIC IMPLICATIONS OF INCREASING DIVERSITY OF POPULATION: THE ETHNIC, LINGUISTIC, AND RELIGIOUS FRAGMENTATION OF THE POPULATION IN THE EU IN THE PAST TWO DECADES

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The paper is published as a part of the project VEGA 1/0646/23, and the grant EkF TUKE P2/2024.

Abstract: The paper focuses on the relationship between population diversity and macroeconomic outcomes. The econometric analysis using fixed and random effect panel data models was conducted in 27 European Union countries in 2000-2023. Changes in the population's diversity are measured using the decreasing transformation of the Herfindahl-Hirsch Index to express the ethnic, linguistic, and religious fragmentation of the population. To capture the overall effect of the changes in the diversity of the population in the European Union, the composite index based on principal component analysis is constructed. The first component with the highest eigenvalue is a regressor of selected macroeconomic outcomes – economic growth, public debt, and income disparities. Besides, the other public policy outcome – political instability, which affects the macroeconomic outcomes, is also considered. As expected, the increasing diversity of the population is observed. It has a statistically significant positive relationship with public debt, income disparities, and political instability, while in negative with economic growth.

Keywords: ethnic fragmentation, linguistic fragmentation, religious fragmentation, public debt, economic growth, income disparities, political instability.

1 Introduction

In the European Union (EU), we witness certain population movements for several reasons. The fall of communist regimes in the eastern part of Europe, the accession of many of these countries to the EU, the Global financial crisis, migration waves from other continents, and the war conflict affecting Europe in the last few years caused population migration. It brings certain changes inside the entire population of the countries when considering the diversity of the population. Increased diversity of the population contributes to higher heterogeneity of preferences which might have important implications for the macroeconomic and societal circumstances of the countries.

The literature focusing on diverse populations works with multiethnicity and multilingualism (e.g. Cassilde and Labart, 2020), and the increasing number of different religions in countries are considered, too (e.g. Okediji, 2005; Chakravarty et al., 2019). The ethnic, linguistic, and religious point of view deals with the implications on macroeconomic outcomes (Vigdor, 2002; Alesina and La Ferrara, 2002; Chakravarty et al., 2019) including the public policy outcomes (Alesina, Baqir, and Easterly, 1999; Vigdor, 2002; Bodman and Hodge, 2010; Mariani, 2017; Maličká and Križko, 2020). Besides, countries might suffer from social and political tensions, and uncertainty driven by diverse populations (e.g. Easterly and Levine, 1997; Reilly, 2000; Vigdor, 2002; Bodman and Hodge, 2010; Chadha and Nandwani, 2018) and it worsens the countries' conditions, too.

The paper aims to analyze the variability of the diversity of the EU population from ethnic, linguistic, and religious perspectives in the past two decades and its impact on several macroeconomic outputs, including public outcomes and political instability, too. The analysis is conducted on the sample of 27 EU countries in 2000-2023. Panel data estimation techniques are employed to examine the relationship between the population's diversity and selected macroeconomic outcomes.

In this paper, to measure the diversity of the population we use the decreasing transformation of the Herfindahl-Hirsch Index to express a fragmentation (opposite to concentration, in a similar vein used e.g. in Easterly and Levine, 1997; Alesina, Baqir, and Easterly, 1999 and 2000; Vigdor, 2002; Alesina et al., 2003; Drazanova, 2019; Maličká and Križko, 2020; Marson, Migheli, and Saccone, 2021) and we focus on ethnic, linguistic and religious fragmentation of the population as proposed

by related literature (e.g. Alesina and La Ferrara, 2002; Okediji, 2005; Bodman and Hodge, 2010; Bossert, D'Ambrosio, and La Ferrara, 2011; Bernhardtsson, 2019; Chakravarty et al., 2019). To reduce the multidimensionality of the populations' diversity measured by three indicators and to catch all the aspects of the diversity of the population, we compute a composite index using the principal component analysis. The component with the highest eigenvalue is then used as a regressor in an econometric analysis of the relationship between the population's diversity and macroeconomic outcomes. The results when using the principal component covering all types of computed diversities are then compared to the results of estimations where ethnic, linguistic, and religious fragmentation indices are employed alternatively to the regression following the approach of Maličká and Križko (2020), who expressed the fragmentation of the population by the maximum value of ethnic and linguistic fragmentation indices.

The paper contributes to the literature on the effects of changes in the population's diversity on economic outcomes. The paper's uniqueness lies in measuring the population's diversity via the composite indicator created using the principal component analysis which covers ethnic, linguistic, and religious fragmentation of the population in EU countries in 2000-2023.

The paper is organized in the following way. After the Introduction, the section on State of the Art, which presents related literature contributions to the topic, is listed. In the section of Methods and Data, the research design and employed data are described. The main results of the paper are presented and discussed in the Results and Discussion section. The paper ends with the Conclusion.

2 State of the Art

Ethnic fragmentation of the population (sometimes referred to as ethnic fractionalization, e.g. Bodman and Hodge, 2010; Bossert, D'Ambrosio, and La Ferrara, 2011; Bernhardtsson, 2019) enjoys wide attention in empirical research. Vigdor (2002) mentions that higher ethnic fragmentation is linked to various undesired effects in the macroeconomic and social fields such as lower economic growth, public spending, trust, and higher corruption. Bernhardtsson (2019) investigates the ethnic diversity and corruption. Alesina and La Ferrara (2002) mention that more ethnically fragmented populations face higher income disparities.

Bodman and Hodge (2010) mention that the perpetual state of uncertainty in a country might be driven by ethnic fragmentation. Similarly, Cassilde and Labart (2020) mention several implications of multiethnicity and multilingualism in countries, too. They consider the index of ethno-linguistic fragmentation the measure of the potential social and political tensions in the country. Earlier, Reilly (2000) mentioned that many countries faced uncertainty (civil wars and internal conflicts) within the country after the collapse of authoritarian regimes (e.g. CEE countries).

Alesina, Baqir, and Easterly (1999) refer to ethnic fragmentation and public spending – public goods. Bodman and Hodge (2010) connect the higher diversity of the population with the higher diversity in demand meaning the provisioning of public goods. It is in line with the findings of Panizza (1999) that the higher diversity of the population is related to the higher heterogeneity of the population in terms of their preferences. According to these authors, especially at the sub-national government levels (regional and local) fiscal decentralization is considered the means of integration of minorities (ethnic, linguistic, or religious). Diverse groups of the population might require more political powers to feel less excluded and, thus more

integrated into society. However, the Decentralization Theorem introduced by Oates (1972, 1999) responds to higher diversity in demand, too. The higher rates of fiscal decentralization are in line with lower central government spending (mentioned e.g. by Vigdor, 2002) and higher sub-national public spending (Maličká and Křížko, 2020). Belmonte, Dell'Anno, and Teobaldelli, (2018) consider federalism a means to prevent ethnic conflicts in ethnically diverse countries such as Belgium, Germany or Spain). Khan (2022) unveils the positive relationship between ethnic fragmentation and public expenditure on education. Easterly and Levine (1997) explain the relationship between ethnic fragmentation and public policy outcomes pointing out that in countries with higher ethnic fragmentation low economic growth is associated with higher political instability or higher public deficits. In a similar vein proceeds e.g. Siddique (2021). Marson, Migheli, and Saccone (2021) investigate the relationship between ethnic fragmentation and economic freedom focusing on developed and developing countries. They conclude that higher ethnic fragmentation is not necessarily linked to lower economic freedom because the effect depends on the countries' development.

Drazanova (2019) provides the dataset on the historical index of ethnic fragmentation in the period 1945-2013. Drazanova (2019 and 2020) points to the observed dramatic changes in the population composition. However, the population's diversity is mainly described using ethnic fragmentation or fractionalization. The ethnic fragmentation of the population is usually connected with linguistic fragmentation. Taylor and Hudson (1972) introduced the index of ethnolinguistic fragmentation, which was employed in a plethora of empirical studies (like Mauro, 1995; Labart, 2010; Maličká and Křížko, 2020). Mauro (1995) investigates the relationship between corruption and economic growth, while the index of ethnolinguistic fragmentation is used as an instrument in this relationship. In a similar vein proceed Papyrakis and Mo (2014). According to Labart (2010), ethnolinguistic fragmentation is often analyzed concerning economic outcomes. However, Chadha and Nandwani (2018) clearly interlink the population's diversity-driven worsening in social and political fields (as poor quality of institutions, corruption, trust, and internal conflicts) with the worsening of economic outcomes. Chakravarty et al. (2019) mention the negative relationship between social fragmentation and the economic performance of the country which is in line with the statement of Chadha and Nandwani (2018) and confirmed by a myriad of empirical studies (e.g. Easterly and Levine, 1999; Alesina et al., 2003).

Besides, Okediji (2005) proposes to employ religion as a factor to catch the population's diversity in the literature on economic development, too. Chakravarty et al. (2019) deal with religious fragmentation and mention that socially homogenous societies tend to cooperate compared to fragmented societies. It corresponds with the findings of Bodman and Hodge (2010), and Cassilde and Labart (2020) that higher fragmentation refers to higher political and social tensions. Walsh-Dilley (2019) agrees that increases in religious fragmentation cause higher tensions and conflicts, thus have disintegrating effects on society. Khalid (2011) states that the socio-religious fragmentation of the population is a serious threat in terms of the integrity and security of the society, too.

As Drazanova (2019, 2020) mentions the increasing ethnic diversity over the world, Walsh-Dilley (2019) points out the increasing religious diversity, too. Even in Europe, after the collapse of authoritarian regimes the churches enjoyed freedom (Tēraudkalns, 2020), the modernity brought the decline in religion (Berger, 2012). According to Martin (2006) and Margry (2012), Europe faces religious fragmentation and secularization. However, as Mariani (2017) mentioned, religious demands are often converted into outcomes of public policies. Lane and Ersson stress that although it is expected that religious fragmentation has the same effect on society (democracy) as e.g. ethnic fragmentation, the final effect

on democracy depends on the type of religion when a religiously homogenous country still might not be democratic.

3 Methods and Data

Measuring the diversity of the population from ethnic, linguistic, and religious perspectives is based on the Herfindahl concentration index (or Herfindahl-Hirsch Index, HHI, mentioned e.g. by Rhoades, 1993). Referring to the expression of the fragmentation of the population's diversity (not concentration) we employ the decreasing transformation of the HHI, labeled as (1-HHI), like Easterly and Levine (1997), Alesina, Baqir, and Easterly (1999, 2000), Vigdor (2002), Alesina et al. (2003), Drazanova (2019), Maličká and Křížko (2020), Marson, Migheli, and Saccone (2021). The homogenous population achieves the fragmentation index close to zero. The fragmentation of the population increases with its diversity and for the population with many small groups, the fragmentation index achieves values close to one.

Many authors use the index of ethnolinguistic fragmentation of the population (e.g. Labart, 2010; Bossert, D'Ambrosio, and La Ferrara, 2011; Maličká and Křížko, 2020; Cassilde and Labart (2020). However, the literature on social fragmentation of the population recommends regard the religious fragmentation, too (e.g. Okediji, 2005).

We compute the fragmentation index (1-HHI) separately for ethnic (1-HHI E), linguistic (1-HHI L), and religious fragmentation (1-HHI R) in the period 2000-2023 for 27 EU countries. Data on ethnic, language, and religious groups of the population in 27 EU countries are collected from the World Factbooks published by the Central Intelligence Agency (CIA), which refer to the most populous groups in question usually with the percentage quantification. However, the index of linguistic fragmentation (1-HHI L) might be biased by the plurilingualism mentioned e.g. by Cassilde and Labart (2020).

To capture various forms of fragmentations, the Principal Component Analysis (PCA) was applied. PCA provides weights for input variables to ensure that the newly obtained variable best explains the deviations in the entire original dataset (Bro and Smilde, 2014). Although the values of these indices are in the same units, they have different ranges. Therefore, for data comparability, it is assumed that normalization is necessary to make them comparable. This adjustment can be done in several ways, such as z-scores and various types of data transformation or rescaling. In this case, since the indices are already standardized, such adjustment is not required (Blessing and Klaus, 2023). The result of the PCA is one principal component that will be used in further analysis.

The fixed effects model (FEM) assumes that individual effects are unobservable and not correlated with the explanatory variables. These effects remain constant over time for each cross-sectional group (e.g., countries). In a standard Ordinary Least Square (OLS) model, parameter estimates (beta) would be biased if these effects were not accounted for. The FEM is suitable when there is variability that could bias parameter estimates, as it captures individual heterogeneity across units that do not vary over time. However, it has a limited capacity to explain changes over time in the data (Novák, 2007). In the random effects model (REM) variables represent individual effects that influence observed values over time, with these effects varying across groups according to a specific distribution. These effects are assumed to be uncorrelated with the explanatory variables. Compared to the FEM, the REM is more flexible, as it allows for variability among groups and can estimate an average response for the entire dataset. However, it may be sensitive to fixed characteristics that cannot be captured by random effects alone (Gibbons, Serrato, and Urbancic, 2014).

For FEM we use equation (1) and for REM equation (2):

$$Y_{it} = \alpha_i + \beta \text{Diversity}_{it} + \sum_{k=1}^L \gamma_k X_{kit} + \varepsilon_{it} \quad (1)$$

$$Y_{it} = \alpha + \beta \text{Diversity}_{it} + \sum_{k=1}^L \gamma_k X_{kit} + u_i + \varepsilon_{it} \quad (2)$$

where:

Y_{it} is a dependent variable for country i in time t ; Diversity_{it} is an explanatory variable for country i in time t ; X_{kit} are k control variables for country i in time t , $k=1, \dots, L$; and ε_{it} and u_i are error terms.

Labeling, technical definition of dependent, explanatory, and control variables, and sources of variables included in the research are shown in Table 1.

Table 1 Research variables

Variable	Characteristic	Source
(1-HHI E)	Ethnic fragmentation of the population. Decreasing transformation of the Herfindahl-Hirsch Index.	CIA World Factbooks
(1-HHI L)	Linguistic fragmentation of the population. Decreasing transformation of the Herfindahl-Hirsch Index.	CIA World Factbooks
(1-HHI R)	Religious fragmentation of the population. Decreasing transformation of the Herfindahl-Hirsch Index.	CIA World Factbooks
Diversity PC1	PCA component with the highest eigenvalue and covering the highest proportion of the variability computed from (1-HHI E), (1-HHI L), and (1-HHI R).	Own
Public Debt	General government gross consolidated debt as % of GDP.	Eurostat
Economic growth	Growth of the Gross Domestic Product at market prices per capita.	Eurostat
Income inequalities (disparities)	Gini index - the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.	The World Bank
Political instability	Negative Political Stability Index which is a composite measure reflecting the likelihood of a disorderly transfer of government power, armed conflict, violent demonstrations, social unrest, international tensions, terrorism, as well as ethnic, religious, or regional conflicts.	The World Bank
Unemployment rate	Unemployment. Percentage of population in the labor force.	Eurostat
Crises	The dummy variable became 1 in 2009 referring to the beginning of the Global financial crisis and in 2021 referring to the beginning of the multi-crisis (COVID-19, energy crisis, and war conflict).	Own
Inflation rate	All items HICP. Annual average rate of change.	Eurostat
Population growth	Population on 1 January. Number of persons. First differences.	Eurostat
Government Expenditure	General government expenditure as % of GDP.	Eurostat

Source: Own processing

As a dependent variable, we employ alternatively:

- Economic growth (inspired by e.g. Vigdor, 2002; Alesina and La Ferrara, 2002; Labart, 2010; Chadha and Nandwani, 2018; Chakravarty et al., 2019).
- Public debt (inspired by Easterly and Levine, 1997; Siddique, 2021; for other public policy outcomes see e.g. Alesina, Baqir, and Easterly, 1999; Vigdor, 2002; Bodman and Hodge, 2010; Mariani, 2017; Maličká and Křížko, 2020).
- Income inequalities (inspired by Alesina and La Ferrara, 2002).
- Political Instability (inspired by e.g. Easterly and Levine, 1997; Reilly, 2000; Vigdor, 2002; Bodman and Hodge, 2010; Khalid, 2011; Walsh-Dilley, 2019; Chadha and Nandwani, 2018; Cassilde and Labart, 2020)

As the main explanatory variable, we employ the variable of the diversity of the population. It is a composite index

computed using the PCA based on the indices of ethnic, linguistic and religious fragmentation of the population expressed through the decreasing transformation of the Herfindahl-Hirsch Index (used e.g. in Easterly and Levine, 1997; Alesina, Baqir, and Easterly, 1999 and 2000; Vigdor, 2002; Alesina et al., 2003; Drazanova, 2019; Maličká and Křížko, 2020; Marson, Migheli, and Saccone, 2021). The component with the highest eigenvalue is then used as a regressor in an econometric analysis of the relationship between the population's diversity and macroeconomic outcomes.

As control variables, we employ a set of variables determining hereinbefore mentioned dependent variables. They include:

- Crises (e.g. Paulus, Figari, and Sutherland, 2017; Ingham, 2023).
- Unemployment rate (e.g. Horváthová et al., 2012; Galiński, 2015).
- Inflation rate (e.g. Šulíková et al, 2015; Shaukat, Zhu, and Ijaz Khan, 2019).
- Population resp. Population growth (e.g. Šulíková et al., 2015).
- Public expenditure (e.g. Parui, 2020; Arawatari, Hori, and Mino, 2023).

We compute the estimations using PC1 and then we alternatively employ (1-HHI E), (1-HHI L), and (1-HHI R) into the estimations to compare the results with those of PC1. The comparison of models is provided based on the approach of Maličká and Křížko (2020), who expressed the fragmentation of the population by the maximum value of ethnic and linguistic fragmentation indices.

Table 2 displays the descriptive statistics of all variables included in the research.

Table 2 Descriptive statistics

Variable	Mean	Median	S.D.	Min	Max
(1-HHI E)	0.242	0.230	0.168	0.000	0.658
(1-HHI L)	0.199	0.167	0.177	0.000	0.630
(1-HHI R)	0.381	0.362	0.200	0.020	0.938
Public Debt	60.10	53.50	35.50	3.800	207.0
Economic growth	0.053	0.045	0.065	-0.201	0.346
Income disparities	31.20	31.20	3.71	23.20	41.30
Political instability	-8.770	-7.600	4.660	-31.40	0.000
Unemployment rate	8.360	7.300	4.280	2.000	27.50
Crises	0.083	0.000	0.277	0.000	1.00
Inflation rate	3.040	2.300	3.740	-1.700	45.70
Population growth	3.3e+004	9.7e+003	1.7e+005	-1e+006	1.1e+006
Government Expenditure	45.00	44.80	6.810	20.70	64.90

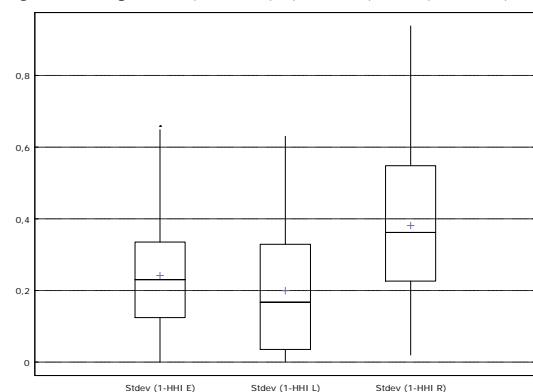
Source: Own processing

4 Results and Discussion

In the first step of the empirical analysis, we focus on computing the ethnic, linguistic, and religious fragmentation of the population using the decreasing transformation of the Herfindahl-Hirsch Index (labeled as (1-HHI E), (1-HHI L), and (1-HHI R)).

Figure 1 shows a comparison of evidenced variability of (1-HHI E), (1-HHI L), and (1-HHI R) measured by standard deviation. The highest average and variability in the EU 27 countries in 2000-2023, thus the largest changes, are observed in the case of religious fragmentation of the population.

Figure 1. Boxplots of (1-HHI E), (1-HHI L), and (1-HHI R)

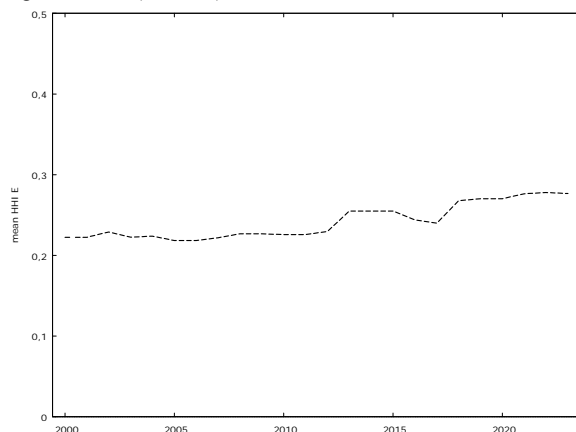


Source: Own processing

4.1 Ethnic fragmentation in the EU

Ethnic fragmentation of the EU population measured as (1-HHI E) increases in the period 2000-2023 with a mean value of 0.242 (see Table 2). Figure 2 shows the group means of (1-HHI E) in EU 27 countries in 2000-2023.

Figure 2 Mean (1-HHI E)



Source: Own processing

The highest variability of the ethnic fragmentation of the population in EU 27 countries in 2000-2023 expressed by the standard deviation of the (1-HHI E) is observed in the Czech Republic (see Figure 3), then in Sweden and Spain. Visible changes in the ethnic fragmentation of the population are obvious also in Ireland, Netherlands, Belgium, Austria, Croatia, and Bulgaria. For the Czech Republic, the continuous evident increase in foreigners since the change of the regime in 1989 is observed. Besides the re-opening of the borders, which influenced the homogeneity of the Czech population (Czech Statistical Office, 2024), in the past two decades, several reasons caused the increase in the population's heterogeneity e.g. economic (migration waves from Africa and Asia), political (migration of population from Eastern Europe, Russia, Ukraine) and related to the integration (EU accession). The most heterogeneous population is evidenced in the capital city.

Figure 3. Variability of (1-HHI E)

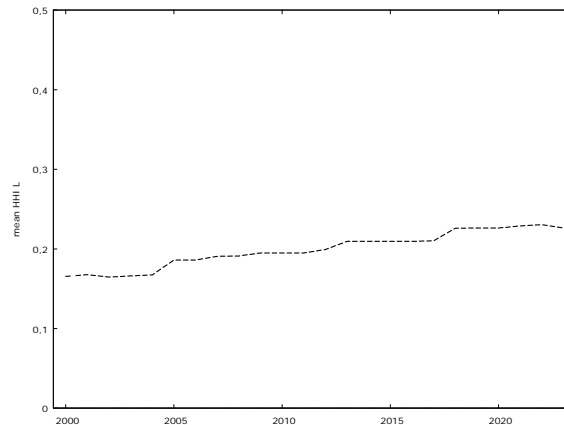


Source: Own processing

4.2 Linguistic fragmentation in the EU

Linguistic fragmentation of the population in EU 27 countries is measured as (1-HHI L). We can observe an increase in linguistic fragmentation in the EU with a mean value of 0.199 (Table 2). Figure 4 shows the group means of (1-HHI L) in EU 27 countries in 2000-2023.

Figure 4 Mean (1-HHI L)



Source: Own processing

The highest variability of the linguistic fragmentation of the population in EU 27 countries in 2000-2023 expressed by the standard deviation of the (1-HHI L) is observed in Luxembourg and Lithuania (see Figure 5), in the Czech Republic, Slovakia, Austria, and Bulgaria. A lot of countries have evidenced a low variation of the (1-HHI L) in the past two decades, while Sayers and Láncoš (2017) mention that regional and minority languages become less appealing in the EU.

Figure 5. Variability of (1-HHI L)

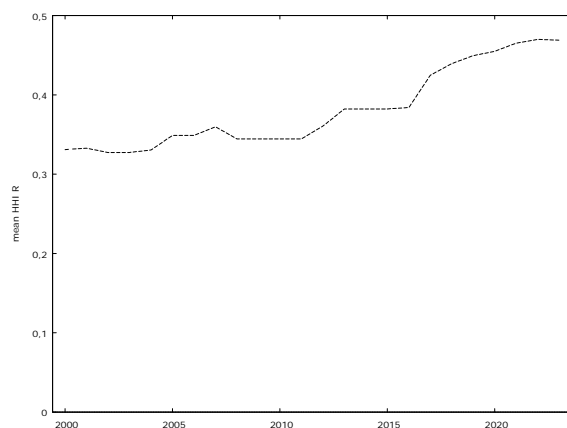


Source: Own processing

4.3 Religious fragmentation in the EU

Religious fragmentation of the EU population measured as (1-HHI R) increases in the period 2000-2023 more significantly as ethnic and linguistic fragmentation. It ranges between 0.3 and 0.5 with a mean value of 0.381 (as shown in Table 2). Figure 6 shows the group means of (1-HHI R) in EU 27 countries in 2000-2023.

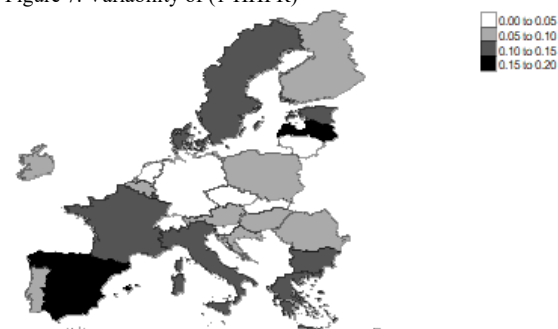
Figure 6 Mean (1-HHI R)



Source: Own processing

In the case of the religious fragmentation of the EU's population, a visible increase in religious diversity is evidenced in line with the findings of Arnaiz et al. (2013), who mentioned that all EU countries guarantee by their Constitutions the freedom of religion to be the fundamental right. The highest variability of religious fragmentation is observed in Spain and Latvia. Vicente Torrado and Urrutia Asua (2023) mention obvious secularism and religious pluralism observed in Spain in the last two decades. As mentioned in Tēraudkalns (2020), in Latvia very high index of religious diversity is observed due to the fragmentation of religious groups. Many other EU countries evidence higher changes in the diversity expressed by the declared religion, e.g. Sweden, France, Italy, Bulgaria, and Greece. A lower variability of religious fragmentation is observed in Finland, Belgium, Ireland, Portugal, Poland, Austria, Hungary, Croatia, Romania, and Cyprus. Figure 7 shows the variability of (1-HHI R) in EU 27 countries in 2000-2023 expressed by the standard deviation of the (1-HHI R).

Figure 7. Variability of (1-HHI R)



Source: Own processing

4.4 Index of population diversity

In the next step of the conducted research, we created a composite index of population diversity using PCA. This index presents a linear combination of (1-HHI E), (1-HHI L), and (1-HHI R). The PCA created three principal components (PC1, PC2, and PC3) that cumulatively cover 100% of the fragmentation variability. The first principal component,

PC1, covers 59,37% of the variability, the second, PC2 covers 29,28%, and the third covers 11,35% of the variability (see Table 3). As the PC1 has the highest eigenvalue (its eigenvalue is higher than the mean) in further analysis we decided to use this component as the regressor determining the selected macroeconomic variables.

The eigenanalysis of the correlation matrix is shown in Table 3.

Table 3 Eigenanalysis of the correlation matrix

Component	Eigenvalue	Proportion	Cumulative
PC1	1.7811	0.5937	0.5937
PC2	0.8785	0.2928	0.8865
PC3	0.3404	0.1135	1.0000
Eigenvectors (component loadings)			
	PC1	PC2	PC3
(1-HHI E)	0.677	0.002	0.736
(1-HHI L)	0.522	0.704	-0.482
(1-HHI R)	0.519	-0.710	-0.475

Source: Own processing

4.5 Macroeconomic implications of population diversity

In the last step of investigating, we employ the Index of population diversity (labeled as Diversity) as a main explanatory variable in the regression analysis to examine the relationship between population diversity and selected macroeconomic outcomes. We run the FEM and REM. Based on the Hausman test we decide whether FEM or REM is adequate. To compare the observed results with each of the parts of the composite index, in a similar vein we conduct regression analysis where the main explanatory variables (1-HHI E), (1-HHI L), and (1-HHI R) are alternatively employed.

In the case of economic growth, the results show the expected negative effect of increasing diversity on the growth of the GDP per capita in line with the assumptions of Vigdor (2002), Alesina and La Ferrara (2002), Labart (2010), Chadha and Nandwani (2018), and Chakravarty et al. (2019) (see Table 4). However, the beta estimates are not statistically significant. Besides, none of the fragmentation individual indices are statistically significant even though their beta estimates have negative signs, too.

Table 4 Results of estimations on economic growth

	Diversity measured as			
	PC1	(1-HHI E)	(1-HHI L)	(1-HHI R)
Intercept	0.2842 (<0.0001) ***	0.2910 (<0.0001) ***	0.2891 (<0.0001) ***	0.2740 (<0.0001) ***
Diversity	-0.0008 (0.8753)	-0.0296 (0.3424)	-0.0438 (0.3909)	-0.0317 (0.2277)
Unemployment rate	-0.0023 (0.0150) **	-0.0023 (0.0158) **	-0.0024 (0.0137) **	-0.0021 (0.0238) **
Crises	-0.0355 (<0.0001) ***	-0.0355 (<0.0001) ***	-0.0356 (<0.0001) ***	-0.0358 (<0.0001) ***
Inflation	0.0060 (<0.0001) ***	0.0060 (<0.0001) ***	0.0060 (<0.0001) ***	0.0060 (<0.0001) ***
Population growth first diff	-5.4e-08 (0.0160) **	-5.4e-08 (0.0166) **	-5.4e-08 (0.0149) **	-5.1e-08 (0.0140) **
Government Expenditure	-0.0051 (<0.0001) ***	-0.0050 (<0.0001) ***	-0.0050 (<0.0001) ***	-0.0051 (<0.0001) ***
Hausman test p-value	6.1e-36 FEM	1.8e-26 FEM	4.5e-28 FEM	7.1e-24 FEM
adjR2	0.2921	0.2931	0.2940	0.2947

Note: p-values of beta estimates in parentheses, *** denotes significance level 0.01, ** 0.05, and * 0.1.

Source: Own processing

When examining the relationship between the population's diversity and public debt, the results show the expected positive effect of increasing diversity on the public debt in line with expectations posed by Easterly and Levine (1997) when diverse populations create pressure on public policy outcomes

(see Table 5). The increasing diversity of the population is tied to the increase in public debt. Similar results are observed when employing the (1-HHI L), and (1-HHI R), while the beta estimate of (1-HHI E) is not statistically significant.

Table 5 Results of estimations on public debt

	Diversity measured as			
	PC1	(1-HHI E)	(1-HHI L)	(1-HHI R)
Intercept	-20.472 (0.1800)	-29.852 (0.0886) *	-27.493 (0.1228)	-37.224 (0.0199) **
Diversity	6.8799 (0.0836) *	27.082 (0.3892)	34.515 (0.0837) *	39.899 (0.0462) **
Unemployment rate	1.2566 (0.0425) **	1.1254 (0.0640) *	1.1784 (0.0507) *	1.2346 (0.0537) *
Crises	-0.3582 (0.8085)	-0.2379 (0.8789)	-0.1492 (0.9234)	-0.5109 (0.7131)
Inflation	-0.4482 (0.0178) **	-0.4325 (0.0145) **	-0.4255 (0.0144) **	-0.5073 (0.0143) **
Population growth first diff	-1.9e-05 (0.0485) **	-2.1e-05 (0.0543) *	-2.1e-05 (0.0621) *	-1.3e-05 (0.0541) *
Government Expenditure	1.6102 (0.0003) ***	1.6994 (0.0004) ***	1.6282 (0.0008) ***	1.6516 (0.0002) ***
Hausman test p-value	0.0003 FEM	0.0066 FEM	8.7e-05 FEM	0.0002 FEM
adjR2	0.3558	0.3206	0.3245	0.3657

Note: p-values of beta estimates in parentheses, *** denotes significance level 0.01, ** 0.05, and * 0.1.

Source: Own processing

Estimation results on the relationship between the population's diversity and income disparities are shown in Table 6.

Table 6 Results of estimations on income disparities

	Diversity measured as			
	PC1	(1-HHI E)	(1-HHI L)	(1-HHI R)
Intercept	31.517 (<0.0001) ***	30.851 (<0.0001) ***	30.958 (<0.0001) ***	30.924 (<0.0001) ***
Diversity	0.4569 (0.0922) *	2.5543 (0.1099)	3.5479 (0.0207) **	1.4254 (0.3831)
Unemployment rate	0.1867 (0.0057) ***	0.1826 (0.0067) ***	0.1819 (0.0068) ***	0.1816 (0.0068) ***
Crises	-0.0999 (0.6156)	-0.0682 (0.7323)	-0.0704 (0.7190)	-0.0812 (0.6745)
Inflation	0.0303 (0.6929)	0.0212 (0.7943)	0.0222 (0.7936)	0.0164 (0.8353)
Population growth first diff	4.6e-07 (0.4074)	3.6e-07 (0.5411)	3.0e-07 (0.6214)	4.6e-07 (0.4138)
Government Expenditure	-0.0422 (0.2277)	-0.0399 (0.2345)	-0.0443 (0.1836)	-0.0395 (0.2346)
Hausman test p-value	0.0005 FEM	0.0032 FEM	0.0081 FEM	0.0014 FEM
adjR2	0.1553	0.1441	0.1504	0.1396

Note: p-values of beta estimates in parentheses, *** denotes significance level 0.01, ** 0.05, and * 0.1.

Source: Own processing

When analyzing the relationship between the population's diversity and income disparities, the results show the expected positive effect of increasing diversity on income disparities (see Table 6). The results are in line with the expectations of Alesina and La Ferrara (2002). The increasing diversity of the population is tied to the increase in income disparities. Similar results are observed when employing the (1-HHI L), while the beta estimates of (1-HHI E), and (1-HHI R) are not statistically significant.

In the case of political instability (see Table 7), the results show the expected positive effect of increasing diversity on political instability. The results are in line with statements of e.g. Easterly and Levine (1997), Reilly (2000), Vigdor (2002), Bodman

and Hodge (2010), and Chadha and Nandwani (2018). The increasing diversity of the population contributes to political friction and tensions. Similar results are observed when employing the (1-HHI L), while the beta estimates of (1-HHI E), and (1-HHI R) are not statistically significant.

Table 7 Results of estimations on political instability

	Diversity measured as			
	PC1	(1-HHI E)	(1-HHI L)	(1-HHI R)
Intercept	-3.8697 (<0.0001) ***	-4.1000 (<0.0001) ***	-4.1408 (<0.0001) ***	-4.1965 (<0.0001) ***
Diversity	0.1850 (0.0257) **	0.7320 (0.2235)	1.696 (0.0006) ***	0.7002 (0.2079)
Unemployment rate	-0.9531 (<0.0001) ***	-0.9566 (<0.0001) ***	-0.9542 (<0.0001) ***	-0.9553 (<0.0001) ***
Crises	-0.1272 (0.0491) **	-0.1219 (0.0571) *	-0.1205 (0.0560) *	-0.1285 (0.0465) **
Inflation	-0.0044 (0.5172)	-0.0049 (0.4988)	-0.0048 (0.4842)	-0.0055 (0.3971)
Population growth first diff	-2.4e-07 (0.3694)	-2.9e-07 (0.3004)	-3.2e-07 (0.2894)	-2.3e-07 (0.3957)
Government Expenditure	0.0706 (<0.0001) ***	0.0725 (<0.0001) ***	0.0693 (<0.0001) ***	0.0724 (<0.0001) ***
Hausman test p-value	1.1e-15 FEM	1.4e-06 FEM	1.4e-13 FEM	1.5e-11 FEM
adjR2	0.9698	0.9691	0.9699	0.9693

Note: p-values of beta estimates in parentheses, *** denotes significance level 0.01, ** 0.05, and * 0.1.

Source: Own processing

5 Conclusion

In the past two decades, the EU's population faced several changes when considering its heterogeneity. The relaxation of totalitarian regimes in Central and Eastern European countries, integration processes, external shocks, and migration waves influenced the diversity of the population. According to the related literature, the increasing heterogeneity of the population has several macroeconomic implications.

The paper focuses on the relationship between population diversity and selected macroeconomic outcomes – economic growth, public debt, and income disparities. Besides, the other public policy outcome – political instability, which affects the macroeconomic outcomes, is also considered.

The econometric analysis using fixed effect and random effect panel data models is conducted in 27 European Union countries in 2000-2023. Changes in the population's diversity are measured using the decreasing transformation of the Herfindahl-Hirsch Index to express the ethnic, linguistic, and religious fragmentation of the population. To capture the overall effect of the changes in the diversity of the population in the EU, the composite index based on principal component analysis is constructed. The first component with the highest eigenvalue is a regressor of selected macroeconomic outcomes.

The results show the increasing diversity of the population. As expected, a diverse population is in a statistically significant positive relationship with public debt, income disparities, and political instability, while in negative with economic growth. However, the relationship between diversity and economic growth is not statistically significant.

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Primary Paper Section: A

Secondary Paper Section: AH

SURVEY ON INTELLIGENCE TEST OF SMART TRANSLATORS

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Abstract: Software tools for translating texts from foreign languages are now part of the practice of almost any professional translator. It might even seem that the translation process has been completely automated, making it the exclusive domain of computers, in which the human factor, i.e. the role of the translator, no longer plays a role. During our own translation work, we had the opportunity to check the accuracy and efficiency of selected translation software (Bing Microsoft Translator, DeepL, and Google Translate). We report on our experience with the practical use of CAT (computer-aided translation) to point out, in particular, the shortcomings of AI translators that we encountered in 2022 when translating long continuous texts from English into Slovak. We give examples of specific software errors as well as results of testing the translation of more complex concepts.

Keywords: Analysis of the translators' errors detected when translating from ENG to SL, Computer-Aided Translation (CAT), Machine Translation (MT), Post-editing (or postediting), AI Translation

1 Introduction

Since computers have become a part of almost every household, nobody can imagine life, especially working, without them. The same is true for professional translators. The tools they use to help them with their translations are becoming increasingly sophisticated. However, in the modern era of computing, a phenomenon called artificial intelligence (AI) is increasingly coming to the fore, and much is expected of it. *"Artificial because it is tied to a man-made artifact. But intelligence - there are multiple perspectives on this. But it is quite sufficient to state that if the behaviour of this system is considered intelligent by humans, it is intelligent."*¹ Compared to traditional computer programs, it contains algorithms that allow you to learn and develop your skills based on previous experience, the purpose is to achieve better and higher-quality results. Thus, AI algorithms are in part autonomous compared to traditional algorithms. It will surprise no one today that artificial intelligence (AI) algorithms are a common part of almost any device, computer software, or mobile phone application. Even a common text editor that detects spelling mistakes already uses AI functions. Software translators from/into foreign languages are another example of their use. Thanks to the fact that they are also freely accessible on the Internet, they are now actively helping both professional translators and everyone around the world overcome language barriers and significantly reduce the time needed for translation. Will they eventually replace professional translators altogether? Will artificial intelligence overwhelm human intelligence? In this paper, we aim to map this very situation and at least partially evaluate the current level of software translation tools – online translators with integrated AI (artificial intelligence) capabilities – by focusing on and testing their abilities to translate text documents from English into Slovak, one-way. In the opposite direction, i.e. from the Slovak language to the English language, we did not run any tests and did not test the translators. We think that without harming the general validity of our obtained results and the conclusions drawn. We logically assume the validity of the premise that when comparing the translations both ways, there would be no major deviations or differences between them in terms of correctness. Moreover, our testing cannot be considered totally exhaustive, reflecting all aspects of the problem, because such testing would be beyond our capabilities. Rather, the aim was to probe into these software tools from the perspective of translators during their working experience and to provide a list of interesting cases encountered during their working experience.

Recall that it all started in the relatively recent past, when machines began to gradually replace humans, or rather especially their physically hard human work. The valiant hero of a well-known American legend from the mid-19th century, a certain railway builder named John Henry, was said to have managed to defeat the machine and win the first prize in a wrestling match with a steam-powered jackhammer. Since then, however, times have changed and man can no longer compete with the machine in many areas. More recently, mankind is also facing a challenge from computers as to whether these machines will gradually replace even human mental work and intelligence. We can clearly see how, in the 21st century, the computational capacity of microprocessors can lightly perform extremely complicated mathematical calculations and the simulation of physical and other phenomena. More recently, there have been artistic feats of artificial intelligence such as the generating of graphic visualisations according to given verbal instructions (projects freely available on the Internet: DALL-E (OpenAI), Midjourney, Stable Diffusion, etc.), also by generating melodies, musical tones, and songs added. It wins over a good player in a game of chess, or in the game of Go, in which the computer has won the world championship. Well-known AI communication projects such as Bard (chatbot) or ChatGPT are now also part of Internet search engines, thus enabling interactive communication with the user at a higher level. They can correctly answer questions, thank for a compliment as well as politely say hello.

Artificial intelligence (AI) is also a frequent subject of science fiction literature and films. Some of those themes, let's be honest, are gradually becoming reality. If AI manages to surpass the intelligence of humans, we are talking about the so-called singularity. Concerns are growing that such a major turnaround may occur in the relatively near future, when AI will be able to fully replace human intelligence, thus displacing it from its current exclusive position of being the number one thinking entity on this planet. So, it may soon happen to any of us that our home computer will one day display on its monitor the message *"Cogito, ergo sum."* (*"I think, therefore I am."*; René Descartes)

2 Theoretical basis of the research problem

We devote the following chapter with subsections to presenting and explaining basic and important concepts and technical terms related to the topic of machine translators with integrated artificial intelligence (AI). We also outline the principle of testing and preliminarily present the evaluation of intelligent machine translators.

2.1 Testing method and the examined sample

The testing was conducted in 2022 during the author's translation work, when she recorded slight or major inaccuracies or, rarely, errors made by these intelligent tools and otherwise excellent helpers. We analyze the initial state of affairs as a basis for reassessing the qualities that machine translation (MT) offers. We seek to answer to what extent a human assistant/translator indispensable in the translation process is, and how necessary their supervisory role is. In terms of terminology, a human translator's role still counts (see definitions of MT, CAT, MAT, MAHT). Also, the results of a survey conducted by the Bulgarian Academy of Sciences, Institute of Philosophy and Sociology, Sofia, among the human translators interviewed (N = 101), state that *"Only 10% of respondents believe AI's impact could result in their profession's extinction."*²

We observed the system of translators' responses in the course of the author's translation practice, during the editing of text documents and news articles, which she was translating mainly during the year 2022. The scope of the text was approximately **500 standard pages of English texts**, i.e. a total of

¹ Farkaš, I., Jaslovský, M.: *Umělá inteligencia nevie, čo je realita.* (3/2023)

² Kirov, V., Malamin, B.: *Are Translators Afraid of Artificial Intelligence?* (Societies, 2022), 9 p.

approximately 10,000 characters, including spaces, which she translated into Slovak. The author's primary job is teaching English for Specific Purposes (ESP).

2.2 Intelligent translators vs. language corpora

To investigate the effectiveness of intelligent machine translators, one could under certain conditions also use the resources of the so-called corpus linguistics, which *"has gradually established itself as a separate linguistic discipline (on the level of e.g. cognitive linguistics, generative linguistics or psycholinguistics) that deals with all the common levels of linguistic description. It follows structuralism in its methodological foundations, but brings specific tools and methods to linguistic research."*³

The essential need for high-quality language corpora is also emphasized in the chapter on Statistical Machine Translation Technology. According to Aranea's Web Corpora publication (citation), *"A corpus serves as a tool for comparing phenomena in a native language with a foreign language and vice versa. It is used to look up phrases that no dictionary – neither explanatory nor translation dictionary – can capture."*⁴ With this in mind, under some specific circumstances, by adapting the corpus, it would be possible to investigate the effectiveness of intelligent translators using corpus linguistics, but the scope of this investigation would be beyond our technical and capacity capabilities. As we know, large national corpora contain such large amounts of data that they are usually limited mainly by the memory and disk capacity of the servers. *"In the use of corpora as a tool for translators, we mainly use the contrastive factors that corpora offer us. We search for expressions in a foreign language and examine the frequency of their occurrence while preserving the equivalent meaning. ...As an example, we look at the European Union texts, where there are even translations of translations from translations available. In the work of a translator extracting comparable language corpora, collocation analysis is especially important."*⁵

2.3 Statistical machine translation technology

Regarding the technology or the way intelligent translators work, it can be said that they need to store, analyse and process a wide range of data in the form of multilingual dictionaries for each language pair. They also process a robust database of language rules, which they gradually update and add new data to over time (also via AI). The goal is to achieve the most accurate and relatively fast translation possible.

*"...The software parses the text and creates a transitional representation from which the text in the target language is generated. This process requires extensive lexicons with morphological, syntactic, and semantic information, and large sets of rules... The software uses these complex rule sets and then transfers the grammatical structure of the source language into the target language... Statistical machine translation uses statistical translation models whose parameters are based on the analysis of monolingual and bilingual corpora... At least 2 million words are needed for a specific field, and even more for a general language. Theoretically, it is possible to reach the quality level, but most companies do not have such a large number of existing multilingual corpora to build the necessary translation models. In addition, statistical machine translation is processor-demanding and requires extensive hardware configuration to run the translation models at an average level of performance. ...Statistical MT provides good quality when large and proficient corpora are available."*⁶

For informative reasons, we mention that one of the interesting projects that resulted in the creation of web corpora and portals was the Aranea project, carried out at the Comenius University in Bratislava as a UNESCO activity of the Department of Plurilingual and Multicultural Communication between 2018 and 2020.

2.4 Terminology

In the following section, we present definitions of the most important terms related to the use of intelligent translators.

MT (Machine Translation) *"...indicates automated translation. It is the process of using computer software to translate text from one natural language into another natural language."*⁷

CAT (Computer-Assisted/Aided Translation) *"... indicates computer-aided translation. It is also called machine-assisted translation (MAT) or machine-assisted human translation (MAHT). These multiple abbreviations refer to essentially the same process of producing a translation, namely a translation produced by a real human, with part of the translation process facilitated by computer software."*⁸

*"...Pre-editing is the process by which a human prepares a document before using machine translation. Some call it ... global readiness editing... It can involve tasks of varying complexity and is ideally carried out by a qualified editor who can analyse the source text from the MT machine's perspective."*⁹

PEMT (Postediting Machine Translation) *"...machine translation after editing is a combination of machine and human translation. It is a type of translation process that involves an initial machine translation followed by post-editing by a human translator/editor. Human translators work on the text to produce the final version. They ensure that it is linguistically and stylistically correct and that it corresponds exactly to the original document."*¹⁰

*"Artificial intelligence (AI) is the intelligence of machines, which is its main feature that distinguishes it from the intelligence of animals and humans."*¹¹

*"AI is the ability of a computer or computer-controlled robot to perform actions that are normally performed by intelligent creatures, i.e. humans."*¹²

*"AI translation is simply the application of machine learning to different languages. It is highly sophisticated and thus far removed from conventional machine translation, which simply translates every word, often resulting in serious misinterpretation errors. However, AI tools can understand words, tone of voice, complex sentence structure, and even jokes or slang language. The result is usually higher quality translation and content that is more effectively customized to specific markets."*¹³

"Neural Machine Translation (NMT), translation with artificial intelligence, uses a technique known as neural machine translation - first developed by Google in 2016. NMT software mimics the method by which humans learn languages. These tools examine patterns in a language using a huge number of documents, both in the source and target language. NMT systems use this information to create codes that map almost any word or phrase to the target language. Neural learning systems are designed to improve their accuracy throughout their task until they reach a point at which they acquire natural language"

³ Cvrček, V., Kovářiková, D.: Naše řeč. (In: Benko, V., et al.: *Webové korpusy Aranea*, 2011), 15 p.

⁴ Benko, V. et al.: *Webové korpusy Aranea*. (2019), 13 p.

⁵ Benko, V. et al.: *Webové korpusy Aranea*. (2019), 14 p.

⁶ Systran: *What is Machine Translation? Rule Based Machine Translation vs. Statistical Machine Translation*. (www.systransoft.com, 2023)

⁷ Systran: *What is Machine Translation? Rule Based Machine Translation vs. Statistical Machine Translation*. (www.systransoft.com, 2023)

⁸ LiLo: *What is Computer-Assisted Translation or CAT?* (www.lilo.global, 2022)

⁹ Toppan Digital Language, Williams, D.: *What is Machine Translation Pre-editing?* (toppandigital.com, 2022)

¹⁰ QuickSilver: *Post-Editing Machine Translation*. (quicksilvertranslate.com, 2021)

¹¹ Wikipedia (en.wikipedia.org, 2022)

¹² Encyclopedia Britannica (www.britannica.com, 2022)

¹³ CCJK, AZ Susan: *What is AI Translation And How Does It Work?* (www.ccjk.com, 2022)

proficiency. An example is the artificial intelligence translation site Google Translate."¹⁴

2.5 A review of translators with integrated AI features

The next subchapter will summarize the basic knowledge and features of the most widely used translation software and applications based on integrated AI features.

"Google Translate... has long been one of the leaders in its sphere. This is mainly due to its high-quality infrastructure. Translation is provided by a modern neural network operating on the principle of machine learning. This means that every day it pushes the quality of its services forward. An indisputable advantage of Google Translate is the number of supported languages. It has already climbed above the magic hundred."¹⁵

"Lingea... has launched a unique project that is unparalleled in Central Europe. It aims to try to break through and has the ambition to gain the label of the best translator of Slavic languages."¹⁶

"DeepL (formerly Linguee). ...offers probably the most comprehensive and accurate translation from a variety of languages. ...Of course, Slovak and Czech are also available, and in excellent quality... Although relatively unknown to the general public, it was also one of the first to use neural networks in translation. The disadvantage is the support of 'only' 26 languages."¹⁷

"Bing Microsoft Translator ... is a user translation portal provided by Microsoft as a part of its Bing services for translating text or entire web pages into different languages. All translation pairs use Microsoft Translator, a neural machine translation platform and a web service developed by Microsoft Research as its backend translation software"¹⁸

"Trados Studio is a computer-aided translation software tool that offers a complete centralized translation environment for editing, controlling and managing translation projects and terminology. It is available as a local desktop tool or online. ...UK-based RWS, which offers language processing, content management, and intellectual property management services based on technology, was described in 2022 as 'the largest publicly listed language services provider'."¹⁹

From 2023, AI principles are already making their way into the realms of well-known internet search engines, namely the two most widely used ones, Google and Microsoft Bing, through the so-called "ChatGPT AI and Bing search engine linking is a reality. It can do this because it is the largest investor in OpenAI and has further increased its stake in January 2023."²⁰

"Alphabet, Google's parent company, responded by launching its own service called Bard (currently running a lightweight version of LaMDA/Language Model for Dialogue Applications), but it incorrectly answered a trivial question."²¹

For our article, we focused on the most used or best intelligent translators such as IBM translator, Reverso, or Translatedict, which we did not test. In practice, users also tend to use various voice translators, small "handheld" devices such as Langie LT-52, Timekettle WT2 Plus, or Vasco M3, whose level of translation quality most probably does not exceed the level and

quality of the best translators and global market leaders, based on the very definition that these are the leaders. However, we have not looked into them further.

3 Examples of the output of intelligent translators and a brief description of their recurrent errors

The tables below show the output translations of the intelligent translators, showing both correct and incorrect translation types. In the upper part of the given examples, we offer the source language text (EN- English language) and then the best possible version of the translated text in the target language (SL- Slovak language) the s. c. Reference Translation.

3.1 Testing translators in translating proper nouns and geographical names

Artificial intelligence as the main thinking unit of intelligent translators, according to our judgment, could fully demonstrate its abilities in the case when it was necessary to think, reason, and make extra effort and activity, such as searching in an online encyclopaedia, to find the correct translation of the English name of the flower species to find the right counterpart in the Slovak language. In our example 1, we give an example of the English name of a flower (Leopard's banes), which does not correspond very well with its Slovak equivalent, and is certainly not its literal translation. It is therefore a translation issue. Unfortunately, it turned out that all tested online translators were not successful in this respect. We believe that this is an area where these programs cannot be fully relied upon. The inevitable thing was to take personal initiative and start searching the Internet on your own. Based on the English name and the appearance of the flower, it was possible to identify its Latin name (*Doronicum orientale*). With the help of this information, it has been relatively easy to click through the online encyclopaedia to the correct name in the Slovak language (*Kamzičník východný*). We think that such a trivial investigative activity on the Internet could also be handled by an AI that can solve much more complicated tasks. We do not know exactly where the problem is, but hopefully, the software developers will fix it soon. Below, we provide specific examples of the output of individual AI-integrated translators.

Example No. 1

ENG.	Everywhere are high alpine Tatra bluebells and <i>Leopard's banes</i> .
SLOV.	Všade sú vysokohorské tatranské zvončeky a <i>kamzičníky východné</i> .

DeepL	Všade sú vysokohorské tatranské zvončeky a <i>leopardie bane</i> .
Google Translate:	Všade sú vysoké alpské tatranské zvončeky a <i>leopardie šišky</i> .
Bing	Všade sú vysokohorské tatranské zvončeky a <i>leopardie bane</i> .
Microsoft:	

Another problematic area for intelligent translators was the translation of some geographical terms. Again, we note that most of the output of these applications was correct, but due to the error rate of the translations, it was necessary to check whether the translated name corresponded to the correct geographic area. The presence of a "human" translator was therefore absolutely necessary. We have many places on the globe with similar if not almost identical names. A good example of the failure of translators with integrated AI functions is a situation in the author's experience when it was necessary to translate based on the overall context of the text to make it clear which country's name was being translated. In this case, it is the region of *Kurónsko*, a historical territory near the city of Riga in Latvia. Most translators, however, have concluded that it is the area around the city of Kursk in Russia, the Kursk region, which is different and located about 250 km away from the aforementioned Curonian region, and on the territory of a completely different autonomous country. Thus, confusion can

¹⁴ CCJK, AZ Susan: What is AI Translation And How Does It Work? (www.ccjk.com, 2022)

¹⁵ onlineprekladac.eu: Najlepši prekladače v roce 2021: Online prekladače, prekladače pro mobily i prohlížeče. (www.onlineprekladac.eu, 2021)

¹⁶ onlineprekladac.eu: Najlepši prekladače v roce 2021: Online prekladače, prekladače pro mobily i prohlížeče. (www.onlineprekladac.eu, 2021)

¹⁷ stiahnut.sk: Najlepšie internetové prekladače pre rok 2022. (stiahnut.sk, 2021)

¹⁸ Wikipedia (en.wikipedia.org, 2022)

¹⁹ Wikipedia (en.wikipedia.org, 2022)

²⁰ Koubský P.: Zbesilé preteky o vyhládávaca s umelou inteligenciou. Vyhrá Google alebo Microsoft? (Denník N/dennikn.sk, 2023)

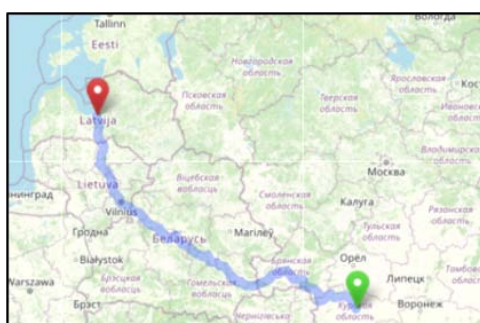
²¹ Tomek, R.: Graf dňa: Šíboj umelých inteligencií sa preniesol na akciové trhy a Google platí za omyl tej svojej. (Denník E/e.dennikn.sk, 2023)

easily arise in a translation where the translated text has explicitly stated an explicit statement: "In this text, we are talking about historical territory in Latvia. A ride in a Curonian fishing boat is a must." However, we found the correct translation in the output of one of the three online translators tested. All the AI had to do was read with understanding and look at the map. (Img. No. 1).

Example No. 2

EN. A ride in a *Curonian* fishing boat is a must.
SL. Plavbu na *kurónskej* rybárskej lodi nemožno vynechať.

DeepL Translate:	Jazda v <i>kurskom</i> rybárskom člene je povinná.
Google Translate:	Nevyhnutná je jazda na <i>kurskej</i> rybárskej lodi.
Bing Microsoft:	Jazda na <i>kurónskej</i> rybárskej lodi je nevyhnutnosťou.



Img. No. 1 (Source: OpenStreetMap.org)

In the case of the ethnicity name, there was a curious case where one of the examined translators could not quite correctly distinguish between the name of the nationality and the type of animal. This is a rarity that may amuse and therefore we mention it in our paper. We note, however, that the overall context of the translated text available to the translator made it clear that these were the locals of the region in question. Thus, no extensive reasoning was necessary to infer this fact. However, when we tried to verify the case later, more than six months later, the translator had already assessed the situation well and translated the text correctly. So, there is a tendency to improve. This is a fundamental characteristic of AI, i.e., that it can learn and experience its own mistakes.

Example No. 3

EN. In those days a tiger cost less than a Castilian donkey. Do the local *lamas* know that?
SL. V tých časoch stál tiger menej ako kastílsky osol. Vedia to miestni *lámovia*?

DeepL Translate:	V tých časoch stál tiger menej ako kastílsky osol. Či to miestne <i>lamy</i> vedia?
Google Translate:	V tých časoch stál tiger menej ako kastílsky osol. Vedia to miestni <i>lámovia</i> ?
Bing Microsoft:	V tých dňoch stál tiger menej ako kastílsky somár. Vedia to miestni <i>lámovia</i> ?

The following sample was problematic for all three tested translators, which could not cope with the word "sumpters". To the detriment of the intelligence of the translators, as soon as the term is typed into an internet search engine, we are presented with the term "pack horse", which can be translated as draught animal (Br. E.) or draft animal (Am. E.)

Example No. 4

AJ Also, depictions and scenes from the *sumpters* over the Sölk Pass are on view.

SJ K videniu sú aj vyobrazenia a výjavy s *ťažnými zvieratami* nad priesmykom Sölk Pass.

DeepL Translate:	K videniu sú aj vyobrazenia a výjavy zo <i>summerov</i> nad priesmykom Sölk.
Google Translate:	K videniu sú aj zobrazenia a výjavy z <i>žumpy</i> nad priesmykom Sölk.
Bing Microsoft:	Na pohľad sú aj vyobrazenia a scény z <i>summerov</i> nad priesmykom Sölk.

From the given findings, we conclude that the intelligent translator in several cases had difficulty distinguishing the country according to the geographical or historical context implied by the text. The ambiguity of some terms or names may also be to blame. For example, 'Brittany' can refer to a female name, but also to the province of Brittany (France).

3.2 Test of translators' knowledge of local language phrases - idioms

To translate correctly, it is essential to know at least the basic regional cultural facts of the target country and its linguistic practices. A translation cannot be a purely technical issue, just as the following quotation says:

"Translation is not a simple interchange of words for words. The translator must interpret and analyse all the elements of the text and know how each word can the other words affect. This requires extensive expertise in grammar, syntax (sentence structure), semantics (meanings), etc. in the source and target languages, as well as knowledge of the different local regions."²²

Examples that aptly illustrate the diversity of established practices in the source/target languages are texts containing phrases/idioms. Some tend to be semantically related in both languages and their usage is very similar, such as "life isn't always rosy" meaning "život nebýva vždy ružový", or "people aren't buying it", meaning "people aren't going to be deceived or outwitted by this". However, some have quite different verbal forms in both languages, denoting identical or similar phenomena. We select examples that we have encountered during our translation practice and also test the translators' response according to a directed scenario, the so-called directed phase, in which the translators are given deliberately selected inputs whose translation may be problematic, to test the degree of ability to handle a given translation. Among the expressions selected in this way, we included, for example, "Talk the talk, walk the walk" and also "Pig in a poke." A looser translation of these established phrases and their Slovak equivalents could be the following phrases: "vodu káže – víno pije" (meaning "does not act as he speaks") and "kupovať mačku vo vreci" (meaning not knowing what exactly to buy, to take a risk, in the Slovak language it is conventional to talk about an animal - a cat, not about a pig). In this regard, we can say that the translators have failed. Other well-known phrases could be mentioned, but due to the size of the contribution we present them in an abbreviated form in the table below, without correcting and mentioning particular mistakes. (Eg.: There is an elephant in the room. Head over heels. Have a bumpy ride. In a nutshell, etc.)

Example No. 5

AJ He talks the talk, walks the walk.
SJ Vodu káže, víno pije.

DeepL Translate:	Hovorí, ako hovorí, a chodí, ako chodí.
Google Translate:	Rozpráva, chodí.
Bing Microsoft:	Rozpráva, chodí.

²² Systran: What is Machine Translation? Rule Based Machine Translation vs. Statistical Machine Translation. (www.systransoft.com, 2023)

Example No. 6

AJ Don't buy a pig in a poke.
SJ Nekupujte mačku vo vreci.

DeepL
 Translate: Nekupujte prasiatko v hrsti.
Google
 Translate: Nekupujte prasa v žite.
Bing
 Microsoft: Nekupujte prasa vo vreci.

Example No. 7

Take me for what I am cause I'll never change
AJ all my colours for you.
SJ Ber ma takú aká som, lebo pre teba nikdy nezmením všetky svoje vlastnosti. (to be continued ->)

DeepL
 Translate: Vezmi si ma takú, aká som, lebo pre teba nikdy nezmením všetky svoje farby.
Google
 Translate: Ber ma takú aká som, pretože pre teba nikdy nezmením všetky svoje farby.
Bing
 Microsoft: Ber ma takú, aká som, pretože pre teba nikdy nezmením všetky svoje farby.

Example No. 8

AJ: She'll go bananas if she sees that mess in the kitchen.

SJ: Bude šalier, keď uvidí ten neporiadok v kuchyni.

✓ Keď uvidí ten neporiadok v kuchyni, zblázni sa.

* Dá si banány, ak uvidí ten neporiadok v kuchyni.

* Pôjde na banány, ak uvidí ten neporiadok v kuchyni.

AJ: She has recently met her husband's ex-girlfriend and there was an elephant in the room because she really doesn't like to meet her at all.

SJ: Nedávno sa stretla s bývalou priateľkou svojho manžela a bola z toho veľmi nepríjemná situácia, pretože sa s ňou naozaj nerada stretáva.

* Nedávno sa stretla s bývalou priateľkou svojho manžela a bol z toho slon v porceláne, pretože sa s ňou naozaj vôbec nerada stretáva.

* Nedávno sa stretla s bývalou priateľkou svojho manžela a vizbe bol slon, pretože sa s ňou naozaj vôbec nerada stretáva.

* Nedávno sa stretla s bývalou priateľkou svojho manžela a v miestnosti bol slon, pretože sa s ňou vôbec nerada stretáva.

AJ: She's had a bumpy ride at school over the last few months.

SJ: V posledných mesiacoch to mala v škole ťažké.

✓ V posledných mesiacoch to mala v škole ťažké.

AJ: In an age of a plethora of information on the internet, some things need to be taken with a grain of salt.

SJ: V dobe množstva informácií na internete je niektoré veci potrebné brať s rezervou.

✓ V dobe množstva informácií na internete treba niektoré veci brať s rezervou.

✓ V dobe množstva informácií na internete treba niektoré veci brať s rezervou.

✓ V dobe množstva informácií na internete je potrebné brať niektoré veci s rezervou.

AJ: Digging a bit more we see that this data is cherry-picked because, despite local outliers, the average value of the mathematical function is within the norm.

SJ: Pri ďalšom skúmaní zistíme, že tieto údaje sú vybrané selektívne, pretože napriek miestnym extrémom je celková priemerná hodnota matematickej funkcie v norme. (a translation in the Slovak language is also permissible as tieto údaje sú ako vyberanie hrozienok z koláča)

* Pri hlbšom skúmaní zistíme, že tieto údaje sú vybrané z čerešníček, pretože napriek miestnym odlahým hodnotám je priemerná hodnota

<p>* Za posledných pár mesiacov mala v škole hrboľatú jazdu.</p> <p>* V posledných mesiacoch mala v škole hrboľatú jazdu.</p>	<p>matematickej funkcie v norme.</p> <p>✓ Keď sa trochu pohrabeme, zistíme, že tieto údaje sú vybrané, pretože napriek miestnym odlahým hodnotám je priemerná hodnota matematickej funkcie v rámci normy.</p> <p>* Ak sa pozrieme trochu viac, vidíme, že tieto údaje sú čerešničkou na torte, pretože napriek lokálnym extrémnym hodnotám je priemerná hodnota matematickej funkcie v norme.</p> <p>(*by DeepL T., Google T., Bing M. T.)</p>
<p>AJ: Complex numbers in a nutshell.</p> <p>SJ: Komplexné čísla v kocke.</p> <p>✓ Komplexné čísla v kocke.</p> <p>✓ Komplexné čísla v skratke.</p>	

The mathematical expression denoting the local extreme of the function in English "outlier" (given in the last example from the previous table) was translated correctly by only one translator. However, given the clear formulation of the sentence being about a mathematical function, we believe that the translators could have had a better "feel" for what is meant. The problem with translating mathematical expressions can also be seen in a later chapter, namely in the first translated expression from Translation Example 9. The Slovak term "prepona" (in the English language hypotenuse in the triangle) is translated as "Hypotension", which is not a correct translation in the Slovak language, being rather similar in form but different in meaning to the word "hypotension" indicating a drop in blood pressure/low blood pressure.

Based on the above examples, it can be concluded and stated that AI has primarily adhered to the denotative interpretation of the meaning of linguistic terms and has not delved into free translation, in which the connotative meaning of words, as well as whole sentences, can be applied more broadly. The translator DeepL Translate offered a selection of correctly translated terms, or those that belonged to the set of connotative meanings of a given term, as a part of the choice of options for translation, but the user had to click on the relevant item menu and decide, so to speak, for the translator.

3.3 Translators' test to determine the level of understanding of the text and translation within a given context

One of the main goals we have pursued is the ability of translators to understand the text, and especially the context, and then process the acquired information in the translation process. We expected and tried to show that translators can make logical inferences and draw conclusions when individual sentences are taken as true statements. We investigated the ability of translators to discern subtle nuances in meanings and the ability to use the correct translation of a given expression in the output. Especially in cases where, for example, the expression has multiple meanings (denotative and connotative). We have specifically chosen examples that have multiple meanings and can illustrate how their translation depends on the overall context of the whole text corpus. We give here an example of the word "pop", which has at least three different meanings. Starting with the designation of a musical genre (modern popular music), continuing in the meaning of explosive sound, it also denotes a sweet fizzy drink/lemonade or in the abbreviation of poppa (meaning father). The following is the expression "You got it!", which can mean "I understand" or "Yes, I will do that." We have tested the translators to determine the correct alternative translations of these expressions.

Example No. 9 (Translations of: "you got it" and "pop".)

AJ: The hypotenuse of a triangle cannot be longer

* "Priniesli by ste mi okuliare?" "Jasné, máš to!"

<p>than the sum of its two legs/sides. You got it?!</p> <p>SJ: <i>Prepona</i> trojuholníka nemôže byť dlhšia ako súčet jeho dvoch odvesien / ramien / ďalších dvoch strán. Rozumiete tomu?! (or Pochopili ste to?!)</p> <p>AJ: "Would you bring me glasses?" "Sure, you got it!".</p> <p>SJ: "Prinesol by si mi okuliare?" "Jasné, spravím to!" (or Jasne, prinesiem!)</p> <p>DeepL Translate: ✓ <i>Hypotenzíva</i> trojuholníka nemôže byť dlhšia ako súčet jeho dvoch ramien/strán. Chápete to?! ✗ "Prinesieš mi okuliare?" "Jasné, máš to!"</p> <p>Google Translate: ✗ <i>Prepona</i> trojuholníka nemôže byť dlhšia ako súčet jeho dvoch strán/nožičiek. Máš to?! ✗ "Prinesieš mi okuliare?" "Jasné, máš to!"</p> <p>Bing Microsoft Translator: ✗ <i>Prepona</i> trojuholníka nemôže byť dlhšia ako súčet jeho dvoch nôh/strán. Máš to?!</p>	<p>AJ: You haven't heard great music until you've heard this pop band.</p> <p><i>I haven't driven my mom and pop's car yet.</i></p> <p>SJ: <i>Ešte ste nepočuli skvelú hudbu, pokiaľ ste nepočuli túto popovú skupinu.</i></p> <p><i>Ešte som nešoféroval auto mojej mamy a otca.</i></p> <p>DeepL Translate: ✓ Nepočuli ste skvelú hudbu, kým ste nepočuli túto popovú skupinu. ✓ Ešte som nešoféroval auto mojej mamy a otca.</p> <p>Google Translate: ✗ Nepočuli ste skvelú hudbu, kým ste nepočuli túto popovú skupinu. ✗ Ešte som nešoféroval mamu a popovo auto.</p> <p>Bing Microsoft Translator: ✗ Nepočuli ste skvelú hudbu, kým ste nepočuli túto popovú kapelu. ✗ Ešte som nešoféroval auto mojej mamy a popu.</p>
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In the examples we have given, one can see that the translators were rather careful in their "reasoning" and the outputs were rather "literal". As if they were "afraid" to think abstractly. We go on to determine a person's gender identity or gender. Determining a person's gender identity or gender is also one of the things that can only be determined if the translator correctly assesses the gender of the person mentioned in the text. It is, therefore, necessary that an intelligent translator be able to analyse the meaning of the text in its context, i.e. be able to distinguish not only the denotative but also the connotative meaning of the translated text.

An example of an error made by intelligent translators when translating from SL to EN is the use of the personal pronoun **he** instead of **it** for inanimate nouns, which also occurred in some of our examined texts.

Example No. 10

AJ	Sovereign Volodymyr was born the son of a female slave who was made pregnant by King Svjatoslav. In the subsequent fratricidal war, he was the victor.
SJ	Panovník Volodymyr sa narodil ako syn otrokyne, ktorú kráľ Svjatoslav priviedol do stavu tehotenstva . V následnej bratovražednej vojne sa stal víťazom.

DeepL
Translate:

Panovník Volodymyr sa narodil ako syn **otrokyne, ktorú** kráľ Svjatoslav **priviedol do stavu tehotenstva**. V následnej bratovražednej vojne sa stal víťazom.

Google
Translate:

Panovník Volodymyr sa narodil ako syn **otrokyne, ktorú otehotnel** kráľ Svjatoslav. V následnej bratskej vojne

bol víťazom.

Bing
Microsoft:

Panovník Volodymyr sa narodil ako syn **otrokyne, ktorú otehotnel** kráľ Svjatoslav. V následnej bratskej vojne bol víťazom.

As we can see, the translators did quite well in this section in all its points and tests. We do not assume they have any problem understanding the poem's allegory, metaphor, or the punch line of a joke. Testing of the translators could continue on a much larger scale. Unfortunately, given our limited possibilities, we could map and analyse mostly the basic flaws and mistakes that occur in translations.

3.4 Translators' test for the correct word order usage in sentences and the use of the passive voice

As we have seen, translators can use the propositional logic. However, we also want to show their behaviour if they receive a sentence in the passive voice as input. Will they preserve the correct word order? In the Slovak language, in contrast to the English language, which uses the passive voice much more frequently, it is more natural to use the reflexive pronouns "*sa*" and "*si*" instead of the forms of the passive voice. In general, the passive voice is used when the action in the sentence is more important than the agent of that action. In contrast, in the active voice, the subject of the sentence is the doer of the action.

Example No. 11 (translation concerning the active and the passive voice)

AJ	„The Tragedy of Hamlet, Prince of Denmark“ was written by William Shakespeare.
SJ	"Tragédia o Hamletovi, princovi dánskom" bola napísaná Williamom Shakespearom. (trpný rod) "Tragédia o Hamletovi, princovi dánskom" napísal William Shakespeare. (činný rod)
DeepL Translate:	"Tragédiu Hamlet, princ dánsky napísal William Shakespeare.
Google Translate:	„Tragédiu Hamleta, princa dánskeho“ napísal William Shakespeare.
Bing Microsoft:	"Tragédia Hamleta, dánskeho princa" napísal William Shakespeare.

Example No. 12 (translation concerning the passive and the active voice)

AJ	The President is also expected to attend the event.
SJ	Prezidentova účasť na podujatí je očakávaná . (passive voice) <i>Očakáva sa, že aj prezident sa zúčastní na podujatí.</i> (active voice)
DeepL Translate:	<i>Očakáva sa, že na podujatí sa zúčastní aj prezident.</i>
Google Translate:	<i>Očakáva sa, že na podujatí sa zúčastní aj prezident.</i>
Bing Microsoft:	<i>Očakáva sa, že na podujatí sa zúčastní aj prezident.</i>

Based on the above examples, it can be concluded that intelligent translators do not leave the shift between the passive voice and the active voice to the human translator, but they handle it very well.

3.5 Test of processing versals or the capitalized words in translators

Both uppercase, or capital letters, and capitalization, or capitals but different in size (larger letters for originally uppercase letters and smaller uppercase letters for letters that were originally minuscules) were a problem for DeepL Translate. For the remaining two translators, we did not observe any significant

negatives, and therefore, their translations are presented sporadically in this chapter, namely when the translators mistranslated a Vietnamese name, the translators translated it as NGO - a non-governmental organisation. This is probably because abbreviations and acronyms (an acronym, as opposed to an abbreviation, is not spelt and pronounced as a separate word) tend to be capitalized.

Example No. 13

AJ	NGO DINH DIEM , the first president of SOUTH VIETNAM, was a dictator who persecuted the followers of BUDDHISM for many years. A large number of innocent monks were arrested and eventually executed before DIEM himself fell from power and was eventually killed.
SJ	NGO DINH DIEM , prvý prezident JUŽNÉHO VIETNAMU, bol diktátor, ktorý dlhé roky prenasledoval stúpencov BUDHIZMU. Veľký počet nevinných mníchov bol zatknutý a nakoniec popravený predtým, ako bol DIEM sám zbavený moci a nakoniec zabitý.
DeepL Translate:	Mimovládna organizácia DINH DIEM , prvý prezident JUŽNÉHO VIETNAMU, bol diktátor, ktorý dlhé roky prenasledoval stúpencov BUDHIZMU. Veľký počet nevinných mníchov bol zatknutý a nakoniec popravený predtým, ako DIEM sám padol od moci a bol nakoniec zabitý.
Google Translate:	Mimovládna organizácia DINH DIEM , prvý prezident južného VIETNAMU, bol diktátor, ktorý mnoho rokov prenasledoval stúpencov BUDHIZMU. Veľké množstvo nevinných mníchov bolo zatknutých a nakoniec popravených predtým, ako samotný DIEM padol z moci a bol nakoniec zabitý.
Bing Microsoft:	NGO DINH DIEM , prvý prezident Južného Vietnamu, bol diktátor, ktorý prenasledoval nasledovníkov budhizmu mnoho rokov. Veľké množstvo nevinných mníchov bolo zatknutých a nakoniec popravených predtým, ako sám DIEM padol od moci a bol nakoniec zabitý..

Example No. 14 (*only the translator DeepL is listed)

AJ	The city's popularity with both foreign visitors and the VIETNAMESE themselves is due to its wonderfully romantic atmosphere.
SJ	Oblúbenosť mesta u zahraničných návštevníkov aj samotných VIETNAMESE je spôsobená jeho úžasnou romantickou atmosférou.*
AJ	Here stands the statue of the last emperor of AUSTRIA... ..Karl the First. In 1921 he emigrated to MADEIRA.
SJ	Stojí tu socha posledného rakúskeho cisára... ..Karola Prvého. V roku 1921 emigroval do MAĎARSKA.*

4 Conclusion

In practice, there are hundreds or thousands more cases of artificial intelligence (AI) translators failing, but we have not encountered fundamentally bad or unusable translations, and intelligent translators have passed our intelligence test. We conclude that the examples of errors and shortcomings of

intelligent translators that we have given are only a partial, carefully selected sample from our translation experience. Because of the limited space of the text, we have selected the most typical and significant examples that show the direction in which intelligent translators could move. Over time, after repeatedly checking our selected software translators for errors, we confirmed that translators are gradually improving and applying machine learning. As a technical remark, we note that some mistranslations were caused by the source language putting certain important terms in the original text in the form of versals, i.e. capital letters, and if they were transliterated into normal form, i.e. only the first letter capitalized or all lower-case letters, the machine translators were already able to translate the term more correctly. Of course, from a quantitative point of view, machine translators outperform human translators, and from a qualitative point of view, despite some shortcomings, a high level of translation is achieved. A very practical aid for the human translator is the provision of a variety of multiple translation options for a particular term or phrase. We also note that the well-known statement of René Descartes mentioned in the introduction ("Cogito, ergo sum."), concerning human thinking and being, has not yet been applied absolutely in the case of intelligent translators, and the person of the translator is probably indispensable, which we have also tried to verify with the results of our paper. We conclude that thanks to intelligent translators, we can translate more efficiently and with higher quality, with a significantly reduced translation time.

In the very conclusion, machine translators, as well as the now popular phenomenon of artificial intelligence (AI), are certainly a powerful assistant and a good servant, but for a truly high-quality understanding and professional translation output, the role of a human translator is still, and in our opinion will continue to be in the future, essential, at least in the role of a supervisor and post-editor of translations. Thus, we can confirm the already cited results of the survey among translators conducted by the Bulgarian Academy of Sciences, Institute of Philosophy and Sociology, Sofia, (2022) among the translators interviewed (N = 101), which shows that only 10% of the respondents believe that the influence of artificial intelligence could lead to the extinction of their profession.²³ Another research (2019), conducted at the Dalian University of Technology, Dalian, China, also confirms the importance of the mutually beneficial coexistence of human translators and machine translation devices for the quality maintenance of translated texts: "The assessment shows that although the quality of machine translation is improving, the gap still exists between the quality of machine translation and human translation. Based on the research findings, the author predicts that machine translation cannot possibly replace human translation and the two will continue to coexist in the foreseeable future."²⁴

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Primary Paper Section: A

Secondary Paper Section: AI

THE COMPETITIVENESS OF THE VISEGRAD GROUP REGIONS IN THE CONTEXT OF HUMAN CAPITAL

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This paper was supported by the Slovak Ministry of Education's Scientific grant agency VEGA: "Study of key determinants of human capital and economic growth in the conditions of digital economy development". Project registration number: 1/0448/24.

Abstract: Competitiveness is an essential condition for regional development. Regional competitiveness is a result of many factors. To succeed in a competitive environment, regions must attract the necessary resources, which currently include human resources and human capital. The objective of this paper is to assess the competitiveness and the level of human capital in the regions of the Visegrad Group countries based on selected indicators in the two observed years 2017 and 2022 and to assess their interrelation. From the results of the competitiveness assessment, we conclude that the best performing regions are Prague, Budapest and Bratislava. When assessing the level of human capital, the Prague region, the Polish Warszawski stołeczny region, the Hungarian Budapest region and the Slovak Bratislava region are again among the best performers. Consequently, we confirmed a positive relationship between the level of human capital and the competitiveness of the regions.

Keywords: competitiveness, competitiveness indicators, human capital, human capital indicators, Visegrad Group.

1 Introduction

The success and economic level of individual national economies is dependent on the socio-economic level of their individual regions, which implies that regions play an increasingly important role in the economic development of states (Staničková, 2019). According to Bąk et al. (2022), the development of regions is a complex process that depends on many conditions. On one hand, emphasis is placed on the need to increase the competitiveness of regions and, on the other hand, on their sustainable development. Therefore, the development of regions and their competitiveness are closely interlinked. To succeed in a competitive environment, regions must attract the desired resources, such as capital, human resources and human capital, new technologies, firms. Crucial factors in the process of increasing the competitiveness of a region are also a well-developed innovation system and knowledge base, quality of public decision-making processes, quality of life, and functional networks that eliminate the risks of losing competitive advantage by diffusion of knowledge or technology to other regions. (Kačírková, 2009) The European Union also strives for the development of individual regions, and according to Fantechi and Fratesi (2024), competitiveness is a key feature of the EU's current regional policies aimed at reducing disparities between its territories. The European Commission has adopted regional competitiveness policy objectives as the main instrument to induce economic growth, export capacity and performance in the global market (Iacob, Iordache, 2023).

Differences among regions are typical not only for the European Union as a whole, but also for the countries of Central Europe, namely the Visegrad Group (Czech Republic, Slovakia, Poland and Hungary). These countries share a common history and similar features. Apart from Poland, these are smaller economies that are very vulnerable to various crises and recessions within the global economy. Their lower economic strength is compensated by higher specialization in production processes (Calgánková, 2020).

This study is aimed at assessing the competitiveness and the level of human capital in the regions of the Visegrad Group countries and assessing their interrelationship.

2 Theoretical backgrounds

Competitiveness is one of the main alternative indicators of economic performance, complementing the key indicator of economic performance, gross domestic product. It combines economic aspects with social aspects and thus more comprehensively monitors all important factors that reflect not only economic efficiency but also the social maturity of a country (Habánik et al., 2016), as competitiveness has a positive impact on long-term economic growth (Charles, Zegarra, 2014). As stated by Staničková (2019), competitiveness is one of the most observed characteristics of national economies today and is increasingly emerging in the assessment of their prosperity, well-being and living standards. The author further states that fostering regional competitiveness requires the creation of framework conditions for the development of necessary infrastructure, human capital, technology and efficient markets that can help attract talent and investment to raise the standard of living of the population (Staničková, 2019).

Competitiveness is an analysed and compared characteristic of different entities, such as companies, institutions, organizations, as well as different regions. In addition to the assessment of national and corporate competitiveness, regional competitiveness is more and more coming to the fore. At national level, competitiveness depends on regional competitiveness. Because, as Ežmale (2019) states, the concept of regional competitiveness is located between two levels of competitiveness (microeconomic and macroeconomic), and this concept has recently gained even more significance, which was mainly because more attention is paid to the regions and also that regional competitiveness is a source of national competitiveness (Ramik, Hančlová, 2012).

Regional competitiveness is the result of many factors. In this context, it should be kept in mind that regions have different geographical conditions, sources of raw materials, historical and economic development, as well as populations that share certain moral and ethical values, which are reflected in the social environment and overall culture of the region. (Pelantová & Kouřilová, 2016) It is difficult to clearly define, both because of the complexity of the functioning of a region as an economic and social unit (Žitkus, 2015), but also because it remains an area of contentious theoretical debate, with some arguing that it is about firms and not territories that compete for resources and markets (Huggins et al, 2014). On the other hand, it can be argued that sustained improvements in competitiveness are a prerequisite for growth and the very viability of production units, which has sparked interest in better assessing the regional and national levels of competitiveness (de la Vega et al., 2019). Different views on the notion of regional competitiveness also stem from which competitiveness factors are given more importance.

The ability to compete with other regions is thus understood as the ability to be economically active. According to Wokoun (2016), the competitiveness of a region depends on its attractiveness to investors and know-how, with the presence of entrepreneurship and immigration being its hallmark. Vukovic et al (2016) characterize the regional competitiveness as the ability to be productive and maintain a high standard of living. Accordingly, Jašková (2022) defines regional competitiveness as the ability of a region to support and attract economic activity to the region to raise the standard of living of its inhabitants.

The regional competitiveness in relation to the overall socio-economic level of regions is considered as the ability of regions to compete successfully with others and many aspects of socio-economic performance are considered in its assessment (Wokoun, Krejčová, 2013). As stated by Chrobocińska (2021), stimulating regional competitiveness is a challenging and complex process that leads to achieving a better competitive position in relation to other compared regions. In the view of

Svoboda et al. (2024), it is essential to understand how fiercely regions compete, where this rivalry comes from and what factors influence territorial economic attractiveness. It is necessary to understand that regional strategic management of competitiveness is a process of strategic decision-making on the choice of alternatives, formed by comparing the existing potential of a particular region with the opportunities and threats of its external environment, as well as with global changes in the external environment. (Borovitskaya et al., 2019). With this, the competitiveness of a region is defined both by the indicators that determine the ability of the region to compete with other regions and by the results that regional competitiveness has created. It is difficult to characterize the main factors of regional competitiveness, as many factors are both indicators and outcomes of competitiveness, thus they intertwine and influence each other.

As stated by Kouskoura et al. (2024), an analysis of key factors and their correlations, aimed at measuring regional competitiveness, provides valuable insights into what influences the growth and development of disadvantaged regions. According to Borovitskaya et al. (2019), the competitiveness of each region is based on certain competitive advantages in its different areas of activity. Among the factors of regional competitiveness can be included both indicators of economic performance, the labor market, the standard of living, the region's infrastructure endowment, factors characterizing the level of health care, educational infrastructure, environmental indicators, and, finally, the level of science and research or innovation. As Penatová and Kouřilová (2016) state, the definition of regional competitiveness is the basis for its measurement, which usually emphasizes those factors that can influence regional competitiveness. According to Bednářiková (2022), regional competitiveness is determined either by indicators that determine a region's ability to compete with other regions, or by the results that the competitiveness of the region has produced. In view of the above, it is possible to note a wide dispersion of indicators and of the methods used in scientific research to assess regional competitiveness.

Ramík and Hančlová (2012) used two methods of multicriteria decision making in assessing the competitiveness of NUTS2 regions in the Visegrad Group countries for the years 2000-2006: the Ivanovic deviation and DEA models. DEA models were also used by Charles and Zegarra (2014) in assessing the regional competitiveness. Pelantová, Kouřilová (2016) evaluated the regional competitiveness in the Czech Republic using the regional competitiveness index created by prof. Huggins for regions in the UK, which they adapted to the conditions of the Czech Republic regarding the availability of indicators. Their index consists of three sub-indices: inputs, outputs and outcomes. De la Vega et al. (2019) developed a multidimensional view of the competitiveness of Spanish Autonomous Communities, where they assessed 53 indicators covering 5 key areas (productive capital, human capital, social and institutional capital, infrastructure and knowledge). Navarro et al. (2017) assessed the level of Spanish regions using an index that contains 15 pillars. In each pillar there is a set of variables that allow measuring the annual value of the pillar index. These indices take values between 0 and 1, with a higher value representing a higher level of competitiveness.

Other competitiveness indices have been created by authors to assess regions in different countries, e.g. Latvia (Judrupa, 2021), India (Moirangthem, Nag, 2021), Italy (Scaccabarozzi et al., 2022), Peru (Charles, Zegarra (2014)), or to compare regions in a

specific territory (Lakócai, Capoani, 2023 - for 11 countries in Central and Eastern Europe; Richterová et al., 2021 for the EU27 countries). Several authors also use the RCI values developed and reported by the European Commission to assess the regional competitiveness (e.g. Lithuania, 2017; Alexa et al., 2021), or suggest its modification with the addition of other indicators (Bilbao-Terol et al., 2019; Maza, Hierro, 2024).

Research on regional competitiveness varies not only because of the number and structure of indicators used, but also because of the methods used. The use of multi-criteria evaluation methods is also quite common. These evaluation methods belong to the group of multivariate statistical methods. They are used when examining multivariate statistical sets. Their characteristics include the fact that they can synthesize several different features (indicators) into one integral indicator (the resulting characteristic) expressed by a specific number. The group of multicriteria methods includes, for example: the weighted sum of ranks method, the scoring method, the normalized variable method and the method of distance from a fictitious object (Šebo, Šebová 2010). A frequently used method for assessing regional competitiveness is the composite indicator (Jašková, 2022) or cluster analysis (Chrobocińska 2021, Jašková and Havierníková, 2020).

3 Goal and methodology

The goal of the paper is to identify and assess the competitiveness of the Visegrad Group regions and the level of human capital and to establish their interrelationship. We examine the above in two years: 2017 (the year with the highest economic growth before the recession) and 2022 (the last year for which data are available for all the examined indicators).

To achieve the above objective, it is necessary to find out the answers to the research questions:

1. What is the competitiveness level of the individual NUTS2 regions of the Visegrad Group in 2017 and how have its values changed in 2022?
2. What is the human capital level in each Visegrad Group region in 2017 and 2022?
3. Is there any relationship between the competitiveness and human capital in the V4 regions?

The basis of effective regional policy is the analysis of factors relevant to regional development, i.e. the identification of key determinants that stimulate regional development (Wokoun, 2016). Regarding the above objective, we will work with selected determinants (Table 1) that represent competitiveness and human capital at the regional level. The selection of the indicators is determined by the available data that can be obtained for all regions of the Visegrad Group countries from relevant databases and the available time series.

The input data are drawn from the Eurostat database as the annual values in the interval from 2017 to 2022.

Tab.1: Investigated indicators

Indicator name	Unit of measure	Data source
Indicators of human capital		
population with tertiary education (levels 5-8) - (from 25 to 64 years)	percentage	[edat_lfse_04_custom_11880893]
life expectancy at birth	years	[demo_r_mlifexp_custom_11868656]
infant mortality	rate	[demo_r_minfind_custom_11880423]
persons with tertiary education and employed in science and technology (HRST)	percentage of population in the labour force)	[hrst_st_rcat_custom_11609865]
Indicators of competitiveness		
gross domestic product	Euro per inhabitant	[nama_10r_2gdp_custom_11596014]
employment rate	percentage	[lfst_r_lfe2emprtn_custom_11226781]
R&D expenditure	percentage of GDP	[rd_e_gerdreg_custom_11879534]
nominal labour productivity	Euro per person	[nama_10r_2nlp_custom_11597192]
total railway lines	kilometres per thousand square kilometres	[tran_r_net_custom_11882820]
motorways	kilometres per thousand square kilometres	[tran_r_net_custom_11882902]

To assess the level of competitiveness and human capital, we will use one of the multi-criteria methods - the scoring method.

For each parameter we assign the region, which reached the best value, 100 points, and other regions are assigned indicator points as follows:

- if the maximum value is the best value:

$$b_{ij} = x_{ij}/x_{j\max} \times 100 \quad (1)$$

- if the minimum value is the best value (infant mortality rate):

$$b_{ij} = x_{j\min}/x_{ij} \times 100 \quad (2)$$

where:

x_{ij} - the value of j -th variable in the i -th region

$x_{j\max}$ - highest value of the j -th variable

$x_{j\min}$ - lowest value of the j -th variable

b_{ij} - the scores of the i -th region for the j -th variable.

Next the overall scores for both competitiveness and human capital levels for each NUTS2 region are calculated. To assess the relationship between the competitiveness level and human capital level, we use the arithmetic mean of the scores of the above areas, due to the different number of determinants examined within competitiveness and human capital.

The relationship between the level of human capital and the level of competitiveness in the Visegrad Group regions is assessed using the Pearson correlation coefficient (r_{xy}):

$$r_{xy} = \frac{n \sum_{i=1}^n x_i y_i - \sum_{i=1}^n x_i \sum_{i=1}^n y_i}{\sqrt{[n \sum_{i=1}^n x_i^2 - (\sum_{i=1}^n x_i)^2][n \sum_{i=1}^n y_i^2 - (\sum_{i=1}^n y_i)^2]}} \quad (3)$$

where:

x is the independent variable

y is the dependent variable.

This coefficient allowed to identify the magnitude and direction of the dependence between the explored indicators. The competitiveness was considered as the dependent variable, and the human capital level as the independent variable.

4 Results and Discussion

Firstly, the competitiveness of the individual V4 regions will be estimated by assigning points for selected competitiveness determinants and aggregating them. The structure of the scores obtained is presented in Figure 1.

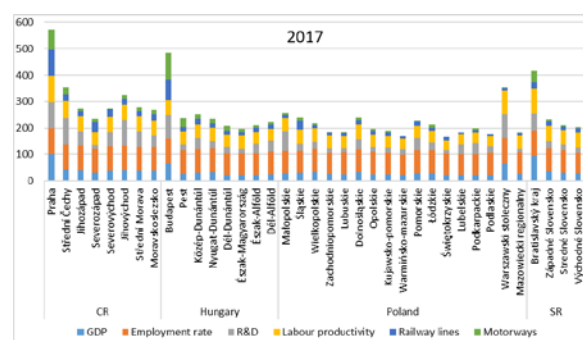


Figure 1: Competitiveness of the V4 regions in 2017

Source: own calculations according to Eurostat data (2024).

In 2017, the Prague region scored the highest for competitiveness (572.54 points), as it scored the best in four out of the six indicators. This was followed by Budapest and the Bratislava region. In addition to the capital city regions, the Czech region of Střední Čechy was among the regions with the best scores. On the other hand, the regions with the lowest scores (less than 200 points) are the regions of Poland and the Hungarian region of Észak-Magyarország. In 2017, the smallest differences between the V4 regions were in employment rates, while the largest differences were in motorway and railway density.

The next observed period is 2022, an assessment of the competitiveness of the V4 regions is presented in Figure 2.

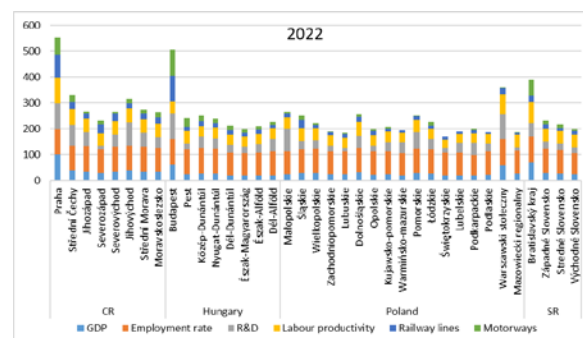


Figure 2: Competitiveness of the V4 regions in 2022

Source: own calculations according to Eurostat data (2024).

In 2022, the ranking of the top three regions remained unchanged, but the top region, Prague, scored fewer points than in 2017 (553.67 points). The number of regions with less than 200 points decreased to 10, with the Eastern Slovakia region tumbling down within this category.

When comparing the scores obtained in 2017 and 2022, we can state that the biggest decrease in scores was recorded in the Bratislava region, in addition, there was a decrease in two other regions of the Slovak Republic, there was also a decrease in all regions of the Czech Republic, followed by two regions of Hungary and Poland. These facts point out to a narrowing gap between the V4 regions.

Next there is an assessment of the human capital level in the V4 regions in 2017 (Figure 3) and in 2022 (Figure 4).

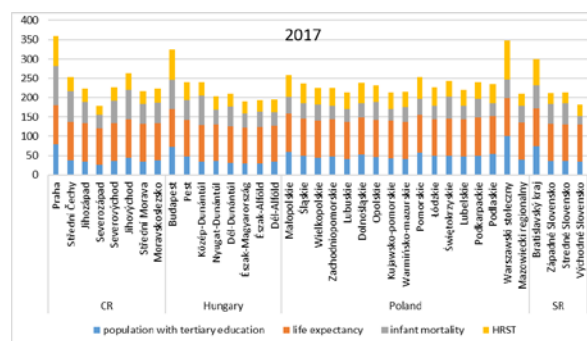


Figure 3: Assessment of human capital level in the V4 regions in 2017

Source: own calculations according to Eurostat data (2024).

Also in the human capital assessment, the highest number of points was gained by the Prague region (358.90), followed by the Warszawski stołeczny region (348.14 points), Budapest (324.06 points) and the Bratislava region (299.90 points). Three Hungarian regions, one Slovak and one Czech region scored less than 200 points. The smallest differences between the V4 regions are in life expectancy at birth.

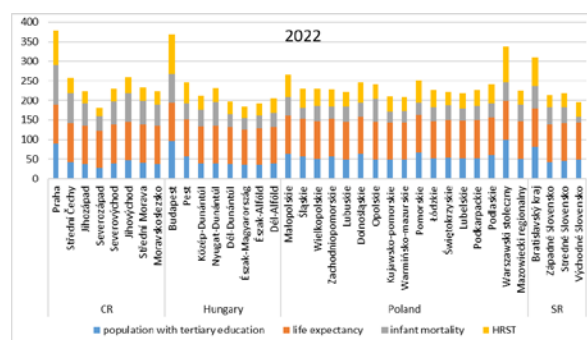


Figure 4: Assessment of the level of human capital in the V4 regions in 2022

Source: own calculations according to Eurostat data (2024).

In 2022, the ranking of the top four regions was the same, apart from the Warszawski stołeczny region seeing an increase in their scores. The worst-ranked region this year remained the Czech region of North-West.

In 2022, compared to 2017, the human capital assessment increased the most in the Budapest region (by 43.28 points), mainly due to an increase in the share of the population with tertiary education and the number of university graduates working in science and research. In contrast, the greatest deterioration occurred in the Közép-Dunántúl region (by 28.23 points), which was mainly due to a worsening of infant mortality.

An assessment of the relationship between competitiveness and human capital in the regions of the Visegrad Group countries in

2017 and 2022 is presented in Figure 5 and Figure 6, respectively.

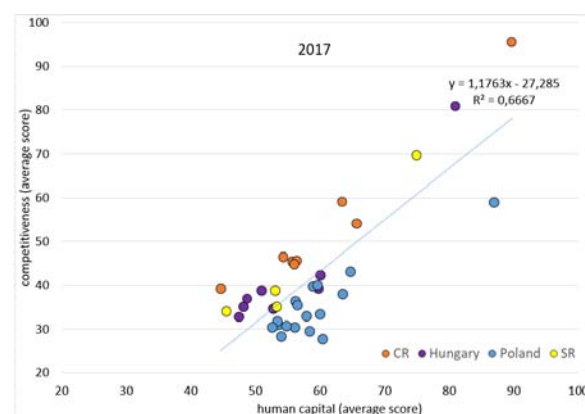


Figure 5: Relationship between competitiveness and human capital in the V4 regions in 2017

Source: own processing.

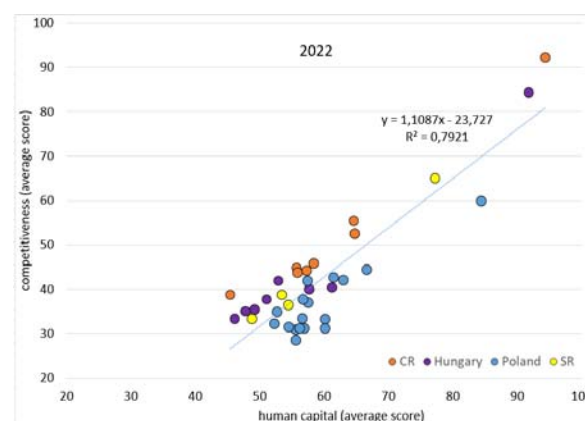


Figure 6: Relationship between competitiveness and human capital in V4 regions in 2022

Source: own processing.

The graphical representation shows a positive relationship between the level of human resources and the competitiveness of regions, which is confirmed by the Pearson correlation coefficient, which reached 0.8165 in 2017 and 0.8900 in 2022. Based on this, the coefficient of determination reflects that in 2017 66.67% of the variability was explained by the model, and even 79.21% in 2022.

The highest competitiveness and the highest level of human resources is in the Prague region and other regions with the capital city. When comparing the average scores of competitiveness and human capital, we note that only the Prague region in 2017 achieved values of competitiveness higher than the level of human capital (Figure 7). All other regions achieved higher values of human capital than competitiveness in both years under study, suggesting that there are reserves in exploiting the advantage of quality human resources, therefore they did not translate into an increase in their competitiveness. The regions of Poland score significantly higher on human capital than on competitiveness, while in the Czech Republic there are smaller differences between competitiveness and human capital levels, indicating better use of existing human capital to increase competitiveness or the influence of other factors on competitiveness enhancement.

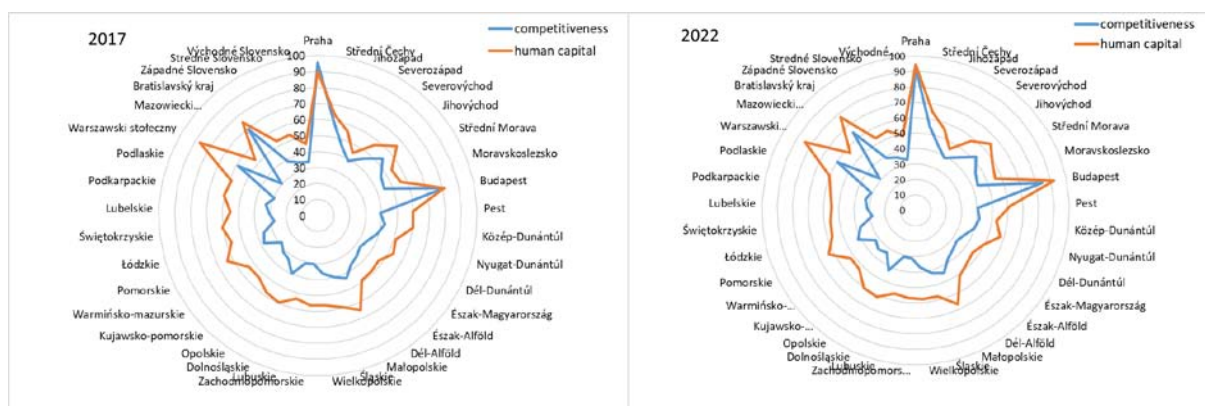


Figure 7: Assessment of the level of competitiveness and human capital in the V4 regions
Source: own processing.

4 Conclusion

From the results regarding the competitiveness assessment, we note that the best results in both the years 2017 and 2022 are achieved by the Prague region, followed by the Budapest and Bratislava regions. When assessing the level of human capital, the Prague region is again among the best, followed by the Polish Warszawski stołeczny region, the Hungarian Budapest region and the Slovak Bratislava region. Consequently, we confirmed a positive relationship between the level of human capital and the competitiveness of the regions. When comparing the average scores of competitiveness and human capital, we concluded that only the Prague region achieved competitiveness values higher than the level of human capital in 2017. In the other observed regions, the values of the human capital quality level were higher than competitiveness. It could be suggested that there are reserves in taking advantage of quality human resources.

In conclusion, we can agree with the suggestions recommended by Kouskoura et al. (2024) that investments in education and innovation are needed to improve prosperity and competitiveness, as well as more informed policies and collective actions for a greener, healthier and more sustainable future and finally, well-planned investments in transport, which is the foundation of the link between R&D, innovation and economic progress, as well as further development of high-tech industries and innovative measures should be taken for sustainable and economic growth of regions.

We are aware that our research has some limitations and constraints, but we encounter this fact in almost all research. In this thesis, we worked with a limited number of literature sources and scholarly works, which may have influenced our perspective on the issue. In the analytical part, we worked with data provided by the Eurostat database, where it was difficult to obtain relevant data for some of observed factors within the timeframe.

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Primary Paper Section: A

Secondary Paper Section: AH

EMPLOYEE TRAINING TO INCREASE DIGITAL LITERACY

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The paper is an output of the project VEGA No. 1/0188/24 Hybrid work regimes as a result of companies learning from the crisis and the implications of their implementation for the people management.

Abstract: The intention of our research was to examine the content and scope of education (stated in hours) to enhance digital literacy required for the profession, where we examined selected forms of education. The research was conducted by questionnaire survey. The aim of the paper was to highlight the importance of different areas of education in the development of digital knowledge and skills and to recommend preferred forms of education in each area of digital literacy. The results of the research show that employees in our research sample used self-education the most, followed by peer-to-peer education. Organized learning was used only minimally. Statistical significance was demonstrated in the case of self-education in different content areas of digital literacy. Statistical significance was not demonstrated for the difference in the forms of education from the original education or from the current job position.

Keywords: digital literacy, digital skills, self-education, peer to peer education, organized learning, Education 4.0, Education 5.0, hybrid work regimes.

1 Introduction

Digital literacy is now a frequently discussed issue in the context of the preparation and implementation of education, both nationally and internationally. Already a few years ago, the concept of a new industrial revolution, referred to as Industry 5.0 (European Commission, 2021) and Society 5.0 (Deguchi et al., 2020), was presented, associated with new technologies, innovations and the extension to virtual environments (Green, 2012). Turbulent changes in the business environment have also been caused by the Covid-19 pandemic, which has forced businesses to move some of their activities to virtual environments (Meinck et al., 2022). The fact is that in many organizations the pandemic brought about an increase in digitalization, which was implemented very quickly, while Covid-19 was considered not only a crisis but also a disaster (Šrobárová & Bursová, 2021). Many experts and specialists who work on digitalization in specific organizations claim that their organizations, instead of many years of digital transformation, implemented it in a matter of months, which was triggered by the Covid pandemic (Lambert, 2020).

During the pandemic, employees were much more willing to try ICT at work and for learning without necessarily being sure of the results. During rapid change, it is high adaptability that is an indicator of the health of an organization that supports and enhances a successful work environment (Kane et al., 2020).

According to UNESCO (Meinck et al., 2020), the main consequence of the Covid 19 crisis was the closure of schools and universities, almost overnight. In educational institutions, there was a transition from physical education at the time to an emergency solution in the form of distance learning (Garcia et al., 2021). Distance education, which until this time had taken a completely different form, was introduced immediately as a necessary measure against the spread of the Covid 19 pandemic. For lecturers and teachers, this meant a new form of teaching but also self-efficacy in pre-service teacher training (Duda et al., 2022). Many organizations that have discontinued physical working regimes have embraced the technologies available for online work activities and also for staff development training. This implemented change in education maintains its position to be able to implement hybrid work modes and to implement various blended learning modalities in a combination of physical and online learning, continuous education of employees in digital skills is essential.

The aim of the paper was to highlight the importance of different areas of education in the development of digital knowledge and skills and to recommend preferred forms of education in each area of digital literacy. The aim of the paper corresponds to the requirements for a fundamental transformation of Industry 5.0 (Maddikunta et al., 2022; Schröder et al., 2024) and also Society 5.0 (Dautaj & Rossi, 2021; Matsuda et al., 2019). The fifth industrial revolution is driven by digital technologies such as artificial intelligence, the Internet of Things, robotics or big data. Industry 5.0 is a broad concept whose relevance evolves as technologies advance, and no one knows exactly what final form it will take, which makes great demands on the preparation of education that should precede the processes of practical implementation (Richnák & Sármany, 2019). Industry 5.0 is changing traditional production processes and the way entire industries operate, while also significantly affecting the labor market and social structures. With increasing automation and digitalization, not only the needs of employers are changing, but also the knowledge and skill requirements of workers (Amjad et al., 2024; Mulongo, 2024; Amirkhizi et al., 2024).

2 Education for increased digital literacy – theoretical background

Nowadays, the digitalization and intelligence of the production process is an inevitable attribute in all sectors of the national economy. Businesses are facing rapid advances and are able to increase productivity and save costs thanks to real-time data and business connectivity.

The content of employee education is adapting to the requirements of Industry 5.0 and the functioning of businesses in a globalized environment. Knowledge of technology, working with data, artificial intelligence and overall orientation in the 5.0 world are becoming essential. Responding flexibly to today's conveniences gives businesses a competitive advantage and provides opportunities even for small organizations that can leverage appropriate technologies. Industry 5.0 itself is based on the integration of modern technologies and the digitalization of many production processes. Employee education needs to be adapted to this wave of development, which is the subject of our next investigation.

2.1 Literature review

Education in different stages of technological development is referred to in the literature as Education 1.0, 2.0, 3.0, 4.0 and 5.0. currently we find it as Education 4.0 stage (Mukul & Büyüközkan, 2023), which is gradually transforming into Education 5.0 (Ahmad et al., 2023).

The implemented education must capture areas that provide a new level of organization and control of the entire value chain of the life cycle of products and services provided. Customer requirements cannot be eliminated in these processes, where smart and open platforms and networked information applications are used. The use of applications is for real-time data monitoring, focuses on instructions to control the production processes and also to monitor the status of products (Vaidya et al., 2018).

Education must be in line with the requirements that are the basic characteristics for the use of new technologies, especially the Internet of Things (IoT), big data, various forms of cloud computing, additive manufacturing (3D printing), automation and robotization and other technologies. which are gradually being implemented in all work activities (Jadeja & Modi, 2012; Maddikunta et al., 2022; Chakraborty et al., 2023).

2.2 Theoretical background of the research

The facts presented in subsection 2.1 place demands on staff education. The education system should therefore not only develop technical skills, but also promote the so-called core competences. We have drawn on the key competences for lifelong learning, which have been outlined in a document by the European Commission and the European Parliament (European Commission, 2019).

In preparing this paper, we have looked at one of the important key competences, which has been characterized as digital competences. In order to carry out empirical research, we have developed groups of these digital competences, which we analyze in terms of the scope of teaching and the forms of learning applied. Industry 5.0 requires changes in the labor market and urgently needs skilled professionals who have the necessary competencies and skills to thrive in this new environment (Hernandez-de-Menendez et al., 2020; Chen et al., 2022).

Digitalization is fundamentally transforming traditional educational processes, opening up new opportunities and challenges. With the advent of technologies such as e-learning platforms, the way we learn is changing dramatically. Digitalization enables access to a wide range of resources and information, promotes flexibility in learning and enhances the personalization of learning according to the individual needs of learners. It also places emphasis on autonomy and responsibility. The development of digital and online learning opportunities, which are integrated not only into formal education but also into further education, places and creates changed demands on learning management. It is imperative that the strategies and teaching forms of educational institutions adapt to new trends closely related to technology and digitalization (Digital Coalition, 2024; Takáčová, 2024). The key demands of globalization and Industry 5.0 require fundamental changes in education, which include:

- self-education and taking advantage of all available learning opportunities,
- learning within work teams, peer-to-peer
- organized learning that is didactically and methodologically sound and is carried out individually, in groups or collectively,
- individualized learning, which focuses more on the specific needs of the trainees,
- further education for andrologists oriented towards the preparation and development of skills in the field of modern technologies. Personality as a factor in the learning and teaching process also plays an important role in education (Czarkowski et al., 2023).

In particular, the development and promotion of a culture of digital learning and increased flexibility in the teaching and learning process are key factors for sustainability (Luna et al., 2024).

Digital transformation can be seen as a more complex concept that encompasses not only the process of digitalization but also the organizational changes that go with it. These changes fundamentally affect the ways in which an institution delivers educational services and responds to the needs of its learners, staff and partners.

For the forms of learning, we have drawn on only some of the forms of learning as outlined in the key requirements for globalization and Industry 5.0. Since we have worked with them in our empirical research, we give a brief description of them. Among the forms of education studied, on the basis of the above-mentioned literature sources, we have included:

- The process of self-education takes place without direct interaction with a lecturer, instructor, consultant.
- The controlling (riadiaci/managing) subject is the learning subject (adult individual).

- Self-study is a complex educational process, the effectiveness of which is conditioned by,
 - that the learner has clearly clarified goals,
 - has the capacity for self-assessment,
 - has the ability and opportunity to compare his/her learning outcomes with the learning objectives,
 - has the capacity for self-motivation.
- For self-study, it is necessary to provide the learner with appropriate study aids and also the possibility of consultation and guidance in learning. Consultations are mostly carried out individually, but can also be carried out in groups (especially in corporate education), either face-to-face or at a distance (including correspondence counselling). It may be appropriate to provide a degree of guided self-study to assist the trainee. It is oriented towards explanations, advice, recommendations, guidance on the usually more difficult parts of the education content.
- Distance learning in the form of off-line e-learning is also appropriate for further education and independent study (self-study). Off-line e-learning allows self-study support in the form of prepared educational documents.

Peer to peer learning in the sense of employee to employee i.e., one to one learning (Pizzul et al., 2024; Zhao et al., 2021):

Participants in this form of education can also be grouped together and prepared for what they will be educated in. By forming such smaller groups, space is created for trainees to demonstrate their knowledge, skills, and abilities, and also to demonstrate how they can respond promptly to ideas that arise and develop them creatively. The individual or group will be given an assigned topic to develop and prepare and then implement the learning.

Organized learning, where we focused on the breakdown of forms of education according to the number of learners. In continuing professional education, it is necessary to work with individual, group and mass education.

According to the way of organization of the activity of the educator and the participants of education, we dealt with individualized education. Individualized education presupposes the introduction of a system of diagnostics and spatial and temporal individualization of the educational program. Mostly, a modular system is used in individualized education, where participants are classified according to their abilities (Ahmad et al., 2023). Individualized learning requires the use of other forms of guided learning where physical learning, distance learning as a multimedia form of learning can be mentioned. In distance learning, it is appropriate to apply e-learning whether offline or online. Online education is nowadays implemented in asynchronous and synchronous versions.

In addition to one form of education and the other, a combination of these forms of education can also be used, which can be characterized as blended learning. Hybrid learning is a specific form of learning where learning takes place both physically and online at the same time. This form of learning requires its own further exploration. It needs to be distinguished from Blended learning, which is used in a type of learning where face-to-face learning is combined or blended with e-learning. E-learning is usually just a complement to physical/face-to-face learning.

It is important for educational institutions to integrate digital technologies into teaching and create an environment that supports lifelong learning and the development of the necessary digital skills for the work environment. Innovative approaches such as project-based learning and online learning are essential to ensure the relevance of educational content in today's rapidly changing world.

In our empirical research, we look at digital knowledge and skills education as one of the components of employees' core competencies. The intention of our research was to examine not only the content of training in this area, but also the appropriate forms of education that employees find effective in the context

of lifelong learning in the field of IT. This research is in line with the objectives of the VEGA project No. 1/0188/24 Hybrid work regimes as a result of companies learning from the crisis and the implications of their implementation for the people management. On the basis of the conducted research, we identify the training needs of employees and recommend appropriate forms of training.

3 Research methodology

In terms of our research design, we sought to find out

- which form of education is preferred by respondents with a higher level of initial education,
- which form of education is preferred by line managers and which by employees – specialists,
- the content area of digital literacy to which respondents devote most of their time.

The research was conducted based on five sets of hypotheses, which were formulated as null and alternative as follows:

1H0: the number of hours of self-education of employees in the field of improving digital literacy does not depend on their education.

1H1: self-education in digital literacy is preferred by employees with a higher level of education.

2H0: the number of hours of peer-to-peer education of employees in digital literacy is independent of their educational background.

2H1: peer-to-peer training in digital literacy is preferred for employees with higher levels of education.

3H0: the number of hours of self-directed digital literacy education for employees is independent of their job title.

3H1: Employees who are specialists in their field spend more time on self-education than other employees.

4H0: the number of hours of peer-to-peer training of employees in digital literacy does not depend on their job position.

4H1: Specialist – technologists in the field spend more time on self-education than other employees.

5H0: the number of hours of employee self-education does not vary by content area of digital literacy.

5H1: the number of staff self- education hours varies according to the content area of digital literacy.

In order to verify the research hypotheses, a research model was created (Table 2. ... Table 6) and then a questionnaire survey was conducted among line managers and employees – specialists in food production from Slovakia, the Czech Republic and Spain. According to the occupational classification (SK ISCO-08, 2020): these are line managers (No. 3122001 Foreman/supervisor in food production) and employees (No. 2141002 Specialists – technologists in food production and No. 3142006 Technologist in food production).

The questionnaire survey was conducted in January-February 2024. Respondents assessed the use of three forms of educations in five areas of digital literacy, namely self-learning, peer-to-peer education and organized education. They reported the number of hours they had spent on each form of learning over a 6-month period and, on a 7-point Likert scale ranging from 0 to 6 (according to Bloom's taxonomy), the level by which their knowledge of the subject had improved, based on their own judgement.

Note: the meaning of Bloom's taxonomy is 0 – not required, 1 – remember level, 2 – understand level, 3 – apply level, 4 – analyze level, 5 – evaluate level, 6 – create level (DigComp, 2024).

In addition to the standard methods of scientific work (analysis, synthesis, comparison), methods of evaluation of research

variables in Excel and statistical verification of hypotheses in Jamovi were used in the paper. We used the following statistical tests, tools and coefficients: descriptive statistics, Cronbach's α and McDonald's ω , Shapiro-Wilk test of normality, Levene's test, non-parametric alternative of Independent Samples T-Test (Mann Whitney test), non-parametric alternative of ANOVA test (Kruskal-Wallis test).

4 Results and Discussion

We present the results of our investigation in the following structure: research sample, model of research variables, reliability of the research instrument, descriptive statistics and outliers of the results, testing the statistical significance of the research hypotheses, and drawing conclusions.

4.1 Research sample

The research sample consisted of 186 respondents from industry C – Manufacturing, division 10 – Food manufacturing, 11 – Beverage manufacturing (according to SK NACE). The detailed specification of the research sample is presented in Table 1.

Table 1 Research sample

Parameters		No.	% share
P1 – country	Slovak Republic	61	32.81
	Czech Republic	68	36.56
	Spain	57	30.65
P2 – education	Secondary education	51	27.42
	Higher education	135	72.58
P3 – function in the company*	Line manager	106	56.99
	Employee – Specialist	80	43.01

* Note: in terms of the Statistical Classification of Occupations line manager represents No. 3122001 Foreman/supervisor in food production and Employee No. 2141002 Specialists – technologists in food production and No. 3142006 Technologist in food production.

Source: own processing

4.2 Model of research variables

The model of research variables consisted of five groups of variables characterizing the 5 research areas in which respondents assessed the form of education implemented (Table 2...Table 6).

Table 2 Information and data literacy research variables

I.	INFORMATION AND DATA LITERACY (working with the Internet)
DL1.1	Getting up-to-date information for work (exchange rate tickets, tax returns, weather information, pollen situation,...)
DL1.2	Using information from published price lists for goods and services
DL1.3	Filling in and sending online forms to state and public institutions (health insurance, social security,...)
DL1.4	Using information from maps and navigation
DL1.5	Use of information published by public authorities and institutions (government, ministries, statistical office, tax office, social security, health insurance,...)
DL1.6	Use of data from publicly available portals (cadastral portal, trade register, commercial register, FINSTAT...)
DL1.7	Use of published publicly available data from the Internet (Open data)
DL1.8	Use of data from commercial databases (Albertina, Datamax, European databank, Kompas, Zlaté stránky,...)
DL1.9	Implementation of online marketing

Source: own processing

Table 3 Research variables of the Communication and cooperation area

II.	COMMUNICATION AND COLLABORATION AREA (collaboration tools and social networks)
CC2.1	Use of MS Outlook
CC2.2	Use of Google Calendar
CC2.3	Using MS Exchange
CC2.4	Using Google Drive file sharing
CC2.5	Use of social networks (Facebook)

Source: own processing

Table 4 Research variables of the Digital Content Creation area

III.	DIGITAL CONTENT CREATION AREA (office tools and enterprise IS)
DC3.1	Use of MS Office and all its applications
DC3.2	Use of MS Excel to create calculations and graphs
DC3.3	Use of MS Word for administration
DC3.4	Use of MS PowerPoint for presenting
DC3.5	Use of other office software
DC3.6	Use of all enterprise IS modules
DC3.7	Use of selected IS modules according to job role
DC3.8	Use of the employee portal (data related only to a specific employee – absence records, leave,...)

Source: own processing

Table 5 Research variables of the Security area

IV.	SECURITY AREA
CS4.1	Use of an appropriate and up-to-date internet browser, e.g. Microsoft Edge, Google Chrome, Mozilla Firefox, Opera
CS4.2	Use of effective anti-virus protection
CS4.3	Regular backup of important data
CS4.4	Knowing the meaning of http cookies
CS4.5	Verify the security of connections to websites where an employee enters sensitive information to prevent leakage of sensitive information (phishing)
CS4.6	For any email message that requests a password check or other sensitive data, checking to ensure that it is not a fake sender

Source: own processing

Table 6 Research variables of the problem solving area

V.	PROBLEM SOLVING AREA
PS5.1	Technical problem solving
PS5.2	Identification of needs and technological solutions
PS5.3	Creative use of digital technologies
PS5.4	Identifying gaps in digital competence

Source: own processing

4.3 Reliability of the research instrument

The research instrument (questionnaire) contained five groups of variables listed in the research model. The individual variables were assessed both absolutely (number of hours) and using a scale from 0 to 6 (improvement by a level), so we only report the reliability of the respective scale. Reliability was tested using Cronbach's α and McDonald's ω .

The scale reliability of the group of variables assessing self-education reached $\alpha=0.808$, $\omega=0.875$ (overall). Reliability of individual variables reached α values from 0.787 to 0.828, ω from 0.856 to 0.881.

The scale reliability of the group of variables assessing peer to peer education reached $\alpha=0.794$, $\omega=0.872$ (overall). Reliability of individual variables reached α values from 0.771 to 0.814, ω from 0.852 to 0.878.

In the case of organized education, we do not report the reliability due to the low number of responses, so we did not include this part in the statistical treatment.

The reported reliability values of our research instrument meet the required values of Cronbach's $\alpha>0.7$ (Hanák, 2016); Kolarčík, 2013; Marko, 2016). The calculation was supplemented with the McDonald's ω coefficient, whose values confirm sufficient internal consistency of the questionnaire used in the survey (Imdad, 2018; Marko, 2016).

4.4 Descriptive statistics and description of outliers

Table 7 Evaluation of information and data literacy education

	Self-education (hrs)	Self-education (level improvement)	Peer to peer education (hrs)	Peer to peer training (level improvement)	Organized learning (hrs)	Organized learning (level improvement)
DL1.1	11.55	1.65	2.99	1.65	0	0
DL1.2	4.06	1.36	2.57	1.36	0	0
DL1.3	19.11	3.60	5.69	3.6	0	0
DL1.4	5.23	2.88	0.82	2.88	0	0
DL1.5	14.95	5.09	0	0	0	0
DL1.6	3.89	3.83	3.89	3.83	0	0
DL1.7	2.34	4.53	2.3	4.53	0	0
DL1.8	1.91	3.34	1.34	3.34	0	0
DL1.9	1.37	2.04	5.77	2.04	34.89	3.49
Average	7.16		2.82		3.88	

Source: own processing

Table 7 shows that respondents spent an average of 7.16 hours on self-education in Information and Data Literacy in the last six months. They were above average in the variable DL1.1 – *Getting up-to-date information for work (course tickets, tax return, weather information, pollen situation,...)*, with 11.55 hours, DL1.3 – *Filling in and sending online forms to state and public institutions (health insurance, social insurance,...)*, 19.11 hrs. and DL1.5 – *Using information published by state bodies and institutions (government, ministries, statistical office, tax office, social insurance, health insurance,...)*, 14.95 hrs. In this variable they also declare the greatest improvement in their knowledge, up to 5 levels. Another interesting improvement of up to 4.53 points occurred in the variable DL1.7 – *Use of published publicly available data from the Internet (Open data)*. It is also worth mentioning the declared improvement in variable DL1.6 – *Use of data from publicly available portals (cadastral portal, trade register, commercial register, FINSTAT...)*, by 3.83 points.

Respondents spent on average only 2.82 hours per half year on peer-to-peer training, most of them in the variables DL1.9 – *Implementation of online marketing*, DL1.3 – *Filling in and sending online forms to state and public institutions (health insurance, social insurance,...)* and DL1.6 – *Using data from publicly available portals (cadastral portal, trade register, business register, FINSTAT,...)*. In the variable DL1.5 – *Use of information published by state authorities and institutions (government, ministries, statistical office, tax office, social insurance office, health insurance office,...)*, this form was not used at all. The highest improvement is reported in variable DL1.7 (similar to self-education).

Organized learning was only used by respondents in the case of variable DL1.9 – *Implementation of online marketing*, where they improved by 3.9 points in this form.

Table 8 Evaluation of the Communication and Cooperation learning area

II.	Self-education (hrs)	Self-education (level improvement)	Peer to peer education (hrs)	Peer to peer training (level improvement)	Organized learning (hrs)	Organized learning (level improvement)
CC2.1	81.97	3.62	6.26	3.62	0	0
CC2.2	5.47	5.48	2.38	5.48	0	0
CC2.3	1.08	0.06	1.31	0.38	0	0
CC2.4	0.18	5.49	1.6	5.49	0	0
CC2.5	3.56	5.8	4.89	5.8	0	0
	18.45		3.29		0	

Source: own processing

In the area of Communication and Collaboration, respondents spent the most time on learning in variable CC2.1 – *Use of MS Outlook*, where they improved by 3.62 points. However, they report the highest improvement in the variables they spent less time studying, namely CC2.5 – *Use of social networking sites*

(Facebook), CC2.4 – Use of file sharing through Google Drive, and CC2.2 – Use of Google Calendar.

Peer to peer education also received the most improvement in variable CC2.1 and also in variable CC2.5. Similarly, the greatest improvements were in the variables consistent with self-education, namely CC2.5, CC2.4, and CC2.2.

Organized learning was not used at all by respondents in this area.

Table 9 Evaluation of Digital content creation education area

III.	Self-education (hrs)	Self-education (level improvement)	Peer to peer education (hrs)	Peer to peer training (level improvement)	Organized learning (hrs)	Organized learning (level improvement)
DC3.1	134.85	5.35	34.25	5.35	0	0
DC3.2	225.46	4.41	51.17	4.41	60.62	3.02
DC3.3	121.3	5.72	5.72	5.72	0	0
DC3.4	14.27	6.00	3.48	6.00	0	0
DC3.5	0	0	0	0	0	0
DC3.6	4.11	5.32	3.03	5.32	0	0
DC3.7	6.17	5.28	6.35	5.28	0	0
DC3.8	7.46	5.7	3.6	5.7	0	0
	64.20		13.46		7.58	

Source: own processing

Respondents spent the most time on Digital content creation education (average 64.20 hours) and the longest time on variables DC3.2 – Using MS Excel to create calculations and graphs, DC3.1 – Using MS Office and all its applications and DC3.3 – Using MS Word for administration. However, they also report a large improvement for other variables in this area (Table 4), with the highest value for DC3.4 – Use of MS Power point for presenting. The exception is variable DC3.5 – Use of other office software, which was not studied at all. Higher values in this area were also observed in the case of peer-to-peer learning, which, with lower values, reflect the values achieved by self-education. In variable DC3.2, respondents also declared organized learning, in which they achieved an improvement of 3.02 points.

Table 10 Evaluation of the Security education area

IV.	Self-education (hrs)	Self-education (level improvement)	Peer to peer education (hrs)	Peer to peer training (level improvement)	Organized learning (hrs)	Organized learning (level improvement)
CS4.1	16.00	4.36	2.03	4.36	0	0
CS4.2	16.28	6.00	5.64	6	0	0
CS4.3	3.70	6.00	3.27	6	0	0
CS4.4	2.63	1.36	12.91	0.78	0	0
CS4.5	2.74	1.36	2.74	1.36	0	0
CS4.6	0.97	5.81	2.85	5.81	0	0
	7.05		4.91		0.00	

Source: own processing

Of the staff self-education in the area of Security, we can highlight the time spent studying in variables CS4.1 – Use of appropriate and up-to-date internet browser, e.g., Microsoft Edge, Google Chrome, Mozilla Firefox, Opera and CS4.2 – Use of effective anti-virus protection, although the maximum improvement to a value of 6 is indicated in variables CS4.2 and CS4.3 – Regular backup of important data, although less time was spent on education in variable CS4.3.

The same values of improvement were declared by the respondents for the above-mentioned variables CS4.2 and CS4.3 for peer-to-peer education.

Organized education in the area of security was not implemented by the respondents at all.

Table 11 Evaluation of Problem-solving education

V.	Self-education (hrs)	Self-education (level improvement)	Peer to peer education (hrs)	Peer to peer training (level improvement)	Organized learning (hrs)	Organized learning (level improvement)
PS5.1	0.32	0.33	2.42	0.33	23.01	1.73
PS5.2	2.06	0.98	7.97	0.98	0	0
PS5.3	2.48	1.2	10.03	1.2	42.8	2.36
PS5.4	5.63	1.59	14.2	1.59	0	0
	2.62		8.66		16.45	

Source: own processing

The area of Problem Solving (in IT) differs from the other areas in that respondents spent the least amount of time on self-education, and improvement through self-education is also low. They took longer to learn through peer to peer, also with low improvement.

As with the only area studied, they spent the most time on organized learning, but only for the two variables PS5.1 – Technical problem solving and PS5.3 – Creative use of digital technologies, with an interesting improvement (of 2.36 points) was reported only for the PS5.3 variable.

The results presented in Tables 7 to 11 show that respondents from our research sample spent the most time on self-education, in four of the five areas studied, followed by peer-to-peer education. They made only minimal use of organized learning.

4.5 Testing the statistical significance of the hypotheses

Independent Samples T-Test, Mann Whitney U and ANOVA and Kruskal-Wallis were used to test the statistical significance of the stated hypotheses.

Testing the statistical significance of hypothesis 1

Hypothesis 1 concerned the amount of time respondents spent on self-education in each of the areas studied in relation to educational attainment. Only employees with secondary and tertiary education were represented in our research sample, therefore Independent Samples T-Test was used for testing. The assumptions of using an appropriate T-test coefficient were made by Shapiro Wilk test and Levene's test. Both tests resulted in a low p-value, which in the case of the Shapiro Wilk test means "a violation of the assumption of normality" and in the case of the Levene's test means "a violation of the assumption of equal of variances". Therefore, the non-parametric Mann Whitney U test was used for testing. The results and significant values of all tests are presented in Table 12. The interpretation of the testing of the number of hours of self-education is similar across all study areas based on the data in Tables 12, 13, 14 so as an example we present the interpretation of the sum of the number of hours of self-education for all study areas in the research model: Employees with a college degree (n = 135) did not spend more time (M=625, SD=131) on self-education than employees with a high school degree (n=51), (M=617, SD=145). The difference (8) is not statistically significant (U=352, p=0.391) with a trivial difference effect (Effect size=0.0026).

Table 12 Preconditions for the use of an appropriate test (1H)

	Normality Test Shapiro Wilk		Homogeneity Test Levene's			
	W	p	F	df1	df2	p
DL	0.983	0.025	2.78	1	184	0.097
CC	0.919	<0.001	0.938	1	184	0.334
DC	0.935	<0.001	1.60	1	184	0.207
CS	0.977	0.004	2.72	1	184	0.101
PS	0.932	<0.001	2.8	1	184	0.151
Total	0.976	0.003	0.978	1	184	0.324

Source: own processing

Table 13 Descriptive statistics (1H)

	Group	Descriptives				
		N	M	MD	SD	SE
DL	Secondary	51	62.9	59.0	16.3	2.28
	Higher	135	65.0	65.0	14.1	1.22
CC	Secondary	51	88.6	82.0	54.3	7.60
	Higher	135	93.6	97.0	58.1	5.00
DC	Secondary	51	413	426	115	16.1
	Higher	135	414	439	122	10.5
CS	Secondary	51	42.5	42.0	5.42	0.759
	Higher	135	42.2	42.0	4.95	0.426
PS	Secondary	51	10.6	10.0	2.64	0.370
	Higher	135	10.5	10.0	2.30	0.198
Total	Secondary	51	617	656	145	20.3
	Higher	135	625	640	131	11.3

Source: own processing

Table 14 Mann Whitney U test results (1H)

	Mann Whitney U		
	Statistic	p	Effect size
DL	3173	0.205	0.078
CC	3276	0.306	0.049
DC	3359	0.400	0.024
CS	3331	0.635	0.033
PS	3282	0.691	0.047
Total	3352	0.391	0.026

Source: own processing

Since there was no statistically significant difference in the individual areas examined, we accept hypothesis 1H0 and reject hypothesis 1H1.

Testing the statistical significance of hypothesis 2

Similar to Hypothesis 1, Hypothesis 2 relates to the amount of time that respondents have spent on education to increase their digital literacy, but focuses on peer-to-peer education in relation to educational attainment. The validation procedure is the same, the results are presented in Tables 15, 16, 17.

We provide an interpretation of the sum of the number of hours of peer-to-peer education for all areas studied: employees with a college degree (n=135) did not devote more time (M=211, SD=27.0) to peer-to-peer education than employees with a high school degree (n=51), (M=216, SD=25.5). Difference (5) is not statistically significant (U=2956, p=0.931) with a trivial difference effect (Effect size=0.141).

Table 15 Preconditions for the use of an appropriate test (2H)

	Normality Test Shapiro Wilk		Homogeneity Test Levene's			
	W	p	F	df1	df2	p
DL	0.989	0.179	0.172	1	184	0.679
CC	0.975	0.002	17.30	1	184	<0.001
DC	0.934	<0.001	0.866	1	184	0.353
CS	0.979	0.007	1.740	1	184	0.188
PS	0.980	0.009	0.100	1	184	0.752
Total	0.939	<0.001	0.850	1	184	0.358

Source: own processing

Table 16 Descriptive statistics (2H)

	Group	Descriptives				
		N	M	MD	SD	SE
DL	Secondary	51	24.7	24.0	4.67	0.654
	Higher	135	24.3	24.0	4.66	0.401
CC	Secondary	51	16.9	17.0	3.03	0.425
	Higher	135	16.2	16.0	1.97	0.169
DC	Secondary	51	111	106	24.5	3.430
	Higher	135	106	101	26.1	2.250
CS	Secondary	51	29.3	29.0	2.40	0.336
	Higher	135	29.5	29.0	2.67	0.230
PS	Secondary	51	34.8	35.0	4.10	0.575
	Higher	135	34.6	34.0	3.56	0.306
Total	Secondary	51	216	211	25.5	3.570
	Higher	135	211	204	27.0	2.330

Source: own processing

Table 17 Mann Whitney U test results (2H)

	Mann Whitney U		
	Statistic	p	Effect size
DL	3292	0.678	0.044
CC	3092	0.861	0.102
DC	3039	0.891	0.117
CS	3331	0.366	0.032
PS	3296	0.674	0.043
Total	2956	0.931	0.141

Source: own processing

Again, we accept the null hypothesis 2H0 and reject the alternative hypothesis 2H1.

Testing the statistical significance of hypothesis 3

Hypothesis 3 concerned the amount of time respondents spent on self-education in each of the areas studied in relation to their job position. Again, the job position variable took only 2 values, namely line manager and employee-specialist, so again the Independent Samples T-Test was used. The results are presented in Tables 18, 19, 20. We interpret the overall result:

Line managers (n=106) did not devote more time (M=604, SD=14.2) to self-education than employee – specialists (n=80), (M=649, SD=12.1). Although statistically significant (U=3401, p=0.010), the difference (45) is trivial (Effect size=0.198).

Although the overall difference is statistically significant (p<0.05), this is not the case in all areas of digital literacy, but only in one (Digital Content Creation), therefore we cannot accept the alternative hypothesis 3H1 (we reject it) and accept the null hypothesis 3H0.

Table 18 Preconditions for the use of an appropriate test (3H)

	Normality Test Shapiro Wilk		Homogeneity Test Levene's			
	W	p	F	df1	df2	p
DL	0.984	0.031	0.961	1	184	0.328
CC	0.927	<0.001	0.788	1	184	0.376
DC	0.939	<0.001	1.850	1	184	0.176
CS	0.967	0.003	0.445	1	184	0.506
PS	0.928	<0.001	0.018	1	184	0.893
Total	0.973	0.001	2.940	1	184	0.088

Source: own processing

Table 19 Descriptive statistics (3H)

	Group	Descriptives				
		N	M	MD	SD	SE
DL	Line Manager	106	64.2	63.5	15.1	1.47
	Employee – Specialist	80	64.7	64.0	14.3	1.60
CC	Line Manager	106	82.0	82.0	54.8	5.32
	Employee – Specialist	80	102.0	102.0	59.5	6.65
DC	Line Manager	106	418.0	418.0	122	11.9
	Employee – Specialist	80	447.0	447.0	114	12.7
CS	Line Manager	106	43.0	43.0	5.20	0.51
	Employee – Specialist	80	42.4	41.5	4.92	0.55
PS	Line Manager	106	10.5	10.0	2.40	0.23
	Employee – Specialist	80	10.5	10.0	2.40	0.27
Total	Line Manager	106	604	627.0	14.2	13.8
	Employee – Specialist	80	649	651.0	121	13.5

Source: own processing

Table 20 Mann Whitney U test results (3H)

	Mann Whitney U		
	Statistic	p	Effect size
DL	4169	0.423	0.017
CC	3779	0.103	0.109
DC	3493	0.020	0.176
CS	4240	0.500	0.0002
PS	4175	0.429	0.015
Total	3401	0.010	0.198

Source: own processing

Testing the statistical significance of hypothesis 4

Hypothesis 4 concerned the amount of time respondents spent on peer-to-peer education in each of the areas studied in relation to their job role. Again, the Independent Samples T-Test was used because the job position variable took only 2 values (line manager and employee – specialist). The results are presented in Tables 21, 22, 23. Again, we interpret only the overall result (number of hours of peer-to-peer training for all areas studied: line managers (n=106) did not spend more time (M=213, SD=26.1) on peer-to-peer education than employee-specialists (n=80), (M=212, SD=27.6). Difference (1) is not statistically significant (U=4005, p=0.741) with a trivial difference effect (Effect size=0.056). Again, there was no statistically significant difference for the individual areas examined, so we accept hypothesis 4H0 and reject hypothesis 4H1.

Table 21 Preconditions for the use of an appropriate test (4H)

	Normality Test Shapiro Wilk		Homogeneity Test Levene's			
	W	p	F	df1	df2	p
DL	0.990	0.190	1.680	1	184	0.197
CC	0.961	<0.001	0.058	1	184	0.809
DC	0.949	<0.001	0.003	1	184	0.953
CS	0.983	0.022	0.051	1	184	0.821
PS	0.983	0.022	1.320	1	184	0.252
Total	0.946	<0.001		1	184	0.943

Source: own processing

Table 22 Descriptive statistics (4H)

	Descriptives					
	Group	N	M	MD	SD	SE
DL	Line Manager	106	24.3	24.0	4.46	0.433
	Employee – Specialist	80	24.5	25.0	4.93	0.551
CC	Line Manager	106	16.4	16.0	2.31	0.225
	Employee – Specialist	80	16.5	16.0	2.34	0.261
DC	Line Manager	106	108	103	24.7	2.400
	Employee – Specialist	80	107	103	27.1	3.030
CS	Line Manager	106	29.7	29.5	2.60	0.253
	Employee – Specialist	80	29.1	29.0	2.57	0.287
PS	Line Manager	106	34.9	35.0	3.94	0.383
	Employee – Specialist	80	34.3	34.0	3.35	0.375
Total	Line Manager	106	213	209	26.1	2.530
	Employee – Specialist	80	212	204	27.6	3.080

Source: own processing

Table 23 Mann Whitney U test results (4H)

	Mann Whitney U		
	Statistic	p	Effect size
DL	4071	0.321	0.040
CC	4189	0.444	0.012
DC	4068	0.682	0.041
CS	3753	0.912	0.115
PS	3843	0.864	0.094
Total	4005	0.741	0.056

Source: own processing

Testing the statistical significance of hypothesis 5

The statistical significance of hypothesis 5 was tested by ANOVA test as the variable characterizing the digital literacy areas took 5 different values. After testing the normality of data distribution (Shapiro-Wilk test) and Homogeneity of variances (Levene's test), we found that in both cases the $p < 0.01$, that is, the data are not normally distributed, therefore, it is necessary to subsequently use the non-parametric Kruskal-Wallis test. The results are presented in Table 24 and Table 25.

Table 24 Kruskal-Wallis test results

	χ^2	df	p	ϵ^2
Number of hours of self-education	762	4	<0.001	0.821

Source: own processing

Table 25 ANOVA test results (descriptive statistics)

Area	N	Mean	SD	SE
DL	186	64.4	14.74	1.081
CC	186	92.3	56.98	4.178
DC	186	413.6	119.5	8.762
CS	186	42.3	5.70	0.372
PS	186	10.5	2.39	0.176

Source: own processing

Interpretation of the results: there is a statistically significant difference between the five groups of digital literacy areas (according to our research model) in the variable number of hours of self-education. The Kruskal-Wallis test was statistically significant $X^2(4) = 762$; $p < 0.01$, with a high effect size for the difference between groups, $\epsilon^2 = 0.82$. Respondents spent the most time on self-education in the area of Digital Content Creation.

In this case, a statistically significant difference was demonstrated in the high strength of the relationship, $\epsilon^2 = 0.82$. Therefore, we accept hypothesis 4H1 and reject hypothesis 4H0.

5 Conclusion

The aim of this paper was to highlight the importance of different areas of education in the development of digital knowledge and skills and to recommend preferred forms of education in each area of digital literacy. The results of our research showed that self-education, followed by peer-to-peer education and organized learning were the most preferred for our respondents, with only minimal use of specific variables such as implementing online marketing, using MS Excel, technical problem solving and creative use of digital technologies.

Based on the statistical testing of the hypotheses, we find that neither the number of hours of self-education nor peer to peer education differ based on initial education or job position. However, self-education differs statistically significantly across digital literacy content areas. Respondents spent the most time learning in the area of *Digital Content Creation*, from which learning in MS Excel proficiency stands out. They also devoted the most time to working in this program in the form of organized learning.

We did not statistically evaluate the level of improvement achieved by the training because the data were not suitable for statistical processing due to the highly individual and simultaneously different approaches and feelings of the respondents.

Our recommendations are directed towards education (Education 5.0) in the anticipated Industry 5.0 phase, in which the increasing demands for digital literacy are bringing new challenges. They affect almost all sectors and industries of the economy and at the same time place new demands on human resources. The basis of Education 5.0 is to focus primarily on requirements targeted at personalized learning and collaborative learning. A key idea in the process of education for the needs of employees is the development of highly adaptive learning using information and communication technologies. Our significant finding is the need for organized learning, which, based on empirical research, is minimally used. We propose to implement organized learning in all the researched areas, but especially in the areas of communication and collaboration, as well as cybersecurity, which were not used at all by the respondents in our research sample. We also cannot leave out self- and peer-to-peer education, as they form an important part of education according to each employee's own knowledge, skills and willpower (not only in the area of digital literacy).

In lifelong learning, we recognize the need for highly adaptive learning, which would need to be delivered through hybrid forms of learning. Hybrid forms of learning require further elaboration and experimental testing in providing multiple learning tutors, which can serve as an idea for further research. A contribution in further corporate professional education would be the need to develop extraordinary forms of education that would be the result of collaboration between academia and business. Universities of different specializations should be more involved in the development of further education and allow for the study of older students with a focus on part-time studies.

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Primary Paper Section: A

Secondary Paper Section: AE, AM, IN

CHANGING PRIORITY VALUES OF THE EUROPEAN POPULATION UNDER THE INFLUENCE OF THE RUSSIAN-UKRAINIAN WAR

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Abstract: Based on the study's results, the article's authors confirmed the hypothesis that the Russian-Ukrainian war affects the change in the priority values of the population of European countries. Military spending tends to be increased in countries that were NATO members before 2014 and share borders with the Russian Federation, Belarus and/or Ukraine. This pattern was confirmed using the trend approach. According to the forecast, in Latvia, Lithuania, Slovakia, and Hungary, military spending in 2025 will be at least 2.24% of their gross domestic product (GDP). In 2014, this indicator was less than 1%. The authors also used correlation analysis to identify the dependence of the increase in military spending in those mentioned above Eastern European and Baltic countries. These results confirm that the priority values of the population of European countries have ensured the integrity of their states and the safety of their citizens.

Keywords: Russian-Ukrainian war, priority values, European countries, NATO, military spending, gross domestic product, military security.

1 Introduction

The Russian Federation's attack on Ukraine in 2014 and its large-scale invasion since 2022, along with several other significant events in and around Europe, have once again raised the fundamental question of what interests and values different European countries share or do not share. In the past, the primary political debates and decisions of the European Union revolved around the speed and direction of European integration. Nowadays, international security challenges are becoming increasingly critical.

Values are essential for every person as they motivate one to act. People's values determine the values of an organisation, region, or state and, accordingly, their culture. Therefore, studying people's values and creating conditions to support them is crucial for every organisation, region, and state to ensure their development.

The Sustainable Development Goals, also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to reduce poverty, protect the planet, and ensure that by 2030 all people live in peace and prosperity. The 17 goals are mutually reinforcing: actions in one area also affect results in others, so development must balance social, economic, and environmental sustainability. Countries have committed to prioritising progress for those countries and communities lagging behind the most. The Sustainable Development Goals aim to end poverty, hunger, AIDS, and discrimination against women and girls. Achieving the Sustainable Development Goals in every context requires creativity, know-how, technology, and financial resources from society (Sustainable et al., 2024).

Changes in a person's environment can change their values or priorities. A vivid example is a person's education in a higher education institution. However, there are also negative examples. One such example is the Russian-Ukrainian war, which affected not only the priority values of the Ukrainian population but also the values of other European countries. This is confirmed by the daily news in the media about changes in people's behaviour. One of the features of values in light of the current study is that it is a set of rules that are acquired to regulate human behaviour

through which the desirable and undesirable lifestyle and behavioural patterns are judged, and what these values ultimately constitute as values of a sense of social responsibility (Alasmari, 2021).

The primary objective of our research is to analyse the impact of hostilities within a state on the evolving values and priorities of its population and that of neighbouring states. This entails understanding the patterns of priority and general values during wartime and post-war periods. Anticipated outcomes of this study include identifying shifting priority values, developing preventive mechanisms against adverse value changes for Ukraine and other European countries, and integrating these mechanisms into economic and socio-cultural systems to bolster national development.

Table 1: An example of a fragment of possible expected results of research on the change in the priority values of the population of European countries under the influence of the Russian-Ukrainian war

№	Priority values before the full-scale invasion of the Russian Federation	Priority values after the full-scale invasion of the Russian Federation	Consequences for Ukraine's development	Implications for the development of other European countries
1	Family, nation, and achieving success through forming and developing one's abilities	Preservation of life and health, obtaining sources of income not based on the results of one's activities.	Family divorces, migrants' reluctance to return to Ukraine regardless of the war's outcome, and a decrease in funds flowing into the Ukrainian budget	Expenditures on social benefits for Ukrainian refugees.
2

2 Literature review

Research studies mention that strengthening values among Ukrainians is related to strengthening the national code and identity. A sense of pride in their country and patriotism have become characteristic of Ukrainians. Ukrainians began to favour intangible values: communication with loved ones, social interaction and mutual assistance, and altruism. In contrast, material values have become secondary. This has led to a revival of active citizenship among Ukrainians. A community of like-minded people united by new values has been formed and has spread beyond the country's borders. The change in the values of the population has intensified the volunteer movement, which became widespread after the events of the Maidan and the Revolution of Dignity in 2014. The volunteer movement in Ukraine is characterized by the active participation of concerned citizens in solving society's problems. It is important to note, along with the material contribution of volunteers and concerned citizens, the massive involvement of Ukrainians in providing information and organizational assistance. Examples include assistance to territorial defence units in the arrangement of protective structures; cooking, search for housing, and employment assistance to internally displaced persons; provision of professional labour services by doctors, teachers, educators, lawyers, and other professionals without receiving payment to persons affected by aggression, etc. (Zaloznova et. Azmuk, 2022).

Over the past several decades, the armed conflicts/wars in Libya, Iraq, Kosovo, Afghanistan, and other countries have significantly impacted regional and global development. With this conflict's emergence, several nations' ability to achieve SDGs by 2030 can become unattainable. The conflict slowed the post-COVID-19 recovery and negatively impacted regional and Global SDG achievement (Pereira et al., 2022).

One of the problems that existed before 2022 (Medvid et al., 2018) and has become more acute today is the demographic problem.

The value of "tolerance" in people, its formation and development, particularly in the military, requires a separate rethinking (Medvid et al., 2021).

Given the current situation in Europe, its countries are trying to become economically independent from the aggressor, professing the abovementioned values. Figure 1, on the right, illustrates that the percentage of liquefied natural gas supply relative to total EU gas imports surpassed 40% in 2023, doubling its share in 2021 (Analysis of the European LNG, 2024).

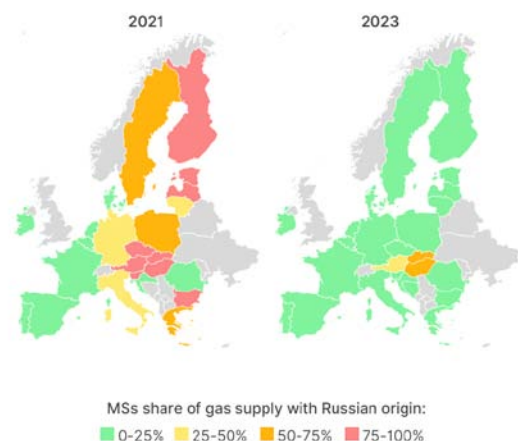


Figure 1 – Estimated share of gas supply with Russian pipeline origin per Member State 2021 vs 2023¹

To achieve the results of the study, the following research methods should be used: sociological surveys of both the population of Ukraine in Ukraine and abroad the population of European countries in order to identify the impact of the Russian-Ukrainian war on the change in their values; methods of statistical research on changes in expenditures and revenues of European budgets in order to identify the impact of changes in the priority values of the population of European countries on their development.

The analysis of scientific works is a system of judgments that gives grounds to assume the hypothesis that the Russian-Ukrainian war affects the change in the priority values of the European population.

3 Materials and Methods

According to the authors of this article, changes in a country's national expenditures by end use are a derivative of changes in the priority values of the population of these countries. The hypothesis that the Russian-Ukrainian war affects the change in the priority values of the population of European countries can be confirmed or refuted using statistical research methods. For example, using the trend approach, it is possible to check whether there is a trend of increasing military spending in countries that were members of NATO before 2014 and share borders with the Russian Federation, Belarus and/or Ukraine. Using correlation analysis, it is also possible to check whether there is a correlation between the increase in military spending in those mentioned above in Eastern European and Baltic countries. To conduct such a study, it is advisable to use the materials of Stockholm international peace research institute (Military Expenditure Database, 2024). The results will confirm or deny that the priority values of the population of European countries have become ensuring the integrity of their states and the safety of their citizens.

¹ Source – Analysis of the European LNG market developments 2024 Market Monitoring Report 19 April 2024. European Union Agency for the Cooperation of Energy Regulators. URL: <http://surl.li/tqftl> (accessed: 23.05.2024).

4 Results

Since 2014, and especially since 2022, creating conditions to ensure the state's integrity and citizens' safety has become a priority value in European countries, particularly those that share borders with the Russian Federation, Belarus and/or Ukraine. Thus, European countries such as Finland (in 2023) and Sweden (in 2024) joined NATO to consume the collective good of military security (Figure 2).

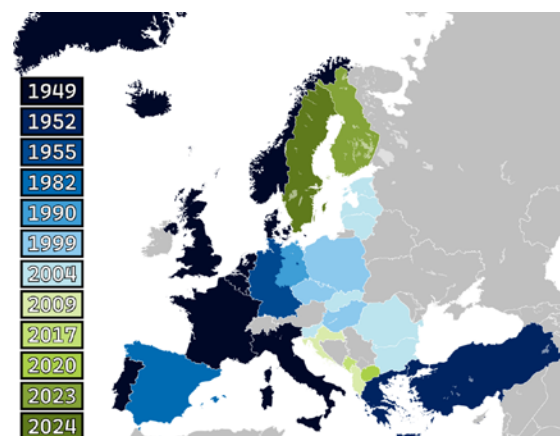


Figure 2 – Periods of NATO membership for European countries²

Gross domestic product (GDP) is the final use of a country's national expenditures, which can be used to assess the change in value priorities by changes in expenditures.

GDP is the main indicator of economic development and the most comprehensive indicator of overall output of goods and services production for a certain period of time. However, GDP per capita is considered the most accurate characteristic that defines the level of economic development as well as economy increase. GDP can be counted by three methods: productive method (method of added values), incomes and costs. The formula that is based upon the costs approach to determine GDP looks like this:

$$GDP \text{ by costs} = C + I + G + NE, \quad (1)$$

where: C – consumer spending; I – private gross investment; G – government spending; NE – net exports.

Military spending tends to increase in the countries that were members of NATO before 2014 (Table 2). One can use the trend approach to confirm or refute this, which extrapolates the forecasted indicator's corrected values of the dynamic time series. This approach is usually used to forecast indicators characterized by either monotonous growth or monotonous decline. Considering the studies conducted to determine the size of the forecasting horizon for making forecasts using trend models (Batsamut, 2020), the forecast was made as of 2025.

In the Baltic countries, military spending is projected to reach at least 2.37% of GDP by 2025, while in 2014, the value of this indicator in Latvia and Lithuania was less than 1% (Figure 3).

In Eastern European countries bordering the Russian Federation, Belarus and/or Ukraine, military spending is projected to reach at least 2.24% of GDP by 2025, while in Slovakia and Hungary, this indicator was less than 1% in 2014 (Figure 4). Even in the more distant Czech Republic, there is a trend toward increasing military spending. The exception to this pattern is Romania.

² Source – Map of NATO's historical expansion in Europe. URL: <http://surl.li/twnml> (accessed: 23.05.2024).

Table 2: Identification of trends in military spending in some Eastern European and Baltic countries and determination of their values in 2025³

Country	Military expenditures (as a percentage of GDP)			Trend line equation	Approximation probability value	Forecast for 2025
	2014	on average over 2015-2022	2023			
Estonia	1,93	2,08	2,87	$y=0.0001x^2-0.001x+0.0213$ (polynomial)	0,63	-
Latvia	0,94	1,81	2,27	$y=0.0063\ln(x)+0.0081$ (logarithmic)	0,92	2,37
Lithuania	0,88	1,84	2,72	$y=0.0018x+0.0086$ (linear)	0,92	3,02
Poland	1,92	2,10	3,83	$y=0.0004x^2-0.0031x+0.0244$ (polynomial)	0,7	-
Slovakia	0,98	1,47	2,02	$y=0.0012x+0.008$ (linear)	0,87	2,24
Czechia	0,97	1,15	1,52	$y=5E-05x^2+1E-04x+0.0092$ (polynomial)	0,95	1,8
Hungary	0,86	1,30	2,13	$y=0.0001x^2+0.0001x+0.0085$ (polynomial)	0,86	2,41
Romania	1,35	1,73	1,61	$y=0.0022\ln(x)+0.0135$ (logarithmic)	0,57	-

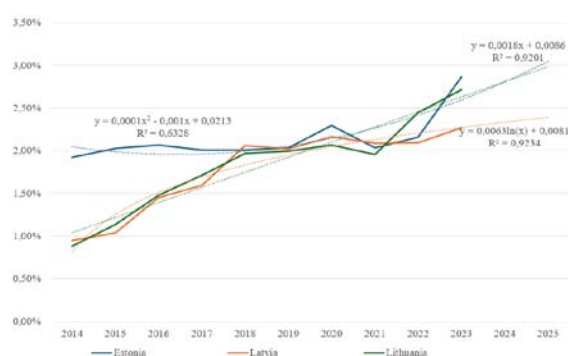


Figure 3 – Identification of trends in military spending by the Baltic States and determination of their values in 2025⁴

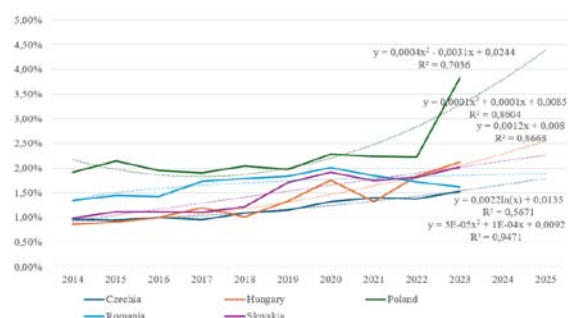


Figure 4 – Identification of trends in the military expenditures of several Eastern European countries and determination of their values in the year 2025⁵

The permissible degree of military-economic tension for the state in peacetime cannot exceed 4-5% of GDP judging by the experience of the developed countries (Borosova et. Drutarovska, 2016). The increase in military spending in Ukraine is understandable; by 2023, it will amount to 36,65% of GDP. However, the overshooting of the threshold of this indicator by the Russian Federation (as of 2023, it amounted to

5,86% of GDP), which negatively affects the welfare of the population of this state, is unjustified and will have negative consequences for this state in the future. After all, directing resources to accumulate productive capital contributes 3-12 times more to growth than using resources for military spending. (Shakhid et. Saba, 2015).

Correlation analysis can also confirm the trend of increasing military spending by countries that were members of NATO before 2014. If the value of one country's indicator changes, the value of another country's indicator changes, and then there is a direct relationship (if the correlation coefficient is more significant than 0,7, there is a robust statistical relationship). Out of seven possible strong relationships with other countries, the Czech Republic has 6, Latvia, Lithuania, and Hungary have 5, Slovakia has 4, Poland has 3, and Estonia and Romania have 2 (Table 3).

Table 3: Identification of statistical correlation between the increase in military spending by some Eastern European and Baltic countries⁶

Country	Latvia	Lithuania	Poland	Slovakia	Czechia	Hungary	Romania
Estonia	0,53	0,70	0,96	0,68	0,72	0,12	0,12
Latvia		0,94	0,47	0,85	0,82	0,81	0,81
Lithuania			0,53	0,86	0,86	0,83	0,82
Poland				0,63	0,72	0,75	0,03
Slovakia					0,93	0,91	0,65
Czechia						0,89	0,52
Hungary							0,48

Therefore, the results of testing the hypothesis confirm that the Russian-Ukrainian war affected the change in the priority values of the European population.

It should be mentioned that «The relationship between military spending and unemployment is a controversial aspect of the National Defence Economy. This relationship has been examined by many authors but the studies have not indicated any uniformity in empirical results» (Odehnal et al., 2023).

5 Conclusion

According to the authors of this article, changes in a country's national expenditures by end use are a derivative of changes in the priority values of the population of these countries. The study's results confirmed the hypothesis that the Russian-Ukrainian war affected the change in the priority values of the population of European countries. Military spending tends to be increased in countries that were NATO members before 2014 and share borders with the Russian Federation, Belarus and/or Ukraine. This pattern was confirmed using the trend approach. According to the forecast, in Latvia, Lithuania, Slovakia, and Hungary, military spending in 2025 will be at least 2,24% of their GDP. In 2014, this figure was less than 1%. The authors also used correlation analysis to identify the dependence of the increase in military spending in those mentioned above Eastern European and Baltic countries. The results confirm that the priority values of the population of European countries have become ensuring the integrity of their states and the safety of their citizens.

Further research will be devoted to conducting sociological surveys of the Ukrainian population in Ukraine and abroad, as well as the population of European countries, to identify the impact of the Russian-Ukrainian war on the change in their priority values.

³ The following source was used to create the table – Military Expenditure Database. Stockholm international peace research institute. URL: <http://surl.li/twbhf> (accessed: 23.05.2024).

⁴ The following source was used to create the figure – Military Expenditure Database. Stockholm international peace research institute. URL: <http://surl.li/twbhf> (accessed: 23.05.2024).

⁵ The following source was used to create the figure – Military Expenditure Database. Stockholm international peace research institute. URL: <http://surl.li/twbhf> (accessed: 23.05.2024).

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Primary Paper Section: A**Secondary Paper Section: AH, KA, BB**

CHANGES IN THE MOTOR PERFORMANCE OF CHILDREN IN PRIMARY EDUCATION

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The paper was solved within the KEGA project no. 026UK/2022.

Abstract: In the paper, the authors approach the issue of motor performance of children in primary education by tracing trends in the development of somatic and motor characteristics over a 20-year period. Our research involved 924 children of younger school age from primary schools in five towns of the Eastern Slovakia region. The aim of the paper is to identify the current status and level of somatic and motor characteristics of primary school children in the primary schools of the East-Slovak region in relation to age and gender. To determine the level of motor skills we used selected tests from the EUROFIT battery. We compared the achieved research results of all children of our research (File 2019) with the results of research (Turek 1999). By analyzing and comparing the results, we highlight developmental trends over a 20-year period and also present an analysis of the causes of possible changes.

Keywords: Diagnosis, somatic and motor characteristics, EUROFIT-test, movement skills, coordination skills, comparison, younger school age.

1 Introduction

Knowing the state of movement abilities of children of younger school age in primary education contributes significantly to its positive influence in terms of prevention and the goal of the set requirements for children. By looking for effective models for the development of movement skills in physical and sports education, we will help children discover the benefits of movement activities and the possibilities of enjoying them. Their development should be carried out taking into account and respecting the age and individuality of each child and adult. We cannot imagine life in our schools without adequate physical activity. The authors (Goodway, Ozmun & Gallahue, 2019) state that childhood, especially the period of younger school age, is a crucial period for movement development. Supporting physical activities and motor competence, especially at this developmental stage, is very beneficial for a healthy and active lifestyle. Research on children's physical activity and health began around 1980. Some long-term studies still exist until today, e.g. Amsterdam Growth and Health Study, Young Finns Study, Leuven Longitudinal Study, Danish Youth and Sports Study, Northern Ireland Young Hearts Study. Physical activity is important for everyone's health, and studies such as the European Youth Heart Study report a high prevalence of cardiovascular disease risk factors, low muscle strength and low bone mass in children who do little physical activity. Nevertheless, there is a large proportion of children with physically inactive lifestyle.

Stavridou, Kapsali, & Panagouli et al. (2021) report that in 2019, 38.2 million children under 5 years were overweight or obese (almost half of them living in Asia) and more than 340 million children and adolescents aged 5–19 years were overweight or obese in 2016. The prevalence of overweight and obesity among children and adolescents aged 5–19 years has increased significantly from only 4% in 1975 to more than 18% in 2016. Although obesity and overweight were considered as a problem in high-income countries, there is also a rapid increase in low-income and middle-income countries. In the United States (USA), nearly 18.5% (13.7 million) children aged 2–19 were obese in 2017–2018.

According to Ruopeng et al. (2020) during the COVID-19 pandemic, extended school closures were mandated to reduce infection rates. However, it was a measure that disrupted the daily routine of distance learning children, limiting their regular, physical, extracurricular and outdoor activities, as public places

were closed. The resulting reduction in energy expenditure was a factor associated with an increased risk of childhood obesity. Nagata, Magid & Gabriel (2020) stated that in addition, children's excessive screen time was associated with sedentary behavior and snacking, which are also associated with obesity and high blood pressure. In a group of 432,302 US children and teenagers aged 2–19, the rate of increase in body mass index (BMI) during the pandemic roughly doubled compared to the period before it. The biggest increases were seen in children aged 6–11 and those who were already overweight before the pandemic. Before the pandemic, children who were at a healthy weight gained an average of 1.55 kg per year. It increased to 2.45 kg during the pandemic. For those who were already mildly obese, weight gain increased from 2.95 kg per year to 5.45 kg after the outbreak of the pandemic. In the severely obese, the average annual weight gain increased from 4 kg to 6.6 kg.

The child should be led to movement activities from a young age, because the first habits are already formed during this period. Children perceive their parents as role models, and when they notice that their parents are not interested in physical activity, we can assume that the child will also imitate their attitude. We believe that among the factors that influence the entire process of motivating children to physical education and sports are primarily the quality and quantity of comprehensible information in everyday life, the climate of school and home, the teacher, coach and family, but also the child himself. According to (Horváth et al., 2010), somatic and movement testing has a wide scope and at the same time affects the individual, school, region, education and health departments, their orientation, with important goals for a healthy lifestyle for the whole society. The author Šimonek (2018) is of the opinion that when determining children's talent for sports, not only the level of motor skills should be monitored, but also the level of motor competences manifested in basic locomotion walking, running, jumping, throwing, rolling a ball, jumping rope, jumping over an obstacle, etc. The state of gross motor skills usually reveals the quality of children's motor skills more than performance in tests of motor skills.

Several authors, e.g. Antala et al. (2018), Antala (2021), Horváth et al. (2016), Merica & Barnáková (2021), Belešová (2022), Merica & Belešová (2022), Severini, E., Kožík Lehotayová, B., & Kuruc, M. (2020), Severini, Kožuchová & Brezovská (2021), Koreňová, Severini & Čavojský (2023) emphasize that teachers significantly influence the development of the educational system, unbringing and education itself. the importance of the teaching profession affects all areas of society's life. According to the authors Gunčaga, Žilková & Partová et al. (2019), Gunčaga & Belešová (2023), Kostrub (2022), Horecký, J., & Koreňová (2023) the teacher influences the character and quality of the relationship with the students, conditions the atmosphere in the classroom, stimulates the students' interest - including their relationship to sports and active physical activity, experiencing life at school, developing their knowledge and whole personality. Other authors, e.g. Gregor (2013), Harsa, Kaplánová, & Gregor et al. (2023), Horváth (2001), Kampmiller & Vanderka et al. (2012), Macura et al. (2022), Petrikán (2021), Turek (1999) recommend physical activities as part of a healthy lifestyle and emphasize the need for regular exercise in children from the earliest school age.

2 Methodology

Diagnosing should be the teacher's basic activity. The student's development is constantly monitored by the teacher, who looks forth causes of possible problems (Porubčanová & Zapletal, 2022). Individualized diagnosis mainly monitors the progress of pupils over a given period of time.

Goal. The goal of the article is to find out and identify the state of the level of somatic and motor characteristics of children of younger school age from primary schools in five cities in the

East Slovak Region and to find out the trends of their development by comparing our research - File (2019) with research - Turek (1999) and on the basis of the comparison try to analyze the causes of development. To determine the level of motor skills, we used selected tests from the EUROFIT battery by Moravec et al. (2002).

Tasks. Based on the goal we set, we set ourselves the following tasks: Select primary schools in the East Slovak region where we will conduct our research, conduct teacher training and explain the methodology of testing children. Select test items from the EUROFIT-test battery that we will use during testing. To carry out planned testing of children of younger school age in primary schools in the East Slovak region, to compare the results of our research (File 2019) carried out on 924 children of the East Slovak region with the results of research (Turek 1999), which carried out research on 3590 children of the East Slovak region. Statistically process and evaluate the measured results.

Hypotheses. On the basis of the goal and tasks of the work, we made the following hypotheses (H0-1, H1-1, H0-2, H1-2, H03, H1-3):

H0-1: we assume that there will be no statistically significant differences in somatic characteristics between the results of the children from the research - Turek (1999) and the results of our research - File (2019).

H1-1: we assume that there will be statistically significant differences in somatic characteristics between the results of the children from the research - Turek (1999) and the results of our research - File (2019).

H0-2: we assume that there will be no statistically significant differences between the results of the children from the research - Turek (1999) and the results of our research - File (2019) in the tests of motor characteristics in individual test items.

H1-2: we assume that there will be statistically significant differences between the results of the children from the research - Turek (1999) and the results of our research - File (2019) in the tests of motor characteristics in individual test items.

H0-3: we assume that the results in motor characteristics of children from our research - File (2019) will be better than that of children from our research - Turek (1999).

H1-3: we assume that the results of the children's motor characteristics from our research - (File (2019) will be worse than the results of the children from the research - Turek (1999).

Characteristics of the research object: Our research was attended by 924 children of younger school age from elementary schools (ES) of the East-Slovak Region in the cities of Michalovce, Košice, Veľké Kapušany, Prešov and Trebišov. Of these, there were 448 boys and 476 girls. They were students of the first, second, third and fourth grades. In our research - File (2019) we included: 7, 8, 9 and 10-year-old children of younger school age, while for 7-year-olds we consider the decimal age 7.00-7.99, for 8-year-olds the decimal age 8.00-8.99, for 9 years decimal age 9.00-9.99 and 10 years decimal age 10.00-10.99.

Data acquisition methods: We chose the following tests to determine the data we are tracking. For somatic characteristics, we chose: 1. BH (body height), 2. BW (body weight), 3. BMI (Body Mass Index). For motor characteristics, we selected the following items from the EUROFIT test:

1. Test (PRKL) – Forward bending with reaching while sitting. Factor: joint mobility and flexibility of the body of the sitting part of the body and the back of the legs.
2. Test (SKOK) - Long jump from a place. Factor: explosive power of the lower limbs.
3. Test (LS) – Sit up in 30s. Factor: dynamic and endurance strength of the abdominal, hip and thigh muscles.

4. Test (VZH) – Pull-up. Factor: static, endurance strength of the muscles of the upper body.
5. Test (CBEH) – Shuttle run 10 x 5m. Factor: running speed with changes of direction.
6. Test (VBEH) – Endurance shuttle run. Factor: running endurance.

Methods of processing and evaluating the results: We statistically processed and evaluated the measured data. We digitized the measured values recorded in the recording sheets as an input database, which we processed using the EXCEL program from the Microsoft Office package. The first step, before processing the research data, was the exclusion of extreme values (outliers). We evaluated somatic indicators using percentile charts. Since we want to test hypotheses about the statistical significance of file differences, we had to decide what type of test to use. When deciding between parametric and non-parametric tests, the deciding factor is the normality of the sets and whether the variances of the sets are not significantly different. We tested normality with the Shapiro-Wilk normality test, and variances were tested with the F test. Since normality was confirmed and the results of the F test did not show significant differences in the variances, we used the parametric T test, the so-called "one simple t test", to test the hypotheses. The formula that this t test is based on is

$$t = \frac{(x_{1999} - x_{2019})}{s} \sqrt{n}$$

where x_{1999} and x_{2019} are the arithmetic means of the sets, s is the standard deviation, n is the number of probands in the set. We compared the calculated value of t at the assumed level of significance $\alpha=0.05$ with the table value of the Student's distribution at $n-1$ degrees of freedom t_{crit} . If $t > t_{crit}$, we reject the null hypothesis H_0 and accept the alternative hypothesis H_1 . The use of several statistical methods can also be found in the authors Hendl (2006), Tomšík (2017), Gunčaga, Zawadowski, Prodromou (2019) and others.

3 Results and discussion

We present the results obtained from the testing of somatic indicators and motor movement skills in children of younger school age ($n=924$) from elementary schools in five cities in the East Slovak Region in tables and graphs with a view to individual six hypotheses. There were (448) boys and (476) girls in the group we monitored. They were students of the first, second, third and fourth grades. In Tab. (1) we present the number and composition of our monitored file: File (2019) in the number of 924 children.

Tab. 1: Number and composition of sets of children of younger school age (n=924): File (2019)

	Boys					Girls					Summary
	7 years old	8 years old	9 years old	10 years old	Total	7 years old	8 years old	9 years old	10 years old	Total	
Elementary school in Michalovce	26	24	24	24	98	27	27	25	25	104	202
Elementary school in Košice	23	24	24	24	95	24	24	24	24	96	191
Elementary school in Veľké Kapušany	10	34	17	24	193	25	32	29	32	200	393
Elementary school in Prešov	13	15	14	14	56	17	15	15	15	62	118
Elementary school in Trebišov	30	30	27	27	114	21	24	25	26	96	210
Summary	102	127	106	113	448	114	122	118	122	476	924

3.1 Somatic characteristics of children of younger school age

In the following tables (Tab. 2, 3) we present the somatic characteristics of children of younger school age in our monitored set: File (2019) in number (n=924), which we also specified for the category: 7- and 8-year-old children and for the category: 9 and 10-year-old children.

Tab. 2: Somatic characteristics of children of younger school age (7 and 8 years old): File (2019)

Age			7						8					
			n	x	s	T	tcrit	T-test	n	x	s	T	tcrit	T-test
BH	B	1999	446	126,11	6,30	2,937	1,993	**	423	129,58	5,31	2,89	1,993	**
		2019	102	128,96	12,5				127	132,02	7,12			
	G	1999	452	125,02	5,19	2,01	1,992	**	403	131,41	5,98	4,65	1,987	**
		2019	114	126,04	5,20				122	129,16	5,35			
BW	B	1999	446	24,82	3,94	7,69	1,993	**	423	27,83	4,91	2,37	1,993	**
		2019	102	26,65	5,06				127	29,74	6,86			
	G	1999	452	20,78	3,10	6,28	1,993	**	403	27,83	3,00	5,25	1,950	**
		2019	114	24,54	4,67				122	29,68	6,35			
BMI	B	1999	446	15,20	9,56	3,23	1,993	**	423	15,93	1,91	3,25	1,993	**
		2019	102	16,73	2,60				127	16,88	2,94			
	G	1999	452	15,91	9,75	2,01	1,992	**	403	16,06	2,11	2,51	1,992	**
		2019	114	16,8	2,31				122	16,93	3,12			

Legend: BH (body height), BW (body weight), BMI (Body Mass Index), B (boys), G (girls), n (number of probands), x (arithmetic mean of values), s (standard deviation), T (calculated value from the T-test), tcrit (critical value of Student's distribution at n-2 degrees of freedom), ** (statistically significant difference of the T-test at the 0.05% level).

Tab. 3: Somatic characteristics of children of younger school age (9 and 10 years old): File (2019)

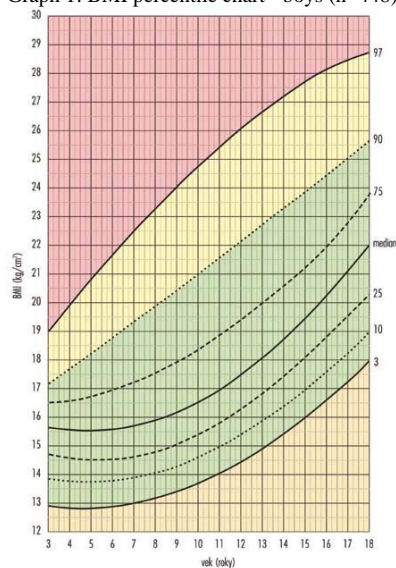
Age		9							10						
			n		x	s	T	tcrit	T-test		x	s	T	tcrit	T- test
BH	B	1999	424	135,95	5,80	0,890	1,994	**	528	141,14	6,43	2,69	1,940	**	
		2019	106	137,76	5,91				113	143,07	7,52				
	G	1999	370	134,37	5,50	2,34	1,993	**	510	140,67	6,86	2,77	1,990	**	
		2019	118	136,05	5,57				122	139,85	8,40				
BW	B	1999	424	32,85	5,19	2,37	1,994	**	528	33,58	6,93	5,37	1,994	**	
		2019	106	31,35	7,68				113	38,14	8,91				
	G	1999	370	30,89	3,56	2,96	1,993	**	510	33,73	7,15	5,05	1,990	**	
		2019	118	32,87	7,37				122	37,35	8,27				
BMI	B	1999	424	16,84	2,30	2,47	1,994	**	528	17,48	4,53	3,37	1,954	**	
		2019	106	17,20	3,08				113	18,56	3,47				
	G	1999	370	16,76	2,30	3,08	1,993	**	510	19,49	10,37	4,08	1,990	**	
		2019	118	17,64	3,15				122	18,37	3,02				

Legend: BH (body height), BW (body weight), BMI (Body Mass Index), B (boys), G (girls), n (number of probands), x (arithmetic mean of values), s (standard deviation), T (calculated value from the T-test), tcrit (critical value of Student's distribution at n-2 degrees of freedom), ** (statistically significant difference of the T-test at the 0.05% level).

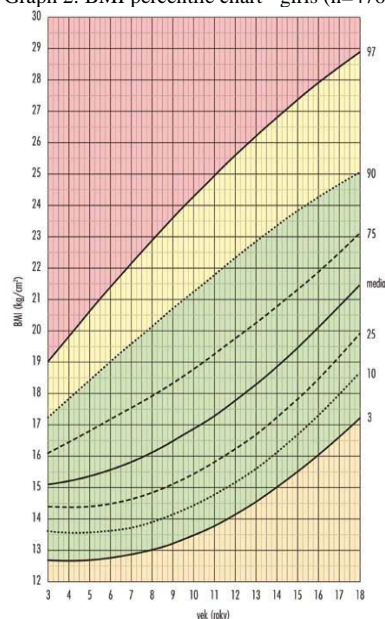
When analyzing the results of the T-test (Tab. 2, 3), we can state that in all age categories there are statistically significant changes in body height and body weight and thus also an increase in BMI. However, the increase in body weight is much higher than in height, as evidenced by the increase in BMI. Body weight gain increases with age. While for boys there is an increase of 7% for 7-year-olds, it is already 12.2% for 10-year-olds. In 7-year-old girls, the weight increase compared to the measurement of Turek (1999) is by 8%, but in 10-year-old girls by up to 11.2%. Of course, the BMI of 7-year-old boys and girls increases proportionally by 11% and 10-year-olds by 15%. From these figures, we can see that the weight of children of younger school age has been growing at a high rate for the last 20 years. If we consider that Turek (1999) already recorded an increase in weight in his research compared to the research of Moravec (1996), this fact is even more interesting.

In the following graphs (Graph 1, 2) we present the BMI percentile values for boys and girls.

Graph 1: BMI percentile chart - boys (n=448)



Graph 2: BMI percentile chart - girls (n=476)



Also on the BMI percentile graphs (Graph 1, 2,) we can see in both boys and girls that while in the research: Turek (1999) the average BMI values were below the median, in our measurement (File 2019) the average values are at the level of 65. up to the 75th percentile. We can therefore state that the hypothesis H0-1 was rejected and therefore we accept the alternative hypothesis H1-1, that there are statistically significant differences between the results of somatic indicators according to the research - Turek (1999) and our research – File (2019).

3.2 Evaluation of motor tests

In the following tables (Tab. 4, 5) we present the motor characteristics of children of younger school age of the group we monitored (n = 924) - File: (2019), which we also specify for children of younger school age (7 and 8 years old) and children younger of school age (9 and 10 years old).

Tab. 4: Motor characteristics of children of younger school age (7 and 8 years old): File (2019)

Motor characteristics of children of younger school age														
Age			7						8					
			n	x	s	T	tcrit	T Test	n	x	s	T	tcrit	T Test
PRKL	B	1999	446	20,56	5,77	9,15	1,993	**	423	21,10	5,67	13,35	1,993	**
		2019	102	19,56	12,41				127	12,45	7,38			
	G	1999	452	21,65	6,01	13,39	1,992	**	403	21,13	7,14	10,75	1,980	**
		2019	114	12,49	7,33				122	14,10	7,24			
SKOK	B	1999	446	115,13	18,15	3,10	1,993	**	423	130,31	13,89	6,26	1,993	**
		2019	102	108,91	20,49				127	119,89	18,96			
	G	1999	452	108,73	16,63	4,011	1,992	**	403	122,11	14,28	4,53	1,980	**
		2019	114	101,61	19,03				122	113,52	20,92			
LS	B	1999	446	15,66	5,311	0,95	1,993		423	17,07	4,37	0,93	1,993	
		2019	102	16,82	9,92				127	16,66	4,80			
	G	1999	452	14,59	4,99	2,206	1,992	**	403	15,80	4,07	0,742	1,980	
		2019	114	13,58	4,89				122	15,50	4,30			
VZH	B	1999	446	12,06	8,84	6,11	1,993	**	423	15,62	10,94	3,20	1,993	**
		2019	102	7,22	9,08				127	12,25	11,84			
	G	1999	452	10,12	7,75	4,66	1,992	**	403	10,75	9,42	0,17	1,980	
		2019	114	7,13	6,86				122	10,59	9,52			
CBEH	B	1999	446	26,56	7,61	5,67	1,993	**	423	24,47	0,35	0,35	1,993	
		2019	102	24,71	3,33				127	24,60	4,06			
	G	1999	452	26,54	3,66	2,84	1,992	**	403	25,67	2,52	2,58	1,980	**
		2019	114	25,51	3,02				122	24,85	3,51			
VBEH	B	1999	446	20,80	5,61	3,65	1,992	**	423	22,43	11,54	2,34	1,993	**
		2019	102	18,72	9,05				127	21,36	9,03			
	G	1999	452	18,91	9,45	4,03	1,992	**	403	19,04	8,64	0,69	1,980	

Legend: n (number of tested probands), x (arithmetic mean of values), s (standard deviation), T (calculated value from the T-test), tcrit (critical table value of Student's distribution at n-2 degrees of freedom), ** (statistically T-test significant difference at the 0.05% level).

The motor tests in the tables (Tab. 4, 5) and in the graphs (Graph 1 – 12) are indicated by abbreviations that mean: 1. Test (PRKL) - Forward bending with reaching while sitting. 2. Test (SKOK) - Long jump from a place. 3. Test (LS) – Sit up in 30s. 4. Test (VZH) – Pull up. 5. Test (CBEH) – Shuttle run 10 x 5m. 6. Test (VBEH) - Endurance shuttle run.

Tab. 5: Motor characteristics of children of younger school age (9 and 10 years old): File (2019)

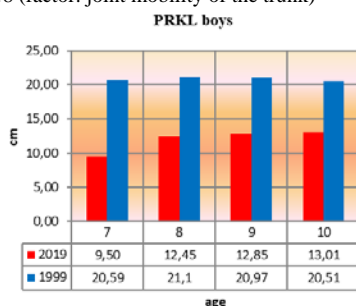
Motor characteristics of children of younger school age														
Age			9						10					
			n	x	s	T	tcrit	T test	n	x	s	T	tcrit	T test
PRKL	B	1999	424	20,97	6,71	8,49	1,995	**	526	20,51	5,72	5,25	1,993	**
		2019	106	12,85	7,18				113	13,01	7,42			
	G	1999	370	22,32	5,66	11,85	1,992	**	510	21,78	6,16	5,46	1,980	**
		2019	118	15,81	6,06				122	14,17	7,31			
SKOK	B	1999	424	141,33	3,01	8,49	1,993	**	526	155,15	18,91	5,25	1,993	**
		2019	106	135,81	20,49				113	135,42	22,55			
	G	1999	370	131,76	15,63	4,86	1,992	**	510	142,28	18,55	5,46	1,980	**
		2019	118	122,97	19,95				122	125,28	21,85			
LS	B	1999	424	19,02	4,32	1,84	1,993		526	21,46	4,48	5,25	1,993	**
		2019	106	19,91	5,101				113	19,03	5,00			
	G	1999	370	17,11	4,37	0,045	1,992		510	19,64	5,62	5,46	1,980	**
		2019	118	17,09	5,46				122	17,28	4,45			
VZH	B	1999	424	16,94	12,36	0,138	1,993		526	19,53	15,42	5,25	1,993	**
		2019	106	17,14	15,40				113	15,52	13,49			
	G	1999	370	12,11	8,55	1,71	1,992		510	13,22	9,93	5,46	1,980	**
		2019	118	10,69	8,64				122	12,81	11,40			
CBEH	B	1999	424	24,03	4,48	0,151	1,993		526	22,45	2,52	5,25	1,993	**
		2019	106	23,98	3,45				113	21,83	3,24			
	G	1999	370	24,59	2,64	0,665	1,992		510	23,75	3,33	5,46	1,980	**
		2019	118	24,34	4,55				122	24,11	3,49			
VBEH	B	1999	424	29,95	13,66	0,89	1,993		526	31,87	13,50	5,25	1,993	**
		2019	106	31,64	16,75				113	29,36	16,37			
	G	1999	370	23,31	10,72	0,70	1,992		510	23,37	9,35	5,46	1,980	**
		2019	118	22,86	11,77				122	24,48	11,38			

Legend: n (number of tested probands), x (arithmetic mean of values), s (standard deviation), T (calculated value from the T-test), tcrit (critical table value of Student's distribution at n-2 degrees of freedom), ** (statistically T-test significant difference at the 0.05% level).

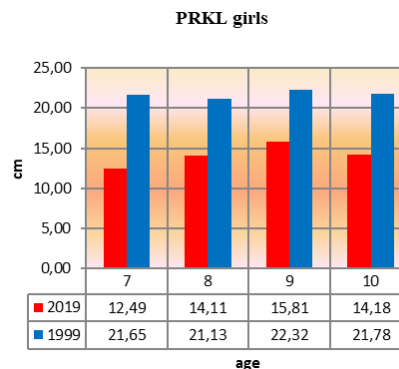
In Tab. (4, 5) show arithmetic averages, standard deviations, and t-test results of measured values from individual items of the EUROFIT-test files (Turek 1999), which is a file from the research: Turek (1999) and from our research carried out in 2019: (File 2019).

In the next part (Graph 3 – 14) we present the results of individual motor tests, including the attitude towards individual hypotheses.

Graph 3: Forward bending with reaching while sitting (PRLK): boys: n=448 (factor: joint mobility of the trunk)



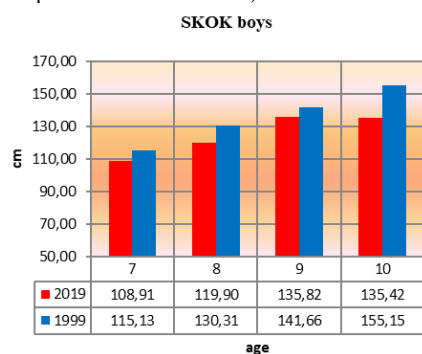
Graph 4: Forward bending with reaching while sitting (PRLK): girls: n=476



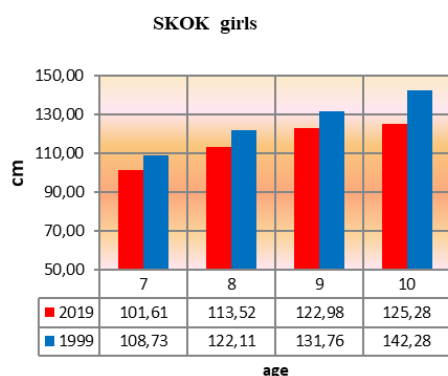
The test item (PRLK – Forward bending with reaching while sitting) represents the joint mobility of the trunk (Graph 3, 4). The achieved results show statistically significant differences between the children from the research - Turek (1999) and our

research - File (2019). The differences are in favor of the set (Turek 1999) and are better than the results of our research (File 2019). The results in the set of boys and girls change at least with age, even in the set of girls (File 2019) the results of 9-year-old girls are better than the results of 10-year-old girls. We can be inclined to believe that the worse results we observed in our research (File 2019) are related to a statistically significant increase in weight.

Graph 5: Long jump from a place (SKOK): boys (factor: explosive power of the lower limbs)

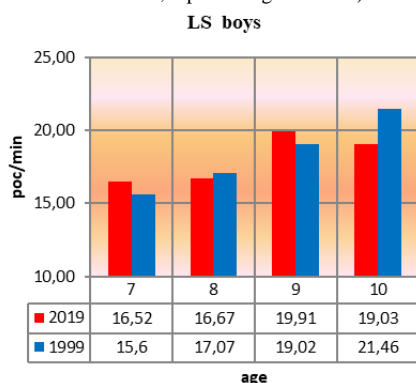


Graph 6: Long jump from a place (SKOK): girls

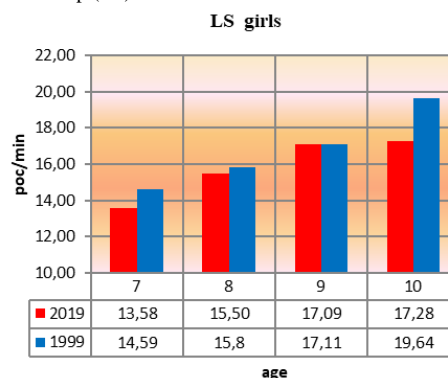


In the test item (SKOK - long jump from a place), which reflects the explosive power of the lower limbs (Graph 5, 6), it can be found that both in boys and in girls the results of the research - Turek (1999) are better than the results of our research - File (2019) in all age categories. We see the most striking differences in the age category of 10-year-old boys and girls. In the category of 10-year-old boys (Turek 1999), performances in the standing long jump are up to 14.5% better than in our research (File, 2019). For girls, this difference is 13.5% in favor of 10-year-old girls from the ensemble (Turek 1999).

Graph 7: Sit up (LS): Boys (factor: dynamic and endurance strength of the abdominal, hip and thigh muscles)

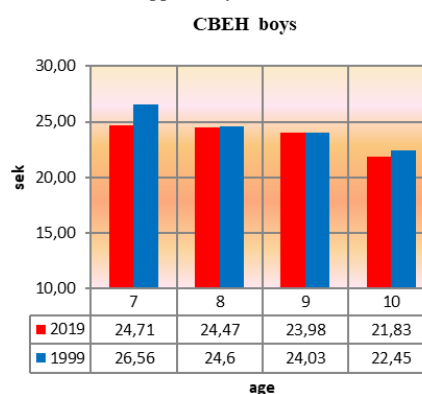


Graph 8: Sit up (LS): Girls

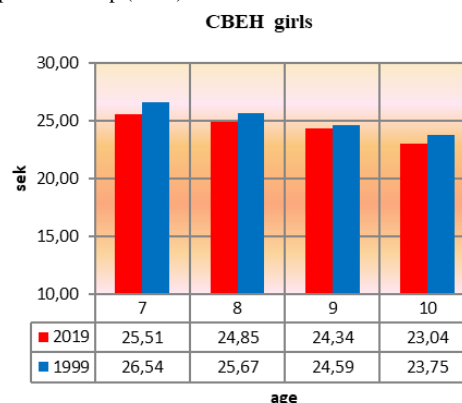


The evaluation of the test item (LS: Sit up), which determines the dynamic and endurance strength of the abdominal and hip-femoral muscles (Graph 7, 8) is not clear-cut. For boys, the research results (Turek 1999) are better only in the age category of 8 and 10 years, statistically significant only in 10-year-old boys. For girls, the results in all age categories are better in research (Turek 1999), but statistically significant only for 7 and 10-year-olds.

Graph 9: Pull-up (VZH): Boys (factor: static, endurance strength of the muscles of the upper body)

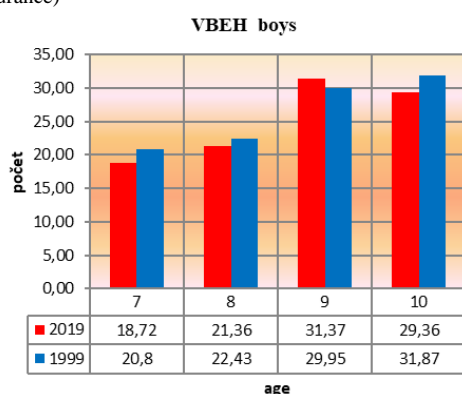


Graph 10: Pull-up (VZH): Girls

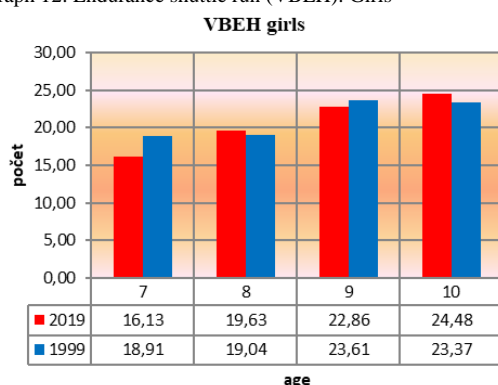


When analyzing the results of testing the item (VZH – Pull-up), which determines the static and endurance strength of the muscles of the upper limbs, we see (Graph 9, 10) that better results were achieved by boys (Turek 1999) in the age categories of 7, 8 and 10 years old, only in the age category of 9-year-old boys were better results in our research (File 2019), also not statistically significant. For girls, similarly better results were achieved in the set (Turek 1999) for 7, 9 and 10-year-old girls.

Graph 11: Endurance shuttle run (VBEH): boys (factor: running endurance)



Graph 12: Endurance shuttle run (VBEH): Girls



In the test item (VBEH - endurance shuttle run) the results are ambiguous (Graph 11, 12). For boys in the age categories of 7, 8 and 10 years, the results are better in the ensemble (Turek 1999). In 9-year-old boys, boys recorded better results (File 2019). The situation is similar for girls, in the age categories of 7 and 9-year-old girls, better results were recorded in the ensemble (Turek 1999), but in the categories of 8 and 10-year-old girls, the girls from our research had better results (File 2019).

3.3 Statement on hypotheses

The results of our research show the following: in the null hypothesis H0-1 where we assumed that there would be no statistically significant differences in somatic characteristics between the results of the somatic characteristics of children from the research of Turek (1999) and the results of our research (File 2019). We disproved this hypothesis with the t-test and the alternative hypothesis H1-1 is valid, that there are statistically significant differences in the somatic characteristics of the children from the research (Turek, 1999) and the results of our research (File 2019), which applies to all age categories and both boys and girls. Children of younger school age from our research (File 2019) have higher weight, body height and higher BMI (Body Mass Index) than the children from the research (Turek 1999).

In the null hypothesis H0-2, we assumed that there would be no statistically significant differences between the results of children from the research of Turek (1999) and the results of our research (File 2019) in the tests of motor characteristics in individual test items. This hypothesis was unambiguously refuted by the t test, and the alternative hypothesis H1-2 is valid, that there are statistically significant differences between the results of the children from the research of Turek (1999) and the results of our research (File 2019) in the tests of motor characteristics in the individual test items.

In hypothesis H0-3, we assumed that the results in the motor characteristics of the children from our 2019 research would be

better than the results of the children from the research (Turek 1999). We unequivocally disproved this hypothesis only for test items (PRKL, SKOK and VZH), where the alternative hypothesis H1-3 is valid, that the results of the research children (Turek 1999) are statistically significantly better than the results of the children from our research (File 2019) for both boys and girls in all age categories.

In the other test items (LS, CBEH and VBEH), hypothesis H1-3 cannot be rejected for all age categories of boys and girls, however, it is also true that the results of the research children (Turek 1999) are better than the results of the children from our research (File 2019), but statistically insignificant.

In somatic characteristics, especially in body weight, our research showed that children of younger school age from our research (File 2019) have a statistically significantly higher weight for all age categories in both boys and girls than the probands from the research (Turek 1999). Since Turek (1999) in his research proved an increase in the weight of children of younger school age compared to research (Moravec 2002), we can conclude that the weight of children of younger school age has been continuously increasing since 1996.

The speed-strength and strength-endurance motor characteristics are in most age categories in both the boys and girls of our research at the level below average to weak according to standards (Moravec 2002) and statistically significantly worse than the results of the research (Turek (1999)). The results obtained show a correlation between the increase in weight of the children from our research (File (2019) and the worse motor characteristics of these children.

Motor skills appear to have clinical relevance for school performance, as research by Ericsson and Karlsson (2012) reports that children with motor skill deficits at the beginning of school may struggle with academic performance. Therefore, it is important to identify children with impaired motor skills already at school and to start intervening in order to improve motor development. Scientific evidence of the relationship between motor coordination and academic performance was also provided by a Spanish study conducted by the Guillaumon, Cantó and García team (2021). Their cross-sectional study included 163 Spanish schoolchildren aged 6–9 years. Motor coordination was measured with the GRAMI-2 test (motor coordination test for the assessment of elementary school children). Variables were calculated: motor coordination index and overall academic performance. The obtained results showed that schoolchildren with a better index of motor coordination had significantly better grades in language, mathematics, science and English (p between $< .01$ and $< .05$). After dividing the sample according to global academic performance, those with good academic performance showed better coordination performance in lateral jumps ($p = 0.021$) and a better motor coordination index ($p = 0.008$). These results indicate the existence of a positive relationship between motor coordination and academic performance.

4 Conclusion

In our article, we tried to approach the issue of motor performance of children of younger school age by following trends in the development of somatic and motor characteristics over a 20-year period. To determine the level of motor skills, we used selected tests from the EUROFIT battery. We compared the achieved research results of all children with the research results (Turek, 1999). By analyzing and comparing the results, we point out development trends after a 20-year period and at the same time provide an analysis of the causes of possible changes.

924 elementary school children from five towns in the East Slovak Region participated in our research. The goal of the article was to identify the current state and level of somatic and motor characteristics of children in primary education in primary schools of the East Slovak region in two selected groups: research (Turek, 1999) and our research (File, 2019) in relation

to age and gender. In the somatic characteristics, we observe an increase in the weight of the children of our research - File (2019) compared to the children of the research (Turek 1999).

The mentioned author (Turek, 1999) in his research reported an increase in the weight of children compared to the research - Moravec, Kampmiller and Sedláček (2002). We believe that the increase in the weight of children of younger school age has continued continuously since at least 1996. Of course, the increase in the Body Mass Index (BMI) also corresponds to this. According to Loz, Child and Doolittle (2023), a significant increase in normalized BMI (Body Mass Index) was already found during the pre-pandemic period in all age groups. This rate of change increased during the pandemic in patients with preexisting overweight or obesity who were in age 0 years. Changes in the rate of weight gain during the period of the COVID-19 pandemic raise the possibility that the effects of the pandemic may have worsened the rate of weight gain in children with pre-existing obesity or overweight.

We therefore ask ourselves the following questions: What is the cause of the increase in the weight of children of younger school age and the decrease in their motor characteristics? Is it a higher standard of living, bad eating habits or lack of exercise? We assume that it is a synergy of these three conditions.

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Primary Paper Section: A

Secondary Paper Section: AK

DETERMINING THE ROLE OF COMPANY CHARACTERISTICS AS INNOVATION DRIVERS IN CREATIVE INDUSTRIES IN THE CZECH REPUBLIC

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Abstract: This study investigates the impact of specific company characteristics on the innovation performance of creative industries in the Czech Republic. Data were collected through a questionnaire survey of 355 private enterprises across all creative industry sub-sectors. Structural equation modelling was employed to develop a measurement model for innovation in these industries. The findings reveal that participation in conferences or workshops and involvement in writing scientific publications are among the company characteristics with the greatest positive impacts on innovation performance. Conversely, business age, company location in an urbanised centre, public funding, and workforce gender diversity did not have significant impacts. These results underscore the importance of knowledge sharing and continuous professional development for innovation in creative industries.

Keywords: creative industries, cultural industries, innovation, innovation performance, company characteristics, knowledge sharing, structural equation modelling

1 Introduction

Creative industries can be considered as contemporary phenomena that are inherently linked to modern lifestyles, economic development, and innovation (Kontrimienė and Melnikas, 2017). The dynamically changing global environment, coupled with the influence of new technologies and globalisation, has led to a significant shift from traditional manufacturing sectors to the development of services and an increasing emphasis on innovation. Creative industries and their untapped potential enable the creation of economic growth and jobs (European Commission, 2010). Their primary input is the creativity of individuals, in contrast to many other sectors of the economy that require additional inputs in the form of various raw materials.

However, the concept of creative industries has largely been artificially created through combining several sub-sectors into a single sector. Through this process, creative industries became sufficiently large to attract the attention of politicians and investors representing advanced economies (Goueva and Vora, 2018). Yet, this step also had negative consequences. An example is the absence of a universally accepted definition, stemming from the fact that creative industries have different sub-sector compositions in different countries. At present, there is no consensus on the structure of creative industries. The creative industries in the Czech Republic comprise three main sectors: the traditional and artistic sector (including Cultural Heritage, Performing Arts, Visual Arts, Arts Education, and Artistic Crafts), the audiovisual and media sector (encompassing Film and Video, Music, Radio, Television, Video Games, and Books and Print), and the creative sector (consisting of Architecture, Advertising, and Design) (NIPOS, 2024). Each of these sub-sectors has unique creative processes, business models, and target audiences. Therefore, research must be based on local conditions, and the findings from research in one country may not automatically apply to others.

Despite their relatively long history, creative industries became the subject of more intensive research only after the turn of the millennium (Jones et al., 2016). Traditional research on creative industries focused on their contributions to economic development, urban agglomeration development, regional development, or the study of their macroeconomic impacts (Cho et al., 2018). In addition to direct positive impacts on a country's gross domestic product growth, reducing unemployment, creating and supporting social cohesion among the population, and promoting creativity and innovation, creative industries also have additional positive impacts in the form of so-called spill-over effects (Kloudova and Chwaszcz, 2014; Castro-Higueras and de Aguilera-Moyano, 2018).

Innovation is one of the main driving forces of creative industries, which are among the most innovative sectors of the economy (Müller et al., 2009). Flew and Cunningham (2010) emphasised that creative industries are increasingly at the centre of economic interest in developed countries, as their development brings innovation, increased employment, and the development of a knowledge society. Moreover, their economic significance gradually increases over time (Kloudova and Chwaszcz, 2014). Despite this general recognition of the importance of creative industries, the current understanding of how specific company characteristics influence innovation performance remains significantly limited. This article aims to identify, through constructing a model for measuring innovation performance, the company characteristics that serve as innovation drivers of companies in creative industries.

2 Theoretical Framework

Researchers have long strived to achieve the most accurate measurement possible of a company's innovation performance. The most common indicators of innovation performance include new products and services, organisational and process changes, or the acquisition of new intellectual property. These are often supplemented by additional indicators. The aim of adding further variables to the measurement of innovation performance is to capture these innovations as precisely as possible (Hagedoorn and Cloudt, 2003).

Only recently has the innovation potential of companies in creative industries, within the context of the broader economy, become the subject of more intensive research (Protogerou et al., 2016). However, innovations are understood differently in creative industries, when compared to traditional economic sectors. In contrast to innovations in other economic sectors, which often involve technological and process improvements, innovations in creative industries focus more on developing new concepts, aesthetics, artistic expressions, and modes of presentation. Given their impacts on culture, society, and the economy, researchers and analysts have focused on a deeper understanding and utilisation of the innovation potential of these creative sectors.

Research on innovation in creative industries is usually divided into two parts. The first examines the role of creative industries as a contributor to innovation in the context of the broader economy, primarily through outputs from creative industries (Bakhshi and McVittie, 2009). The second line of research focuses directly on innovations in companies belonging to creative industries (Miles and Green, 2008; Müller et al., 2009; Protogerou et al., 2016). Gohoungodji and Amara (2023), in their review article, identified three basic approaches used in researching innovations in companies operating in creative industries. The first assimilation approach adopts the traditional perception of innovations, which are technology-driven and take the form of new products, services, or organisational changes in companies. The second differentiation approach rejects the traditional perception of innovation and prefers to understand innovation in the context of the differences between creative industries and more traditional sectors of the economy. In this approach, innovations do not necessarily bring new or improved products, services, or processes. They can take the form of, for example, artistic innovations that bring new artistic values, or aesthetic innovations that bring changes without affecting the functional aspect of the resulting product or service. The third approach to defining innovations in creative industries is a mixed approach, in which authors respect the traditional perception of innovation but add additional contextual metrics to traditional metrics that can better capture innovations in the specific analysed sub-sector(s) of creative industries.

The mixed approach is currently the most widespread approach to researching innovations in creative industries in the scientific

literature (Gohoungodji and Amara, 2023). Nevertheless, this article adheres to the assimilation approach, based on the definitions of innovation provided in the Oslo Manual (OECD, 2018). The reason for choosing the assimilation approach is the great heterogeneity of creative industries, which encompass a large number of different sub-sectors, each with its own specificities. Given that the main objective of this article is to create a model for measuring innovation in creative industries, it would be counterproductive to include specific metrics in this model to capture innovations in only some of the creative industry sub-sectors. The resulting model would lack validity for the entire creative industries sector; conversely, if parameterised only for a specific sector, the model would not be statistically representative for the chosen sub-sector, as it would not be based on a representative sample of companies. The innovation performance of companies is represented in this article using a latent factor, which is composed of three manifest variables: new product and service innovations over the past three years, new organisational and process innovations over the past three years, and the acquisition of new intellectual property over the past three years (DCMS, 2001; Hotho and Champion, 2011; Hassanien and Dale, 2012; Battisti et al., 2015; Protogerou et al., 2017; Cestino and Berndt, 2017; OECD, 2018; Jiao et al., 2019).

The choice of company characteristics stems from the specificities of creative industries, which distinguish many of the companies operating in creative industries from companies in more traditional sectors of the economy. The first described area, which is presumed to influence the innovation performance of companies in creative industries, is the entrepreneurial identity of the company's founder or manager. This is amplified in the case of creative industries by the fact that these are, in most cases, small and micro companies. Formal education and previous work experience play a key role in their ability to identify and exploit innovative opportunities in this dynamic business environment (Shane, 2000; Brandellero and Kloosterman, 2010; Lampel and Germain, 2016; Hennekam and Bennet, 2017; Protogerou et al., 2017). Although we are talking about highly educated individuals in the case of workers in creative industries, research points to a certain level of dissatisfaction among some workers, regarding how their education prepared them for the practical demands of daily work responsibilities in this sector (Hennekam, Bennet, 2017). Therefore, the manifest variables in the theoretical model will include, in addition to the level of education attained, satisfaction with this education and, in the case of previous work experience, the respondent's assessment of the importance of this work experience.

The second area presumed to affect the innovation performance of companies is company management, which builds upon entrepreneurial identity. Management in creative industries has undergone significant professionalisation over recent decades (Boorsma, 2006; Win, 2014; Lee, Lee, 2017). The identification of market and innovation opportunities, an "open mind," and a proactive approach are now automatically expected from managers in creative industries (Cantarello et al., 2011; Parkman et al., 2012). However, it is not possible to speak of adopting the classic managerial approach known from other sectors. Excessive attempts to manage creative employees may have an undesirable effect in suppressing their artistic and creative integrity (Eikhof and Haunschild, 2007), which can subsequently affect the innovation performance of companies in creative industries. The organisational culture and management approach in the company, therefore, have significant impacts on the company's innovation performance (Nauwelaerts and Hollaender, 2012; Li et al., 2017; Prima Lati et al., 2020). To identify the level of management in the company, manifest variables are used, with the aim of determining the presence of planning in the company, which is one of the main functions of management. Specifically, the presence of set goals and strategies to achieve these goals is verified in the analysed companies. Additionally, a manifest variable is included to identify the use of a democratic approach to management and decision-making in the analysed companies, which could be

considered to be a prerequisite for maintaining the artistic integrity of employees (Eikhof and Haunschild, 2007).

The third analysed area presumed to impact the innovation performance of companies in creative industries is research and development. One of the traditional indicators included in models for measuring innovation performance is investment into research and development (Evangelista, et al., 1998; Lee and Drever, 2013). Investments in research and development are often perceived differently in creative industries, compared to traditional economic sectors. Instead of investments in technology, design, processes, or infrastructure, in creative industries, we more often speak of investments in projects (Benghozi and Salvador, 2016). One of the observed manifest variables under the latent factor research and development is the amount of profit re-invested into research and development by the analysed companies. Another area presumed to impact innovation is collaboration with other entities. In practice, it is very rare for an entrepreneur to be able to independently plan the entire innovation process from its inception to implementation. Therefore, in creative industries, there is a common effort to build functioning partnerships, aimed at effectively sharing and coordinating common resources (Wilson and Stokes, 2005; Yamada and Yamashita, 2006; Parida et al., 2017; Loots et al., 2018). Company collaboration is captured in the resulting model from two perspectives: the existence of direct long-term collaboration with another company and indirect collaboration, which also involves the sharing of important knowledge and experience in the sector in which the analysed company operates. Indirect collaboration or willingness to share information and knowledge is captured by two manifest variables: the company's participation in conferences and workshops, and the publication of scientific publications by employees of the analysed companies. The final manifest variable, belonging to the area of research and development, is formulated in terms of the use of external funding sources by the analysed companies. Support for creative industries is particularly important during their inception (Drab-Kurowska, 2018). One way in which the state can support the development of creative industries is through providing public funding sources. There is, thus, an assumption that if a company in creative industries uses external public funding sources, it will have a positive impact on its innovation performance (Nauwelaerts and Hollaender, 2012; Vicente et al. 2012). The reason for this is that obtaining public funding sources can represent (at least temporary) financial stability and predictability for the company. Public grant schemes and grants aim to support the development of culture and cultural events, as well as promoting the social inclusion that the development of art and culture brings. It is, therefore, possible that companies can receive grants for riskier projects where economic return may not be the primary factor in assessing the project application.

The final analysed group of variables in the model are independently functioning company characteristics. In this case, the existence of an explanatory latent factor is not assumed, and the direct impacts of these variables on the company's innovation performance are analysed. The first manifest variable is the age of the company, with the assumption of lower innovation performance as the company's age increases. The reason for this is that younger companies make greater use of interactions with their surroundings to gain knowledge, and they can more effectively utilise the positive spill-over effects that companies in creative industries bring. Conversely, in older companies, the number of these interactions decreases, which reduces their absorptive capacity (Müller et al, 2009; Lee and Drever, 2013; Rodríguez-Gulías, 2020). The second manifest variable is company size. In the case of company size, it is conversely assumed that, as the size of the company increases (in terms of the number of its employees), the company's innovation performance will also increase. The assumption is that larger companies tend to have more resources available, especially human resources (Müller et al, 2009; Camarero et al., 2011; Lee and Drever, 2013; Li et al., 2017; Protogerou et al., 2017; Rodríguez-Gulías, 2020). The third analysed manifest variable is

the location of the company in a highly urbanised centre. One of the specific characteristics of creative industries is their concentration in highly urbanised places. The creative class—that is, employees of creative industries—are a specific group of employees who appreciate diversity, tolerance, culture, and creative stimuli that urbanised areas often bring (Florida, 2005; Zakova et al., 2015; Dörry et al., 2016; Goueva and Vora, 2018). However, spatial concentration is not the same across different countries or regions. Thus, the spatial concentration of creative industries considers the local specificities of the given area (Lazzeretti et al., 2008). In the Czech Republic, creative industries are concentrated primarily in the capital city of Prague, followed by Brno. In these two urbanised centres, creative industries are concentrated across all sub-sectors while, in other urbanised areas, typically only some of the sub-sectors of creative industries are represented (Slach et al., 2013; Zenka and Slach, 2018). The fourth and final analysed manifest variable, which is presumed to impact the company's innovation performance, is the presence of a gender diverse workforce. Gender diversity has a positive impact on a greater diversity of opinion within the company, which subsequently stimulates broader discussion (Cumming et al., 2015). From the perspective of creative industries, there is an assumption that, if the workforce of a company is gender diverse, it will have a positive impact on the innovation performance of the company (Protogerou et al., 2017).

3 Materials and Methods

3.1 Theoretical Model Creation

Based on the theoretical research above, it is possible to describe the presumed functionality of the theoretical model in more detail, which is composed of four latent factors: innovation performance, entrepreneurial identity, management, and research and development. An assimilation approach was chosen to measure innovation performance, based on which three manifest variables were assigned to the innovation performance factor: the existence of new organisational or process innovations over the last three years (INO_ORG), the existence of new products and services over the last three years (INO_PR), and the existence of new intellectual property acquired over the last three years (INO_IP). All three manifest variables falling under the latent factor of innovation performance were dichotomous in nature, with respondents able to agree or disagree with the statement.

Four manifest variables were assigned to the latent factor entrepreneurial identity: the existence of previous work experience of the questionnaire respondent in the field of business (WORK), evaluation of the importance of this previous work experience (WORK_EVAL), level of education attained (EDU), and evaluation of the importance of education attained from the perspective of job content in creative industries (EDU_EVAL). For the manifest variable WORK, respondents chose answers on a three-point scale, with options of previous work experience, partial previous work experience, and no previous work experience. For the manifest variable EDU, respondents had the option of selecting primary, secondary or tertiary education. For the manifest variables WORK_EVAL and EDU_EVAL, respondents chose the level of importance of previous work experience and education on a five-point Likert scale.

Three manifest variables were assigned to the latent factor management: the existence of set goals in the company (GOAL), the existence of strategies in the company to achieve these set goals (STR), and decision-making based on achieving consensus (DEM). For all three manifest variables falling under the latent factor management, respondents answered the level of agreement on a five-point Likert scale.

Five manifest variables were assigned to the fourth and final latent factor, research and development: the amount of profit reinvested into research and development (RND_INV), scientific publications by company employees (PUB), participation in

conferences and workshops (CONF), long-term collaboration with another business entity (COL), and obtaining external public funding (FUN_EXT). The manifest variable RND_INV is based on the responses of respondents who could choose the level of re-invested profit on an 11-point scale. The remaining manifest variables falling under the latent factor research and development were dichotomous in nature.

For the last four manifest variables, with regard to the theoretical part of the article, a direct impact on the company's innovation performance is assumed. These manifest variables are the age of the company (AGE), number of employees (EMP), existence of the company in a highly urbanised centre (URB), and gender diversity of the workforce (GEN_DIV). For the manifest variable AGE, respondents chose from five predefined company age categories. For the manifest variable EMP, respondents chose from eight predefined number of employees categories. To evaluate the impact of a company's location in an urbanised centre (URB), it was necessary to create a dummy variable based on the question regarding the region in which the company is registered. From previous research concerning the concentration of creative industries in the Czech Republic, it was possible to identify regions that can be designated as highly urbanised, specifically, the capital city of Prague and the South Moravian Region (Zenka and Slach, 2018). If a company was registered in one of these two administrative territorial units, it was identified as a company located in a highly urbanised centre. Similar logic was applied in the creation of the GEN_DIV dummy variable. Respondents chose the composition of the work team in the company on a ten-point scale, with the left side of the scale indicating a female work team and the right side of the scale indicating a male work team. In case the respondents chose the middle 4 options on a ten-point scale, i.e. a work team without a clear inclination towards the predominant gender, the firm's work team was labelled as gender-diverse.

3.2 Model Implementation and Evaluation

Structural equation modelling (SEM) tools were used to implement the theoretical model, allowing for modelling of the complex relationships between selected variables and evaluation of the presumed relationships between the chosen company characteristics and innovation performance. SEM tools were chosen as, compared to regression analysis tools, they allow for the analysis of both direct and indirect effects, making them suitable for the more complex models that often arise in social science research. The SPSS Amos 21 software was used to implement the theoretical model. Within structural equation modelling, the most commonly used estimation technique is ML (Maximum Likelihood). This technique attempts to find the maximum value of the likelihood function based on the analysed data. The disadvantage of this function is that it assumes the use of normally distributed cardinal variables. Nevertheless, it is most frequently used in practice, and its application to data other than cardinal data with a normal distribution result in poor model performance. This means that, if the model is functional even with ML, its values would be higher when using other more appropriate estimation techniques that SPSS Amos does not provide (Soukup, 2022).

The model evaluation also took into account the modification indices provided by SPSS Amos in its outputs. Where these identified indices were justified, logically fitted the developed model and met the requirements of statistical significance, they were accepted. The SPSS Amos program also allows for the calculation of indirect effects, along with an evaluation of their statistical significance. If the direct impacts of latent factors on the innovation performance factor were not confirmed in the resulting model, the indirect impacts and their statistical significance were analysed.

A large number of tests and parameters were used to evaluate the functionality of the model. The basic test describing the suitability of the model with respect to the analysed data is the chi-square test. Comparative criteria, represented by the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root

Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Square Residual (SRMR), were also used to evaluate the model's capability. The comparative criteria were supplemented with an information criterion, namely, the Akaike Information Criterion (AIC). Specific values along with minimum required values (Soukup, 2022) are presented in the results section of this article.

3.3 Distribution and Collection of Questionnaires

To obtain all the variables necessary for constructing the model, it was first necessary to send a questionnaire to the selected companies. A rigorous approach was applied when compiling the questionnaire, in order to ensure the validity and reliability of the collected data. For questions concerning specific aspects of innovation, the standardised Community Innovation Survey questionnaire used by Eurostat (2024) was utilised as a template for creating questions. The advantage of using a standardised questionnaire is its proven functionality and high validity; however, due to the absence of standardised procedures for creative industry research, this approach could only be applied to this part of the questionnaire. The final form of the questionnaire was consulted with university colleagues and creative industry representatives. Based on their valuable feedback, the questionnaire was adjusted, and the formulation of some questions was changed. An example is the use of the word "collaboration" in the original version of the questionnaire, which was changed to "cooperation" based on negative feedback from creative industry representatives stemming from the historical connotation of this word.

Based on the Satellite Account of Culture existing in the Czech Republic (NIPOS, 2024) and the three-sector division of culture, NACE codes belonging to individual sectors of creative industries were identified. In the traditional and artistic sector, which includes Cultural Heritage, Performing Arts, Visual Arts, Arts Education, and Artistic Crafts, 984 privately owned companies were identified. In the audiovisual and media sector, which includes Film and Video, Music, Radio, Television, Video Games, and Books and Press, 2453 companies were identified. In the last creative sector, which includes Architecture, Advertising, and Design, 4653 companies were identified. In total, 8090 companies were identified within creative industries.

The questionnaire was distributed to identified companies in electronic form in the spring of 2023. Based on the identified NACE codes, a list of companies was requested from the Czech Statistical Office. Contact email addresses for these companies were then searched for in the Orbis database. However, not all contact email addresses for the companies were found in this database, so a manual search was subsequently conducted. The study targeted all companies for which email contact information could be obtained, and each of these companies was invited to participate in the research. The questionnaire was specifically intended for owners/managers/directors of private companies in creative industries. The total number of respondents was 355, representing a completed questionnaire response rate of 4.4%. Given the size of the sample, it is possible to consider this sample of companies as representative.

4 Results and Discussion

4.1 Innovation Performance

The first latent factor is innovation performance, composed of three manifest variables: INO_ORG, INO_PR, and INO_IP. In the case of the INO_ORG variable, more than 50% of the analysed companies experienced significant organisational or process changes in the last three years. Nearly 55% of companies recorded a product or service innovation in the last three years. Over 48% of respondents stated that their company had acquired new intellectual property in the last three years. In this case, the high rate of innovation inherent to creative industries was confirmed (Müller et al., 2009).

4.2 Entrepreneurial Identity

The second factor is entrepreneurial identity, composed of four manifest variables: WORK, WORK_EVAL, EDU, and EDU_EVAL. Nearly 58% of respondents had previous work experience. Almost 51% of respondents indicated that their previous work experiences were important for their current role in creative industries. An additional 21% described their previous work experiences as rather important. This means that nearly 72% of respondents expressed some degree of importance of their previous work experiences with respect to their current role in creative industries.

The third variable, EDU, which is linked to the latent factor entrepreneurial identity, indicates the level of education attained. Employees in this industry tend to be highly educated, with a much higher percentage having university degrees compared to the national average (Hennekam and Bennet, 2017; Campbell, 2020). The results of the questionnaire survey confirmed this, as 70% of respondents stated that they had achieved a university education, while only 1% of respondents had completed only primary education. One of the reasons for such a large representation of people with higher education may be the fact that the questionnaire was addressed to people in the highest positions in companies. Another reason may be the focus of the research on private companies, which do not form such a large part of creative industries, in which 84% of all entities in the Czech Republic are self-employed individuals (Zakova et al., 2015). Nearly 43% of respondents rated their previous education as important, and almost 23% of respondents as rather important. This means that over 66% of respondents expressed some degree of satisfaction with the importance of their previous education.

4.3 Management

The third latent factor is management, comprising three manifest variables: GOAL, STR, and DEM. A total of 49% of respondents agreed with the existence of clearly defined goals in the analysed companies, and 22% expressed at least partial agreement. This means that up to 71% of respondents expressed some degree of agreement with the existence of goals in their company. The second manifest variable, STR, logically follows from the previous variable. Almost 36% of respondents agreed with the existence of strategies and plans in the analysed companies, and over 30% of respondents at least partially agreed with such existence. In total, more than 66% of respondents expressed some degree of agreement. This represents a slight decrease, compared to the GOAL variable.

The last manifest variable belonging to the latent management factor, DEM, focused on the democratic approach of leadership when discussing important decisions concerning the company. This question complements the overall picture of the management style in the company: if decisions in the company were to be made without consensus, there is a risk of disrupting the artistic integrity and internal motivation of employees in the company, which could have a negative impact on their work performance. More than 58% of respondents expressed some degree of agreement with the existence of a democratic leadership style in the company.

4.4 Research and Development

The fourth and final latent factor is research and development. This factor includes not only the level of investment in research and development (RND_INV) but also additional manifest variables that were posed to the respondents of the questionnaire survey, specifically, PUB, CONF, COL, and EXT_FUN. Only approximately 5% of the analysed companies reported re-investing more than 80% of their profit into research and development, in contrast to more than 60% of companies that re-invested 20% or less of their profit into research and development.

The second manifest variable is the existence of publications by employees of the analysed companies, PUB. Working on

scientific publications leads to a deepening and development of the professional knowledge and skills of employees. It can also increase the internal motivation of publishing employees, which may have a positive impact on the company's innovation performance. In the analysed sample of companies, professional publications were produced in a surprisingly high 23% of them. Logically following is the manifest variable that inquired about the participation of analysed companies in conferences and workshops, CONF. In this case, it is also assumed that the participation of companies in such events has a positive impact on their innovation performance. The reason for this is that employee participation in conferences and workshops contributes to their better awareness of current trends and technologies in the industry in which their company conducts its business activities. At the same time, such events also allow for the informal sharing of ideas and experiences with colleagues from other companies, resulting in the expansion of contact networks through networking. Almost 60% of the analysed companies had participated in conferences and workshops in the past, indicating a willingness to share information and knowledge in this industry.

Long-term collaboration brings a positive synergistic effect that results from sharing information and experiences, but also brings new opportunities. In total, 80% of the analysed companies reported long-term collaboration with another company. The willingness of the analysed companies in creative industries to collaborate with other companies is a fundamental prerequisite for sharing knowledge, information, and know-how in the industry. For this reason, the COL variable is strongly logically linked to the CONF and PUB variables, which also represent a form of knowledge sharing, albeit through different communication channels.

The last manifest variable is FUN_EXT, which investigated whether the analysed company had attempted to obtain public funding. Only approximately 22% of the analysed companies had applied for public funding. One of the reasons for this is the fact that any application submission represents a significant administrative burden for the company as, in the case of companies in creative industries, we are primarily talking about micro-enterprises. Within the analysed sample, up to 66% of companies had fewer than five employees. Micro-enterprises predominate in creative industries, and the findings in the analysed sample of companies confirm previous research conducted in the Czech Republic (Zakova et al., 2015). The p-value for the regression relationship of this variable was equal to 0.082 and, for this reason, the manifest variable FUN_EXT was removed from the final model.

4.5 Additional Selected Company Characteristics

In addition to the latent factors, the theoretical model also includes four manifest variables that are assumed to have a direct impact on the innovation performance factor: EMP, AGE, URB, and GEN_DIV. The first selected company characteristic is the number of employees in the company, EMP. Within the analysed sample, up to 66% of companies had fewer than five employees, confirming the results of previous research (Zakova et al., 2015). Of the four analysed company characteristics, the p-value of the regression relationship was lower than 0.05 only in the case of the EMP variable.

The second selected company characteristic, which directly affects the latent factor of innovation performance in the theoretical model, is the age of the company, AGE. Approximately one-fifth of the analysed companies were younger than five years, whilst companies younger than ten years accounted for approximately 50% of the data set. Meanwhile, companies aged between 11 and 20 years constituted approximately 28% of the analysed sample of companies, and those over 20 years old made up approximately 23% of the analysed companies.

The third selected company characteristic, URB, is the location of the company in highly urbanised centres in the Czech

Republic. Of the total number of respondents, more than 52% of companies were registered either in Prague or in the South Moravian Region. It is, therefore, evident that the international phenomenon of concentration of creative industries in large cities and highly urbanised locations is also prevalent in the Czech Republic.

The last selected company characteristic, assumed to have a direct impact on the innovation performance factor, is the gender diversity of the workforce in the analysed companies (GEN_DIV). Up to 71% of companies in the analysed sample had a gender-diverse workforce, while the workforce in 29% of companies was inclined towards being either predominantly male or female. Upon closer analysis of the regression weights and corresponding p-values for the manifest variables AGE, URB, and GEN_DIV, it was concluded that they do not have statistically significant impacts on the company's innovation performance. Therefore, these three manifest variables were removed from the final model.

4.6 Evaluation of the Final Model

The following Tab. 1 lists the standardised and unstandardised regression weights, standard errors, critical ratios, and p-values for all regression relationships in the final version of the model for measuring innovation performance in creative industries. Latent factors names are replaced by abbreviated following labels in the Tab. 1, Entrepreneurial identity (F1), Management (F2), Research and development (F3) and Innovation performance (F4).

Tab. 1: Description of the model for measuring innovation performance in creative industries

Anal. Relat.	Std. Reg. Weight	Reg. Weight	Std. Error	Crit. Ratio	p-value
F1 → F2	0.805	5.632	2.043	2.757	0.006
F2 → F3	0.378	0.371	0.086	4.318	<0.001
F3 → F4	0.500	0.108	0.028	3.852	<0.001
EMP → F4	0.221	0.034	0.011	3.170	0.002
F1 → WORK	0.201	1.000			
F1 → WORK_EVAL	0.550	4.814	1.441	3.340	<0.001
F1 → EDU	0.377	1.108	0.407	2.722	0.006
F1 → EDU_EVAL	0.433	3.585	1.290	2.779	0.005
F2 → GOAL	0.937	1.000			
F2 → STR	0.780	0.854	0.063	13.457	<0.001
F2 → DEM	0.296	0.379	0.074	5.138	<0.001
F3 → RND_INV	0.451	1.000			
F3 → PUB	0.406	0.152	0.034	4.447	<0.001
F3 → CONF	0.652	0.298	0.061	4.851	<0.001
F3 → COL	0.190	0.068	0.026	2.585	0.010
F4 → INO_ORG	0.485	1.000			
F4 → INO_PR	0.712	1.455	0.224	6.509	<0.001
F4 → INO_IP	0.589	1.212	0.197	6.149	<0.001

(Source: Author)

Based on these results, it can be stated that all regression relationships in the final model for measuring innovation performance were statistically significant. It is also possible to confirm that the latent factor entrepreneurial identity has a significant impact on the latent factor management, with a standardised regression weight of 0.805 and a p-value equal to 0.006. The management factor subsequently has a statistically significant impact on the latent factor research and development, with a standardised regression weight of 0.378 and a p-value less than 0.001. Finally, the research and development factor has a significant impact on the latent factor Innovation Performance, with a standardised regression weight of 0.500 and a p-value less than 0.001.

In addition to these relationships, the theoretical model also assumed direct impacts of the entrepreneurial identity and management factors on the innovation performance factor. However, these direct relationships were not evaluated as statistically significant from the perspective of model functionality. In the case of the indirect influence of the latent factor entrepreneurial identity on the latent factor innovation performance, the path of this influence is through the latent factors management and research and development. The standardised regression weight of this indirect relationship is equal to 0.152 with a p-value of 0.003. In the second analysed case, the indirect influence of the latent factor management on the latent factor innovation performance is through the latent factor research and development, where the standardised regression weight of this indirect relationship is equal to 0.189. This relationship is statistically significant with a p-value of 0.004. Based on these results, it can be stated that the latent factors of entrepreneurial identity and management have statistically significant indirect effects on the latent factor innovation performance.

Two modification indices were accepted in the development of the model. The first modification index suggested interconnecting the WORK and WORK_EVAL variables with a covariance link. Given the wording of the questions, this modification index was evaluated as justified, and this link was added to the final model. The standardised value of the covariance link was 0.140 with a p-value less than 0.001. The second modification index suggested interconnecting the EDU and EDU_EVAL. The standardised value of the covariance link was 0.390 with a p-value lower than 0.001.

The final part of model creation using structural modelling methods involved an evaluation of the model's ability to correctly interpret the analysed data. Several metrics and indices were utilised to verify this ability. The specific measured values for the final model, along with the recommended minimum values (Soukup, 2022), are provided in the following Tab. 2.

Tab. 2: Evaluation of the model for measuring innovation performance in creative industries

Criterion	Recommended Value	Created Model	
χ^2/df	<2	1.542	
CFI	>0.9	0.947	
TLI	>0.9	0.934	
RMSEA	<0.06	0.039	
SRMR	<0.08	0.057	
		Saturated model	Analysed model
AIC	A.M. < S.M.	270.000	231.075

(Source: Author)

Based on the results of the evaluation criteria used, it can be concluded that the final model for measuring the innovation performance of companies in creative industries met all the recommended values for these evaluation criteria. The final form of the model, along with all statistical relationships, is depicted in the following Figure 1.

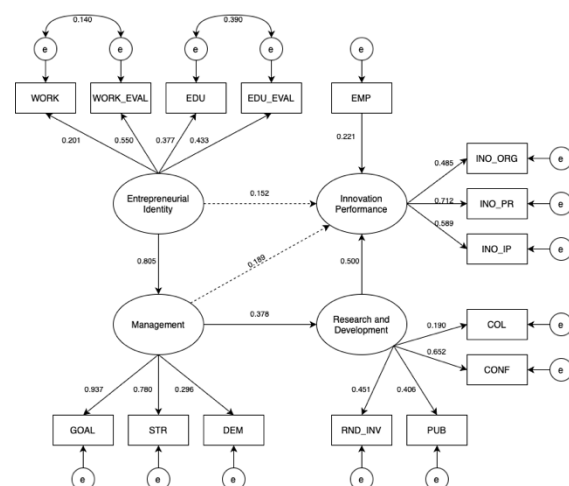


Figure 1: Model for measuring innovation performance in creative industries (Source: Author)

4.7 Application of the Model

The resulting model assigns a value of the latent factor innovation performance to each company, which represents its innovation performance in the context of all analysed companies. The values of this variable were backinputted into the data matrix, allowing for further analysis. Given the way in which the analysed manifest variables were oriented, a lower value means higher innovation performance and, conversely, a higher value means lower innovation performance of the analysed companies. Through quartile analysis, it was possible to divide the companies according to their innovation performance into three groups. The first group of companies, with above-average innovation performance, represents the first quartile of analysed companies with the lowest values of the inputted latent factor. The second group of companies, with average innovation performance, represents the second and third quartiles. The last third group of companies, with below-average innovation performance, comprises the last quartile with the highest measured values of the inputted latent factor Innovation Performance. The following Figure 2 shows the average values of all manifest variables entering the final model for measuring innovation performance in creative industries. For all variables, it is possible to observe the lowest average values for companies with above-average innovation performance and, conversely, the highest average values for companies with below-average innovation performance.

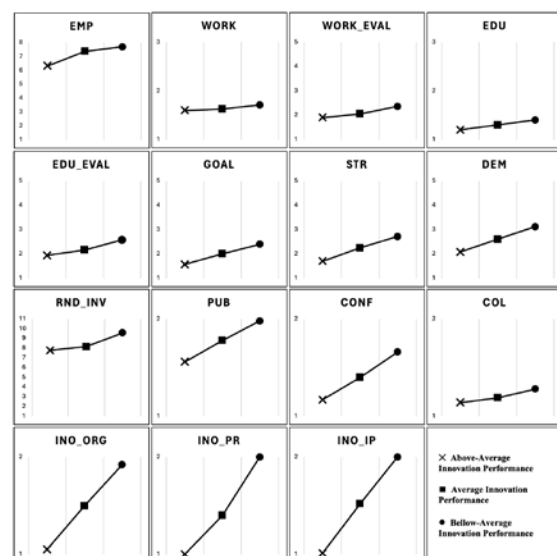


Figure 2: Average values of the manifest variable in the three performance groups of companies (Source: Author)

When looking at the average values of manifest variables entering the final model, it is evident that the differences between the three groups of companies (divided according to their innovation performance) are larger for some of the variables than for others. This partially indicates the significance of certain variables in measuring a company's innovation performance. Upon closer analysis of the factor scores for all analysed manifest variables, it can be stated that all variables in the final model positively influence the innovation performance of the analysed companies. Nevertheless, some variables had a more significant impact on the innovation performance of the analysed companies. The most significant impacts on innovation performance logically derive from direct manifestations of innovations, in the form of the variables INO_ORG, INO_PR, and INO_IP. This confirms that the model functions correctly as, on the basis of the grouping of the companies, it is clear from Figure 2 that companies with above-average innovation performance achieved real innovation, while companies with below-average innovation performance tend not to innovate.

Other manifest variables with a higher impact on innovation performance, based on their factor scores, include CONF, PUB, and EMP. In the case of the EMP variable (i.e., the number of employees), its higher impact on the company's innovation performance is logical: the larger the number of employees an analysed company has, the greater the amount of human resources available to the company. However, as mentioned earlier, micro-enterprises with fewer than five employees predominate in the analysed sample of companies, so hiring new employees to increase the innovation performance of companies might not be in the interest and financial capabilities of the analysed companies.

In the case of variables such as publishing scientific articles (PUB) and participating in conferences (CONF), it appears that an effective way for a company to increase its innovation performance is through sharing information and knowledge. Authorship or co-authorship of scientific publications by company employees, their participation in conferences and workshops, and the company's willingness to cooperate long-term with other firms are all variables that support the exchange of knowledge and experience among participants in creative industries. When creating scientific publications, employees continuously educate themselves and keep up to date with current trends and the latest knowledge in their industry. Moreover, the creation of publications often occurs in collaboration with universities or public institutions, which further strengthens the positive impact on employee education. Participation in conferences and workshops serves to further develop the professional knowledge and skills of employees, with these events providing space for gaining new contacts, exchanging information and ideas, and gaining inspiration or new perspectives. The willingness to cooperate only underlines the willingness of employees to share and receive new information, experiences, and know-how with other entities in creative industries, thus supporting a synergistic effect that is beneficial to all stakeholders regarding creative industries in the Czech Republic.

5 Conclusion

The inherent connection between creative industries and innovation has long been known, yet many processes at the company level remain unexplored. The aim of this article was to identify company characteristics that influence the innovation performance of companies. The created model for measuring the innovation performance of companies in creative industries in the Czech Republic identified company characteristics that positively influence the innovation performance of companies. The added value of this article and possible theoretical or managerial implications for creative industries lie primarily in identifying variables that have the greatest impact on the innovation performance of companies in creative industries. The willingness to share experiences and knowledge at conferences and workshops, the existence of long-term cooperations with other companies in the industry, and cooperation with other

institutions (e.g., universities) in publishing scientific articles appear to be the best ways to increase the innovation performance of companies in creative industries.

From the perspective of public policy, there is an opportunity to increase the innovation performance of creative industries through systematic support and the development of platforms, such as conferences or workshops, designed to share knowledge in specific creative industry sub-sectors. Similarly, the results indicated the significance of cooperation in creative industries. The creation of grants and programmes or the establishment of innovation hubs to support cooperation and knowledge exchange between companies in creative industries and public and academic institutions could also positively contribute to increasing the innovation potential of creative industries.

Most of the analysed company characteristics were found to affect innovation in creative industries; however, some characteristics did not show such an influence. Specifically, the use of external public funding sources, the location of a company in a highly urbanised centre, the age of the company, and the gender diversity of the workforce were excluded from the final model. For these manifest variables, their statistically significant influence on innovation performance in the analysed sample of companies was not confirmed.

Given its focus on overall creative industries, this study adopted an assimilation approach to define innovation, in which we understand innovations as traditional indicators, such as new products or services, or organisational or process changes in companies (Gohoungodji and Amara, 2023). The main reason for choosing this approach is the significant heterogeneity of creative industries, which contain a large number of diametrically different sub-sectors. In future research, it would be possible to verify and parameterise the model with respect to selected sub-sectors of creative industries to capture all the nuances accompanied with innovation in selected sub-sector. In this way, it would be possible to identify other manifestations of innovations that are valid only for the analysed sub-sector, thus complementing the traditional manifestations of innovation considered in this article.

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Primary Paper Section: A

Secondary Paper Section: AE, AH, AJ, AL

CO-EXISTENCE OF PARTICULAR AREAS IN GLOBAL DEVELOPMENT IN EARLY AGE – RISK AND PROTECTIVE PERSPECTIVE

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Abstract: The aim of the research: provide empirical evidence of overlapping of developmental domains, with regard not only to the strong highlighted comorbidity of neurodevelopmental disorders, difficulties and delays in preschool age, rather to highpoint overlapping in view of major everyday activities of the children; strengths in order to find and support the gifts of the child, so that stimulating activities and games in the kindergarten and the family environment maximized the child's developmental potential. By using the IDS-P (Krejčířová, 2018) 39 children in Slovak kindergartens was tested, by data collection in direct personal contact. The aim covers the correlations of the measured areas, identification of predictors of the domain cognition, which proved to be the most saturating the Global developmental level. The output was a stepwise linear regression model that identified three indicators from the field of social-emotional and personality development: tenacity of effort, delayed reward and social-emotional competence, the impact of which is statistically significant and explains almost 50% of the variability of the developmental level of cognition. Based on the provided empirical evidence, we can assume that the developmental level of cognition reflects the support and building of competences in these areas, which is the basis of pre-academic and later academic skills.

Keywords: development, developmental domains, cognition, social skills, overlapping of domains, preschool age, common neurodevelopmental core, IDS-P

1 Introduction

Research-based findings that point to the necessity of viewing theoretically defined developmental domains as one neurodevelopmental unit (APA, 2013; Davidson et al., 2014; Diamond, 2000; Flavell et al, 2001; Soska & Adolph, 2014) are not sufficiently reflected in practice. The tools used include individual developmental areas (domains), they also summarize the measure of the overall developmental level - either with one data, in some cases as a percentile expression of the level of development, there is an intelligence quotient, or by determining the norm and risk band. Many tools provide the possibility of displaying or numerically expressing the development profile - that is, they describe the areas of development separately (Krejčířová, 2018; Řičan, 2006; Svoboda, 2022).

The overall clinical picture depends on the expertise, experience and skills of the assessing expert (Langmeier & Krejčířová, 2006; Vágnerová, 2012), including within the framework of outputs from measurable diagnostic tools (Svoboda, 2022; Valachová, 2009), and within the framework of the professional assessment of the overall clinical picture of the child (Francéz et al, 2022; Řičan, 2006), also in the framework of parental and teachers provided with regard to understanding the developing level seen f.eg. in the cognitive flexibility for improving their emotionality (Mengxia, 2024). The practice still reflects the status of measurable findings as higher, more valuable, as they are more accurate in detecting and measuring defined constructs and evidence of results. The complexity of the image of the child's development, requiring the expertise of the assessor (Zero to Three, 2016), is a kind of supplement to these measurements. It is not understood as higher quality supported by measurable partial results. Cognitive and social skills and emotional self-expertise are united in play, which is the natural major activity of children at early age (Kaizar & Alordiah, 2023), there is the possibility for observing the co-existence of the researched areas of development and maturity of individual skills.

At the same time, practice still reflects findings in terms of difficulties and shortcomings more significantly (APA, 2013; Řičan, 2006; Svoboda, 2022; WHO, 2019). It is important to pay attention to the particular components of development, like cognition and emotionality, especially in their mutuality, from an early age precisely because of the substantiated overlap into

older age and academic skills and results (Goméz et al., 2024). Identifying and measuring a child's strengths is still in a significantly lower position compared to identifying weaknesses, even in the case of an assessment of the overall developmental level, ideally a profile of the overall developmental level.

This paper contributes to empirical evidence of the mutuality of individual developmental domains and aims to point out that the internal developmental context and interconnectedness of developmental domains should be understood not only as a potential risk of a cascading nature (Biotteau et al., 2017; Downing and Caravolas, 2022; Harbourne et al., 2014; Varuzza et al., 2023) (which is also indisputable), but also the protective potential of those areas of development that are stronger, less or not at all disturbed by the neurodevelopmental specificity of the child (Diamond, 2000; Flavell, 2001; Wiesen et al., 2016; Wu et al., 2017).

These identified strengths, less or unaffected by neurodevelopmental deficits, are a potential basic starting point for shaping intervention activities. It is not only about the overall developmental domain, which can be strong, it is also important to perceive individual smaller skills that are strong and, above all, in line with the child's interests and thus have the potential to become motivators and helpful mechanisms even for areas that are more challenging for the child, or in areas where development progresses more slowly, and because with certain difficulties/restrictions.

2 Methods

2.1 Research sample and procedure

39 children in the addressed kindergartens in western Slovakia took part in the research. On the basis of informed consent, the children participated in the research in the form of standardized activities of the IDS-P intelligence and development scale, by data collection in direct personal contact. There were 20 girls and 19 boys, attending kindergartens in the capital city 21 and outside the capital city 18. In the context of age, the chronological age in months was used, for identifying the score of the developmental level, the age was from 37 to 71 months ($M = 61.28$; $SD = 8.88$). The level of correlation was signed like strong $\geq .5$; medium $\geq .3$ and light $< .03$, using Pearson's and Spearman's correlation in behalf of normality of data. Used simple linear regression and stepwise linear regression was reported in statistical importance and percentage of variation.

2.2 Measures

In the research study, the collection of basic sociodemographic data regarding age, gender, area of residence, number of siblings and birth order was applied. The Czech version of the Intelligence and Development Scale for Preschoolers (IDS-P) (Krejčířová, 2018) was used to collect data related to the areas of development, capturing the overall level of development consisting of the areas of cognition (7), psychomotor skills (3), social-emotional competence (1), logical-mathematical thinking (1), speech (3) and verbal thinking (2). Each of the areas is composed of a different number of corresponding subtests (data in parentheses). The achieved level of development of individual areas is determined by converting the average score to a weighted score in the context of chronological age and reflects the level of development in the given area relative to the population norm according to the data of the authors of the tool. Areas supplementing the overall picture of the participant focused on the child's approach to the test situation were evaluated with a rough score based on the degree of fulfilment of the criteria that were the subject of investigation in the given area. These were the areas of delayed reward, enjoyment of performance, persistence of effort, and theory of mind. In the context of the research study, we perceive these variables as part

of social-emotional and personal maturation, therefore we examine them together with the variable social-emotional competence.

3 Results

IBM SPSS Statistics 23.0 software was used to analyse the data. The first area of research was the finding of correlations between single development domains and areas. Pearson's (for variables with normal data distribution) and Spearman's (for variables not meeting the criterion of normal data distribution) correlation coefficient was used to determine the relationships between developmental areas. The variable Cognition identified as the most saturating Global developmental level by correlation ($r_s = .836$; $p < .01$), which was supported by the high statistical significance ($p < .01$) and verified by simple linear regression determining the variability of 70% of the variance of Global developmental level, which can be explained by the variable Cognition on level of statistical significance ($p < .001$). A simple linear regression was used to determine the degree of dispersion of individual areas of development, which can be used to statistically explain the value of the Cognition variable. The next and aimed step was the identification and analysis of stepwise linear regression models. Correlation of single developmental areas

3.1 Relationship between individual developmental areas

The first area of research was the relationships between the developmental areas of Cognition (C), Psychomotor Skills (PM), Socio-Emotional Competence (SEC), Logical-Mathematical Thinking (LMT), Speech (S), Verbal Thinking (VT), and variables capturing the child's approach to the test situation: Delayed Reward (DR), Joy of Achievement (JA), Persistence of Effort (PE), and Theory of Mind (TM) (Table 1). The results show strong, statistically significant relationships between Cognition (C) and Verbal Thinking ($r = .687$; $p < .01$), C and Logical-Mathematical Thinking ($r_s = .670$; $p < .01$), C and Delayed Reward ($r_s = .647$; $p < .01$), C and Speech ($r = .585$; $p < .01$), C and Joy of Achievement ($r_s = .528$; $p < .01$), and C and Persistence of Effort ($r_s = .511$; $p < .01$). Similarly, there was a strong, statistically significant relationship between Logical-Mathematical Thinking (LMT) and Speech ($r_s = .646$; $p < .01$), LMT and Verbal Thinking ($r_s = .557$; $p < .01$), and LMT and Delayed Reward ($r_s = .533$; $p < .01$). Another strong relationship was identified between Psychomotor Skills and Delayed Reward ($r_s = .616$; $p < .01$). There was also a strong relationship between the variables Persistence of Effort (PE) and Joy of Achievement ($r_s = .605$; $p < .01$) and between PE and Delayed Reward ($r_s = .506$; $p < .01$), with the relationships being statistically significant.

Table 1a Correlation matrix of developmental domains

	C	PM	SEC	LMT	S
C	-				
PM	.438**	-			
SEC	.463**	.149	-		
LMT	.670**	.464**	.229	-	
S	.585**	.261	.473**	.646**	-
VT	.687**	.366*	.266	.557**	.622**
DR	.647**	.616**	.205	.533**	.347*
JA	.528**	.192	.378*	.298	.375*
PE	.511**	.417**	.299	.418**	.423**
TM	.233	.089	.128	.206	.149
OD	.836**	.568**	.614**	.814**	.817**

Notes: C - cognition; PM - psychomotor skills; SEC - socio-emotional competence; LMT - logical-mathematical thinking; S - speech; VT - verbal thinking; DR - delayed reward; JA - joy of achievement; PE - persistence of effort; TM - theory of mind; OD - overall development

Table 1b Correlation matrix of developmental domains

	VT	DR	JA	PE	TM
C					
PM					
SEC					
LMT					
S					
VT	-				
DR	.490**	-			
JA	.238	.428**	-		
PE	.221	.506**	.605**	-	
TM	.130	.230	.129	.217	-
OD	.796**	.586**	.448**	.492**	.216

Notes: C - cognition; PM - psychomotor skills; SEC - socio-emotional competence; LMT - logical-mathematical thinking; S - speech; VT - verbal thinking; DR - delayed reward; JA - joy of achievement; PE - persistence of effort; TM - theory of mind; OD - overall development

3.2 Prediction of Cognitive Skills

Predictors of individual developmental areas influencing the level of development of cognitive skills (Cognition (C)) were determined using linear regression analysis. Based on the results, we can deduce the regression values that most significantly predicted the level of development of cognitive skills, which were the areas of Verbal Thinking, Logical-Mathematical Thinking, and Persistence of Effort. Other significant predictors included Speech, Delayed Reward, and Socio-Emotional Competence.

The achieved level of VT is a significant predictor of Cognition ($p < .001$) and explains 47.2% of the variability achieved in the level of Cognition. The achieved level of LMT also significantly ($p < .001$) explains slightly less — 41.7% of the variability of the variable Cognition. The third most significant predictor of the level of Cognition development was Persistence of Effort, which explains 40.5% of the variability at high significance ($p < .001$). Areas that explain a slightly smaller portion of the variability of the Cognition variable were Speech, explaining 34.2% of the variability ($p < .001$), Delayed Reward explaining 28.6% of the variability ($p < .001$), and Socio-Emotional Competence explaining 21.4% at ($p < .001$) (Table 2).

Table 2a Simple linear regression

Predictor:	PM		LMT		S		VT	
	R ²	Sig.	R ²	Sig.	R ²	Sig.	R ²	Sig.
Dependent variable:	.192	.005	.417	<.001	.342	<.001	.472	<.001
Cognition								

Table 2b Simple linear regression

Predictor:	SEC		DR		JA		PE		TM	
	R ²	Sig.	R ²	Sig.	R ²	Sig.	R ²	Sig.	R ²	Sig.
Dependent variable:	.214	.003	.286	<.001	.213	.003	.405	<.001	.038	.234
Cognition										

Considering the possible use of several measured areas that capture not only cognitive but also personal development and the maturation of the child, we decided to examine them by creating stepwise regression analysis models to more precisely determine which variables and in what combination and sequence have the potential to predict the level of cognitive development. By applying stepwise linear regression analysis, we identified a simple single-component model A, containing the variable

Persistence of Effort, which mirrors our findings from the previous simple linear regression analysis. Model B, containing two components, showed the inclusion of PE and DR as a model explaining 43.2% of the variability at the significance level of $p < .05$, (specifically $p = .025$), and the third and most accurate model C, which explains up to 49.9% of the variability (almost half) of the variable C, showing the level of development of cognitive skills, also at a significance level of $p < .05$, (specifically $p = .037$). This model includes PE, DR, and Socio-Emotional Competence.

Table 3 Stepwise linear regression

Dependent variable: Cognition		R ²	R ²	Sig.
Model A	PE	.588	.346	<.001
Model B	PE	.657	.432	.025
	DR			
Model C	PE	.707	.499	.037
	DR			
	SEC			

4 Discussion and recommendations for practice

The aim of the research study was to identify overlapping developmental areas – domains and areas measured in the context of determining the overall developmental level of the child, its maturation, and the adequacy of developmental milestones in the context of chronological age.

4.1 Connections between individual developmental areas

The first set of hypotheses were assumptions about the existing relationship between developmental domains, and these hypotheses were confirmed. The relationships between developmental areas were medium to strong, with most also statistically significant. The strongest relationship was noted between the area of cognition and thinking subtests, but also between cognition and subtests assessing the child's approach to the test situation and socio-emotional competence. After a critical analysis of the data, we consider that the area of cognition contains the most subtests, which are averaged into a mean score, and we can also assume that this area is determined with the greatest accuracy due to the construction of the subtests.

We find the strong relationship between the area of speech, which is medium to strong with almost all areas of development, interesting, but the strongest is with logical-mathematical thinking, and secondarily with verbal thinking. We can assume that this finding may be related to the relatively small sample size and may change with the size and composition of the research sample. However, we can also consider the ability of logical reasoning used in understanding speech as well as in the expressive aspect of speech, with the application of grammatical rules and analytical-synthetic or causal relationships present in the language. The strong relationship observed between individual areas capturing the child's approach to the test situation – delayed reward, perseverance of effort, and joy of performance, we can assume, reflects the verification of their inclusion by the authors of the IDS-P tool into a common category and the empirical evidence of their connection also statistically. The most significant relationship among the areas of the child's approach to the test situation is the relationship of delayed reward with cognition and the relationship of delayed reward with psychomotor skills, from which we can infer delayed reward as one of the elements whose maturation significantly overlaps with significant indicators of overall development (cognition and psychomotor skills). Other findings also support this (Diamond, 2000; Harbourne et al., 2014; Mischel et al., 1989; Murray et al., 2007; Soska & Adolph, 2014; Varuzza et al., 2023; Wiesen et al., 2016; Wu et al., 2017), which supports the assumption of a common

neurodevelopmental basis for these areas. The assumption was not confirmed for the variable assessing the level of developmental maturity of the theory of mind in preschoolers. The relationships of the theory of mind with developmental domains and with areas of the child's approach to the test situation were weak to negligible, statistically insignificant, which contradicts the claims of authors who consider the emerging ability to understand another person's perspective as one of the indicators of the level of thinking development and overall developmental level (de Villiers et al., 2014; Jenkins & Astington, 1996; Wellman, 2010). We consider a possible consequence of this that the theory of mind was examined by a single task and the scoring was not very diversified, resulting in lower accuracy of findings. Given the assumptions offered by the authors (Slade & Ruffman, 2010; Wellman, 2010), we consider it appropriate to explore this phenomenon more closely using more precise tools.

Cognition is one of the fundamental pillars of observed and measured skills in preschool age (Bednářová & Šmardová, 2021; Valachová, 2009), as developing cognitive skills significantly contribute to the level and development of pre-academic skills (Zelinková, 2001; Wirth, 2021), the development of abstraction ability (in preschool age based on exploration, verification of concrete experiences, but also significant connection of findings and creation of new solutions (Inhelderová & Piaget, 2014; Soska & Adolph, 2014) as a foundation for later academic skills (Inhelderová & Piaget, 2014; Langmeier & Krejčířová, 2006; Vagnerová, 2012). We confirmed this assumption by identifying cognition as the most significant predictor of overall development, considering (as mentioned above) the possible consequence that cognition is determined most accurately due to the test construction. Therefore, in the following research question, we focused on identifying developmental areas that predict the level of cognitive development.

Significant predictors of the level of cognition were areas focusing on other areas of thinking than those included in the area of cognition – verbal thinking and logical-mathematical, which is consistent with the view of pre-academic skills being categorized into logical-mathematical and verbal areas, as the success of children in preschool age in tasks and activities of this kind is a prerequisite for the development of cognitive level (Jerusalem & Klein-Hefling, 2002) and we can assume that their development supports the development of general cognitive skills needed for overall success in later academic environments.

We consider the identification of predictors of cognition from the group of emotional-personality assumptions significant, as these are often present and observed in processes in kindergarten and home environments during preschool age (Flavell et al., 2001; Pons et al., 2004; Widen & Russell, 2002). By creating a stepwise linear regression model, we identified that the child's ability to delay reward and thus understand temporal connections and succession, as well as internal regulation, along with perseverance demonstrated in the effort made during longer systematic work, and socio-emotional competence shown in the ability to recognize emotions on displayed faces and understand and explain displayed social situations, to which various authors have paid attention from different perspectives (Denham, 2003; Hašto, 2019). With a model including these three areas, we can explain almost half of the variability in the level of cognitive development. Consistent with several authors (Gergerly & Watson, 1996; Rose et al., 2018) on the influence of these also developing areas (McCabe & Altamura, 2011) on the level of cognitive development, we can view them as important in the context of the social environment that children encounter at the beginning of preschool age (when entering kindergarten) and which provides them with opportunities to develop and apply skills acquired in early development and family background. In accordance with our finding, it is necessary to look at the research of the developmental domains, as well as their practical inclusion in everyday direct work with children in early age and their developmental supportive interventions, as mutually influencing and conditioning factors, whose level of

development and maturity is directly related to learning as a process and later success in school (Gómez, 2024).

4.2 Recommendations for Practice and Long-term Research Goals

From the above, it follows that the assumption of a common neurodevelopmental basis of individual developmental domains can be considered empirically supported. We supplement this picture with areas that can be applied and observed in the usual family environment and kindergarten environment. This allows us not only to predict the area of cognition and overall development, but also to perceive them as preventive supportive elements that can be observed and examined but specifically integrated into children's activities in the form of play, as the highest form of children's learning and work. Direct activities recommended for kindergartens and stimuli for family games and activities not only towards skills commonly known to support pre-academic development (drawing, construction, counting), but specifically activities aimed at personality development, understanding one's own and others' emotions, the ability of reflection and self-reflection, the ability to regulate, the ability to name observed and experienced phenomena, both in direct contact with peers or other children, in contact with competent pedagogical or non-pedagogical staff (e.g., school psychologist) and last but not least with parents and the family circle.

In future research plans, we intend to use tools whose accuracy in determining the developmental level of motor, communication, cognitive, social, and emotional-personality skills will be comparable with a more balanced number of items, thus obtaining more accurate data on the developmental level in individual areas.

The long-term research goal is to expand the research sample and report results with regard to individual sub-components of developmental domains that could be identified as potential protective pillars of the pedagogical approach in kindergarten, the parental approach in the natural family environment, and the natural strengths of the child, which can be developed and utilized not only to increase the developmental level of other aspects but also to enhance the overall psychological well-being and personal comfort of the child and thus also their family.

Given the lack of research conducted in very early age (born – 3) with infants and toddlers, and in area how primary caregivers and early childhood psychologists support emotional competence of children (Housman, 2017) and thus contribute to the development of cognition and other developmental components (Davidson et al., 2014; Gómez et al., 2024; Kaizar et al., 2023; Mengxia, 2024); it is crucial to develop, research and implement programs as early as possible, at an age when it is possible and feasible in our conditions, as this research also shows, i.e. from the age of 3, when children enter the preschool education environment. Working with children before this age requires that pediatrics are open to cooperation with developmental psychologists and parents, which presupposes functional interdepartmental cooperation and an understanding of the overlap of patterns and skills of early childhood and the home environment (Ministry of Social Affairs and Family) into the school environment (Ministry of Education) and the overlap with overall psychological, psychosomatic and physical health (Ministry of Health).

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Primary Paper Section: A

Secondary Paper Section: AN, FG, FQ

EVALUATION OF TEACHING PRACTICE BY STUDENTS OF TEACHER EDUCATION AT PAVOL JOZEF ŠAFÁRIK UNIVERSITY IN KOŠICE

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Acknowledgement: This study was financially supported by the project KEGA 013UPJŠ-4/2023 Implementation of simulation strategies developing the teacher students reflexive competencies into attendance and distance forms of practical professional training, VVGS 2022-2441 Adaptation of The Teacher Efficacy for Inclusive Practices scale for self-diagnosis of self-efficacy to inclusive education implementation, and ESF – OPLZ NFP312010AFP1 Innovation of pedagogical practices at UPJŠ focused on targeted development of professional competences of future teachers (IPPU).

Abstract: The teaching practice of teacher education students is a means of their professional growth and a space for forming a comprehensive understanding of the process of institutionalized education and pupil training. Well-managed and implemented practice reflects the quality of future teacher preparation. The aim of this study is to analyze students' opinions on teaching practice in terms of key aspects that underpin its effectiveness. We used a self-designed questionnaire consisting of four sections of scaled items (respondents expressed their views on practice organization, preparedness to handle it, professional competencies, and practice conditions). The study involved 111 students of teacher education at Pavol Jozef Šafárik University in Košice (the criterion for inclusion in the study was the completion of all types of teaching practices). Based on paired comparisons of scores for the items in the first section, we identified a statistically significant difference in student satisfaction with the organization of teaching practices by the Department of Pedagogy, significant differences in satisfaction with the organization of practices by teachers, psychologists, and subject didacticists, statistically significant differences in satisfaction with the scope of observations in teaching practices, and a statistically significant difference in satisfaction with the extent of independent outputs in teaching practices. Based on paired comparisons of scores in the second section, we identified a statistically significant difference in students' preparedness for observation-pedagogical-psychological practice in selected subjects, statistically significant differences in their preparedness for interim practice in selected subjects, a statistically significant difference in their preparedness for continuous practice II in selected subjects, and statistically significant differences in the necessity of teaching practices for students in practical professional preparation. Based on paired comparisons of scores in the third section, we identified a statistically significant difference in the level of professional competencies of students in the area of professional development. Based on paired comparisons of scores in the fourth section, we identified statistically significant differences in students' assessment of the conditions of teaching practice at the training school. The research findings suggest that teacher education students generally evaluate the structure, process, and benefits of teaching practice positively. However, the results indicated that changes should be made towards greater uniformity in practice organization (MPPc, MPPd), a reduction in the number of observations, strengthening of independent outputs (MPPb, MPPc, and MPPd), thorough preparation for practice in psychology (MPPa, MPPd) and subject didactics (MPPb), clearer development of students' diagnostic competence, and an expansion of opportunities to engage in additional activities at the training school.

Keywords: student, teacher, teaching practice, university.

1 Introduction

Pedagogical practice is one of the fundamental constitutive elements involved in preparing future teachers for educational activities, shaping their approach to teaching and perspective on expertise. The practice of teaching students in real school conditions is not merely a straightforward application of acquired knowledge in a selected educational setting. It serves as a platform for testing didactic theories, developing resulting teaching strategies, and reassessing the effectiveness of the applied teacher education model.

The conclusion of Rovňanová's (2013) study is that a teacher's functional literacy depends not only on the thoughtful organization of undergraduate and postgraduate training. Regardless of how we try to prepare teaching graduates, the final transformation into an expert teacher lies in the hands of real school practice (including their own activity). The results of the study by Ozdemir and Yildirim (2012) indicate that teaching practice courses support the professional development of teaching students, especially in gaining pedagogical experience. They have the opportunity to practice the skills acquired during their bachelor's studies in a school environment and to get to

gain deeper insight into the teaching profession. Research by Černá et al. (2017) demonstrated that the clinical year impacted the professional progress of teaching students in all monitored variables (focus on students, growth in flexibility, long-term planning skills, and anticipation). Danek (2019) affirms that pedagogical practice is associated not only with the motivation of teaching students to study but is also crucial for their retention in the profession.

Kontírová (2010) mentions the following basic functions of pedagogical practice:

- Integrative – Pedagogical practice serves to overcome the isolation of knowledge structures in the disciplines of higher education preparation and to support a more comprehensive understanding of educational phenomena and processes.
- Orientational – Pedagogical practice familiarizes students with the specific school environment and its organization (types of schools, educational programs, various classes).
- Educational – Pedagogical practice complements and enriches the theoretical preparation of students and creates conditions for its concrete and creative use in the educational process.
- Self-reflective – Pedagogical practice forms the foundation for the development of pedagogical thinking in teaching students, as they need to be able to justify their teaching methods.
- Feedback – Pedagogical practice is a tool for aligning theoretical instruction with the latest scientific knowledge and the needs of the school.
- Stimulative – Pedagogical practice contributes to shaping the student's attitude toward the teaching profession itself.
- Socialization – Pedagogical practice shows teaching students how to strengthen appropriate social bonds among students and the teaching staff.

The teaching practice of students in elementary and secondary schools usually has a gradational character. At faculties of education, a 4-level model of pedagogical practice is typically used. Novocký et al. (2021), following Kosová, Tomengová et al. (2015), describe the following types of practices:

- Observation-Pedagogical-Psychological Practice (MPPa) – Its primary purpose is to familiarize students with the real school environment, reflect on and understand the characteristics of elementary and secondary schools, confront the theoretical aspects of university preparation with educational reality, and prepare for assistant activities and their own teaching outputs. The key activity of this practice is pedagogical observation focused on the activities and behavior of students and teachers in the context of educational and psychological phenomena.
- Interim Practice (MPPb) – Its main purpose is to observe the school's socio-cultural environment, the internal and external conditions of teaching and learning in the specialized subjects, observe interactions between teaching participants, and further confront the theoretical and practical aspects of university preparation with educational reality. The key activity of this practice is pedagogical observation focused on psychodidactic phenomena in the subjects of specialization (also mastering one independent output).
- Continuous Practice I (MPPc) – Its primary purpose is to develop the knowledge gained through observation during previous pedagogical practices and to form students' professional skills through direct activities in lessons. The key activity of this practice is independent teaching outputs in specialized subjects (application of didactic tools, implementation of their own educational project designed for teaching a given topic).

- Continuous Practice II (MPPd) – Its main purpose is to verify theoretical knowledge and deepen didactic competencies in the educational environment. The key activity of this practice is independent teaching outputs in specialized subjects (the student conducts the teaching process continuously over a specified period).

Uçar (2012) states that the learning process plays a crucial role in pedagogical practice, providing teacher candidates with a space for professional development. The key elements determining the quality of the practice are the mentor, cooperating teacher, teaching student, and the practice school itself. The mentioned author conducted empirical research, choosing to conduct interviews with multiple groups of participants (school administrators, mentors, and teaching students). The analyzed data from the research participants point to potential reasons why pedagogical practice does not achieve its set goals. These include issues related to theoretical knowledge, the timing and duration of practice, its organization, as well as communication and regulations. One of the cardinal recommendations arising from the research by Tomengová et al. (2017) for undergraduate teacher education is the adjustment of the balance between theoretical and practical training, focusing on content-oriented and process-oriented knowledge by increasing the share of practice for future teachers.

Our first research objective was to determine how satisfied teacher training students are with the management of teaching practices and the number of observations or independent outputs concerning the described practices. Additionally, we were interested in the level of satisfaction they attribute to achieving the objectives of each practice.

A sequentially structured practice, where a teaching student progresses from mastering elementary pedagogical-didactic activities to managing a teaching unit, has its justification, which arises from fulfilling the partial objectives of pedagogical practice. Siroťová (2015) describes these in more detail, operationalizing the main purpose of teaching students' practice:

- Orienting oneself in the basic pedagogical documentation of the school and classroom.
- Using pedagogical agendas in the teaching process during pedagogical practice.
- Getting to know the school environment (conditions for teaching in classrooms).
- Understanding the students in the classroom (knowing how to work with them based on their individual characteristics).
- Planning lessons (formulating and setting educational goals, selecting methods, creating teaching aids, etc.).
- Independently and creatively implementing the educational process.
- Developing one's own teaching concept (or teaching style).

In the Slovak context, Rovňanová and Nemcová (2017) evaluated the connection between the theoretical and practical preparation of teaching students. The results of their research specifically point to significant dissatisfaction among future teachers regarding the development of specific professional activities during their studies (negative assessments predominated in 25 of these activities). Petrová and Duchovičová (2013), in a reflection-oriented study focused on university teacher training in the context of transformational processes, summarize, based on research conducted among teaching graduates at two universities in Slovakia, that future teachers are dissatisfied with the highly academic nature of their preparation, which is disconnected from educational reality, their preparedness to work with students with special educational needs (health-disadvantaged, problematic), and the lack of teaching skills (creating thematic plans, innovative teaching aids, classroom work planning).

Kyriacou and Stephens (1999) identified nine main areas of concern for teaching students during their practice. Trainees worry about not being seen as real teachers, managing disruptive

behavior in the classroom, taking on the role of disciplinarian, whether they will teach adequately, proper planning, teaching sensitive topics, handling a heavy workload, the lack of teaching experience, and being the subject of evaluation themselves. On the other hand, they classify the categories of students' successes supported by practice as taking on responsibility and developing self-confidence.

Considering these facts, our second research objective was to investigate how teaching students are prepared to handle practice from the perspective of key subjects that are part of their university education. In this context, we were interested in how they evaluate their performance during practice and how they perceive its necessity in their practical professional training.

Orosová and Boberová (2016) propose viewing the teaching practice of students as a form of experiential learning through which trainees develop their professional and personal dispositions. Toom et al. (2015), in their study of patterns of reflective episodes among teaching students, demonstrated that students are capable of applying reflection beyond practical problems in teaching and can formulate various professional questions arising from discrepancies in practice. Thoughtful integration of theory and practice in teacher training can contribute to the development of 21st-century competencies, as evidenced by the conclusions of the study by Niu et al. (2021).

Given the current discourse on the professionalization of the teacher's educational work, it is appropriate to discuss professional competencies. These concern all teachers, regardless of career level and years of experience (including teaching students as novice teachers). The structure and content of the Professional Standard for Lower and Upper Secondary Education Teachers (2017) indicate that a teacher should effectively demonstrate activities related to diagnostic, professional-didactic, and reflective competencies. First, they should recognize and differentiate the biological, psychological, social, and material circumstances of education (the abilities of students and their own capabilities). Second, they should master the content and didactics of their subject, plan, implement, and evaluate the course and results of education (eliminating unintended elements from teaching and avoiding unwarranted spontaneity). Third, they should strive for self-development (which requires identifying with the professional role and conducting professional reflection, serving as a basis for removing stereotypes in teaching and introducing innovations).

Gabrhelová et al. (2020), in the conclusion of their study, propose suggestions for improving teaching practice. Alongside minimizing schedule changes during its course, it is crucial to build awareness of practice schools as cooperating organizations with the academic environment and actively work with practice teachers through informational meetings, seminars, and workshops. Practice teachers can facilitate the learning process for teaching students through practical experiences and provide them with suitable models for working with students (Baeten & Simons, 2016; Jaspers et al., 2022). As Northfield and Gunstone (1997) point out, teacher educators (i.e., faculty teachers covering the common core and subject didactics) should maintain a close connection with school practice. McIntyre and Hagger (1992) emphasize that when developing teaching practices, the value of collegiality should not be underestimated.

These facts served as the basis for defining two additional research objectives. First, we investigated the level of professional competencies of teaching students, and then we examined how they would evaluate the conditions of pedagogical practice at training schools and the approach of the practice teacher.

2 Methodology

To map students' opinions on the course and implementation of pedagogical practice, we used a self-designed questionnaire consisting of four sections. In the first section, respondents answered items related to their satisfaction with the organization

of the teaching practice, the scope of observations, independent outputs during the practice, and the fulfillment of its purpose and objectives (5 – very satisfied, 4 – satisfied, 3 – neutral, 2 – dissatisfied, 1 – very dissatisfied; MPPa – Observation-Pedagogical-Psychological Practice, MPPb – Interim Teaching Practice, MPPc – Continuous Teaching Practice I, MPPd – Continuous Teaching Practice II). In the second section, respondents answered items concerning their preparedness for different types of pedagogical practices from a professional perspective in relevant subjects (5 – excellent, 4 – very good, 3 – good, 2 – sufficient, 1 – insufficient). In the last two items of this section, they were to express their satisfaction with themselves and their performance during the practices (5 – very satisfied, 4 – satisfied, 3 – neutral, 2 – dissatisfied, 1 – very dissatisfied, N – I have not yet completed it; MPPb – Interim Teaching Practice, MPPc – Continuous Teaching Practice I, MPPd – Continuous Teaching Practice II) and to what extent these practices are necessary in their practical professional preparation (5 – very necessary, 4 – necessary, 3 – neutral, 2 – unnecessary, 1 – completely unnecessary; MPPa – Observation-Pedagogical-Psychological Practice, MPPb – Interim Teaching Practice, MPPc – Continuous Teaching Practice I, MPPd – Continuous Teaching Practice II). In the third section, respondents answered items regarding the level of their professional competencies as beginning teachers (5 – excellent, 4 – very good, 3 – good, 2 – sufficient, 1 – insufficient). In the last section, respondents answered items concerning the assessment of the conditions of the teaching practice at the training school and the approach of the mentor teacher (5 – excellent, 4 – very good, 3 – good, 2 – sufficient, 1 – insufficient). The content evaluation of the tool was carried out by didactics experts.

2.1 Research sample

The research sample was assembled using an available selection method. Students of teacher training at UPJS were invited to fill out an online questionnaire after completing the Continuous Teaching Practice II (MPPd). A total of 121 respondents participated in the research; however, after removing those who had not completed this type of practice (e.g., had only completed the first two types of practice) and those who responded to the questionnaire items by choosing extreme alternatives (1 or 5), we worked with a research sample of 111 respondents. Data collection took place between 2021 and 2023.

2.2 Data Analysis

To evaluate statistically significant differences between variables, we used non-parametric tests (Friedman test, Dunn-Bonferroni post hoc test, and Wilcoxon test). The level of significance was 0.05. The Likert scale essentially has the characteristics of an ordinal variable (a respondent's answer to a single item in the questionnaire, formatted, for example, with 5 levels). If such items do not cover a dimension of the tool where a summary score for respondents would be calculated, we should refrain from claiming that it is an interval variable (see Kubiak, 2016 for further details). Descriptive statistics used included mean rank, arithmetic mean (AM), standard deviation (SD), median (Me), mode (Mod), minimum (Min), and maximum (Max) measurement values. Nevertheless, when interpreting the results of the research, we used the arithmetic mean (to compare the higher or lower scores achieved by the respondents, but without determining the difference between them – how much better they were). We also consider the value of the mean rank. Data processing was carried out using SPSS 27.0.1.0.

2.3 Research Questions

Based on the theory and research objectives, we formulated the following research questions:

RQ1: Is there a statistically significant difference in student satisfaction with the organization of teaching practices provided by the Department of Pedagogy concerning pairwise comparisons?

RQ2: Is there a statistically significant difference in student satisfaction with the organization of teaching practices by teachers, psychologists, and subject didactics experts concerning pairwise comparisons?

RQ3: Is there a statistically significant difference in student satisfaction with the scope of observations in teaching practices concerning pairwise comparisons?

RQ4: Is there a statistically significant difference in student satisfaction with the scope of independent outputs in teaching practices concerning pairwise comparisons?

RQ5: Is there a statistically significant difference in student satisfaction with the fulfilment of the mission and objectives of teaching practices concerning pairwise comparisons?

RQ6: Is there a statistically significant difference in students' preparedness for the Observation-Pedagogical-Psychological Practice in terms of selected subjects?

RQ7: Is there a statistically significant difference in students' preparedness for the Interim Teaching Practice in terms of selected subjects concerning pairwise comparisons?

RQ8: Is there a statistically significant difference in students' preparedness for Continuous Teaching Practice I in terms of selected subjects concerning pairwise comparisons?

RQ9: Is there a statistically significant difference in students' preparedness for Continuous Teaching Practice II in terms of selected subjects concerning pairwise comparisons?

RQ10: Is there a statistically significant difference in student satisfaction with their performance as a teacher during previous teaching practices concerning pairwise comparisons?

RQ11: Is there a statistically significant difference in the perceived necessity of teaching practices for students in the practical professional preparation of future teachers concerning pairwise comparisons?

RQ12: Is there a statistically significant difference in the level of students' professional competencies in the area of "student" concerning pairwise comparisons?

RQ13: Is there a statistically significant difference in the level of students' professional competencies in the area of "educational process" concerning pairwise comparisons?

RQ14: Is there a statistically significant difference in the level of students' professional competencies in the area of "professional development"?

RQ15: Is there a statistically significant difference in students' assessment of the conditions of teaching practice at the training school concerning pairwise comparisons?

RQ16: Is there a statistically significant difference in the mentor teacher's approach to the student during teaching practice concerning pairwise comparisons?

3 Research results

Table 1 shows that there is a statistically significant difference (Friedman test = 33.469; $p = 0.000$) in student satisfaction with the organization of teaching practices by the Department of Pedagogy (communication, problem-solving, supporting materials). Based on pairwise comparisons, a statistically significant difference was found between MPPd and MPPa (Dunn-Bonferroni post hoc test = 3.015; $p = 0.015$). Respondents scored higher for MPPa (AM = 4.47) and lower for MPPd (AM = 4.08).

Table 2 shows that there is a statistically significant difference (Friedman test = 45.888; $p = 0.000$) in student satisfaction with the organization of teaching practices by teachers, psychologists, and subject didactics experts (supporting material for observations, supporting material for the preparation of outputs). Based on pairwise comparisons, a statistically significant difference was found between MPPd and MPPb (Dunn-Bonferroni post hoc test = 2.885; $p = 0.023$) and between MPPd and MPPa (Dunn-Bonferroni post hoc test = 3.457; $p = 0.003$). In the first case, respondents scored higher for MPPb (AM = 4.24) and lower for MPPd (AM = 3.84). In the second case, they scored higher for MPPa (AM = 4.29) and lower for MPPd (AM = 3.84).

Table 3 shows that there is a statistically significant difference (Friedman test = 55.994; $p = 0.000$) in student satisfaction with

the scope (number) of observations in teaching practices. Based on pairwise comparisons, a statistically significant difference was found between MPPd and MPPc (Dunn-Bonferroni post hoc test = 3.171; $p = 0.009$), between MPPd and MPPb (Dunn-Bonferroni post hoc test = 3.353; $p = 0.005$), and between MPPd and MPPa (Dunn-Bonferroni post hoc test = 5.121; $p = 0.000$). In the first case, respondents scored higher for MPPc (AM = 3.69) and lower for MPPd (AM = 3.19). In the second case, they scored higher for MPPb (AM = 3.74) and lower for MPPd (AM = 3.19). In the third case, they scored higher for MPPa (AM = 4.04) and lower for MPPd (AM = 3.19).

Table 4 shows that there is a statistically significant difference (Friedman test = 20.016; $p = 0.000$) in student satisfaction with the scope of independent outputs in teaching practices. Based on pairwise comparisons, a statistically significant difference was found between MPPd and MPPc (Dunn-Bonferroni post hoc test = 3.356; $p = 0.002$). Respondents scored higher for MPPc (AM = 3.58) and lower for MPPd (AM = 3.09).

The data presented in Table 5 indicate that there is no statistically significant difference (Friedman test = 5.726; $p = 0.126$) in student satisfaction with the fulfillment of the mission and objectives of teaching practices. Respondents scored similarly across all items.

Table 6 shows that there is a statistically significant difference (Wilcoxon test = -2.476; $p = 0.013$) in students' preparedness for the observation-pedagogical-psychological practice from selected subjects. Respondents scored higher for pedagogy (AM = 3.77) and lower for psychology (AM = 3.65).

Table 7 indicates that there is a statistically significant difference (Friedman test = 55.389; $p = 0.000$) in students' preparedness for the interim teaching practice from the perspective of selected subjects. Based on pairwise comparisons, a statistically significant difference was found between subject didactics of the 1st specialization subject and specialized subjects of the 1st specialization subject (Dunn-Bonferroni post hoc test = -3.139; $p = 0.025$), between subject didactics of the 1st specialization subject and specialized subjects of the 2nd specialization subject (Dunn-Bonferroni post hoc test = -3.516; $p = 0.007$), and between subject didactics of the 2nd specialization subject and specialized subjects of the 2nd specialization subject (Dunn-Bonferroni post hoc test = -3.229; $p = 0.019$). In the first case, respondents scored higher for specialized subjects of the 1st specialization subject (AM = 4.02) and lower for subject didactics of the 1st specialization subject (AM = 3.60). In the second case, they scored higher for specialized subjects of the 2nd specialization subject (AM = 4.06) and lower for subject didactics of the 1st specialization subject (AM = 3.60). In the third case, they scored higher for specialized subjects of the 2nd specialization subject (AM = 4.06) and lower for subject didactics of the 2nd specialization subject (AM = 3.61).

Although Table 8 indicates that there is a statistically significant difference (Friedman test = 27.537; $p = 0.000$) in students' preparedness for Continuous Teaching Practice I from the perspective of selected subjects, the pairwise comparisons using the Bonferroni procedure did not reveal a statistically significant difference between the subjects. Respondents scored similarly across all subjects.

Table 9 indicates that there is a statistically significant difference (Friedman test = 27.935; $p = 0.000$) in students' preparedness for Continuous Teaching Practice II from the perspective of selected subjects. Based on pairwise comparisons, a statistically significant difference was found between psychology and specialized subjects of the 2nd specialization subject (Dunn-Bonferroni post hoc test = -2.942; $p = 0.049$). Respondents scored higher for specialized subjects of the 2nd specialization subject (AM = 4.12) and lower for psychology (AM = 3.73).

Although Table 10 indicates that there is a statistically significant difference (Friedman test = 11.575; $p = 0.003$) in student satisfaction with their performance as a teacher during

previous teaching practices, the pairwise comparisons using the Bonferroni procedure did not reveal a statistically significant difference between the practices. Respondents scored similarly across all practices.

Table 11 indicates that there is a statistically significant difference (Friedman test = 100.813; $p = 0.000$) in the perceived necessity of teaching practices for students in the practical professional preparation of future teachers. Based on pairwise comparisons, a statistically significant difference was found between MPPa and MPPd (Dunn-Bonferroni post hoc test = -4.939; $p = 0.000$), between MPPa and MPPc (Dunn-Bonferroni post hoc test = -5.563; $p = 0.000$), between MPPb and MPPd (Dunn-Bonferroni post hoc test = -4.211; $p = 0.000$), and between MPPb and MPPc (Dunn-Bonferroni post hoc test = -4.835; $p = 0.000$). In the first case, respondents scored higher for MPPd (AM = 4.69) and lower for MPPa (AM = 4.07). In the second case, they scored higher for MPPc (AM = 4.77) and lower for MPPa (AM = 4.07). In the third case, they scored higher for MPPd (AM = 4.69) and lower for MPPb (AM = 4.19). In the fourth case, they scored higher for MPPc (AM = 4.77) and lower for MPPb (AM = 4.19).

The data presented in Table 12 indicate that there is no statistically significant difference (Friedman test = 3.754; $p = 0.153$) in the level of students' professional competencies in the area of "student". Respondents scored similarly in their assessment of the level of their professional competencies within this area.

Although Table 13 indicates that there is a statistically significant difference (Friedman test = 9.867; $p = 0.020$) in the level of students' professional competencies in the area of "educational process", the pairwise comparisons using the Bonferroni procedure did not reveal a statistically significant difference between the professional competencies. Respondents scored similarly across all competencies.

Table 14 indicates that there is a statistically significant difference (Wilcoxon test = -2.884; $p = 0.004$) in the level of students' professional competencies in the area of "professional development". Respondents scored higher for the competency of identification with the professional role and the school (AM = 3.75) and lower for the competency of planning and implementing their professional growth and self-development (AM = 3.56).

Table 15 indicates that there is a statistically significant difference (Friedman test = 50.298; $p = 0.000$) in the assessment of teaching practice conditions by students at the training school. Based on pairwise comparisons, a statistically significant difference was found between opportunities to participate in other school activities and the equipment of classrooms and laboratories (Dunn-Bonferroni post hoc test = 3.429; $p = 0.009$), between opportunities to participate in other school activities and the timetable (Dunn-Bonferroni post hoc test = 3.919; $p = 0.001$), between opportunities to participate in other school activities and material-didactic resources for teaching curriculum topics (Dunn-Bonferroni post hoc test = 3.939; $p = 0.001$), between opportunities to participate in other school activities and the composition of the class (Dunn-Bonferroni post hoc test = 3.978; $p = 0.001$), and between opportunities to participate in other school activities and the space for the trainee (Dunn-Bonferroni post hoc test = 4.605; $p = 0.000$). Respondents scored the lowest for opportunities to participate in other school activities (AM = 3.42).

Although Table 16 indicates that there is a statistically significant difference (Friedman test = 33.606; $p = 0.000$) in the mentor teacher's approach during teaching practice as assessed by students, the pairwise comparisons using the Bonferroni procedure did not reveal a statistically significant difference between the components of this approach. Respondents scored similarly across all components.

Table 1: Satisfaction with the Organization of Teaching Practices by the Department of Pedagogy (Communication, Problem Solving, Supporting Materials)

Type of Practice	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
MPPa	111	2.70	4.47	0.60	5.00	5.00	3.00	5.00	33.469	0.000
MPPb	111	2.63	4.40	0.64	4.00	5.00	3.00	5.00		
MPPc	111	2.49	4.31	0.84	5.00	5.00	2.00	5.00		
MPPd	111	2.18	4.08	0.90	4.00	5.00	2.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
MPPd – MPPc									1.794	0.437
MPPd – MPPb									2.573	0.060
MPPd – MPPa									3.015	0.015
MPPc – MPPb									0.780	1.000
MPPc – MPPa									1.222	1.000
MPPb – MPPa									0.442	1.000

Table 2: Satisfaction with the Organization of Teaching Practices by Teachers, Psychologists, and Subject Didactics Experts (Supporting Material for Observations, Supporting Material for Preparation of Outputs)

Type of Practice	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
MPPa	111	2.76	4.29	0.78	4.00	4.00	1.00	5.00	45.888	0.000
MPPb	111	2.66	4.24	0.74	4.00	4.00	2.00	5.00		
MPPc	111	2.41	4.05	0.91	4.00	4.00	2.00	5.00		
MPPd	111	2.16	3.84	0.96	4.00	4.00	2.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
MPPd – MPPc									1.456	0.873
MPPd – MPPb									2.885	0.023
MPPd – MPPa									3.457	0.003
MPPc – MPPb									1.430	0.917
MPPc – MPPa									2.002	0.272
MPPb – MPPa									0.572	1.000

Table 3: Satisfaction with the Scope (Number) of Observations in Teaching Practices

Type of Practice	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
MPPa	111	2.88	4.04	1.02	4.00	4.00	1.00	5.00	55.994	0.000
MPPb	111	2.58	3.74	1.09	4.00	4.00	1.00	5.00		
MPPc	111	2.55	3.69	1.04	4.00	4.00	1.00	5.00		
MPPd	111	2.00	3.19	1.17	3.00	4.00	1.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
MPPd – MPPc									3.171	0.009
MPPd – MPPb									3.353	0.005
MPPd – MPPa									5.121	0.000
MPPc – MPPb									0.182	1.000
MPPc – MPPa									1.950	0.307
MPPb – MPPa									1.768	0.463

Table 4: Satisfaction with the Scope (Number) of Independent Outputs in Teaching Practices

Type of Practice	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
MPPb	111	1.98	3.25	1.33	4.00	4.00	1.00	5.00	20.016	0.000
MPPc	111	2.23	3.58	1.05	4.00	4.00	1.00	5.00		
MPPd	111	1.78	3.09	1.18	3.00	4.00	1.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
MPPd – MPPb									1.477	0.419
MPPd – MPPc									3.356	0.002
MPPb – MPPc									-1.879	0.181

Table 5: Satisfaction with the Fulfillment of the Mission and Objectives of Teaching Practices

Type of Practice	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
MPPa	111	2.54	4.17	0.72	4.00	4.00	2.00	5.00	5.726	0.126
MPPb	111	2.44	4.05	0.86	4.00	4.00	1.00	5.00		
MPPc	111	2.63	4.23	0.83	4.00	5.00	2.00	5.00		
MPPd	111	2.40	4.06	0.87	4.00	5.00	2.00	5.00		

Table 6: Preparedness for Observation-Pedagogical-Psychological Practice from the Perspective of Selected Subjects

Subject	N	AM	SD	Me	Mod	Min	Max	Wilcoxon Test (Z)	p-value
pedagogy	111	3.77	1.00	4.00	4.00	1.00	5.00	-2.476	0.013
psychology	111	3.65	1.04	4.00	4.00	1.00	5.00		

Table 7: Preparedness for Interim Teaching Practice from the Perspective of Selected Subjects

Subject	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
pedagogy	111	3.50	3.78	0.91	4.00	4.00	1.00	5.00	55.389	0.000
psychology	111	3.27	3.68	0.99	4.00	4.00	1.00	5.00		
subject didactics (1. AP)	111	3.12	3.60	0.99	4.00	4.00	1.00	5.00		
subject didactics (2. AP)	111	3.19	3.61	1.05	4.00	4.00	1.00	5.00		
specialized subjects (1. AP)	111	3.91	4.02	0.92	4.00	4.00	1.00	5.00		
specialized subjects (2. AP)	111	4.00	4.06	0.91	4.00	4.00	1.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
subject didactics of the 1st specialization subject – subject didactics of the 2nd specialization subject									-0.287	1.000
subject didactics of the 1st specialization subject – psychology									0.610	1.000
subject didactics of the 1st specialization subject – pedagogy									1.489	1.000
subject didactics of the 1st specialization subject – specialized subjects of the 1st specialization subject									-3.139	0.025
subject didactics of the 1st specialization subject – specialized subjects of the 2nd specialization subject									-3.516	0.007
subject didactics of the 2nd specialization subject – psychology									0.323	1.000
subject didactics of the 2nd specialization subject – pedagogy									1.202	1.000
subject didactics of the 2nd specialization subject – specialized subjects of the 1st specialization subject									-2.852	0.065
subject didactics of the 2nd specialization subject – specialized subjects of the 2nd specialization subject									-3.229	0.019
psychology – pedagogy									0.879	1.000
psychology – specialized subjects of the 1st specialization subject									-2.529	0.171
psychology – specialized subjects of the 2nd specialization subject									-2.906	0.055
pedagogy – specialized subjects of the 1st specialization subject									-1.650	1.000
pedagogy – specialized subjects of the 2nd specialization subject									-2.027	0.640
specialized subjects of the 1st specialization subject – specialized subjects of the 2nd specialization subject									-0.377	1.000

Table 8: Preparedness for Continuous Teaching Practice I from the Perspective of Selected Subjects

Subject	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
pedagogy	111	3.43	3.77	0.95	4.00	4.00	1.00	5.00	27.537	0.000
psychology	111	3.22	3.68	1.00	4.00	4.00	1.00	5.00		
subject didactics (1. AP)	111	3.29	3.73	0.93	4.00	4.00	1.00	5.00		
subject didactics (2. AP)	111	3.44	3.76	1.00	4.00	4.00	1.00	5.00		
specialized subjects (1. AP)	111	3.76	3.97	0.93	4.00	5.00	2.00	5.00		
specialized subjects (2. AP)	111	3.87	4.02	0.93	4.00	4.00	1.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
psychology – subject didactics of the 1st specialization subject									-0.269	1.000
psychology – pedagogy									0.825	1.000
psychology – subject didactics of the 2nd specialization subject									-0.861	1.000
psychology – specialized subjects of the 1st specialization subject									-2.135	0.492

psychology – specialized subjects of the 2nd specialization subject	-2.583	0.147
subject didactics of the 1st specialization subject – pedagogy	0.556	1.000
subject didactics of the 1st specialization subject – subject didactics of the 2nd specialization subject	-0.592	1.000
subject didactics of the 1st specialization subject – specialized subjects of the 1st specialization subject	-1.865	0.932
subject didactics of the 1st specialization subject – specialized subjects of the 2nd specialization subject	-2.314	0.310
pedagogy – subject didactics of the 2nd specialization subject	-0.036	1.000
pedagogy – specialized subjects of the 1st specialization subject	-1.309	1.000
pedagogy – specialized subjects of the 2nd specialization subject	-1.758	1.000
subject didactics of the 2nd specialization subject – specialized subjects of the 1st specialization subject	-1.274	1.000
subject didactics of the 2nd specialization subject – specialized subjects of the 2nd specialization subject	-1.722	1.000
specialized subjects of the 1st specialization subject – specialized subjects of the 2nd specialization subject	-0.448	1.000

Table 9: Preparedness for Continuous Teaching Practice II from the Perspective of Selected Subjects

Subject	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
pedagogy	111	3.39	3.86	0.96	4.00	4.00	1.00	5.00	27.935	0.000
psychology	111	3.11	3.73	0.99	4.00	4.00	1.00	5.00		
subject didactics (1. AP)	111	3.38	3.86	0.96	4.00	4.00	1.00	5.00		
subject didactics (2. AP)	111	3.55	3.92	0.99	4.00	4.00	1.00	5.00		
specialized subjects (1. AP)	111	3.72	4.05	0.95	4.00	5.00	2.00	5.00		
specialized subjects (2. AP)	111	3.85	4.12	0.92	4.00	5.00	2.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
psychology – subject didactics of the 1st specialization subject									-1.058	1.000
psychology – pedagogy									1.112	1.000
psychology – subject didactics of the 2nd specialization subject									-1.722	1.000
psychology – specialized subjects of the 1st specialization subject									-2.422	0.232
psychology – specialized subjects of the 2nd specialization subject									-2.942	0.049
subject didactics of the 1st specialization subject – pedagogy									0.054	1.000
subject didactics of the 1st specialization subject – subject didactics of the 2nd specialization subject									-0.664	1.000
subject didactics of the 1st specialization subject – specialized subjects of the 1st specialization subject									-1.363	1.000
subject didactics of the 1st specialization subject – specialized subjects of the 2nd specialization subject									-1.883	0.895
pedagogy – subject didactics of the 2nd specialization subject									-0.610	1.000
pedagogy – specialized subjects of the 1st specialization subject									-1.309	1.000
pedagogy – specialized subjects of the 2nd specialization subject									-1.830	1.000
subject didactics of the 2nd specialization subject – specialized subjects of the 1st specialization subject									-0.700	1.000
subject didactics of the 2nd specialization subject – specialized subjects of the 2nd specialization subject									-1.220	1.000
specialized subjects of the 1st specialization subject – specialized subjects of the 2nd specialization subject									-0.520	1.000

Table 10: Student Satisfaction with Their Performance as a Teacher During Previous Teaching Practices

Type of Practice	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
MPPb	111	1.85	3.87	0.79	4.00	4.00	1.00	5.00	11.575	0.003
MPPc	111	1.98	3.97	0.92	4.00	4.00	1.00	5.00		
MPPd	111	2.17	4.08	0.75	4.00	4.00	2.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
MPPb – MPPc									-0.940	1.000
MPPb – MPPd									-2.383	0.052
MPPc – MPPd									-1.443	0.447

Table 11: Necessity of Teaching Practices in the Practical Professional Preparation of Future Teachers

Type of Practice	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
MPPa	111	2.01	4.07	0.93	4.00	4.00	1.00	5.00	100.813	0.000
MPPb	111	2.14	4.19	0.81	4.00	4.00	2.00	5.00		
MPPc	111	2.98	4.77	0.47	5.00	5.00	3.00	5.00		
MPPd	111	2.87	4.69	0.61	5.00	5.00	2.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
MPPa – MPPb									-0.728	1.000
MPPa – MPPd									-4.939	0.000
MPPa – MPPc									-5.563	0.000
MPPb – MPPd									-4.211	0.000
MPPb – MPPc									-4.835	0.000
MPPd – MPPc									0.624	1.000

Table 12: Level of Students' Professional Competencies in the Area of "Student"

Professional competencies	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
Identification of the developmental and individual characteristics of the student	111	2.08	3.46	0.97	4.00	4.00	1.00	5.00	3.754	0.153
Identification of psychological and social factors in student learning	111	1.98	3.37	1.01	3.00	3.00	1.00	5.00		
Identification of the socio-cultural context of student development	111	1.94	3.35	0.97	3.00	3.00	1.00	5.00		

Table 13: Level of Students' Professional Competencies in the Area of "Educational Process"

Professional competencies	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
Mastery of the content and didactics of teaching subjects	111	2.37	3.74	0.87	4.00	4.00	1.00	5.00	9.867	0.020
Planning and designing instruction	111	2.47	3.79	0.85	4.00	4.00	1.00	5.00		
Implementation of teaching	111	2.72	3.95	0.76	4.00	4.00	1.00	5.00		
Assessment of the process and outcomes of teaching and student learning	111	2.44	3.77	0.82	4.00	4.00	1.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
Mastery of the content and didactics of teaching subjects – Assessment of the process and outcomes of teaching and student learning									-0.416	1.000
Mastery of the content and didactics of teaching subjects – Planning and designing instruction									-0.572	1.000
Mastery of the content and didactics of teaching subjects – Implementation of teaching									-2.028	0.256
Assessment of the process and outcomes of teaching and student learning – Planning and designing instruction									0.156	1.000
Assessment of the process and outcomes of teaching and student learning – Implementation of teaching									1.612	0.642
Planning and designing instruction – Implementation of teaching									-1.456	0.873

Table 14: Level of Students' Professional Competencies in the Area of "Professional Development"

Professional competencies	N	AM	SD	Me	Mod	Min	Max	Wilcoxon test (Z)	p-value
Planning and implementing one's professional growth and self-development	111	3.56	0.87	4.00	4.00	1.00	5.00	-2.884	0.004
Identification with the professional role and the school	111	3.75	1.00	4.00	4.00	1.00	5.00		

Table 15: Assessment of Teaching Practice Conditions by Students at the Training School

Conditions	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
Equipment of classrooms and laboratories	93	3.53	3.96	0.88	4.00	4.00	1.00	5.00	50.298	0.000
Material-didactic resources for teaching curriculum topics	93	3.67	3.99	0.93	4.00	4.00	1.00	5.00		
Timetable	93	3.67	4.00	0.77	4.00	4.00	2.00	5.00		
Composition of classes	93	3.68	4.01	0.77	4.00	4.00	2.00	5.00		
Space for the trainee (office, staff room, workspace)	93	3.85	4.05	0.90	4.00	4.00	2.00	5.00		

Opportunities to participate in other school activities	93	2.59	3.42	1.06	4.00	4.00	1.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
Opportunities to participate in other school activities – Equipment of classrooms and laboratories									3.429	0.009
Opportunities to participate in other school activities – Timetable									3.919	0.001
Opportunities to participate in other school activities – Material-didactic resources for teaching curriculum topics									3.939	0.001
Opportunities to participate in other school activities – Composition of classes									3.978	0.001
Opportunities to participate in other school activities – Space for the trainee (office, staff room, workspace)									4.605	0.000
Equipment of classrooms and laboratories – Timetable									-0.490	1.000
Equipment of classrooms and laboratories – Material-didactic resources for teaching curriculum topics									-0.510	1.000
Equipment of classrooms and laboratories – Composition of classes									-0.549	1.000
Equipment of classrooms and laboratories – Space for the trainee (office, staff room, workspace)									-1.176	1.000
Timetable – Material-didactic resources for teaching curriculum topics									0.020	1.000
Timetable – Composition of classes									-0.059	1.000
Timetable – Space for the trainee (office, staff room, workspace)									-0.686	1.000
Material-didactic resources for teaching curriculum topics – Composition of classes									-0.039	1.000
Material-didactic resources for teaching curriculum topics – Space for the trainee (office, staff room, workspace)									-0.666	1.000
Composition of classes – Space for the trainee (office, staff room, workspace)									-0.627	1.000

* The frequency (N) in the table is lower than 111 because not all respondents were able to provide a relevant answer to the given question.

Table 16: Mentor Teacher's Approach to the Student During Teaching Practice

Components of the Approach	N	Mean rank	AM	SD	Me	Mod	Min	Max	Friedman Test	p-value
Interest in the trainee	111	5.26	4.51	0.69	5.00	5.00	2.00	5.00	33.606	0.000
Motivating the trainee for the teacher's role	111	4.77	4.37	0.82	5.00	5.00	1.00	5.00		
Acceptance of the trainee's autonomy	111	4.88	4.41	0.78	5.00	5.00	2.00	5.00		
Providing information about the class composition	111	4.73	4.38	0.74	5.00	5.00	2.00	5.00		
Providing materials for lesson preparation and implementation	111	5.27	4.50	0.76	5.00	5.00	1.00	5.00		
Approach to the trainee in front of students	111	5.27	4.51	0.69	5.00	5.00	2.00	5.00		
Allowing the trainee to implement chosen teaching strategies and methods	111	5.15	4.48	0.70	5.00	5.00	3.00	5.00		
Approach to the trainee during lesson analysis	111	5.18	4.47	0.80	5.00	5.00	1.00	5.00		
Quality of the lesson analysis	111	4.49	4.30	0.90	5.00	5.00	1.00	5.00		
Pairwise Comparisons									Dunn-Bonferroni Post Hoc Test	Adjusted Significance
Quality of the lesson analysis – Providing information about the class composition									0.674	1.000
Quality of the lesson analysis – Motivating the trainee for the teacher's role									0.772	1.000
Quality of the lesson analysis – Acceptance of the trainee's autonomy									1.078	1.000
Quality of the lesson analysis – Allowing the trainee to implement chosen teaching strategies and methods									1.801	1.000
Quality of the lesson analysis – Approach to the trainee during lesson analysis									1.899	1.000
Quality of the lesson analysis – Interest in the trainee									2.108	1.000
Quality of the lesson analysis – Providing materials for lesson preparation and implementation									2.120	1.000
Quality of the lesson analysis – Approach to the trainee in front of students									2.120	1.000
Providing information about the class composition – Motivating the trainee for the teacher's role									0.098	1.000
Providing information about the class composition – Acceptance of the trainee's autonomy									0.404	1.000
Providing information about the class composition – Allowing the trainee to implement chosen teaching strategies and methods									-1.127	1.000
Providing information about the class composition – Approach to the trainee during lesson analysis									-1.225	1.000
Providing information about the class composition – Interest in the trainee									1.434	1.000
Providing information about the class composition – Approach to the trainee in front of students									-1.446	1.000
Providing information about the class composition – Providing materials for lesson preparation and implementation									-1.446	1.000

Motivating the trainee for the teacher's role – Acceptance of the trainee's autonomy	-0.306	1.000
Motivating the trainee for the teacher's role – Allowing the trainee to implement chosen teaching strategies and methods	-1.029	1.000
Motivating the trainee for the teacher's role – Approach to the trainee during lesson analysis	-1.127	1.000
Motivating the trainee for the teacher's role – Interest in the trainee	1.336	1.000
Motivating the trainee for the teacher's role – Approach to the trainee in front of students	-1.348	1.000
Motivating the trainee for the teacher's role – Providing materials for lesson preparation and implementation	-1.348	1.000
Acceptance of the trainee's autonomy – Allowing the trainee to implement chosen teaching strategies and methods	-0.723	1.000
Acceptance of the trainee's autonomy – Approach to the trainee during lesson analysis	-0.821	1.000
Acceptance of the trainee's autonomy – Interest in the trainee	1.029	1.000
Acceptance of the trainee's autonomy – Providing materials for lesson preparation and implementation	-1.042	1.000
Acceptance of the trainee's autonomy – Approach to the trainee in front of students	-1.042	1.000
Allowing the trainee to implement chosen teaching strategies and methods – Approach to the trainee during lesson analysis	-0.098	1.000
Allowing the trainee to implement chosen teaching strategies and methods – Interest in the trainee	0.306	1.000
Allowing the trainee to implement chosen teaching strategies and methods – Providing materials for lesson preparation and implementation	0.319	1.000
Allowing the trainee to implement chosen teaching strategies and methods – Approach to the trainee in front of students	0.319	1.000
Approach to the trainee during lesson analysis – Interest in the trainee	0.208	1.000
Approach to the trainee during lesson analysis – Providing materials for lesson preparation and implementation	0.221	1.000
Approach to the trainee during lesson analysis – Approach to the trainee in front of students	0.221	1.000
Interest in the trainee – Approach to the trainee in front of students	-0.012	1.000
Interest in the trainee – Providing materials for lesson preparation and implementation	-0.012	1.000
Providing materials for lesson preparation and implementation – Approach to the trainee in front of students	0.000	1.000

4 Discussion and conclusion

Regarding RQ1, we conclude that a statistically significant difference in student satisfaction was identified between MPPa and MPPd. On average, respondents reported being more satisfied with MPPa.

The observation-pedagogical-psychological practice at the Faculty of Arts, UPJŠ, is organized by the Department of Pedagogy in cooperation with the Department of Educational Psychology and Health Psychology. Before beginning their practice, teacher training students receive instructions with precise guidelines on which educational phenomena to observe and how to record them. Students are provided with supporting materials that operationalize and facilitate the process of registering student and teacher behavior during lessons. Additionally, this type of practice includes a final seminar where students evaluate the course of MPPa, highlight which aspects were fulfilled (what activities teachers performed during teaching and what they managed to monitor), and discuss whether they understood the importance of observing lessons led by more experienced teachers (experts) within the gradation model of pedagogical practice. This observation is one of the significant reflective methods that, especially for novice teachers, supports identification with a certain teaching model and professional adaptation. Regarding the Continuous Teaching Practice II, it is primarily managed by subject didactics experts. However, there seems to be a lack of a unified approach to the conception and implementation of this type of practice (e.g., supporting materials, such as observation sheets and sets of self-diagnostic questions based on taxonomies, may vary between departments). It is also important to emphasize that for the first three types of practice, students are assigned to mentor teachers through the practice coordinator, who selects them based on their experience and student feedback, thereby minimizing issues with the practice process.

Regarding RQ2, we conclude that a statistically significant difference was identified in student satisfaction with the organization of teaching practices by teachers, psychologists, and subject didactics experts between MPPd and MPPb, and

between MPPd and MPPa. In both cases, respondents generally reported being less satisfied with MPPd.

The observation-pedagogical-psychological practice and interim teaching practice are quite standardized in terms of form, content, and organization, meaning that all teacher training students have relatively equal conditions for completing them (they know what will be expected of them and what final output they will be evaluated on, regardless of their specialization). These first two types of practices focus primarily on student observations and their analysis. During the interim teaching practice, students have only one independent teaching output. Continuous Teaching Practice II, on the other hand, is differentiated depending on the subject didactics experts overseeing it, and students are left to choose their own training elementary or secondary school. In this case, they also interact with mentor teachers with whom the Faculty of Arts, UPJŠ, does not maintain contact or close cooperation (they are not on the list of teachers regularly providing teaching practice opportunities; their approach to students and interest in their professional-educational needs are unknown). The Department of Pedagogy and the Department of Educational Psychology and Health Psychology intervene the least in this type of practice, although students are provided with preliminary instructions and recommendations before it begins (e.g., how to get involved in school life and the school's operations). However, they do not guide students in lesson preparation or the appropriate use of didactic tools for the given class. Students often report that Continuous Teaching Practice II conflicts with the period when they are finalizing their theses, preventing them from focusing adequately on preparing model lessons for the teaching practice. Kiggundu and Nayimuli (2009) explored the experiences of teacher training students during their 10-week practice, focusing on how these experiences influenced their perception of the teaching profession. Despite the positive experiences, future teachers also faced challenges. In some schools, they felt unaccepted by other educators and had to play dual roles (teacher and student), resulting in increased pressure on them.

Regarding RQ3, we conclude that a statistically significant difference was identified in student satisfaction with the scope of observations between MPPd and MPPc, MPPd and MPPb, and

MPPd and MPPa. In all three cases, respondents generally reported being less satisfied with MPPd.

Although the number of observations (monitoring teachers' educational activities) decreases with a higher level of practice, it remains a crucial component of the practical preparation of a novice teacher. Observations serve to inspire students on how to handle educational and instructional challenges when working with students or to compare learned theories and educational concepts with their application in practice. The observed differences may suggest that students would welcome a reduction in the number of observations and an increase in independent teaching outputs. However, it is important to note that including observations in each type of practice has its rationale, as students may start their practice with a different mentor teacher each time. Therefore, in the initial phase, it is essential to observe the conditions under which teaching is conducted, how experienced teachers manage the course of the lesson, and how they interact with students (how they communicate, assess, and what teaching style they prefer). Referring to the taxonomy of psychomotor objectives (Dave, 1970 In Petlák, 2016), before engaging in pedagogical-didactic activities, it is advisable to first prepare for them, practice them, and only after mastering individual tasks proceed to their comprehensive implementation.

Regarding RQ4, we conclude that a statistically significant difference was identified in student satisfaction with the scope of independent outputs between MPPd and MPPc. On average, respondents reported being more satisfied with MPPc.

Similarly, to the discussion of the response to RQ3, while the number of independent outputs increases with a higher level of practice, this feedback from students may indicate that it would be more beneficial for them to increase the number of independent outputs specifically in Continuous Teaching Practice II (at an appropriate time outside of other study obligations). This information should prompt a reflection on the logistics of practice organization by the university and its potential to expand cooperation with additional training schools. However, this presents only one perspective, as this practice model is well-established in Slovakia, and university studies are structured rather than continuous, with a division between theoretical and practical preparation. This raises the question of how the university can influence this matter and how it can compensate for it (e.g., creating activities within various pedagogical disciplines that allow students to try out educational activities with students in school educational institutions). A suitable alternative to consider is the implementation of practices within extracurricular activities (if we consider events organized by various civic associations, etc.).

Regarding RQ5, we conclude that no statistically significant difference was identified in student satisfaction with the fulfillment of the mission and objectives of the teaching practices.

We primarily attribute this to the fact that before each practice, a meeting is held with the students where, as mentioned earlier, they are provided with didactic and diagnostic materials (in the case of MPPc and MPPd, these are provided by didactics experts according to the subject). Additionally, they are informed about the specific focus of each practice, how it contributes to the development of professional skills, and how it relates to the structure of their field of study. Each practice has a set objective, recommendations for its implementation, and a defined outcome regarding what students should be able to handle after its completion and how they should approach reflecting on educational experiences (in cooperation with the mentor teacher). Although we remain in the realm of assumptions, students likely perceive a connection between these practices and their studies, in other words, the expansion of knowledge from specialized, pedagogical, and psychological subjects, along with their verification and reconstruction during teaching practice. Msangya et al. (2016) used semi-structured questionnaires to explore the perspectives of teacher training

students regarding their experiences with teaching practice. The findings indicate that future teachers perceived practice as an important tool that supported the development of their teaching skills, preparing them for the real world of work in schools. Nevertheless, the study recommends more thorough supervision and building a strong university partnership with local schools, which is the primary goal of the Faculty of Arts, UPJŠ (in organizing practices).

Regarding RQ6, we conclude that a statistically significant difference was identified in students' preparedness for the observation-pedagogical-psychological practice. On average, respondents reported being more prepared in pedagogy than in psychology.

It is clear that this will also depend on the nature of the subjects represented in the teacher training curriculum and how the students themselves assess the urgency/necessity of their knowledge in relation to this type of practice in primary and secondary schools. The difficulty of noticing pedagogical phenomena is generally lower (e.g., the didactic methods used, organizational forms, assessment) than that of psychological phenomena (e.g., being able to determine the prevailing classroom climate or the effectiveness of the teacher's methods in relation to student learning and engagement). This requires more frequent practice and a holistic approach to teaching, where students do not focus solely on selected activities but are able to reflect on the educational process with attention to details (e.g., "What did the teacher do?" "What did the students do?" "How did the teacher feel?" "How did the students feel?") (Koster & Korthagen, 2011; Kouteková, 2011).

Regarding RQ7, we conclude that a statistically significant difference was identified in students' preparedness for the interim teaching practice between subject didactics of the 1st specialization subject and specialized subjects of the 1st specialization subject, between subject didactics of the 1st specialization subject and specialized subjects of the 2nd specialization subject, and between subject didactics of the 2nd specialization subject and specialized subjects of the 2nd specialization subject. On average, respondents reported being more prepared in specialized subjects.

Teacher training students encounter subject didactics only during their master's studies (after the winter semester, they have completed only general didactics, and subject didactics typically come later). Therefore, during their bachelor's studies, they have only limited exposure to teaching strategies (e.g., in general pedagogy, educational diagnostics, theory of education), whether it involves lesson planning, didactic analysis of content, the use of methods in various stages of a lesson, or student assessment and evaluation. They gradually (often implicitly) develop the ability to carry out the didactic transformation of scientific information and knowledge in a way that conveys it to students in a simplified and systematic form, enabling students to develop their knowledge, skills, and habits. One possible solution would be to change the placement of teaching practices in study programs (e.g., introducing MPPa during the bachelor's program), which, however, is challenging to implement given the current study model. Another option is to design most pedagogical (and even psychological) courses and subject didactics so that students are evaluated based on practical outputs (focusing not just on mastering theory but also on applying it during practical exercises). This approach is used, for instance, in the implementation of general didactics.

Regarding RQ8, we conclude that no statistically significant difference was identified in students' preparedness for Continuous Teaching Practice I with respect to pairwise comparisons.

With the completion of additional courses related to pedagogy and subject didactics, teacher training students sequentially expand their knowledge, which forms the foundation for developing professional competencies and demonstrating them in practice in line with professional standards. This may not be

the only reason for the results we obtained. The number of independent outputs in this type of practice is significantly higher (18 hours per specialization subject) compared to interim teaching practice (1 hour per specialization subject). Therefore, students may have gained a more thorough understanding of their preparedness for practice, even in subjects forming the core of teacher training (e.g., whether and how they can address various educational problems based on previous theory and experiences, which arise from interactions with students and their learning needs).

Regarding RQ9, we conclude that a statistically significant difference was identified in students' preparedness for Continuous Teaching Practice II between psychology and specialized subjects of the 2nd specialization subject. On average, respondents reported being more prepared in the specialized subjects of the 2nd specialization subject.

On one hand, this may relate to which psychology courses are mandatory for students and which they choose to study based on their practical professional needs. On the other hand, it raises the question of whether students are being adequately prepared to analyze the conditions, process, and student work during lesson evaluations from the perspective of various psychological disciplines (e.g., ontogenetic psychology, educational psychology, social psychology). As mentioned in the commentary on RQ6, the need to understand psychological principles in teaching and student learning including the perception and differentiation of key factors influencing the effectiveness of education – becomes increasingly pressing with more teaching practice. Initially, a novice teacher focuses mainly on managing the lesson content, but later, once they feel confident in that aspect, they may wish to adopt a more global perspective on the classroom. In older practice models, it was common for both the subject didactics expert and a psychologist to attend the student's teaching output, where they, along with the student teacher, would evaluate the pedagogical-didactic activities in terms of professional competencies related to the educational process and students (considering what happened in the classroom, the atmosphere, and how the student used methods to activate and motivate students).

Regarding RQ10, we conclude that no statistically significant difference was identified in student satisfaction with their performance as a teacher during previous teaching practices with respect to pairwise comparisons.

Behind this result, we see the initiative of the didactics experts (not limited to the departments overseeing the teacher training core) to prepare students for the various types of practice. This includes a tendency toward jointly solving issues related to practices, with didactics experts from departments consulting the coordinator of teaching practices when there are changes in mentor teachers and after evaluating student feedback. This may later influence students' responsible selection of mentor teachers (in MPPd), as they are informed about how and in what ways a mentor teacher should support them and which mentor could serve as a reflective practitioner (a teacher who pays attention to lesson analysis, evaluation, and structuring of educational experiences). This is also supported by the research results presented in Table 16, where respondents assessed the approach of mentor teachers in their previous teaching practices. None of the components of the mentor teacher's approach to the trainee stood out significantly.

Regarding RQ11, we conclude that a statistically significant difference was identified in the perceived necessity of teaching practices for students in the practical professional preparation of future teachers between MPPa and MPPd, MPPa and MPPc, MPPb and MPPd, and MPPb and MPPc. On average, respondents indicated that MPPc and MPPd are more necessary.

This is understandable, considering the number of independent outputs students carry out in each type of practice. However, observations also have their significance in teaching practice

(Hupková, 2006; Rys, 1975). Developing functional literacy, where an individual applies learned knowledge to independently address problems and discrepancies, initially relies on successfully mastering the techniques of selected activities and understanding their importance for the effectiveness of educational work. In teacher preparation (as well as for students), didactic principles of adequacy, clarity, continuity, and progression are taken into account. Understanding and accepting this analogy serves as a platform for students to develop professional competencies (e.g., the content and scope of these competencies are modified with a higher career level of the educational employee).

Regarding RQ12, we conclude that no statistically significant difference was identified in the level of students' professional competencies in the area of "student".

All three professional competencies under this area, if generalized, relate to understanding and assessing the conditions of education, which, as derived from the theory of general didactics and pedagogical diagnostics, represent a multifaceted complex of both educational and non-educational phenomena associated with the abilities and capacities of students and the teacher. Although there is no noticeable difference in how respondents rated their level, attention should be directed to comparing measures of central tendency between these competencies and those categorized under the areas of the educational process and professional development. We are operating at a descriptive level, but it is noticeable that recognizing educational factors that frame the course and nature of the educational process appears to be relatively more challenging and requires more extended practice (reflected experience). Pedagogical diagnostics must not remain solely at an intuitive level; it must have a scientific and professional foundation (planning its implementation, utilizing other forms of diagnostics besides didactic, using valid diagnostic methods). Currently, as teachers face pressure to implement the concept of inclusive education in schools, as outlined in the "Strategy for an Inclusive Approach in Education" (2021), this is a key priority in preparing teacher training students for practice. The goal is for them to adopt the role of inclusive educators (developing self-efficacy and competencies in this area) (Lechta et al., 2012). The study by Liu et al. (2022), which focuses on the teaching experiences of student teachers, demonstrates that after their internship, they were still more self-focused, even though they recognized the importance of focusing on students and their educational needs during teaching.

Regarding RQ13, we conclude that no statistically significant difference was identified in the level of students' professional competencies in the area of "educational process" with respect to pairwise comparisons.

These are the core competencies that define a teacher as a didactics expert responsible for planning, preparation, execution, and evaluation of the educational process. Along with diagnostic and reflective competencies, they form the foundation for optimizing teaching. The fact remains that in teaching practice, given its time and scope limitations, students primarily focus on developing skills related to processing and conveying subject matter to students and verifying the level of its acquisition by them. However, they may perceive these competencies in a simplified manner because they involve a complex set of activities that extend beyond direct teaching (the student's performance during a lesson is focused on the informational aspect but less on the formative or curricular/content aspects), which stems from the limitation mentioned earlier (number of independent outputs). Professional competencies, of course, are based on professional standards, but it would be beneficial to more precisely define the elements (knowledge, skills) that represent them. Komba and Kira (2013) examined the effectiveness of teaching practice in terms of improving student teachers' teaching skills. The findings suggest that the length of the practice was insufficient for acquiring the competencies necessary for effective teaching. Supervisors during the practice were not flexible enough to discuss with student teachers their

strengths and weaknesses observed during teaching. Of the total number of participants, 76% stated that teaching practice did not help them improve as future teachers.

Regarding RQ14, we conclude that a statistically significant difference was identified in the professional competencies of students in the area of "professional development". On average, respondents reported a higher level of competency in identifying with the professional role and the school compared to planning and implementing their professional growth and self-development.

Planning and implementing professional growth and self-development are not only connected to teachers' length of practice and their experience in educating students, but professional adaptation of the novice teacher (career progression) and the identification or definition of current educational needs aligned with the needs of the school, its educational philosophy, culture, and policy, also play a crucial role. Teachers often lack professional support from experienced mentor teachers, who could assist them in self-reflection and self-evaluation of their teaching performance. Identifying with the professional role and the school remains the starting point. Zhao and Zhang (2017) investigated how field teaching practice affects the professional identity of teachers in the preparatory phase. The research results showed that, compared to the period before field teaching, the professional identity of novice teachers increased after completing the practice, specifically in terms of the growth of inner value identity, which was also supported by mentors. The practice also contributed to the professional engagement of novice teachers (students), enhancing their emotional assessment and confidence in the teaching profession.

Regarding RQ15, we conclude that a statistically significant difference was identified in the assessment of teaching practice conditions by students at the training school between the opportunities to participate in additional school activities and the equipment of classrooms and laboratories, the timetable, the composition of classes, the material and technical resources for teaching curriculum topics, and the space for the trainee. On average, respondents rated the opportunities to participate in additional school activities lower.

The teaching profession is often limited to the area of instruction and related tasks. However, it is teachers who contribute to shaping the school climate and maintaining the tendencies and values that define the school as an educational institution responsive to current societal trends and the needs of individuals/students. This is why teacher training students should be involved in the life of the school, which ultimately depends on the primary goals of teaching practices (such as participating in school-organized events – excursions, trips, training, etc.). It is also important to remember that teachers are qualified to perform the roles of a teaching assistant or educator.

Regarding RQ16, we conclude that no statistically significant difference was identified in the mentor teacher's approach (its components) to the student during teaching practice with respect to pairwise comparisons.

This result leads us to believe that efforts toward uniformity in organizing teaching practices, closer collaboration with mentor teachers in elementary and secondary schools, understanding their specific characteristics, and their potential contribution to shaping teacher training students play a significant role in the professional preparation of future teachers. The mentor teacher should serve both as a role model and a mentor (consultant, facilitator, etc.). Since the Dunn-Bonferroni post hoc test is conservative and, in this case, it was the largest number of pairwise comparisons, which increases the occurrence of a type II error, we could consider, given the value of the mean rank and the arithmetic mean, that it proves to be appropriate to work on unification of quality of the lesson analysis conducted by mentors and student teachers. Caires et al. (2012) analyzed student teachers' perceptions of teaching practice (their feelings, insights). The research results highlight some difficulties

encountered during this period (stress, feelings of fatigue, vulnerability), but also the growing knowledge and skills of student teachers, as well as a more developed sense of flexibility in performance and interactions. Students also positively evaluated the guidance and support from their supervisors.

Tóblová and Krištofiaková (2021) provide several key recommendations for improving interim teaching practice, drawing inspiration from the final evaluation analysis by Gubricová and Bizová (2016). These include identifying weaknesses in the organization of practice (on the part of training schools and mentors), expanding practice in institutions involved in extracurricular education (at least observations in school clubs for children), placing practice in a larger number of training schools (so students can compare them in terms of student social structure or the quality of the educational process), maximizing the scope of interim practice (seeking suitable alternatives), introducing interim practice into the lower years of study (to connect the theoretical and practical components of teacher preparation early), and updating the list of mentor teachers based on student feedback. The Faculty of Arts and the Faculty of Science, UPJŠ, have long reflected these recommendations, but as the research results indicate, addressing other critical points is necessary. These include ensuring uniformity in the setup of practices (in terms of broader cooperation between departments) (MPPc, MPPd), adjusting the ratio of observations to direct educational activities of students during practice (MPPb, MPPc, and MPPd), providing more thorough preparation for practice in psychology (MPPa, MPPd) and subject didactics (MPPb), focusing on enhancing students' diagnostic skills, and encouraging training schools to involve students in other activities (not limited to teaching). The number of teaching practice hours for teacher training students in Slovakia is extremely low compared to Finland (almost incomparable), but three approaches could serve as inspiration and are considered prerequisites for the success of university education for future teachers: a continuous connection with the school (school-based; starting at the bachelor's level), personal experimentation – innovation (experimental personal-based), and solving problems and situations from educational practice (problem-based, case-specific) (Sahlberg, 2010 In Kosová, 2016). We are, of course, aware of the research limitations, such as the available sample of respondents (students of natural sciences predominated, representing almost half of the sample, followed by students of other fields), the research tool used (whose validity and reliability are questionable), and the potential for biased responses (the questionnaire was anonymous, but the students had not yet completed their studies, which might have affected the reliability of their answers).

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Primary Paper Section: A

Secondary Paper Section: AM

THE GENRE TRADITION OF THE BILDUNGSROMAN IN THE NOVELS OF THE PROTOCANON OF SOCIALIST REALISM

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The study was supported by a grant from the Russian Science Foundation № 23-18-01007, <https://rscf.ru/en/project/23-18-01007/>; F. M. Dostoevsky Russian Christian Humanitarian Academy

Abstract: The article analyzes the protocanon phase of the Russian novel of education on the material of N. Ognev's "Diary of Kostya Ryabtsev" and A. Gaidar's "School". It is established, firstly, that the genre tradition of the novel of education, represented in these texts, embodies the common universal idea of the socialist realist novel – the education of workers in the spirit of socialist realism. Secondly, the markers of socialist realist consciousness, the carriers of which the main characters become, are: a clearly formed position in relation to the bourgeois class, a heightened sense of justice. Thirdly, A. Gaidar's and N. Ognev's heroes have not yet arrived at exceptional positivity: the trajectory of transformation of Kostya Ryabtsev and Boris Gorikov is identical – it is the path from spontaneity to consciousness, obedience to the Party. Finally, unlike the characters of socialist realism, whose direction of character development is characterized by a consistent upward movement, the trajectory of personality development of A. Gaidar's and N. Ognev's heroes is a downward movement up to the point of symbolic death. A. Gaidar's and N. Ognev's heroes' personality trajectory is a downward movement up to the point followed by symbolic death. Only after experiencing it, they start an upward movement, get a new chance to find themselves.

Keywords: protocanon; literature of socialist realism; novel of Bildungsroman; A. Gaidar; N. Ognev; tradition.

1 Introduction

Before talking about the socialist realist novel of education, it is necessary to clearly define which texts it would be legitimate to refer to socialist realist literature in general. Of interest is the fact that a number of researchers (Clark 2002; Litovskaya 2008; Sinyavsky 1988) call the canonical texts of socialist realism novels written before 1934 – the moment of the official approval of the statute at the First All-Union Congress of Soviet Writers, in which the definition of socialist realism as the main method of Soviet fiction and literary criticism was first formulated (Clark 2002, 716). Thus, M. Gorky's "Mother", D. Furmanov's "Chapaev" and F. Gladkov's "Cement" are referred to the canon. Katerina Clark explains it as follows: "After socialist realism was 'created', many texts began to read differently than when they were written" (Clark 2002, 18). Thus, these novels were not created as models, but were later chosen as such. The charter itself confirms this idea: "During the years of the proletarian dictatorship, Soviet fiction and Soviet literary criticism, going with the working class, guided by the Communist Party, have developed their own, new creative principles", which "have found their main expression in the principles of socialist realism" (First All-Union Congress 1934, 716). However, in our opinion, the lack of a clear periodization in this matter is fraught with confusion in relation to other artistic texts of the 1920s, as a result of which there may be a tendency to artificially "inflate" the boundaries of socialist realism. The process of formation of the socialist realist canon is described most convincingly by H. Gunter in his article "Life Phases of the Socialist Realist Canon" (Gunter 2000). Based on the historical process of development of Soviet society, the researcher identifies five phases that socialist realism passed through in its existence: the preparatory phase of the protocanon, the phase of canonization, the phase of application of the canon, the phase of decanonization and the post-canon stage (Gunter 1990, 197;

Gunter 2000, 181–182). This division, in our opinion, seems to be very successful, because it delineates the range of texts belonging to one or another phase by chronological frameworks. Thus, if we take into account H. Gunter's periodization, it is more logical to attribute the texts we have chosen to the phase of canon formation, since they "prepared" the universal model of the socialist realist novel.

2 Materials and methods

The material for our study are two texts that continue the tradition of the novel of education – "Diary of Kostya Ryabtsev" by N. Ognev (1926) and "School" by A. Gaidar (1929), which belong to the proto-canon phase by A. Gaidar (1929), which by the time of their creation belong to the protocanon phase. On their example it is most indicative to trace what features of the socialist realist method they contain. The key methods of our study are, firstly, the method of holistic analysis of an artistic work, thanks to which the works of A. Gaidar and N. Ognev are considered in the unity of their poetics and problems; secondly, the comparative-historical method, which allowed us to compare the works of A. Gaidar and N. Ognev to the canonical examples of socialist realism; thirdly, the typological method, with the help of which we identify the works that represent the type of Bildungsroman as the protocanon phase of socialist realist literature.

3 Literature Review

It is well known that the Bildungsroman is a type of novel genre, according to a number of researchers, genetically dating back to the monuments of medieval literature, chivalric tales, the Baroque novel, and received a complete classical form in the work of the German enlighteners – C. M. Wieland and J. W. Goethe. The genre continued its development in the romantic tradition of German and English writers, and then embodied in realistic literature.

The study of Bildungsroman has been the subject of scientific interests of many scholars. Despite the generally accepted opinion that the term Bildungsroman was first used by K. Morgenstern, a number of researchers (Demchenkova 200, 20; Dialektova 1972, 31–32) rightly point to its earlier use in German literary studies. Already in the XVIII century, in particular in 1774, in F. Blakenburg's work "Experience about the novel" the German novel "The Story of Agathon" by K. M. Wieland is characterized by the author as a Bildungsroman. A. V. Dialektova notes that by identifying the signs of the novel genre on the example of "The Story of Agathon", Blakenburg thus connects the first serious study in this field with the German educational novel (Dialektova 1972, 20). In the same year, I. Herder made one of the first attempts to philosophically justify the concept of Bildung (Herder 1777, 701). A few years later, the conceptual interpretation of the humanistic ideal of this concept was formulated by W. Humboldt (Kirchner 2008). Thus, in the early 19th century, K. Morgenstern approached the phenomenon of Bildungsroman as an already known phenomenon, as a result of which he tried to give its genre characterization. The term was introduced into scientific circulation by W. Dilthey, and later he also laid down the tendencies for an in-depth study of the genre of the educational novel. In German literary studies, the first significant monograph devoted to the Bildungsroman, namely, its origins and formation up to Wieland's "Agathon", was the book by M. Gerhard (Gerhard 1926). The next major German study, in which an attempt was made to outline the historical and literary background of the genre and its philosophical justification, was the work of J. Jacobs (Jacobs 1972), which, in addition, contains theoretical remarks (in particular, one of its sections is devoted to the terminological issue). The main driver of the plot, according to the researcher, is the conflict of the educated person with different spheres of the external world. It is also important

that the scientist includes the so-called “novel of anti-nurture” in the variety of the Bildungsroman, considering the hero’s disappointment and loss of illusions in the finale as one of the alternative endings that equalize the finale. The scholar’s idea about the international existence of Bildungsroman is also quite remarkable in this work: while not denying the formation of the Bildungsroman on German soil and noting that “there is a variety of the novel, which, however, is German, typically German, legitimately national” (Jacobs 1972, 327), he considers it necessary to avoid searching for exclusively national features in the general assessment of its artistic uniqueness, and thus expands the boundaries of the study of the genre. The most profound and detailed approach to the study of Bildungsroman in German literary studies is distinguished by R. Selbmann’s monograph (Selbmann 1984), which examines the genre of the educational novel from a historical perspective; however, the undoubted importance of this work still does not exclude the fact that in the summarizing part the researcher fails to clearly classify the concepts he actively operates with: “educational novel”, “educational structure”, “educational history”. It should be emphasized that the review of the history of the study of Bildungsroman in German literary studies reveals an insufficient theoretical basis: this is due to different methodological approaches to the study of the issue, diverse philosophical interpretations of the ideological component of the genre, terminological ambiguity, the desire to cover extensive material, and the lack of a differentiated approach to the study.

In Russian literary studies, the beginning of the study of the Bildungsroman genre model was laid by M. Bakhtin (Bakhtin 1976; 2000). The scientist formulated the conceptual difference between Bildungsroman and other varieties of the novel genre: “The hero himself, his character becomes a variable value in the formula of this novel. The change of the hero himself acquires plot significance <...> Time is brought inside the man, enters into his very image, essentially changing the meaning of all moments of his fate and life. This type of novel can be labeled in the most general sense as a novel of human formation” (Bakhtin 1976, 209). It should be noted that earlier M. Gerhard, defining the “novel of development”, noted only one characteristic feature of its genre: “gradual development and ingrowth into the world” of the individual as the ultimate goal of his journey (Gerhard 1926). Obviously, M. Bakhtin concretizes the definition of genre, believing its basis to be its chronotopic component – time. This observation allowed us to specify the characteristic features of the novel of education, such as the presence of retrospections and introspections represented by the hero’s inner monologues. The works of A. Dialektova, V. Pashigorev, E. Krasnoshchekova, O. Osmukhina and E. Ovsyannikova (Dialektova 1972; Pashigorev 2005; Krasnoshchekova 2008; Osmukhina, Ovsyannikova 2022, 2023) are based on M. Bakhtin’s methodology.

4 Results and Discussions

The genre tradition of Bildungsroman, represented in the works of N. Ognev and A. Gaidar, embodies the common universal idea of the socialist realist novel – “education of workers in the spirit of socialist realism”. This idea was first expressed by A. Sinyavsky: “In a large part of its Soviet literature is an educational novel, which shows the communist metamorphosis of individuals and collectives” (Sinyavsky 1988, 25). K. Clark partly agrees with this idea, but suggests not to take it literally, because “the socialist realist novel is so ritualized that the hero’s progress is deprived of personhood and self-value” (Clark 2002, 134). By the way, if we perceive the novel of education not in its traditional version, but allow its possible transformation and adaptation in accordance with the requirements of its time, then K. Clark’s argument can be refuted. Clark’s argument can be refuted: the novel of education in the socialist realist period takes the form of its variety – “the novel of the figure”, in which, as V. Pashigorev notes, “the development of the character is carried out not so much in its psychological diversity and contradiction, as in the perspective of the evolution of ideas” (Pashigorev 2005, 130). Thus, by becoming a narrative about a figure whose fate is pre-programmed, the socialist realist novel is reduced to a clear

schematization - it presents to the reader the transformation and development not of a hero, but of an idea: the hero initially possesses all the necessary communist virtues, the author’s task is to nurture in him the ideology of Bolshevism and thus popularize it.

One of the main distinguishing features of the novel of socialist realism is a positive hero, which is pointed out by a number of literary critics (Clark 2002; Litovskaya 2008; Dobrenko 2007; Volodina 1998; Shalaginov 2006). Moreover, his typicalization does not allow us to refer him to the heirs of positive heroes of the XIX century. The formulaic “positivity” of the protagonist of socialist realism is so obvious that it became the subject of several barbed remarks by scholars. Thus, A. Sinyavsky in his pamphlet ironizes his increased power: “As he approaches his goal, he becomes more and more positive, beautiful, majestic” (Sinyavsky 1988, 29). K. Clark notes that depriving him of any individual features would allow him to “pass from book to book without loss or special changes” (Clark 2002, 56).

Indeed, Boris Gorikov in A. Gaidar’s work in his hotheadedness, stubbornness, spontaneity, ideological fervor in a few years will be embodied in Pavka Korchagin. Gaidar’s Boris Gorikov in his hotheadedness, stubbornness, spontaneity, ideological ardor will be embodied in Pavka Korchagin in a few years. Not quite ritualized yet, not hagiographically emphasized, he chickens out more than once on the way to his formation, but his “positivity” is set by the author from the beginning and expressed on the first pages of the novel in his aspiration to belong to the working class:

- What are you preparing for? – strictly asks his mother, signing the ballnik. – <...> Why again the inspector writes that you climbed up the roof of the school on the fire escape? What’s that for? That you’re training to be a chimney sweep?
- No. No artists, no writers, no chimney sweeps... I’ll be a sailor (Gaidar 1967, 8).

The origin of N. Ognev’s hero is no less important. Ognev: Kostya Ryabtsev is “the son of a laboring element”. The author does not ignore his position towards the bourgeoisie – resenting the new system of education, he resents only the origin of its creator: “I will say this: why do we need this bourgeois plan? And they also say that this lord was fed only goose liver and jelly when he invented it. We should put him on an octopus and a vobla and see! Or to make him beg in the villages, as we used to do in the colony” (Ognev 1988, 423). The attitude of the hero of A. Gaidar’s hero, Boris Gorikov, to the bourgeoisie, is read in the scene, which is given by the author after the events of the overthrow of the tsar’s power: Boris sits in the attic and looks at the fire of the Polutin’s bar estate: “I smiled through my tears, not yet dried up after the heavy loss, rejoicing that the ‘merry time’ is approaching” (Gaidar 1967, 63–64). But so far the positions of these two characters look only like ill-will, which in N. Ostrovsky will develop into real hatred from the first pages of the novel, when Pavka pours a handful of mahr into the priest’s Easter dough (Ostrovsky 1974, 29).

The positivity of the heroes of A. Gaidar and N. Ognev’s heroes are not only in their origin and clearly formed position in relation to the bourgeois class, they possess a number of typical personal traits. Hotness in relation to the common cause, adventurism mixed with colossal self-confidence are seen in the characterization of Kostya Ryabtsev, composed by shkrabs (Ognev 1988, 457), and Boris, who joined Shebalov’s detachment “When there will be a battle, I will not bend down on purpose, and if I am killed, it’s nothing either. Then they will write to my mother: ‘Your son was a communist and died for the great cause of the revolution’. And my mother will cry and hang my portrait next to my father’s, and a new, bright life will go its way past that wall” (Gaidar 1967, 181). A heightened sense of justice is another marker of socialist consciousness. Ryabtsev’s truthfulness breaks through in the scene when he learns of Lina’s pregnancy and rebuffs Venka Palkin: “No, you drink and debauch with your buddies, but leave our school alone!” (Ognev

1988, 502). The same feeling will be cultivated by N. Ostrovsky in the character of Pavka, who as a young man overhears the sobs of the disgraced Froysa, „shuddering and beating her head against logs“ (Ostrovsky 1974, 39), and after encountering the atrocities of the Petlyurovtsy against Khristina, and the Poles who raped and executed Valya Bruzzhak and Rosa Gritsman: „And, driving away from the gate, Pavel remembered the last words of the order of the Rensovet, read before the regiment: „The Workers' and Peasants' Country loves its Red Army. It is proud of it. It demands that not a single stain be on its banner“. – Not a single stain, – whispered Pavel's lips“ (Ostrovsky 1974, 181).

However, the heroes of A. Gaidar and N. Ognev have not yet arrived at exceptional positivity. The trajectory of transformation of Kostya Ryabtsev and Boris Gorikov is identical – it is the path from spontaneity to consciousness, obedience to the party. The hero's movement from anarchy to discipline, „striving to solve the contradictions between the natural needs of people and the interests of society“, as K. Clark points out, is the task of socialist realism literature (Clark 2002). This is the path that Pavka later takes in N. Ostrovsky's novel. The words of comrade Segal encapsulate the main idea of the novel: „The young man has not yet completely gone from spontaneity. He lives with feelings that revolt in him, and the whirlwinds of these feelings knock him aside“ (Ostrovsky 1974, 199). And this, we note, after he consciously renounced his love for Tonya in an effort to belong to the party (Ostrovsky 1974, 191).

Socialist realism requires total discipline not only in personal life, but also the reorganization of the entire inner world of man. Ryabtsev's spontaneity is consistently embodied throughout the narrative: rebelliousness in his relations with shkrabs, stealing apples from Moisey Markelych's garden, participating in a scuffle and beating Grigoriev, and as a result – a problem with his studies, which turns out to be completely unacceptable for a Party member. His path lies through losses and gradual alienation from society. The first major loss for Kostya is Lenin's death, which „made him ten years older“, followed by his breakup with Silva, after which he feels complete loneliness: „And it turned out that I had affairs that I know alone. <...> And now this diary is like a close friend, with whom I talk decisively everything“ (Ognev 1988, 508).

Ryabtsev is surrounded by social life: he is appointed to the academic committees, defends the rights of the students in front of Yelnikitka, tries to work with street children, and after receiving a party ticket, he is a member of the school council from the outpost, but being an individualist, he cannot integrate into social life, and therefore feels deeply lonely. Toward the end of the story there are notes that he is shunned by the boys (Ognev 1988, 589), and this culminates in his own confession to Ivanov: „Still, Ivanov, take me off the pioneer work <...>. It's difficult, you know?.. I now see that I am an individualist and that I do more harm than good“ (Ognev 1988, 599). Unlike Pavka Korchagin, whose direction of development, according to H. Gunther, is characterized by a consistent upward movement (Gunther 1990, 195), Ryabtsev develops differently – like Nikolai Ableukhov of A. Beloi, whose trajectory of personality formation is a downward movement up to the point followed by symbolic death. Only after surviving it, A. Belyi's hero begins an upward movement, gets a new chance to find himself. In N. Ognev's Ryabtsev also experiences a symbolic death when he recognizes that his individualism harms society – he dies as a spontaneous personality – and also, like Ableukhov, gets a second chance in Ivanov's words: „Stay“ (Ognev 1988, 600). But if the tradition of the novel of education in the 1910–1920s was embodied in the hero's desire for individualism, inner development, isolation of his personality from the world outside (the novels „We“ by E. Zamyatin, „Petersburg“ by A. Belyi), then in 1926 only those who consciously renounced spontaneity and individualism, who were ready to unconditionally obey the party discipline demanded from above, could remain in the service of the proletariat. Thus, the finale of Kostya Ryabtsev's Diary conveys the idea that any individualist is capable of being raised within the framework of socialist realist ideology, of

becoming useful to society, and even more, of unconditionally submitting to the system.

Note that in the Diary it is not the process of depersonalization itself that is important, as it will be in N. Ostrovsky's work; only one thing is required of the hero – his consent. Such consent was also required of Zamyatin's D-503: it is no coincidence that the day before he was so struck by S's message that „there is no infinity“. „Infinity“ in Zamyatin's text means soul, while in the socialist realist novel it means individuality. In both texts, agreement is achieved through negation: 'if there is no soul, there is no need for fantasy', 'if individualism interferes with the common cause, there is no place for it'. The novel protocanon brings its hero almost to the finale of Zamyatin's novel „We“: Ryabtsev voluntarily agrees to the eradication of his individuality.

The path of becoming a hero A. Gaidar – the path of mistakes and overcoming them. For the first time he is cowardly in the first task entrusted to him: at the decisive moment he is unable to shoot the White Guard and in confusion drops his rifle. Later, in the captivity of the Whites, he chickens out, not daring to save Chubuk: „No matter what I said, no matter how I roused myself, I finally did not want to go and stand against the wall“ (Gaidar 1967, 209). He feels a burning sense of guilt, but even this mistake does not save him from spontaneity – it is followed by violations of Shebalov's orders in Fedya Syrtsov's company, which lead to the tragic death of the company commander Galda. Like Kostya Ryabtsev, Boris sinks into a sense of loneliness: „There is no special friendship with anyone. Not only that, even the guys squint“ (Gaidar 1967, 238). Loneliness in the socialist realist novel is a kind of punishment of the hero for his freedom-loving, for the lack of discipline, for the fact that personal interests are put above social ones. In N. Ostrovsky's novel, „like a plague“, they begin to shun the deserter who did not want to sacrifice his health on the construction of the road and refused a party ticket: he is punished precisely by loneliness (Ostrovsky 1974, 228).

In socialist realism, spontaneity must necessarily be defeated, and so Boris's correction begins with his joining the Party: Shebalov becomes his „godfather“. Boris, like Ryabtsev, is given a second chance, and therefore in the final scene he heroically broadcasts the result of the accomplished socialist education: falling from a bullet into the snow, he reflects on only one thing – that „a bright life“ can be found only together (Gaidar 1967, 246). This is the path of formation of both heroes – from anarchic, freedom-loving thinking to party personality, strict discipline and service to common ideals. The described formation is always a rejection of the „personal“ in favor of the common, a kind of sacrifice made in the name of socialism.

In the novels of the 1920s, this sacrifice is not yet expressed with the convincing conviction with which it will be formulated later, in N. Ostrovsky by Pankratov: no inhuman conditions can cause the cessation of the construction of an access road for the delivery of firewood to the city, because it is „not allowed by the idea and discipline“ (Ostrovsky 1974, 238); „die five times, but it is necessary to build the branch line“ (Ostrovsky 1974, 238); „five times die, but it is necessary to build the branch line“ (Ostrovsky 1974, 238); „die five times, but the branch line must be built. What kind of Bolsheviks we will be otherwise <...>“ (Ostrovsky 1974, 226). Personal, and even if objective reasons – cease to be not only an argument, but become a reproach. Thus, the Bildungsroman translates one fundamental idea of socialism – from free-thinking to unconditional obedience and even proactive sacrifice for the sake of common ideas. Education itself – let us agree with K. Clark – can hardly be called personalized, it is ritualized and devoid of self-value (Clark 2002), the ultimate goal of heroes' formation is depersonalization.

Therefore, the novels belonging to the protocanon phase already broadcast a schematism that turns the Bildungsroman into a novel of the figure. It is noteworthy that both works do not give the reader a complete program of the hero's development up to

maturity, do not cover a serious chronological period of the protagonist's life, leaving him as if on the threshold of further exploits in the service of building a "bright future", do not offer a model of this service. Such a remark organically corresponds with the opinion of F. Yost, who called Bildungsroman a pre-novel, a preamble, because it tells about the formation of a man at the very beginning of his journey until he is ready to "continue his novel" (Yost 1969, 99).

5 Summary

The phase of socialist realist protocanon adapted the tradition of the novel of education to the ideology broadcast in the contemporary historical period. In this regard, it seems very fair to note F. Moretti, who called the novel of education a "symbolic form" that served in Europe as a tool for rethinking modernity. The same thing happened in socialist realism. It is established, firstly, that the genre tradition of the novel of education, represented in these texts, embodies the common universal idea of the socialist realist novel – the education of workers in the spirit of socialist realism. Secondly, the markers of socialist realist consciousness, the carriers of which the main characters become, are: a clearly formed position in relation to the bourgeois class, a heightened sense of justice. Thirdly, A. Gaidar's and N. Ognev's heroes have not yet arrived at exceptional positivity: the trajectory of transformation of Kostya Ryabtsev and Boris Gorikov is identical – it is the path from spontaneity to consciousness, obedience to the Party. Finally, unlike the characters of socialist realism, whose direction of character development is characterized by a consistent upward movement, the trajectory of personality development of A. Gailar's and N. Ognev's heroes is a downward movement up to the point of symbolic death. A. Gaidar's and N. Ognev's heroes' personality trajectory is a downward movement up to the point followed by symbolic death. Only after experiencing it, they start an upward movement, get a new chance to find themselves.

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Primary Paper Section: A

Secondary Paper Section: AJ

SHAPING THE ENTREPRENEURIAL SKILLS THROUGH UNIVERSITY COURSES

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Abstract: In European society, fostering entrepreneurship skills is more critical than ever, as the region faces challenges such as economic competitiveness, technological change, and the need for sustainable development. Equipping individuals, especially university students, with entrepreneurial skills offers a strategic path to ensuring long-term prosperity, resilience, and innovation across Europe. This paper presents our approach to building and developing our students' entrepreneurial skills. Within the framework of several subjects in our curricula, the individual skill set needed by a current entrepreneur is gradually built. The focus is not only on fostering hard skills but also on developing soft skills, which are equally important for success in the market. The aim is to investigate and describe possibilities of how to incorporate entrepreneurial education into higher education courses and enhance students' interest in the topic via workshops provided by entrepreneurs.

Keywords: Entrepreneurial Education in the European Union; Higher Education; Entrepreneurial skills; Project Based Learning.

1 Introduction

Entrepreneurship is a proven driver of economic growth, innovation, and job creation in the long run. Except for various societal challenges, including ageing populations, environmental concerns, and the need for social cohesion, the European Union as a region is currently facing important challenges such as economic competitiveness, technological transformation, and the need for sustainable development, which is why the importance of promoting entrepreneurial skills in European society is constantly increasing and growing. Education of individuals, especially university students, to equip EU citizens with entrepreneurial skills offers a strategic route to ensuring long-term prosperity, resilience, and innovation across Europe. Individual industries and their development are represented by the entrepreneurs behind technology start-ups, green energy solutions, or innovations in the health and social sectors. Developing entrepreneurial skills among university students creates the conditions for the emergence of the next generation of leaders who change the approach to established norms, promote innovations focused on sustainable practices, circular economy models, inclusive growth, and stimulate job creation.

For university students, entrepreneurship skills can't be concerned just about starting businesses. These transferable skills enhance employability in a rapidly evolving job market. Critical thinking, problem-solving, creativity, risk management, and leadership are all core components of entrepreneurship. These competencies are in high demand across industries, and by instilling them during university education, Europe can better prepare its graduates for future jobs. By developing these skills, we can nurture adaptability, helping young professionals navigate the uncertainties and disruptions of the modern economy.

Europe's strength is hidden in its diversity of cultures, ideas, and markets. By its very nature, business encourages cross-border cooperation as entrepreneurs seek to expand their businesses and penetrate wider markets. Exposing university students to entrepreneurship during their studies encourages them to engage in international cooperation, to gain different perspectives, and to contribute to the development of the innovation ecosystems that transcend national borders. This cross-border exchange of ideas and solutions is key to Europe's position as a leader in global innovation.

Thanks to the above facts, entrepreneurship education has become a part of modern higher education, which promotes innovation, economic growth of society, and personal development of the students themselves as well as the growth of various communities. Universities around the world are increasingly incorporating entrepreneurship programs or

methods into their curricula to provide students with the knowledge and skills needed to become successful entrepreneurs.

2 Literature review

The creation of new businesses has always contributed to the economy's productivity increasing steadily. Academic programs offering degrees in business management and economics should prioritize entrepreneurship education and the development of students' entrepreneurial attitudes. (Gerdin & Linton, 2016).

Schools usually don't provide students with enough real-world entrepreneurial experience (Harris, 1979). On the other hand, as students may engage with their peers, work with or be employed by them, and get real-world experience, university education might be an excellent time for them to start their own enterprises. Even a company's failure has benefits because many successful businesses have emerged from a line of failed ones (Thiel & Masters, 2014).

Moreover, participating entrepreneurs get vital insights from failing ventures that they may utilize in their future careers, whether as employees or entrepreneurs. The business sector has been significantly influenced by information and communication technology (ICT) in several aspects.

Many facets of economic life are now impacted by using information and communication technologies. Entrepreneurs may use it for marketing, banking and payment services, client product delivery, administrative institution communication, company creation, and other purposes. ICT development paved the way for the development of e-businesses and electronic commerce.

Entrepreneurship significantly influences economic growth (Carree et al., 2002). According to several early studies, entrepreneurs are not made but born. Universities and business schools have no capacity to educate people on how to be more entrepreneurial (Johannison, 1991). People are generally hesitant to pursue entrepreneurial careers because they view them as being extremely hazardous and uncertain (Petridou et al., 2009).

On the other hand, new research indicates that entrepreneurship education and training can help to foster entrepreneurship (Petridou and Glaveli, 2008). Entrepreneurship education is described as a set of institutionalized courses that educate anybody interested in creating a business. Entrepreneurship education may spark entrepreneurial efforts by cultivating an entrepreneurial mentality among students. (Petridou et al., 2009; Lubis, 2014). According to results of Zou (2015), entrepreneurial education should be incorporated in colleges and universities' reform and development plans, staff training systems, and teacher evaluation index systems.

The results of recent research have clearly demonstrated the necessity of entrepreneurial education. The contribution of academic institutions and business schools to the field of entrepreneurship education is a topic of discussion (Kirby, 2004). Some contend that the characteristics and abilities needed to create entrepreneurs are not fostered in the traditional educational system. Rather than teaching students how to become great entrepreneurs, the traditional education system trains them to be effective employees. Significant adjustments to the learning process are necessary.

Argumentation, creativity, critical thinking, management, problem solving, and time management are among the skill sets required to become an entrepreneur (Mani, 2017). Various teaching techniques are used in entrepreneurial education programs, including lectures, guest speakers, case studies, and role models (Solomon, 2007; Wilson et al., 2007). The goal of the entrepreneurship programs should be to educate students

about the realities of the real world and show them how to solve its challenges (Petridou et al., 2009).

In order to provide students with as much first-hand experience as possible in managing businesses, it is imperative that all the aforementioned fundamental components be included in the preparation of future entrepreneurs. Information and communication technology frequently enhances the learning process and supports students' acquisition of knowledge and skills (Akimov et al., 2021).

ICT may help aspiring business owners analyze, rework, and enhance their operations to maximize their firms' performance. It may also help throughout the entrepreneurship education process (Von Graevenitz, Harhoff & Weber, 2010; Vejačka, 2024). A variety of cutting-edge information and communication technologies are also employed in instructional procedures to simulate entrepreneurship (Vanevenhoven & Liguori, 2013). Keramitsoglou, Litseselidis, and Kardimaki (2023) proposed a virtual enterprise model for introducing circularity and sustainability in entrepreneurship to students.

Zhi (2021) created an education model for cooperative simulated firms with the goal of addressing specific teaching challenges in entrepreneurship. Borgese (2011) identified the virtual enterprise as a transformational learning tool that is extremely useful and successful in attaining entrepreneurship education objectives. Zhang and Zhang (2018) have recommended the use of simulated businesses for entrepreneurial education in Chinese higher education settings, concluding that it gives more practice capital for university students' self-employment.

This contribution will introduce the possibilities of shaping entrepreneurial skills in the educational process of university courses and its contributions to self-reported gains of students' knowledge, skills, and experience with entrepreneurship from our educational praxis.

3 Entrepreneurship in Education

3.1 The Importance of Entrepreneurship Education

Education for entrepreneurship offers several benefits. As noted above, entrepreneurs play a key role in job creation, economic growth and regional development. Their activities drive innovation and technological progress in countries' economies, as they contribute to the overall competitiveness of the economy. Basic skills, for example problem solving, critical thinking, creativity, leadership, and networking are more effectively shaped by the integration of entrepreneurship education into the educational process. These skills are highly transferable and valuable in a variety of career paths, even if students do not decide to start their own business later in their careers.

The creation and introduction of entire curricula, stand-alone courses, or parts focused on the development of entrepreneurial skills allows teachers to encourage students to come up with new ideas and develop them further. Students are thus forced to approach problem-solving in a more inventive way and to go beyond classical approaches with the courage to take risks. In the frenzied environment of an educational institution, students thus gain new, enriching experience, but also freedom, a sense of purpose in their studies, and control over their professional career.

The main objective of entrepreneurship education is to gain a thorough understanding of the key concepts and issues associated with starting and running a business. The cornerstones of such education include basic principles in areas such as planning, marketing, financial management, and operations management. Important aspects that complement theoretical training are internships, cooperative programs, and business competitions, which enable the practical application of the knowledge acquired in a real environment, thus gaining valuable practical skills during study.

During this learning experience, students gain access to experienced entrepreneurs and professionals from various industries who provide them with an outside perspective, expertise, and advice, and open opportunities by sharing contacts with potential partners, investors, and clients. A significant benefit is the sharing of their experiences, which enhances the motivation of the students to participate in the self-education process. Moreover, accelerators and incubators serve as additional tools, providing support, resources, and funding to aspiring entrepreneurs. In this environment, young student entrepreneurs can develop their ideas, refine their business plans, and gain access to the basic resources needed to build their businesses.

As the global economy develops, the demand for business education is expected to increase. Encouragement for entrepreneurship education is nowadays at the heart of education changes in the European Union. The list of educational roles of current educational institutions is expanding to include the responsibility of guiding future generations of workers towards entrepreneurship and entrepreneurial thinking. The universities are already adapting their courses to the changing demands of students and the economy, including new technologies and trends.

Many institutions, such as Aalto University, Finland, ESCP Business Schools, Germany/France, Linnaeus University, Sweden and others, provide courses focusing on social entrepreneurship, sustainable business, and digital marketing. However, it is not necessarily necessary to create a new study program to introduce entrepreneurship education. There is a wide variety of ways to incorporate entrepreneurial principles into education: seminars, guest lectures, networking events, experiential learning projects with possible exposure to real-world experiences, collaborative efforts, mentoring programs, etc. (Wang, 2024). Through them, students can learn skills that are crucial for their future lives.

As stated later in the article, education towards entrepreneurship with shaping different entrepreneurial competencies and skills are nowadays widely integrated into university courses. The importance of this topic is underlined with wide and intensive support from the side of European Commission. The main activities that aim to enhance entrepreneurial skills, promote innovation and ensure access to resources and opportunities for start-ups and aspiring entrepreneurs can be described by following:

- *SME Strategy for a Sustainable and Digital Europe* provides support for small businesses by simplifying access to finance, boosting entrepreneurship, and promoting digital and green transitions.
- *EU Startup Nations Standard* ensures EU member states create the best possible environment for startup growth, including entrepreneurship education and regulatory improvements.
- *European Social Fund* and *European Regional Development Fund* that fund or co-finance numerous national and regional projects aimed at boosting entrepreneurship education and vocational training.
- *InvestEU Program* aims at mobilizing public and private investment by funding SMEs, startups, and innovators across various sectors.
- *Skills Agenda for Europe* strengthens the focus on lifelong learning, with entrepreneurship as a core competence.
- *Digital Education Action Plan (2021-2027)* - Focuses on enhancing digital skills across the EU, including measures to integrate entrepreneurship into education systems. *European Innovation Council* supports high-risk, high-impact innovation by providing funding, advisory, and networking services for startups and scale-ups.
- *European Institute of Innovation & Technology* fosters entrepreneurial education through its innovation communities, combining business, education, and research to develop skills and start-ups in fields like health, digital, and climate.

- *Erasmus for Young Entrepreneurs* - EU exchange program that provides aspiring entrepreneurs with the opportunity to learn from experienced counterparts in other EU countries.

3.2 Entrepreneur's skills set

The integration of the development of entrepreneurial skills and abilities during the studies helps to understand better the needs of the market, the management, and the needs of potential clients and thus increases the courage of students to start their own business, while at the same time enables them to understand the needs of their potential employers. If students gain practical business experience during their education, they also become much more valuable employees who can think and act in an entrepreneurial spirit. This way of thinking can contribute to the success of their employers' businesses even if they do not decide to go into business for themselves. It is therefore essential for policy makers, business leaders, and teachers to develop the entrepreneurial spirit of young Europeans.

Entrepreneurial competencies represent a set of characteristics associated with successful business development. Competencies include personality traits and individual motivation as well as specific knowledge and skills. As Gustomo et al. (2017) state, competencies are skills that can be learned and that enable people to perform successfully. Therefore, recognizing and identifying competencies is very important for educators and the development of learning opportunities.

There were identified 5 dimensions of entrepreneurial competencies: *opportunity, administrative, relationships, personal and commitment* (Lee et al., 2016). In the research of entrepreneurial competencies there are mentioned mainly three different competencies models: *Three entrepreneurial competencies models - Entrepreneurial Competencies Models* (Morris et al., 2013), *Great Eight Model* (Bartram, 2005) and *EntreComp* (Bacigalupo et al., 2016) that made it possible to identify the 15 important skills that help achieve greater success of the entrepreneur. Based on the EntreComp model they are grouped into three main competence areas:

- The area named *Ideas and Opportunities* emphasizes identifying ways to create value for others through vision, creativity and opportunity recognition while ensuring that ideas remain ethical and sustainable. Key to this is the process of exploring business opportunities. This process involves systematically assessing innovative ideas, strategies and market trends, identifying reliable data sources, validating business potential and exploring insights from industry and consumers. Creativity and innovation are indispensable skills for success in a dynamic environment. Different tools and techniques that help solve problems efficiently and generate innovative ideas are important parts of enhancing creative and innovative potential of the entrepreneurs. Creative ideation makes it possible to define a mission and vision in business easier.
- The area of *Resources* focuses on understanding and mobilizing internal and external resources to achieve the set objectives, identifying one's skills, strengths, and abilities, and other resources that complement them. By recognizing their strengths, weaknesses, successes, and progress, entrepreneurs build their self-awareness, self-efficacy, and active mindset. Leadership skills, ensuring effective business management and financial literacy are indispensable skills in the effective use of various resources. Another of the key factors is motivation. This serves as a driving force that supports individuals in overcoming challenges and setbacks while maintaining focus on long-term goals.
- The *Into Action* area emphasizes the initiative itself, and the implementation of the entrepreneur's plans. This process also includes gaining experience in

overcoming risks and uncertainties that need to be overcome in practice. Development in this area is achieved through the further development of qualities such as self-education, proactivity, and perseverance in achieving goals. Fostering a proactive approach enables students to gain the ability to identify opportunities and respond effectively to challenges in both educational and professional contexts. To manage the business optimally, management and decision-making under conditions of risk and uncertainty need to be included in the educational process. The need to gain experience while solving tasks in teams is also not overlooked, as such collaboration integrates different perspectives and promotes innovation, which further improves business management. Resource management and working in teams enable awareness of the importance of initiative, effective management and adaptive decision-making in transforming ideas into effective business actions.

Without implementing these topics into education, we will not achieve a positive attitude towards entrepreneurship as such, and entrepreneurship will not become one of the employment opportunities for university graduates. It is therefore important to integrate the development of entrepreneurial skills into fields of study that are not directly focused on business disciplines and to adapt this education also to students with different educational backgrounds.

4 Background information and integration of Entrepreneurship to the education process

A graduate from our faculty understands the basic principles of the functioning of the economy. He has the prerequisites to assess and solve theoretical and practical problems in the private and public sector and can creatively apply knowledge of teaching, management, marketing, project management, team management and law in economic and social practice. He is professionally prepared to manage and participate in the solution of various analytical tasks and research projects.

In the EU environment, entrepreneurship is not only understood as a competence related to opportunity identification, business development, self-employment, business creation, and growth. It is understood in a broader sense as a complex of other aspects such as personal development, creativity, proactivity, and initiative. Entrepreneurship can thus be broadly described as the ability to act on opportunities and ideas and turn them into value for others. The value created can be financial, cultural, or social, and the outcome of entrepreneurship is not only to make a profit but also to improve social and cultural conditions in a given context.

Even though the field of study provided by our faculty is not directly focused on business and entrepreneurship, we decided, in the context of the above-mentioned facts, to integrate into the offered subjects, tasks and topics that will help our students in developing some entrepreneurial competencies.

In this article, we describe two subjects, Informatics II and Economic Information Systems, within which we integrated the topic of developing entrepreneurial skills through various assignments. Both subjects used the same didactic concept Figure 1.

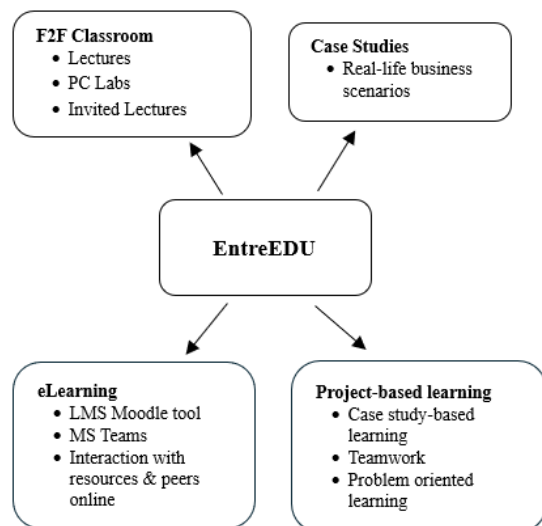


Figure 1 Didactical concept for shaping entrepreneurial competencies; Source: own

This picture presents the main concept of the educational process that students have at their disposal during the study of the described subjects. During the semester, they have classic F2F sessions supplemented by online activities on LMS Moodle. By supplementing lectures and exercises with classes led by experts from practice, we show students in specific case studies the use of e.g. ICT for better and more effective search and management of resources and work teams. Semester projects simulate real-life learning scenario in workplace. In groups of 4-5 people students face real-life problems of analyzing the current situation in the company and marketplace and try to stay competitive by discovering possibilities of innovation and further development of team business. The Mentioned combination of different kinds of learning resources and learning activities provides a wide range of possibilities of shaping entrepreneurial skills and competencies of the students.

The main aim of the course Informatics II is to provide basic knowledge about business informatics and concepts related to this area. It focuses mainly on the position of data in today's companies, their creation, analysis and visualization. Students will acquire knowledge of the principles and methodologies of process and data modeling, their interconnections, and the potential for implementing these methods in real-world corporate environments. They will also gain practical experience in creating fundamental models utilized in the formulation of business information strategies. During the educational process various teaching and learning methods are employed, i.e. an interactive lecture connected with the establishment of a problem and a possible discussion with students on given topics and use-case from a given area presented by companies from practice, computer-assisted teaching to facilitate problem-based teaching, which we use to acquire, support and develop practical skills.

In order to develop practical skills and competencies, we have included a semester project in the teaching of the subject, which also uses the method of role-playing and various online activities using the gamification of the educational process.

Successful completion of the course presupposes active independent work of the student, whether self-study of relevant literature, active search for information in the Internet environment and work with the necessary applications to create business process models, database management system, spreadsheet, etc.

The basic objective of the EIS course is to try to run a small virtual company from its establishment to the annual closing through information and communication technologies. The course will provide practical experience in commercial law, accounting, marketing and building and managing the economic

information system of a modern company. Students will gain knowledge in the field of entrepreneurship, company legislation, electronic communication security, payment systems, e-commerce, company accounting and information systems analysis.

They will also gain skills such as the ability to master the basic operations necessary for establishing a business entity, work with an electronic filing office, submit electronic documents related to the establishment of a business entity, work with an electronic bank, create a website for a business entity, operate e-commerce, make electronic payments for goods purchased in e-commerce, develop a strategic study and business plan, file an electronically created tax return, record transactions of a business entity in accounting software or develop an analysis of the information system used.

At the same time, the EIS course significantly develops logical and critical thinking, provides the ability to navigate the business environment and the environment of electronic information systems for business support, and then use them to master the acquired skills described above. Through the analysis of the information system, the student develops the ability to evaluate the environment and processes that he performed during practical actions during the operation of the company. The subject builds on the amount of knowledge gained in previous completed subjects from previous years of study.

However, both subjects contain activities that help us develop our students' entrepreneurial competencies. The following image schematically shows which of all the competencies listed in EntreComp are developed. (Figure 2).

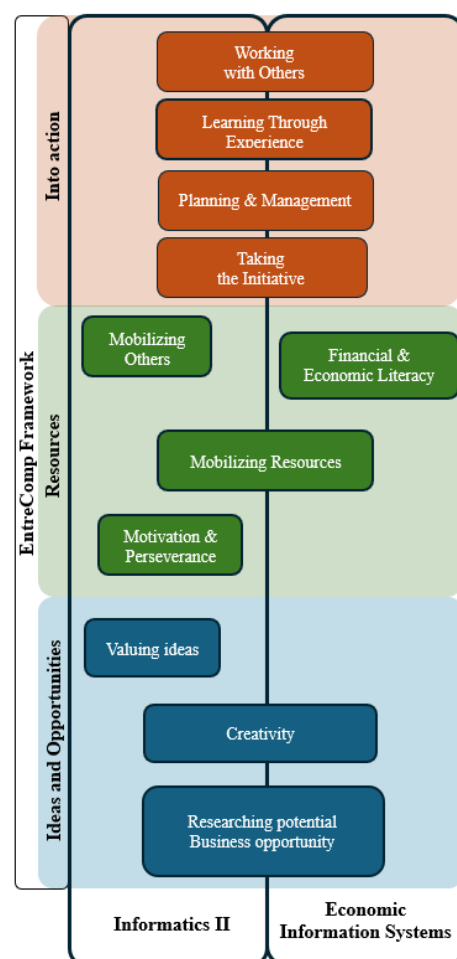


Figure 2 Entrepreneurial skills development in courses Informatics II and EIS; Source: own

During the course of Informatics II (in addition to acquiring theoretical foundations) students also acquire practical skills, primarily by participating in a semester project. Its aim is to critically analyze processes in a selected company and propose an innovative solution. The main outputs of the project include a report in which students analyze the position of the company and its competitors on the market, identify shortcomings in the management of processes in the company and choose one for which they subsequently propose an innovation.

The semester project is solved in small teams, managed by the SCRUM method, where they can try out all roles and teamwork in the life cycle of the semester project, thanks to which we develop competencies such as organizing and executing, leading and deciding, planning and management supporting and cooperation. The project outputs are User Stories covering areas such as process modelling, creating data structures, analyzing the impacts of introducing innovation into the business environment, etc. These phases of the project solution develop skills and competencies such as Mobilizing resources, Analyzing and interpreting, commercial thinking, Identifying and accessing business opportunities (Ideas and opportunities).

They then defend the created presentations through a presentation, thereby developing another entrepreneurial competence – interacting and presenting. Since the students have not encountered a similar task or the area where the project was being implemented in the past, it is necessary for them to study a lot. This covers the Learning competence, important for the needs of an entrepreneur who wants to "keep up with the times". The Informatics II course is more focused on teamwork, ideation, creative thinking, but omits topics such as legislation, financial management, etc. These competencies are developed precisely within the EIS subject. Subsequently, in the further course of study, students become familiar with various aspects of the functioning of businesses and the economy.

In the course of Economic Information Systems (EIS) the business activities of newly founded e-commerce enterprises are simulated. The students' firms have a fictitious character with an aim to serve for entrepreneurship education purposes within the course. This non-mandatory course is available to students in their second year of master's degree studies in Business Informatics, or in the third year of bachelor's studies in Finance, Banking, and Investment. The EIS course uses problem-oriented learning, learning-by-doing, and e-learning methodologies.

The EIS course simulates the operation of electronic commerce in the context of the Slovak economy using virtual companies. The EIS course is constructed around e-learning technologies, which allow students to complete the course without having to attend in-person lectures. Face-to-face components of the course are mostly advisory in nature and are not mandatory for students. The course allows students to put the foundations of entrepreneurship into reality by creating and managing virtual enterprises. The EIS course uses problem-oriented learning, learning-by-doing, and e-learning methodologies, and participants may increase their understanding of website design, online store administration and management, legal concerns, taxation, and accounting.

Within the EntreComp framework students during the EIS course develop multiple entrepreneurial competences. The EIS course is based on the principle of learning through experience within the first period of existence of students' virtual firms. When establishing their virtual businesses, students need to take the initiative to start their entrepreneurial careers. While preparing business and strategic plans for their virtual firm, their creativity is fostered.

Students also experience the necessity of daily management of their business and as well as the need for operational and strategic planning within their businesses. Furthermore, they research potential business opportunities when preparing a strategic plan for the development of their business in the future. Students practice cooperation while working with their peers as

long as competitiveness when competing with other virtual firms. When they analyze the economic state of their business and prepare their company's accounting, they also improve their economic and financial literacy by practical experience.

5 Results

As inputs for evaluating the success of the integration of the formation and development of entrepreneurial skills, we used two sources: the evaluations obtained from students after completing a given activity developing one of the entrepreneurial skills or competencies and the feedback, we obtained from students completing the given subjects. Our evaluation generated positive and encouraging results.

The students' activity is evaluated within each subject based on the course graduation criteria, however, since tasks focused on the development of entrepreneurial competencies can also be evaluated separately, we focused not on the overall results of the students after completing the subject, but on the evaluation of their skills, or rather, the quality of the outputs, for the creation of which it was necessary to use a certain number of entrepreneurial skills. The results obtained were analyzed and determined the most problematic part, which needs to be worked on further in the future.

As described in the previous chapter, the aim of the semestral project (SP) is to transfer students to the environment of a chosen company (small, medium, large – this decision depends on their choice) and focus on solving a specific problem. Within the framework of the project evaluation, we focus both on the development of hard skills (such as working with various applications such as ARIS Express, MS Excel, MS Access, Trello/MS Teams, MS PowerPoint/Canva, ...), and on the development of soft skills and entrepreneurial competence, as stated in the EntreComp document.

Thanks to the evaluation of the results that the students obtained after the submission and subsequent defense of their proposed innovation, we found the following: The students excelled especially in demonstrating their hard skills, that is, that they are able to use the applications they encountered during their studies in an appropriate way for the necessary purposes. Semestral projects were developed by 141 students forming 34 teams (composed of 3-5 students).

Within the SP assessment, the points are divided into demonstrating technical skills (hard skills) and soft skills. In the case of hard-skills, students achieved an average of 88% points. As for the area of business skills, in their case, the students achieved the following levels of assessment:

- *Ideas and opportunities* – 68%, which was due to a poorly processed survey of the existing market and comparing their ideas with existing products,
- *Resources* – 67%, while in this area they demonstrated a lack of skills in searching for and subsequently using various types of resources in practice,
- *Into Action* – also 67%, while the most significant problem for students was time management and cooperation, but this deficiency was gradually eliminated during the project.

Another deficiency appears to be a lower level of argumentation and presentation of one's positions during the presentation of results in public.

What pleased us is that the younger generation shows very good results in competencies such as creativity and ideation. In addition to the results obtained, which we assigned, we were also interested in the perception of the importance of developing entrepreneurial skills by students and how they perceived the need for integration into the subject. We obtained their opinion through questionnaire surveys. It is important to note that a different number of students participated in the surveys, because the subject Informatics II is taught in the 1st year of bachelor's studies and EIS in the third, and therefore some students no

longer appear in this subject for various reasons. Likewise, we did not evaluate the abilities of the same sample of students, but of current participants in the given subjects in the academic year 2023/2024. However, in the future, we plan to conduct this research on the same sample of students to get an overview of the development of the abilities of the same people.

Within the course Informatics II, 107 students participated in the feedback, completed the course and submitted and defended the semester project. This group did not include students who, thanks to the cooperation of the team, worked on the project and completed it, but did not receive enough points on the transcript and therefore could not evaluate the course after its overall completion. The feedback mapped out general questions about students' satisfaction with the content of the course, educational methods and the method of subject assessment, or communication with teachers during their studies. In addition, it also contained questions with which we determined their opinion on individual parts of the semestral project and their impact on their future lives.

As for the semester project, which developed entrepreneurial competencies the most, 89% of students consider SP to be a contribution, as well as the fact that the topic of SP is interesting. Up to 95% of students confirmed that they had never worked in a team before and were not familiar with SCRUM. Thanks to SP, up to 7% worked 3-4 hours a week on SP and 56% worked about 1-2 hours a week, which they also marked as a contribution, because SP is usually dealt with only occasionally, right before submitting SP. What is good is that they confirmed teamwork, when 75% of respondents said that they worked evenly within the team. However, what they failed at was the time frames, which they set themselves (56% sometimes yes, sometimes no, 34 yes). They also marked this as the most common problem, along with communication within the team.

Within the course Economic Information Systems (EIS), 71 students participated in the feedback, who successfully completed the course. The feedback recorded questions about students' satisfaction with the content of the course, educational methods, communication with teachers and their opinion on individual parts of their virtual firm's first business period. They also assessed their impact on their potential future entrepreneurial lives.

Nearly 97% of respondents thought that attending the EIS course provided them with relevant expertise in establishing or operating a firm. More than 90% of course participants stated to have learnt anything new regarding the process of establishing a business in accordance with applicable regulations. Despite having experience with business plan generation, more than 61 percent of respondents said that the practical drafting of a business plan for their virtual firm was beneficial to them. More than 86% of course participants said it was beneficial to get hands-on experience talking electronically with virtual public administration authorities through the virtual lab's electronic register.

Additionally, nearly 73% of students said that using digital signatures in this communication was a worthwhile experience. More than 32% of respondents stated that creating a website for their own company provided them with some additional learning possibilities, even if they had previously made a website for their studies. More than 72% of students felt that starting and maintaining an online store for their business was a beneficial experience. Students mostly appreciated the chance to see an online store run from the administrator's point of view. The ability to attempt to maintain an accounting of their virtual businesses as they would in real life was deemed helpful by nearly 59% of participants in the EIS course. The experience with the first accounting period was particularly highlighted by the students. Even though it was outside the purview of the present course, 72% of students said they appreciated the task of developing a long-term plan for their virtual businesses. Over 87 percent of students appreciated the practice of financial and economic literacy and 79% creativity. As many as 95%

emphasized the possibility of learning through experience. 61% appreciated planning and management, and 48% had experience with taking the initiative. Almost 90 percent welcome the opportunity to work with others within the EIS course. Moreover, 74 percent of the course attendees considered researching potential business potential as an important part of this course.

Based on the above facts, it can be stated that the proposed didactic framework supports the development of entrepreneurial skills, in particular – teamwork, organization of time and people, support of creativity and gaining practical experience with the life cycle of a project from its beginning to the presentation of results. However, in the future, it will be necessary to examine in more detail the level of these skills at the very beginning of the educational process and subsequently, it will be possible to more optimally evaluate the contribution of the activities themselves to shaping entrepreneurial competencies of students.

6 Conclusion

Fostering entrepreneurship skills among university students and in broader European society is an investment in the region's future. It drives economic growth, innovation, and job creation, while also equipping individuals with the critical skills necessary to succeed in a dynamic world. By cultivating entrepreneurial thinking, Europe can build a resilient, sustainable, and competitive economy that meets the challenges of tomorrow with creativity, inclusiveness, and adaptability. It is essential for European policymakers, educational institutions, and businesses to work together in promoting a culture of entrepreneurship, ensuring that young people are ready to shape and lead the future. Building entrepreneurial culture has become a priority not only for public-policy makers, but also for educators and researchers.

Embracing EntreComp (Bacigalupo et al., 2016), therefore, means believing that everyone can learn to become more entrepreneurial. It also means believing that – by becoming more entrepreneurial – learners, employees, civil servants, managers, third sector leaders or business owners can create greater value for others. It means believing that entrepreneurship is not only about creating successful businesses, but rather it is a competence that allows us to improve the environment we live in, by tackling old and new problems, addressing the unmet needs and having the ambition to tackle well-known and emerging challenges.

Entrepreneurial skills are important not only for entrepreneurs themselves, but their development is also important for employees. Skills in business management, teamwork and leadership, communication, analytical and problem-solving skills, critical thinking, and planning skills are important also in every business, no matter if you are an entrepreneur yourself or part of a larger enterprise. Finding leadership opportunities such as managing specific projects or teams, and requesting feedback on your performance as team leader, helping coworkers organize and manage their time by helping them develop strategies that keep them organized and on task, learning from your supervisors by observing the approaches they use to manage teams, make decisions and collaborate with other managers leads to the development of not only the department, the business but also the overall society.

The young generation is very aware of this need, as proven by our results, and appreciates the integration of topics related to building entrepreneurial skills. As part of their university studies, students have several options in a safe environment to acquire, build and eventually transform these skills into start-ups, whether as part of compulsory and optional courses at the faculty or by active participation in various workshops, where they also benefit from an international environment.

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Primary Paper Section: A

Secondary Paper Section: AM

SILENCE OF KUNTI: AN INQUISITIVE ANALYSIS OF MADHAVI. S. MAHADEVAN'S *THE KAUNTEYA* AND B. R CHOPRA'S *MAHABHARATA*

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This original manuscript received no external funding from any organization or institute.

Abstract: This article presents an analysis of the portrayal of Kunti's Silence from the literary and cinematic epic retellings. Literary and cinematic representation in S. Madhavi Mahadevan's *The Kaunteyas* and B R Chopra's *Mahabharata* are studied through the in-depth exploration of Third-World feminism in Uma Narayan's *Dislocating Cultures: Identities, Traditions and Third World feminism*. The paper examines the contemporary cinematic narrative in contrast to the depiction of thoughts in the modern retellings of the *Mahabharata*.

Keywords: Silence, Kunti, Retelling, Third-World feminism, Cinematic Representation.

1 Introduction

In the late 1980s, there was an increase in the viewership of television programs in India. A new kind of revolution was witnessed when shows like *Buniyaad*, *Hum Log* and *Rangoli* were a rage and with them, there was an increase in the production of television serials. The themes were independence, post or pre-partition, social issues, mythology, devotion etc. In 1988, the magnum opus of the television version of *Mahabharata* on Doordarshan was created by B. R Chopra. With a total number of 94 episodes, the show is a television adaptation of the original epic *Mahabharata* written by Vyasa in Sanskrit. Chopra's *Mahabharata* along with Ramanad Sagar's *Ramayana* brought a new wave of television consumption (Kumar 2020). Every Sunday in the late 1980s was religiously devoted to the consumption of the television versions of Indian epics. The society which grew up listening to the stories and folktales from the epics, started connecting with the cinematic version which was been presented to them on their television screens. These television mythological legends were widely beloved nationwide, with viewers writing letters to share their feelings about the episodes. Chopra and Sagar paved the way for the modern versions of the television mythologies but nothing could surpass the popularity of the original television versions of the mythologies. In the year 2020, when the world was in quarantine due to the coronavirus Doordarshan re-aired *Ramayana* and *Mahabharata*. The rebroadcasting of these TV myths also turned out to be a huge success. These series once again regained popularity among the viewers. This time, they caused a big stir on both television and the internet. However, the depiction of epic women characters in the TV mythologies continues to be highly disturbing.

The silence of the woman on the television is disturbing and questions the authenticity of the written form. The views of television are highly dominated by women, therefore the shows are produced and written about women and their interests. Woman is represented to be quiet, gentle, vulnerable and submissive. Ideally, they were the most obedient daughters, the sweetest sisters, the perfect mothers and idealistic wives (Kumar 2020). This paradigm of gender representation on television can lead to a mass culture which overshadows the social and educational background of its viewers (Kumar 2020). Kumar further mentions that the consumption of mass media on television played a key role in moulding and recreating opinions and reconstructing images and dominant cultural values of society. Thus, the portrayal of the silence of the epic women characters on the television screens is the most perturbing, as

theoretically the mythological drama was televised to strengthen the nation-building theme added with the promotion of moral values and tradition. Contradictory the promotion and acceptance of silence of epic women in the mass media validates, appropriates and accepts the regressive thought process of the society. The purpose of this paper is to present an analysis of the portrayal of Kunti's silence from the literary and cinematic retellings. Literary and cinematic representation in S. Madhavi Mahadevan's *The Kaunteyas* and B R Chopra's *Mahabharata* are studied through the in-depth exploration of Third World feminism in Uma Narayan's *Dislocating Cultures: Identities, Traditions and Third World feminism*.

1.1 Review of Literature

The original epic *Mahabharata* is written in Sanskrit. Recited by Sage Vyasa and written by Ganesha, the epic is considered a widely read text from ancient Indian literature. Over 1,00,000 verses are written and composed to exhibit the grandness of the epic narrative. The *Mahabharata* focuses on the Pandavas and Kauravas, two divisions of the Kuru clan, detailing their epic Kurukshetra battle for the Hastinapur throne. The epic deals with the themes of dharma, brotherhood, fratricide, filicide, devotion, justice and the battle of Kurukshetra. The epic researcher P. Lal mentions, the huge hulk of *Mahabharata*, spanning over 18 books can be split into three distinct parts, the first four Parvas are preparatory, introducing the characters as it were, Parvas 5 to 11 are actual war books while Parvas 12 to 18 constitute the epilogue, the aftermath of the war. There are numerous mythic characters, humans and supra-humans whose destiny are inextricably interlocked (Lal 1991). These numerous characters are characterized to establish the foundation of the dharma. Over the years, the epic has been retold, re-narrated and adapted in multifarious languages and translations, but what continues to trouble is the representation of the silence of the women characters in the epic.

Mahadevan is an Indian author of children's books, short stories and novels based on the modern retelling of the *Mahabharata*. Her retellings emphasise the story from the female perspective. She gives voice to the voiceless epic women characters from the *Mahabharata*. Mahadevan's work often explores themes such as identity, culture and the complexities of modern life. *The Kaunteyas* is a retelling of *Mahabharata* narrated from the perspective of Kunti, an epic woman. The text centres on the lives of Pandavas and their widow mother Kunti. The purpose of the text is to give voice to the voiceless character of Kunti, where her silence is illustrated as her strength. *The Kaunteyas* present an unconventional perspective on the epic, delving into the emotional and psychological complexity of the character of Kunti and her sons, Pandavas. The text takes the readers into the journey of Kunti from a foster child to the queen mother of Hastinapur.

B. R Chopra was a prominent Indian filmmaker and television producer, famous for his influential work in Indian television and cinema. Chopra's most acclaimed project is the TV adaptation of the *Mahabharata*, which was aired in 1980. The show has become an influential cultural phenomenon in India and is celebrated for the precise depiction of the epic. It was deeply associated with the characters and themes of the epic.

Uma Narayan is a feminist scholar whose works highlight postcolonial feminism and its theories associated with the Third World. Her work *Dislocating Cultures: Identities, Traditions and Third World Feminism* is a pivotal work that critically explores the intersections of feminism, culture and identity in the context of the Third World. Narayan tries to argue against the binaries often created between Western and non-Western women. Her work focuses on the necessity of understanding the diversity of feminism in the context of different cultures and

traditions. The text is divided into five chapters and each chapter focuses on the Third World cultural perspective of feminism against the Western perspective of feminism. Narayan's work explores the themes of cultural relativism and feminism, intersectionality, critique of Western feminism and cultural identity.

1.2 Research Objectives

Even though the story of *Mahabharata* and Kunti's character have been extensively read, the portrayal of her silence continues to be disturbing in both the original narrative and its retellings. This study explores the theme of the portrayal of Kunti's silence from the literary and cinematic retelling. To investigate this study's theme, qualitative comparative textual research methodology is analyzed. The paper also explores the concept of Third World feminism by Uma Narayan in the context of Mahadevan's *The Kaunteyas* and Chopra's *Mahabharata*. This study also examines the contemporary cinematic narrative in contrast to the portrayal of thoughts in the modern retelling of the *Mahabharata*.

2 Feminism and Third-World Feminism

The aim of the term "Feminism" is to constitute a world for women beyond women's liberation or equality (Mehrotra 2001). The word feminism derives from the French term *feminisme*. Historically, feminism was initially referred to as the women's movement in the United States in the 19th century. The women's movement comprised of diverse collection of groups all aimed at advancing the position of women. A.J Jaggar in his 1983 work, "Feminist Politics and Human Nature" states that in the early 20th century 'feminism' in the United States was introduced to refer to one particular group of women's rights advocated, namely which ascribed uniqueness of women, the mystical experience of motherhood and women's special purity. During the 19th and 20th centuries, the movement was marked as the 'First wave of feminism'. The agenda of the first wave was to focus on legal issues, particularly women's suffrage. However, it neglected the issues of women of colour, instead focusing on the rights of white women. As a response to the limitations of the first wave of feminism, the second wave of feminism emerged in the 1960's focusing on women's equality in all aspects of life. Third-world women's oppression was neglected by the second wave of feminism. Thus, the ideology of 'Third World feminism' emerged. Third World feminism is the result of the assumption by the West that the challenges faced by women around the world are the same as White Women. Herr mentions that "during the second wave white feminism in the West the concept of feminism have assumed that women everywhere faced similar oppression by their sex/gender". The Third World feminist rejects the Western doctrine and argues that feminism should not be categorized as white feminism, as women's oppression worldwide is influenced by their local and national circumstances (Herr 2014). Uma Narayan's *Dislocating Cultures: Identities, Traditions, and Third World Feminism* highlights the presence of Westernized political agendas in various Third World settings. She further asserts that how Western and non-Western cultures were "totalizations" pictures that cast and promote the values and practices that are ascribed to a specific privileged group within the community. These values and practices of the culture later become the common whole of the entire community. Her work focuses on the necessity to question the 'selective labelling' of the Hindu fundamentalists to characterise Indian feminist issues as the symptom of Westernisation. However, these Hindu fundamentalists skillfully use contemporary techniques to propagate their ideological messages. Third-world feminists are 'insiders' in the sense that they are often both familiar with and affected by the practices, institutions and policies they criticize (Narayan 1997). Therefore, defining the doctrines of Third-World feminism is emphasized in Narayan's *Dislocating Culture*, as opposed to the feminist doctrines of the West.

3 Portrayal of Kunti's Silence: Literary and Cinematic Retelling

"When there is no voice there is silence".
(anonymous)

Silence depicts the absence of voice or word. The word "silence" is derived from the Latin word *silentium* which is defined as "muteness, state of being or keeping silent; a forbearing from speech or utterance". The culture of silence is widely witnessed in literary and visual forms. Silence as a category is not considered as fixed and it also provides a means of signifying the underside of prevailing cultural practices (Dauncey 2003).

Dauncey affirms that silence can also be the product of fear of speaking out of place. The facets of fear and silence can be explored in analyzing the character of Kunti. The silence of Kunti's character is most disturbing when despite knowing the truth about Karna's parentage she chooses not to speak. In *The Kaunteyas*, Karna was born when Kunti was unmarried and was born out of summoning the sun god. This summoning was the result of the boon given to her by sage Durvasa. Fearing the outrage and the black lash of society over her premarital pregnancy, Kunti immediately abandoned Karna. Afterwards, when for the first time she came across the young Karna in the court of the Hastinapur she remained silent and her silence resulted in the massive destruction of the Dvapara Yuga (Mahadevan 2017):

He is alive. How will the Pandavas react when they learn who he is? They will not see a thing beyond what is obvious to all: sutaputra. They will not be able to live down the shame of it. It has taken us years to make a place in Hastinapur, and nothing is settled yet... I must not put my sons' future in peril. One false step and I will pull everyone with me deeper into this quicksand... (Mahadevan 263)

In the above reference, the silence of Kunti can be examined with two implications, in the first implication her silence can be indicated as a product of fear, a fear of losing the better future of her sons and the second implication, her silence can be the result of her gender, thus, the absence of speech is a product of social subordination. Contradictorily, in Chopra's *Mahabharata*, the moment Karna enters Hastinapur to claim his title of the best archer, Kunti recognizes him and decides not to disclose it. Chopra astutely adds the voice of the narrator who says nothing about her inner turmoil but instead, a piece of background music plays and she faints. Here, Chopra is doubly silencing Kunti's voice. Chopra is denying the voice of her inner soul as well.

Uma Narayan in her book opines that the injunction to be silent came from the mother who shares her conjugal sufferings with her daughter while simultaneously silencing the voice of her daughter, "The same mother who complained about her silencing enjoined me to silence, doing what she had to do since my failures to conform would translate as her failures to rear me well". Thus focusing on the perspective that the silencing of the woman comes from the mother who complained about her silencing while simultaneously silencing the voice of her daughter. She further mentions that the dynamics of the bond between a mother and her daughter may be seen as reflections of the relationship with the nation of the culture in which the individual is raised (Narayan 1997). As Narayan points out, both the mother and the culture send conflicting messages to the daughter, while encouraging the daughter to be confident, impolite, and self-assertive they also silence her voice. To illustrate, Kunti initially instructs her five sons to share the prize won by Arjuna but realizes her mistake upon learning that Arjuna won Draupadi. She then asks Draupadi to accept her decision and become the shared wife of her sons. Thus, the silence of woman by a woman. This silencing of women can also be the outcome of the culture, politics and the dominant patriarchy which are in the position of the policymakers hence influencing individuals' relationships.

Third World feminism opines that the labelling of the daughter as “Westernization” or the accusation of lack of “respect” for the culture is the result of her raising her voice (Narayan 1997). Hence this voice must be subdued in the name of cultural and patriarchal norms. In *The Kaunteyas* and Chopra’s *Mahabharata*, Kunti, an epic woman couldn’t voice out her agony, sorrows and dilemma after the untimely death of her husband, King Pandu. The patriarchal and cultural norms appropriate for a widow forced her to keep herself muted throughout the narration.

Silence has numerous connotations associated with it. The reason for the silence differs depending upon its narrative context and upon the analytical mode employed to explicate it (Duncey 2003). The representation of silence of a character also represents the superiority and marginalization in the hands of the patriarchy. When the silence of a woman or marginalized character is depicted on the screen it unknowingly becomes the characteristic of that particular character and that is the case with Kunti. Kunti’s character is written in such a manner which is to remain silent throughout the narration, however, she is given a voice when any blame is to be laid on her shoulders. In *The Kaunteyas* and Chopra’s *Mahabharata*, women were oppressed and marginalized in the name of dharma. The purpose of dharma is to determine the moral rights and duties of each individual along with the behaviours that enable social order, right conduct and those that are virtuous, but in subjugating the woman dharma plays a pivotal role. It acts as an invisible text of ‘do’ and ‘don’ts’ established for the idea of the ideal man and woman (Datta 2021). The critics of literature believe that the voice is sometimes considered as a challenge to the threat posed to social harmony by outspoken behaviour and a pretext for the investigation of social and ideological issues. As a result, the silence of a woman is more acceptable in the power play of the dharma over the silence of a man. Kunti was adopted by King Kuntibhoj, she was named Pritha at the time of her birth. When she was adopted by the King, her name was changed from Pritha to Kunti, “Pritha, pledged away before her birth, had no place to call her own, but I, Kunti, belonged to a kingdom” (Mahadevan 15). Likewise, Kunti had no choice in the matter when her husband King Pandu married another woman named Madri. The portrayal of silently understanding betrayal in cinema is seen as crucial. In Chopra’s *Mahabharata*, Kunti exuberantly embraces her husband’s infidelity by warmly receiving his second wife Madri. This unsettling episode prompts various inquiries about her spouse’s unfaithfulness, treachery, and unshown rage, and still he stays quiet.

The qualities which are stereotypically associated with women are silence and passivity. The reasoning for such association is the representation of the women characters by the male writers, directors, producers and editors in the written, verbal and visual forms. Stuart Blackburn mentioned in “Speech and Gender: Indian Versions of the Silence Wager”, that in 1987 Ruth Bottigheimer studied the Grimms Tales, where the researcher Bottigheimer investigated not only the external female voices but the internal ones as well. According to the study, there are 5 levels of silence:

Historical (external voice or pen), Narrative (silence as a narrative motif), Textual (internal speech of the story characters), Lexical (words for speak that either validate or question what is said), Editorial (authorial or editorial comment on what is said by the story characters) (Blackburn, 172)

Summing up Bottigheimer’s observation in context to Kunti’s silence in the text, *The Kaunteyas* can be interpreted as historical and textual silence, while Kunti’s silence in Chopra’s *Mahabharata* can be interpreted as editorial silence. Instead of voicing out Kunti’s emotions upon encountering Karna, the author’s comment was added in the form of a background song sung by a male singer, as portrayed in Chopra’s *Mahabharata*. Bottigheimer also argues it would be unfair to claim that only female voices are silent in literary and cinematic portrayals; male voices also experience silence, but their silence is short and chosen, while female silence is

extended and punitive (Blackburn 1999). Dauncey stated that there are two different styles of silence which are widely adopted by artists as a literary strategy: Loud and Soft. The first one is self-destructive and it is considered like an apocalyptic perspective, which might result in destructing the narration of the text, this style of silence in literature when not addressed properly might result in the danger of collapsing into the ‘negative silence’ (Dauncey 2003). Contradictorily, the soft style of silence in literature is more subtle and reticent, and it also has a long-term impact on the literature and culture. Kunti’s character is defined by her soft silence, as it has affected both the story and the reader’s thoughts. She embodied the silent epic-woman archetype, distinct from other characters who were vocal and clear in their intentions and words. She is seen as a character with the potential to alter the narration’s tone, but instead ended up being the driving force behind the battle. Her silence also prompted many questions within and outside of the narration. The ‘literature of silence’ is often viewed as a phenomenon which has a positive effect on the literature of the future (Dauncey 2003). To some critics, silence is a form of speech and acts as a positive element in a dialogue (Pattanaik 2024). The impact of their silence can be seen in literature and culture from the past to the future. Both in *The Kaunteyas* and Chopra’s *Mahabharata*, Kunti finally disclosed her secret to the Pandavas, ending her prolonged silence. However, the disclosure caused a rift between Kunti and her five sons:

Nothing was ever the same again. The secret that I had kept all these years to protect my sons had, by its revelation, drawn a rift between us. The Pandavas did not know how to behave with me. I had become a mystery to them. They tried not to judge me, but it was strange. (Mahadevan 386)

However, the rift is not acknowledged by Chopra and instead, he mentions the curse of Yudhishther after discovering Kunti’s secret. To popular belief, her character was depicted as a flawless representation of a perfect mother and the ideal of a goddess who gave up everything for her children, disregarding her fears and challenges as a woman. She was illustrated as a goddess rather than a woman. Narayan has substantiated the labelling of women as goddesses in her significant work on feminist theory and postcolonial studies. Narayan posits that “Indian culture saw women as “goddesses” ...”, for instance, Kunti’s silence can also be attributed to the phenomena of representation of the epic woman as a symbol of a goddess by male authors. The cinematic representation of an epic woman as equivalent to the goddesses and the dominance of male gods as strong, masculine, macho-centered heroes is a result of Hindu fascism (Sengupta 1991). Sengupta further mentioned in her work, “Sexual Politics of Television Mythology”, that this Hindu Fascism of the epics focuses on two aspects, first, disregarding the aspects of female and male sexuality where it proves to be uncomfortable with masculine, puritanical and heterosexual worldview. Second, it focuses on the complete and total sub-versions of any dissenting voice within the female characters. Therefore since Chopra’s *Mahabharata* was aired during the late 80’s the time when Hindu Fascism was at its peak, hence the subversion of the female voice became the new normal in television mythologies. Television mythologies present an intricate portrayal of epic women as goddesses, shaping viewers’ perception of women as divine beings through a unique narrative. The TV epic asserts female identity and sexuality in one of two ways, either they are ignored or they are castrated (Sengupta 1991).

Narayan in *Dislocating Cultures- Identities, Traditions and Third World Feminism* also emphasizes how the representation of the colonized woman became an expression of the oppressiveness of the entire colonial cultural tradition. Therefore the depiction of epic-women’s silence in the literary and cinematic canons also becomes the reflection of the oppression of the cultural traditions of the Third World nations. Female characters’ stories being narrated by male writers can also be a factor in the silencing of women in literature and cinematic canons. The female silences are a denotative of women’s cultural absence by concentrating attention on the specificity of women’s

writing (Showalter 1981). Thus raising the necessity of women's writing. Narayan argues that Third World Feminists must focus on addressing changes within their circumstances so that their agendas are not discredited by references to "unchanging traditions." In additionally, she also postulates the need to reinterpret the "public" roles for women:

I also wish to point out that appropriate "public" roles for women also continue to be reinterpreted to make some changes, but not others, consonant with the 'preservation of tradition' at particular times.

Therefore, thus focusing on the necessity to reinterpret and rewrite the stories of the epic women. Epic women like Kunti, Sita, Gandhari and Draupadi must be reinterpreted and rewritten, they must be given a chance to narrate their version of the story. The focus on the role of the woman in the context of society leads to the subjection of her voice and further marginalizing her. This subjection of women in the form of mass communication on television is menacing the minds of the viewers. However, this portrayal of women must be reinterpreted and rewritten, as suggested by Narayan. She further highlights the necessity for the feminists of the world to be suspicious of locally prevalent pictures of 'national identity' and 'national traditions' both because they are used to privilege the views and values of certain parts of the heterogeneous national population. For instance, Chopra's *Mahabharata* is written and narrated with the mindset of forming national traditions by portraying the women characters as goddesses, and addressing them as "devi" The writer focuses on creating a perfect image of a woman. The television epic also emphasizes portraying the epic women as the image of "weaker sex" rather than raising the voice for gender equality for women (Kumar 2020).

4 Conclusion

Both *The Kaunteyas* and Chopra's *Mahabharata* are modern versions of the original epic *Mahabharata*. They emphasize the importance of a modern approach towards rendering the literary and cinematic adaptations of the original epic. Both the text and television mythology stress the significance of revising and reinterpreting the epic, emphasizing the need for epic women to have a platform to share their perspectives in the narrative. Mahadevan in *The Kaunteyas* emphasizes the requisite need to write the epic from the perspective of the epic women characters, especially the ones who are constantly muted by the male writers. Chopra's *Mahabharata*, on the other hand, emphasises the necessity of altering the narrative of television in portraying female characters on the screen.

However, his work is the most accurate cinematic representation of the original text. In recent times, there is ample literature written and produced on television illustrating the stories of the epics. Despite there being an abundance of works written or visually presented on the themes of the epics, what remains perturbing is the silence of the epic women, especially in the context of the cinematic representation. However, modern readers are keen on reading the epics from a woman's point of view, but the television versions of the epic have a different story. Such as, a show like *Siya Ke Ram* is one such example, the show was written from the perspective of Sita, but unfortunately, it couldn't gain popularity among the viewers as the viewers are more inclined towards the mythological shows glorifying the heroes rather than the heroines. Muting women in films is a highly harmful act against women's representation, highlighting their oppression by patriarchal societies and state influence on media. It also indicates that the patriarchy wants the stories of the heroes to be heard over the unheard stories of the heroines. Hence, to sum up, it can be said that like the literary standards, it is necessary for a change in the portrayal of epic women in cinema to be embraced in electronic media, giving a voice to women characters and shifting the focus of storytelling to include the female perspective. This shift towards more women's stories written by women writers is the requirement of the time. In the future it is important to raise the voice and the concerns of the epic-women characters as not representing them on a large

scale leads to misinformation and distressful images about those characters.

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Primary Paper Section: A

Secondary Paper Section: AJ

ENHANCING FIRST-YEAR UNDERGRADUATE STUDENTS' ADAPTATION THROUGH PERSON-CENTRED THINKING

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This research originated as a partial outcome of a research project BIN SGS02_2021_002: University Enhancing the Smart Active Ageing (UESAA), supported by Norway through the Norway Grants. Information about the project is available at: <https://ff.ucm.sk/sk/eea-grants/> and within the research project VEGA No. 1/0603/23 Volunteering in Slovakia in times of crisis supported by the Ministry of Education, Culture and Sports of the Slovak Republic and the Slovak Academy of Sciences.

Abstract: This study uses person-centred thinking as a theoretical framework to explore first-year undergraduate students' adaptation preferences. The aim is to enhance understanding of support mechanisms by analyzing students' subjective experiences. A qualitative visual methodology employing "one-page profiles" was used to identify preferences for improving adaptation. The research involved 18 students from humanities programs at two Slovak universities. Semiotic analysis of visual representations and thematic analysis of text revealed key preference areas: values, personality traits, social aspects, and motivation. Findings highlight a preference for a holistic approach combining personal development, social support, and academic growth, emphasizing authentic communication and empathetic understanding.

Keywords: academic adaptation, person-centred thinking, students, preferences.

1 Introduction

Support for first-year students and reducing the dropout rate are topics being addressed in the Slovak Republic in the context of ongoing accreditations and internal quality systems at higher education institutions (2022-2024). These areas are primarily included in Act No. 131/2002 Coll. on Higher Education Institutions and its amendments and related documents administered by the Accreditation Agency of the Ministry of Education, Science, Research and Sports of the Slovak Republic. The criteria for the accreditation of higher education study programs are implemented through internal guidelines of individual universities. Each higher education institution and university has set its internal guidelines within the internal quality assurance systems, which regulate measures to support students. And follow the policies of the Standards for Study Programmes of the Accreditation Agency (Šoltésová, Nemcová, 2023). In the context of this guideline, higher education institutions in Slovakia have started implementing specific measures. Examples include adaptation measures that provide various forms of support for first-year students (individual counselling, adaptation programs, support for creating social ties, mental health support, etc.) and dropout rate monitoring, which includes systems for monitoring study results and measures to prevent early graduation. Indicators such as attendance, study results, or student feedback are regularly monitored to identify those who may be at risk of early graduation (Slovak Accreditation Agency for Higher Education, 2020).

In this context, increased research attention is focused on adapting first-year students to higher education. The significant increase in the number of students entering higher education has brought greater diversity to the student population regarding their readiness, social background, and individual needs (Gabriel, 2022; Lim, 2020; Seberini, 2020). At the same time, demands on the quality of higher education and student success have increased, with the first year of study proving to be a critical period for student retention and overall academic success (De Clercq et al., 2020) or for problematic internet use and procrastination (Doktorová et al., 2023).

1.1 The theoretical framework

The transition from secondary to tertiary education presents several challenges for first-year undergraduate students. Research shows that unsuccessful adaptation in the first year often leads to early dropping out of studies, which has consequences for individuals, institutions, and society (Nurmalitasari et al., 2023; Lim, 2020). Body image evaluation reflects the degree of satisfaction or dissatisfaction with one's own body and adaptation to a new environment (Doktorová, et al., 2024). Therefore, identifying students' specific needs during this transition period is crucial for setting up effective support strategies and measures for higher education institutions. Improving the adjustment of first-year undergraduate students through person-centred thinking involves considering various factors that influence their adjustment to university life and academic activities e.g., problematic internet use as described by Doktorová et al., (2023). Person-centred approaches can facilitate this transition by encouraging direct engagement with students in an educational context and promoting creative thinking and reflection through interactive workshops (Reeve et al., 2021). The adaptation of first-year university students is a complex process influenced by multiple factors. A study by Shengyao et al. (2024) highlights the importance of personality traits such as emotional maturity, positive self-attitude, social activity, and intelligence for successful adjustment. Academic expectations, along with personal, social, and institutional dimensions, are key factors in student adaptation and success (Kahu & Nelson, 2017; Corti et al. 2023). A person-centred approach and a psychologically secure educational environment, supported by study mentors and faculty members, are essential for successful student adaptation (Chaudhry et al. 2024). Rogers (in McHenry et al. 2020) argues that every individual possesses a natural potential for positive growth, which can best be realized in an environment characterized by three core conditions: congruence (authenticity), unconditional positive regard, and empathetic understanding.

Undergraduate students face challenges that require creating a supportive environment that respects their needs and pace of adaptation, directly related to Rogers' conditions for facilitating personal development (Tudor & Rodgers, 2020). The person-centred approach, which emphasizes subjective experience and a phenomenological approach, allows to capture of each student's unique preferences and needs during the adaptation process. Thus, this approach provides a suitable theoretical basis for investigating how students perceive and define their needs in the process of academic adaptation and how this process can best be supported from their perspective. This study examines first-year undergraduate students' adaptation preferences through a person-centered thinking approach. The investigation aims to broaden understanding of support mechanisms by analysing students' subjective experiences and preferences. This study was guided by the research question: *What are the individual preferences of first-year students to improve their academic adaptation?*

2 Methods and Materials

A qualitative exploratory research design was implemented in this study. Specifically, the concept of Visual Research Methods, which approaches qualitative research, uses visual techniques to collect data and interact with young research participants. This approach is beneficial when working with students because it allows them to express themselves in ways that may be more natural and accessible than traditional verbal methods (Barriage et al., 2017). This approach can provide insights into social realities, visual culture, and environments in ways that text alone cannot (Ong, 2020). As visual research methods evolve, they offer new opportunities for data collection, analysis, and presentation, challenging researchers

to expand their methodological tools and theoretical perspectives (Metcalfe & Blanco, 2019).

Data Collection

Data was collected using the 'One-Page Profile' (OPP) method. Students compiled profiles according to specific instructions as assignments during seminars at two universities in the Slovak Republic. Students created an OPP according to particular instructions (format: Word or PDF file, minimum 500 characters per section, maximum length: 2 A4 pages, content structure: 1. What is important to me? 2. What do people value about me? 3. How can others support me?).

Integrating the OPP method with Visual Research Methods presents new potential, as it provides a richer and more comprehensive view of students in the research context. OPPs are increasingly emerging as a valuable educational tool to improve communication and support. In education, OPPs can strengthen the relationship between the study tutor and the student and support student retention at the university (Ridley, 2017). The use of OPPs is consistent with person-centred approaches that focus on the strengths and needs of the individual (Landor, 2018). At the same time, this method corresponds to the principles of the person-centred approach, such as authenticity and congruence. OPP reflects Rogers' emphasis on a phenomenological approach and the subjective experience of the individual by giving voice to the students themselves to express what is important to them (Freire et al., 2020).

Data Analysis

The analysis process involved three complementary approaches: 1. phenomenology analysis (identifying meaningful units, comparing similarities and differences, grouping meaningful units, and establishing coherent categories). Phenomenology is a qualitative research method that explores diverse perceptions of phenomena based on the experiences of individuals (Santos et al., 2018). The interpretive phenomenological analysis (IPA) method is used to understand personality. Phenomenology respects human uniqueness and subjective experiences, analyzing phenomena through textual and narrative descriptions (Neubauer et al., 2019). 2. Thematic analysis (all researchers focused on identifying patterns in students' written responses, developing thematic categories describing adaptive preferences, and analyzing value systems and priorities). It involves a systematic process of familiarizing oneself with the data, coding it, and developing themes (Kiger & Varpio, 2020). 3. Visual semiotic analysis (all researchers examined denotative and connotative meanings in visual elements). Visual semiotic analysis is a method for examining how visual signs present meaning. These approaches often examine denotative and connotative meanings in visual elements (Mengoni, 2021).

Study Setting and Sample

The intentional selection of 18 university students enrolled in the undergraduate humanities programme at universities was conducted in two phases. In the first phase, two authors (JŠ and TŠZ) presented the research with a lecture to the undergraduate students. Following the lecture, the students were invited to participate in the creation of their OPP (baseline data was collected from 35 social work students, 65 psychology students, and 120 pedagogy students). Those who expressed interest in participating in the study were asked to provide consent and contact information. In the second phase of the recruitment process, the authors (JŠ and TŠZ) contacted the 80 students who had initially expressed interest in creating a one-page profile by email. A total of 40 students confirmed their participation in the creation of the one-page profile. Subsequently, the students were allotted five weeks to create their one-page profiles. Upon this timeframe's conclusion, the authors received 36 completed profiles. The process of data sorting then commenced. From the data provided, the authors selected 18 final profiles for analysis, according to the Quality Criteria Model, from the 36 profiles. A deliberate selection of

15-20 participants in phenomenology research ensures sufficient variability (Moser & Korstjens, 2018).

The research establishes the Quality Criteria Model criteria (Yadav, 2021; Rubel & Okech, 2017) encompassing three dimensions: (1) textual content assessment, examining clarity, information depth, and essential area coverage; (2) visual quality evaluation, analysing aesthetics, clarity, and visual element usage; and (3) relevance measurement, determining alignment with research goals and comprehensiveness of question responses.

Table 1 Characteristics of Research Participants

Study Program	Code	Gender	Number of Participants
Pedagogy	(PD)PD1-PD6	Women (W)	3
		Men (M)	3
Social Work (SW)	SW1-SW6	Women (W)	4
		Men (M)	2
Psychology (PS)	PS1-PS6	Women (W)	3
		Men (M)	3
Total		Women (W)	10
		Men (M)	8
Total Participants			18

Source: Own processing

This investigation's sample consists of first-year undergraduate students enrolled full-time in three humanities bachelor's programs: social work (SW), pedagogy (PD), and psychology (PS).

Ethical considerations

The study received approval from the Institutional Ethics Committee (ref. no. UCM-FF-EK 3/2023). All participants provided written informed consent and anonymization to ensure privacy.

Credibility and Transparency

To guarantee the accuracy and reliability of the interpretation, the analysis was conducted by a team of researchers. The analytical rigour provided by researchers JŠ (social work), TŠZ (education sciences) and MT (public health and social sciences) was achieved through independent coding and consensus discussions. The utilisation of a plurality of analytical methodologies, encompassing phenomenography, thematic analysis and visual techniques, served to reinforce the process of methodological triangulation, as described by Ahmed (2024) enhancing both the credibility and transparency of the findings.

3 Results

This study examines first-year undergraduate students' adaptation preferences through a person-centered thinking approach. The investigation aims to broaden understanding of support mechanisms by analysing students' subjective experiences and preferences. The research findings identified students' experiences and preferences that reveal their subjective perception of support mechanisms. The analysis identified four topics in which preferences occurred: I. values and priorities; II. personality characteristics; III. social aspects; and IV. motivational factors.

3.1 Preferences for academic adaptation in the identified topic - Values and Priorities

The findings revealed three thematic categories: core values, personal development, and social connection. Within core values, participants emphasized family support, trust, and health as fundamental elements. The family emerged as a critical support system, illustrated by a social work student who described it as "...my leaning willow, without them I wouldn't be able to function at all" (SW1, W), while another participant acknowledged "I owe everything to them" (PS1, W). Trust manifested both as relational foundation and self-confidence, evidenced when participants noted "...trust is the foundation of all relationships..." (PD5, W) and emphasized "...trust in my

ability..." (SW6, W). Health, particularly mental well-being, was identified as crucial for academic success, with one participant stating "...my mental health and inner well-being are important for my studies..." (SW1, W).

The analysis revealed key themes within personal development, centered on education and success. Participants emphasized academic achievement's intrinsic value, with one student noting "I only know it makes sense when I achieve something good here at school!" (SW5, M). Educational motivation was linked to personal interest and future impact, illustrated by a participant's reflection on "...the opportunity to study in a field that I enjoy..." (PS1, W), and another's goal to "...help others through my future expertise..." (PS4, M). Life management emerged as a distinct subtheme, encompassing life balance and stability. Students described specific strategies for maintaining equilibrium between academic, professional, and personal commitments, exemplified by one participant's detailed account of balancing "studying social work... working in a café on the weekends, and spending time with family and friends" (SW3, W). The importance of stability manifested through preferences for structured environments, with one student emphasizing how "...rules for the subject, clear expectations in advance give me a sense of stability..." (PD4, M). Another participant metaphorically described consistency as "an anchor on a ship, highlighting the need for 'a familiar environment, proven people, and established procedures'" (SW2, W).

The theme of social connections centred predominantly on meaningful friendships. Participants distinguished between superficial and authentic relationships, as illustrated by one student's observation that "Having good friends is important, and not just having friendships is important" (PS4, M), emphasizing the value of relationship quality over quantity.

The presented results show that students' value preferences are formed at several levels in the process of academic adaptation. The first level consists of fundamental values, where students clearly emphasize the importance of family as a pillar of stability, friendly relationships as a source of social support, and physical health as an essential prerequisite for functioning. Higher values represent the second, more complex level, where students demonstrate a significant degree of self-reflection and awareness of the importance of education for personal development, the need to maintain a balance between different life roles, the importance of psychological health and well-being, building trust in interpersonal relationships, achieving success in the academic environment, and the need for specific stability as a stabilizing element during the period of adaptation changes. This level structure of values and priorities indicates that students in the process of academic adaptation create a complex value system that integrates both traditional values and more sophisticated aspects of personal and professional growth.

3.2 Students' preference for academic adaptation in the identified area - Personality characteristics

Analysing students' personality characteristics in the process of academic adaptation shows that they possess a diverse set of traits that help them cope with the demands of the university environment. These characteristics can be categorized into five key areas. Proactive characteristics, represented by a positive attitude and perseverance, enable them to face challenges actively. Reflective characteristics, including healthy self-criticism and the ability to be alone, support their self-knowledge and personal growth. Socio-emotional characteristics, manifested in an energetic and humorous nature and empathy, facilitate their social adaptation. Goal-oriented characteristics, expressed in determination and constructive stubbornness, help them achieve academic goals. Communication characteristics, especially the ability to actively listen, support effective interaction in the educational environment. All these characteristics complement each other and create the prerequisites for successful adaptation to university studies.

Table 2 Students' preferences in the area of personal characteristics

Category	Examples of qualitative quotes
Positive attitude	"My ability to be positive helps me cope with problems at school, in the family, and to help others." (PD3, W)
Perseverance	"I will always confirm that I am persistent; I first finish what I started, and only then do I move on." (PD2, M) "In addition to creativity, crocheting taught me to be persistent; it is not easy to achieve what I started, but I always persevere and continue, and that will come in handy at school." (SW1, W)
Self-criticism	"It also helps me that I try to be critical not only of myself but also of others; I say exactly what the problem is. I realize whether the problem is on my side or others' side." (PS3, M)
Energetic and humorous nature	"They like my sense of humour, that I can make fun of myself; it helps me too." (PS4, M) "A sense of humour that would be indispensable without it and with which everything goes easier." (PD1, W).
Empathy	"I can empathize with people; I don't have to tell them, they feel safe with me, empathy helps me too." (PD3, W)
Ability to listen	"I am open to people, and you can talk to me about any topic; I will listen, and they will talk, and I think it is important because I also need to hear from them sometimes." (SW4, M)
Stubbornness	"Only in the good sense, I go after what I want, and no one discourages me; I often do things my way, as I feel and want to do them." (PD3, W)
Purposefulness and ambition	"...my determination, whatever I do, I look for all possible ways to get to the results." (PD1, W)
The ability to be alone	"People can also support me by giving me so much space to think, by leaving me alone to think things through." (SW2, W)

Source: Own processing

3.3 Students' preferences in the identified area - Social aspects

The analysis of social dimensions revealed a multilayered framework of interpersonal relationships in students' academic adaptation, spanning from familial bonds to broader social networks. The findings identified four critical dimensions: (1) the necessity of transparent communication for preventing misunderstandings and relationship development; (2) proactive helping behaviour that enhances both collective well-being and personal meaning; (3) the establishment and maintenance of personal boundaries as prerequisites for relationship health; and (4), environmental support manifested through trust and encouragement from social networks.

These social aspects create an interconnected network, where each dimension contributes to the student's overall social adaptation to the academic environment. In contrast, balancing the need for social interaction and maintaining personal space appears to be a critical factor in successful adaptation.

Table 3 Students' preferences in the area of social aspects

Category	Examples of qualitative quotes
The importance of open communication	"I am a person who thinks about a lot of things, so I need to clarify things through direct, open communication." (PD5, W)
Willingness to help others	"It makes me happy to help others, and I want to be helpful to them." (PS2, W) "As I mentioned, I am a person who likes to help people, even those I don't love. My friends also know ... because then I am with them." (PS5, W)
The need to respect boundaries	"I am a person who needs my space and time. Sometimes I need to be alone with my thoughts; other times I need time to think about important decisions." (PD6, M) "Respecting boundaries is the basis of healthy relationships for me. When someone crosses my boundaries, I feel uncomfortable, stressing me out." (SW3, W)
Need for support from others	"Close people who believe in you, are always there for you and always support you are the best. That can support me in what I do, and it gives me energy." (PS2, W) "I am much stronger when people believe in me, not my family, just support from anyone." (PS3, M)

Source: Own processing

3.3 Students' preferences in the identified area - Motivational factors

The analysis of motivational factors points to both external and internal motivators. Students show internal solid motivation manifested in the desire to face new challenges and achieve personal satisfaction with their performance, which is

confirmed by statements such as *"I enjoy discovering new things"* and *"I gave my best"* (PS3, M). At the same time, external motivation plays a significant role in emotional support, constructive criticism, and positive feedback from others, illustrated by the quote, *"I need to feel that someone believes in me"* (PS1, W). A specific motivational factor appears to positively influence others, where 'other people's happiness' functions as a catalyst for further development.

These motivational factors create a mutually reinforcing system. Constructive criticism and praise guide personal growth, while internal satisfaction and joy from helping others represent deeper, long-term motivators. This multi-layered motivational structure supports not only academic adaptation but also the overall personal development of students.

Table 4 Students' preferences in the area of Motivational factors

Category	Examples of qualitative quotes
New challenges	<i>"I enjoy discovering new things and pushing my limits. Every new challenge is an opportunity for me to learn something and improve."</i> (PS3, M)
Emotional support from others	<i>"I need to feel that someone believes in me, in my dreams and desires, it pushes me forward."</i> (PS1, W)
Inner satisfaction	<i>"The biggest motivation for me is the feeling that I gave my best and I can be proud of my performance."</i> (PD1, W)
Constructive criticism	<i>"It is crucial for my personal development when I receive constructive criticism from people."</i> (PS6, M)
Feedback and praise from other people	<i>"When I see a smile, joy on a face, or someone tells me that finally..."</i> (SW4, M) <i>"The happiness of other people that I see is like fuel for me - it gives me energy and motivation for life."</i> (PS5, W) <i>"Being there for me, honestly, tells me where I need to improve."</i> (PS1, W) <i>"...praise from others, from family... is important for me to have the motivation to continue working on myself."</i> (PD5, W)

Source: Own processing

3.4 Results of semiotic analysis

The semiotic visual analysis of students' One-page profiles revealed symbolic representations of values, personality characteristics, and motivations. These visual elements constitute a complex symbolic system facilitating a deeper interpretation of students' psychological dimensions during academic adaptation.

Table 5 The semiotic visual analysis of students' One-page profiles

Visual representation of topics	Symbols in One-Page Profile	
	Denotative	Connotative
Significance and visualization		
Values and priorities	Symbol of stability and security (e.g., house/tree) Symbol of education (book) Symbol of travel (compass)	Symbol of boundary lines (borders between people) Symbol of tree roots (family)
Personality characteristics	Symbol stone (for strength and stability) Symbol heart (for kindness)	Symbol of communication (interconnected circles/networks) Symbol of balance (scales) Symbol of energy (sun) Symbol of empathy (joined hands) Symbol of independence (single tree in the background)
Social aspects	Symbol of the most (connection) Symbol of the hug (relationships)	Symbol of boundary (demarcation of boundaries between people) Symbol of diamond (personality, uniqueness)
Motivational factors	Symbol of joined hands (cooperation with others)	Star symbol (praise) Ladder symbol (recognition, growth)

Source: Own processing

The visual analysis revealed five key domains represented through symbolic elements. Values and priorities are manifested through stability symbols (house, tree) and development indicators (book, compass), conveying security

needs and life direction. Personality characteristics emerged through diverse symbols ranging from stone (strength) to sun (energy) and joined hands (empathy). Social dimensions were predominantly represented by bridge and hug symbols, denoting connection and relationships. Motivational factors appeared through joined hands, star, and ladder symbols, representing cooperation, recognition, and growth respectively. This symbolic framework illuminates the multifaceted nature of students' academic adaptation experiences.

4 Discussion

Our findings describe the preferences of first-year university students. They provide a comprehensive picture of what students consider necessary for successful academic adaptation - emphasizing a balanced approach between personal development, social support, and educational growth. Analysis of students' preferences in academic adaptation points to consistency with the fundamental principles of Rogers' person-centred thinking (authenticity, congruence, unconditional acceptance, self-actualization, etc.) (Landor, 2018). The student emphasized the need for open communication and authenticity: *"...when I am myself..."* (PD1, W) reflects Rogers' concept of congruence. Recent research has stressed the importance of authenticity in education, especially for university students in the process of their education. Authentic environments and open communication can improve student engagement, well-being, and skill development (Walkington & Ommering, 2022; Svård et al., 2022). Another area that students preferred was the need for support and trust from those around them: *"I am much stronger when people believe in me"* (PS3, M); or stressed: *"People close to me ... that can support me in what I do and give me energy"* (PS2, W). Social support from family and peers, as one of the preferences of support in the adaptation of first-year students, was also identified by Awang et al. (2014). This study confirmed that social support develops emotional adaptation and well-being. In addition to microcontext support (on an individual level), it is also important the support of the university community (teachers, students, dormitory staff, etc.), the research study has shown their importance, as it plays a key role in facilitating this adaptation (Lau et al., 2018).

Empathic understanding is noted: *"...sometimes it's enough for someone to perceive and listen to me, at least try to understand what it's like for me..."* SW3, W, which Rogers considered a key element in facilitating personal growth, is in students' ability to empathize with others and create a safe relationship environment (Landor, 2018). Research indicates gender-based variations in empathy levels, with females demonstrating higher scores, while value-semantic orientations correlate positively with altruism and acceptance (Anisimova & Krushelnitskaya, 2023). This finding aligns with participant responses: *"I can empathize with people, I don't have to tell them, they feel safe with me, empathy helps me too"* (PD3, W). Additionally, self-actualization tendencies manifest through expressed desires for personal growth, as evidenced by one participant's statement: *"I like learning new things, that's why I'm in school..."* (PS4, M), indicating intrinsic motivation for academic engagement. Within this area, research shows that this area is related to the development of self-esteem and self-management skills. Both contribute to improving the adaptation of first-year students (Lau et al., 2018; Awang et al., 2014). Students emphasize the need for a safe environment also through respecting boundaries *"... alone time"* (SW2, W) and *"...respecting boundaries is essential for me..."* (SW3, W), which Freire et al. (2020) identified as an essential prerequisite for effective personal development and the ability to respond to new situations.

The application of Rogers' person-centred theoretical framework facilitated comprehension of students' individual adaptation preferences. According to Mengoni (2021), visual semiotic analysis of One-Page Profiles revealed specific symbolic representations reflecting adaptation preferences across multiple dimensions. Environmental preferences are manifested through stability symbols (house, tree) and directional indicators (compass). Personal development

emerged through resilience symbolism (stone) and academic engagement (sun), while one participant emphasized that "everything should be connected through understanding and empathy" (PD3, W). Social dimensions centred on academic community connection (bridge) and supportive relationships (hug), complemented by motivational preferences for cooperation (group symbols) and achievement recognition (stars). These findings demonstrate how person-centred approaches illuminate crucial factors in first-year students' academic adaptation processes.

The analysis of preferences of beginning students for improving their academic adaptation carried out through One-Page Profiles, revealed the broad-spectrum nature of the adaptation process. Students prefer a balanced combination of internal and external factors supporting their adaptation. In the area of values and priorities, they emphasize the need for stability (set rules and expectations of education, support from family and other people) in combination with the need for self-development and growth (the meaning and purpose of education, acceptance of constructive criticism and feedback, balance in life). Their adaptation is significantly supported by specific personality characteristics, especially a positive attitude, perseverance, the ability to self-reflect, and purposefulness; perhaps there is no room for developing these qualities within university education. In social relations, they prefer clear, open communication and a balanced approach between the need for environmental support and maintaining one's boundaries. The results indicate that successful academic adaptation requires a comprehensive approach that considers students' characteristics and needs and the supportive elements of the educational environment.

Limitations of this study

The study's limitations encompass two critical dimensions. First, the recent implementation of new university accreditation criteria in Slovakia, described by Hall et al. (2019) presents an evolving context requiring future research to measure the impact of emerging support mechanisms. Second, methodological constraints arise from limited comparative research within Slovak higher education, restricting comprehensive validation of findings. Expansion of the qualitative design through additional methods, including interviews and student interpretations, would enhance understanding of individual preferences. While these findings contribute to the knowledge of student adaptation and well-being, they represent an initial examination of Slovakia's transforming tertiary education landscape.

5 Conclusion

This study highlights the effectiveness of person-centred thinking in understanding and supporting the adjustment preferences of first-year students in Slovakian higher education. Through visual and textual analysis using one-page profiles, the research shows that students prioritise a holistic approach to adjustment that integrates personal development, social support and academic growth. The results show that successful adjustment relies on a complex interplay of value systems that combine traditional supports with higher-order needs, personality traits that emphasise resilience and empathy, social aspects that balance connection with boundary maintenance, and motivational factors that integrate internal drive with external support.

The methodological approach, based on Rogers' person-centred principles, allowed for authentic expression of students' preferences through both visual and textual elements. While the study provides valuable insights for the development of targeted support mechanisms in Slovak higher education, further research using additional qualitative methods would strengthen the generalisability of the findings. The research contributes to the understanding of how person-centred approaches can enhance academic adjustment by respecting individual student preferences and needs, particularly in the

context of evolving higher education standards and support systems.

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Primary Paper Section: A

Secondary Paper Section: AM

MENTAL HEALTH OF GIFTED PUPILS IN THE CONTEXT OF A POSITIVE SCHOOL CLIMATE

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Abstract: Giftedness results from a dynamic and interactive process. It manifests itself in abilities that are expressed in the cognitive domain, cognition, understanding, thinking academic achievement, creativity. The issue of giftedness is of interest not only to psychologists but also to educators. It is essential to support gifted children not only in the family but also in the school environment by creating a positive school climate linked to good mental health for these children. The main goal of research was to find out the relation between mental health of gifted pupils and school climate. Our research sample consisted of 71 intellectually gifted participants. There is a significant positive correlation between mental health and positive school climate.

Keywords: giftedness, gifted pupils, mental health, positive school climate

1 Introduction

In the following chapters, we will explore the concepts of giftedness, gifted students, their mental health and positive school climate. Subsequently, we will research giftedness in the context of mental health and school climate.

1.1 Giftedness

Giftedness is a biologically given characteristic, primarily denoting a label for a high intelligence level resulting from a precocious and accelerated combination of brain functions, including the senses, emotions, cognition, and intuition. It is also secondarily manifested in an accelerated thinking process, more complex problem identification and problem solving, and unusual and divergent abstract thinking (Clark, 2012).

Winnerová (1996) lists several types of giftedness: global giftedness, mathematical-linguistic giftedness, logical-mathematical giftedness, and verbal-linguistic giftedness. Dočkal and Duchovičová (2017) list the following types of giftedness: giftedness for sport and movement, artistic giftedness, rational (intellectual and academic giftedness), practical giftedness, creative giftedness, and general giftedness.

Our research focuses on participants with general intellectual giftedness. Intellectual giftedness is most commonly understood as highly above-average general intellectual ability relative to the population (Fábik, 2019). We can define an intellectually gifted child as a child with accelerated cognitive development. With sufficient motivation, creativity and adequate environmental stimulation, gifted children perform exceptionally in one or more intellectual activities compared to peers. It does not always have to be manifested by above-average performance at school. Typical characteristics of intellectually gifted children include developmental advantage over peers in one or more cognitive domains, early reading, and the emergence of mathematical abilities in preschool. They also have good memory, speed and ease of learning, intellectual curiosity, activity and motivation. These children enjoy discovering new things and asking unusual questions. They have a wide range of interests and vast vocabulary. Gifted children need to invent new things; they are unconventional, critical of authority, and have a highly average performance on psychological tests. Accompanying signs of high intellectual giftedness are a lower need for sleep, hyperactivity and low self-esteem. These children have reduced social adaptation, emotional problems, and negativism. They are unwilling to submit to external authority and to accept defeat. They are perfectionists with high demands on themselves and the environment (MŠ SR, 2008).

1.2 A brief history of giftedness

The study of giftedness came to the fore in the late 19th and early 20th centuries. Until this period, vague philosophical reflections on different forms of thought, presented by Greek thinkers such as Socrates, Plato, and Aristotle, were prevalent. In the late 19th

century, the psychiatrist Lombroso advocated the genetic nature of the gifted. The natural scientist Galton made a breakthrough in giftedness research. He studied genes and noted that some families are biologically better equipped, concluding that intelligence is a set of abilities that are passed down from generation to generation. The first intelligence tests were created by psychologist Binet in collaboration with Simon, focusing on the prerequisite of children's mastery of compulsory schooling. The psychologist Terman examined thousands of children, selected about 1500 children with IQs above 140 and followed them until his death. Thanks to him, a genius began to be identified with high IQ. Subsequently, experts such as Gardner, Cattell, Guilford, and others devoted their research to high intelligence and giftedness.

The first elementary school for gifted students opened in New York City in 1940. In the 1970s, the first professional organizations to support the gifted, such as the National Association for Gifted Children, began to emerge. Magazines such as Gifted International, Gifted Child Today, Gifted Child Quarterly were published. New institutions such as the National Professional Training Institute guided teachers and parents. The issue reached a milestone in 1985 when the World for Gifted and Talented Children Congress organised the first World Congress on Giftedness in Hamburg. Thanks to this congress, the topic spread worldwide (Fábik, 2019).

Nowadays, giftedness is a subject of interest for psychologists, educators, and experts from various disciplines, such as sociologists, physiologists, biologists, and others (Fábik, 2019).

1.3 Gifted pupils in schools

A gifted pupil is further specified in a document issued by the Ministry of Education (2008), which states that a gifted pupil is a child whose IQ is above 130, provided that the level of creativity is at least in the average range. The gifted child is also the child whose level of creativity falls in the range of the top 2% of the population, provided that the intellectual ability reaches an IQ above 120. In assessing the intellectual aptitude of preschool children, there is a requirement that their mental age, as measured by a test of non-verbal intelligence, must be at least 7 years and 10 months when entering into the first year of primary school. At school age, pupils are intellectually gifted if they perform exceptionally well in learning, with an intellectual ability level falling in the IQ range above 120 and a creativity level at least in the average range. The level of sociability of children identified as gifted must not be significantly below average. The assessment also includes their attention, persistence and motivation.

School manifestations of gifted children are the following: They adapt relatively well in a new learning environment and prefer individual learning to group learning. They seek out and work with new information independently, and with interest. Their knowledge exceeds the required scope and depth of the curriculum. Gifted pupils like to experiment and prefer problem-based tasks. They work at their own pace, and strive for perfect completion of the task. The gifted often argue with teachers (Hříbková, 2009). Lazníbatová (2012a) mentions these characteristics: gifted pupils ask many questions and have unusual ideas and ways of solving problems. They draw conclusions independently; initiate projects; create new solutions, and enjoy intellectual activity.

Gifted children's cognitive characteristics include using encyclopaedic resources and modern technologies. They are interested in cause-and-effect relationships, and they recognise relationships between phenomena and identify inconsistencies. These children are sensitive to the existence of problems; they can generalise correctly and quickly, and they have developed critical thinking, manifested by a tendency to doubt. The gifted children have polemic and increased self-criticism and a rich

vocabulary; they use abstract concepts, are guided by their own criteria when evaluating their own and other's results, and have a more prolonged concentration of attention. The creative characteristics of gifted pupils include that they easily develop imagination and phantasy and are intellectually playful and curious. These children can absorb new information and like to learn. They are flexible in thinking, and their ways of solving problems and tasks are original. Regarding emotional characteristics, the gifted children have a higher need for emotional support and emotional acceptance. They are sensitive and they appear less emotionally mature than their peers. These children are impulsive and expressive when defending their views, and are attracted to the aesthetic side of things. Social characteristics include the need for freedom, liberty, and activity. The gifted children attract attention from the environment, and they usually have an extreme position in a group of peers. They have either high or, on the contrary, very low social skills. These children boldly present their opinions and resolutely defend them within the group. They seek out older children for communication and are socially naïve and gullible. Some gifted children have problems with self-confidence and inadequate self-image formation (Hříbková, 2009).

Qualities such as willpower, ambition, and appropriate social conditions and opportunities are necessary for innate abilities to translate into performance (Szobiová, 2004).

1.4 Mental health and positive school climate

Support for gifted pupils is essential to realising giftedness. The school environment, a positive school climate as well as a positive classroom atmosphere play crucial roles in supporting the development of giftedness, because it impacts the good mental health of gifted children. Unilateral support oriented only on the cognitive side insufficiently develops the social and emotional dimension of the gifted child (Dočkal, Duchovičová, 2017).

School climate is the quality of the school environment related to the attitudes and behaviours of members of different groups (Wood, Peterson, 2018). More comprehensively, school climate is the culture of a school with its values, norms, and beliefs. More thoroughly, it is the school's goals and values, the classroom rules, the pupil's psychological state, their mental health and other factors. We also include the culture of success, the teaching process and the social climate (Pílech, 2003, in Petlák, 2006).

Průcha, Mareš and Walterová (2009) state that school climate is a social-psychological variable that expresses the quality of interpersonal relationships and social processes functioning in a given school as evaluated, perceived and experienced by teachers, pupils and school staff.

Nowadays, there is an evident increase in aggression, violence, bullying, cyberbullying and suicidal attempts. There has also been an increase in substance and non-substance addictions, loss of life involvement, apathy, resignation, demotivation, anxiety and depression. Many children lack social and emotional competencies for everyday functioning. For these reasons, building a positive school climate is highly crucial.

A positive school climate is based on Martin Seligman's positive psychology concept. From the pupil's point of view, a positive school climate is a climate where stressful situations do not occur, and pupils have the opportunity for their own self-fulfilment. Children feel their teachers care about their development. They feel accepted, and teachers treat them individually and fairly. The pupils know what teachers expect of them and have no fear of unpredictable demands. A school climate is a variable that educational psychology should prioritise. It is related to classroom climate, which depends on communication and teaching practices. For this reason, teachers must communicate positively with students, discuss different topics, evaluate objectively, and respect each other. Pupils can participate in the school's and classroom's assessment processes.

Support and security have a motivating effect (Petlák, 2006). School climate affects school performance. A negative school climate impacts the underperformance of gifted pupils. A positive school climate influences pupils' overall quality of life and mental health.

The World Health Organization (WHO, 2001) defines mental health as a state of physical and mental well-being in which a person is aware of his or her abilities, can cope with the usual stress of life, and can work productively and successfully.

Positive psychology plays a vital role in studying mental health. It deals with the following concepts: mental health, joy, and mental freshness, hope, enthusiasm, gratitude, and love (Park, Peterson, Seligman, 2004).

Positive psychology frequently discusses the topic of social-emotional health, a synonym for mental health. Social-emotional health is a state of subjective well-being and impacts a person's optimal functioning in life (Thompson, 1994). Social-emotional health is influenced by genetic disposition, temperament, and health problems, parenting style, environmental risks (Calkins, 2004), school environment and teacher personality. Social and emotional health are interrelated and interact with each other.

Covitality is a synonymous term for social-emotional health, a term introduced by Furlong in 2013. The term implies the presence of positive traits. The harmonious progression of the different dimensions of covitality is a prerequisite for satisfactory physical and psychological health (Furlong et al., 2014). According to Furlong (2014), children's and adolescent's strengths and positive characteristics include gratitude, optimism, enthusiasm, and excitement, which are also part of covitality. Gratitude is the ability to appreciate a gift or help from another person. It is also the power to realise the good things in life, and to be grateful for them. It is essential to foster this focal trait in pupils in the school environment. Optimism represents a general orientation towards the future with an expectation of a positive outcome, contributing to well-being. In the school environment, enthusiasm is an energy in pupil's and teacher's approach to life. Perseverance is a quality we characterise as stamina and passion for achieving a goal. Pupil's strong points help them succeed in school (Furlong et al., 2013).

Positive psychology has also been introduced into schools to promote pupil's mental health. The first phase emphasised the identification and measurement of student strengths. The second phase consisted of the developing and testing of interventions that focused on developing identified strong points. Finally, the third phase centered on developing diagnostic tools and intervention programmes for creating a positive school environment (Renshaw et al., 2009).

1.5 Research aim and research questions

Our quantitative research aimed to investigate the relationship between the social-emotional health of gifted pupils and the school climate in a school for gifted pupils. We also explored the relationship between the domains of Social-Emotional Health Survey (SEHS-S) and Georgia School Climate Survey (GSCS) dimensions. For this reason, it is a quantitative and exploratory research.

We think that a positive and supportive school climate improves mental/social-emotional health of gifted pupils.

Based on the literature reviewed, we set the following research questions:

Is there a relationship between the social-emotional health of gifted pupils and school climate in the school for gifted children? Are there relationships between the particular domains/dimensions in the Social-Emotional Health Survey and Georgia School Survey?

2 Methodology

The following section provides information about the research population and data collection methods.

2.1 Research population

The research population consisted of 71 pupils from a school for gifted children. The average age of the participants was 12.59 years. The most frequently occurring value concerning age was 12 years, with the most participants at this age. The minimum age was 11 and the maximum age was 15 years. The median age was 13 years. The selection of the research population was intentional.

2.2 Research method

The Social-Emotional Health Survey, which includes social and emotional skills, is used to measure covitality. In our research, we used a version of the questionnaire for older school age (from grade 6 in primary school to grade 4 in secondary school) called Social-Emotional Health Survey – Secondary SEHS-S (Furlong et al., 2014).

The covitality index has four domains, and each domain has three indicators:

- emotional competence (emotion regulation, self-control, empathy) (ECO);
- engagement in everyday life (optimism, enthusiasm, gratitude) (ENL);
- self-belief (self-awareness, self-efficacy, perseverance) (BIS);
- belief in others (family support, school support, peer support) (BIO) (Social-Emotional Health Survey, SEHS, Furlong et al., 2014).

The Social-Emotional Health Survey provides insight into children's psychological schemas, focusing on the optimal development of their personalities. It shows the areas of mental health and social-emotional competencies where the children are strong or have reserves, weaknesses, or shortcomings (Gajdošová et al., 2018).

Furlong (2016) reports that on a relevant school population of 14 171 secondary-school students in California, USA, by measuring the internal consistency of the responses obtained, they found a Cronbach's alpha reliability of 0.95 for the all racial groups of the school population.

We used the Georgia School Climate Survey (GSCS) to examine school climate, which has the following dimensions:

- relationships at school,
- pupil's character and their communication (CHA),
- school environment (PRŠ),
- adult social support (SOD),
- peer social support (SOR),
- cultural acceptance (KUL),
- order and discipline (PAD)
- safety (BEZ).

There is also the dimension mental health, but we did not include it in the research because it studies roughly the same thing as the social-emotional health questionnaire.

La Salle and Meyers (2014) validated the Georgia School Climate Survey questionnaire as part of a research project.

3 Results

To investigate the relationship between the social-emotional health of gifted pupils and school climate, as well as relationships between the domains and dimensions of the two questionnaires, the Social-Emotional Health Survey (SEHS-S) and the Georgia School Climate Survey (GSCS), we used

Spearman's correlation, a non-parametric test, given that the data did not have a normal distribution.

Table 1 Correlations between domains and dimensions of social-emotional health and school climate

		CHA	PRŠ	SOD	SOR	KUL	PAD	BEZ	GSCS TOTAL
BIS	rs	.300*	.370**	.297*	.430**	.354**	0,181	-0,015	.484**
	p	0,011	0,002	0,012	0,000	0,002	0,131	0,903	0,000
BIO	rs	0,231	.458**	.377**	.397**	.334**	.445**	0,024	.508**
	p	0,053	0,000	0,001	0,001	0,004	0,000	0,842	0,000
ECO	rs	.374**	0,183	0,233	.378**	.343**	.269*	-0,153	.344**
	p	0,001	0,127	0,051	0,001	0,003	0,024	0,202	0,003
ENL	rs	.297*	0,217	0,111	.427**	.288*	.344**	-0,006	.450**
	p	0,012	0,070	0,355	0,000	0,015	0,003	0,962	0,000
SEHS TOTAL	rs	.409**	.370**	.307**	.527**	.433**	.411**	-0,026	.585**
	p	0,000	0,001	0,009	0,000	0,000	0,000	0,828	0,000

Explanatory notes:

rs=Spearman's correlation coefficient, i. e. the higher the value, the stronger the correlation between the dimensions. The coefficient also indicates substantive significance.

p=p-value: it is statistical significance, and if $p < 0.05$, then we talk about statistical significance.

The results show a strong positive correlation (0.585) between social-emotional health and school climate.

The most significant correlations are between the domains/dimensions self-belief (BIS) and peer support (SOR) ($rs=0.430$, $p=0.000$); belief in others (BIO) and school environment (PRŠ) ($rs=0.458$, $p=0.000$); belief in others (BIO) and order and discipline ($rs=0.455$, $p=0.000$); and life engagement (ENL) and peer social support (SOR) ($rs=0.427$, $p=0.000$). These are moderately strong correlations.

The least significant correlations are between the domains/dimensions of self-belief (BIS) and safety (BEZ) ($rs=0.015$); belief in others (BIO) and safety (BEZ) ($rs=0.024$); life engagement (ENL) and safety (BEZ) ($rs=0.0006$).

4 Discussion

Our research aimed to investigate the relationship between the social-emotional health of the gifted pupils and the school climate in a school for gifted children. We also researched relationships between the domains/dimensions of the Social-Emotional Health Survey (SEHS-S) and the Georgia School Climate Survey (GSCS).

4.1 Interpretation of the results

With the first research question, we wanted to investigate the relationship between the social-emotional health of the gifted pupils and the school climate. We found out a strong correlation between these two investigated constructs. It is possible to improve the social-emotional health of pupils by improving the school climate.

Gajdošová et al. (2018) examined the relationship between social-emotional health and experience of happiness. They found a strong positive correlation. The experience of happiness influences the level of social-emotional health positively.

In our research, we found moderately strong relationships/correlations in the Social-Emotional Health Survey and the Georgia School Climate Surveys between the domains/dimensions of self-belief (BIS) and peer support (SOR); belief in others (BIO) and school environment (PRŠ). Belief in others (BIO) and order and discipline (PAD); life engagement (ENL) and peer social support (SOR) also correlated positively.

We assume that when pupils perceive support from peers, it is related to their self-belief, which may be higher and more profound. An appropriate and positive school environment is related to belief in others. Teachers and school staff are leading creators of a positive school climate which influences good mental health of pupils. Belief in others is also related to order and discipline. Discipline is desirable to some extent. Pupils should respect the boundaries. Peers social support relates to a pupil's life engagement, such as optimism, enthusiasm, gratitude. Fostering good relationships between pupils, their peers, and teachers is vital. We found weak correlations between the domains/dimensions of safety and self-belief; safety and belief in others; safety and life engagement. These domains/dimensions are not significantly related and do not influence each other.

The overall school climate level is in the positive perception of school climate range ($M=2.72$), with the highest level reached by the grade 2 and the lowest level reached by the grade 4. We can attribute this result to the challenging developmental stage when children perceive everything more critically. Boys perceive the school climate more negatively than girls. The highest value in the Social-Emotional Health Survey reached the domain belief in others (BIO) and the lowest level reached the domain life engagement (ENL), which may also be related to the critical developmental stage. The character and communication (CHA) with other domains was the highest scoring dimension in the Georgia School Climate Survey. The safety (BEZ) dimension was the lowest scoring dimension. We found the pupils have friends at school who can help them when they need it.

Gajdošová and Majerčáková Albertová (2018) validated the Georgia School Climate Survey (GSCS) in Slovakia. They surveyed four elementary schools, and 832 students participated in the research. Pupils perceived the school climate positively.

Szobiová and Polák (2019) researched on school climate in inclusive schools. The sample consisted of 136 primary school pupils in Slovakia. Pupils from lower grades rated the school climate the lowest. Perceptions of school climate became more positive with increasing age.

Peterson and Ray (2006) researched bullying in a school for gifted children in grade 8. The authors found through qualitative analysis that victims of bullying did not share their problem with others. However, high intelligence helped them understand why they were bullied. It is crucial to create social contacts so gifted pupils can experience well-being and feel safe at school. Building a positive school climate is also essential.

The school represents an important social environment, influences the children's self-concept, self-image formation, and impacts their healthy development. Ignat (2011) emphasises the role of school counsellors in schools for gifted children. They co-create a positive school climate. Kumar, Phil and Vijay (2013) argue that school climate impacts the achievement and the use of the potential of gifted children.

5 Conclusion

We want to undertake further research in other schools for gifted children to provide them with the results. The research results would be interesting to these schools, as they would allow them to improve the conditions for the education of gifted pupils and enhance their well-being and mental/social-emotional health.

There is a lack of research on giftedness, and it seems vital to realise research on giftedness and gifted children. New and up-to-date research will contribute to better support for the gifted population in schools.

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Primary Paper Section: A

Secondary Paper Section: AN

EMOTIONAL HABITUAL SUBJECTIVE WELL-BEING IN SELECTED LANGUAGE CLASSES AMONG SECONDARY SCHOOL PUPILS

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Abstract: Objectives. The study aimed to determine: 1). The possible difference in emotional habitual subjective well-being for the mother tongue (primary language acquired by the pupils), dominant language (a language acquired a longer time by the pupils) and subdominant language (a language acquired a shorter time) in the pupils of two secondary schools. 2). Possible difference in school performance (average school achievement in the taught languages of English, German, Russian, Spanish, French and Slovak) of pupils and emotional habitual subjective well-being in the mother tongue, dominant and subdominant language in the language skills of reading, writing and speaking. Research population and method. The research population comprised secondary school pupils (n = 38) attending a given secondary school's first to the third year. We divided them into a group of participants studying in a bilingual grammar school (47.37%) and a group of participants studying in a bilingual class of a business academy (52.63%). We administered a non-standardised questionnaire and the Scales of Emotional Habitual Subjective Well-being (SEHP) (Džuka & Dalbert, 2002) to the participants. Research questions. Is there a difference in emotional habitual subjective well-being among pupils based on gender in the mother tongue language skills of reading, writing, and speaking? Is there a difference in emotional habitual subjective well-being among pupils based on school type in the mother tongue in the language skills of reading, writing, and speaking? Is there a difference among pupils in average school achievement in their mother tongue and emotional habitual subjective well-being? Is there a difference in emotional habitual subjective well-being among pupils based on gender in the dominant language in the language skills of reading, writing, and speaking? Is there a difference in emotional habitual subjective well-being among pupils based on school type in the dominant language in the language skills of reading, writing, and speaking? Is there a difference among pupils in average school achievement in the dominant language and emotional habitual subjective well-being? Is there a difference in emotional habitual subjective well-being among pupils based on gender in subdominant language in the language skills of reading, writing, and speaking? Is there a difference in emotional habitual subjective well-being among pupils based on school type in the subdominant language in the language skills of reading, writing, and speaking? Is there a difference among pupils in average school achievement in subdominant language and emotional habitual subjective well-being? Is there a difference in emotional habitual subjective well-being in any of the languages studied and average school achievement? Statistical analysis. The methods of statistical processing were: descriptive statistics (percentages, arithmetic averages). Results. The results indicate differences in emotional habitual subjective well-being between languages for pupils in terms of gender, school type and average school achievement. Limitations. Our research did not focus on the possibility of a different representation of the mother tongue than Slovak and non-bilingual classes. We assessed school achievement through a single modality: the arithmetic means obtained from foreign language scores. We did not account for other factors, such as time frame and teachers' perceptions of participants in the context of their school achievement. Another shortcoming of our research was the uneven representation of participants in terms of gender. The results were treated only in terms of descriptive statistics. A severe limitation is that the research results are valid only for the research population under study.

Key words: foreign language, dominant language, emotional habitual subjective well-being, language skills, mother tongue, average school achievement, subdominant language, pupil

1 Introduction

Fundamental theoretical underpinnings of research by Caldwell-Harris (2014), Frances, De Bruin and Duñabeitia (2020), Ivaz, Griffin and Duñabeitia (2018), Jurášová and Kissová (2021), Iacozza, Costa and Duñabeitia (2017), Kráľová, Škorvagová, Tirpáková and Markechová (2017), Kráľová, Kováčiková, Repová and Škorvagová (2021), Kamenická and Kráľová (2021) led us to an investigation if there is a difference in emotional habitual subjective well-being in language learning. In our research, we examined the differences in emotional habitual subjective well-being in the mother tongue, first acquired foreign language and second acquired foreign language in pupils of two secondary schools (bilingual grammar school and bilingual class of business academy). We focused on language skills of reading, writing and speaking based on the studies of Jurášová and Kissová (2021), Jurášová and Szalatnyaiová (2019), Frances, De Bruin and Duñabeitia (2020), who found that there is a difference in emotional habitual subjective well-being between the mother tongue and dominant language. For the research, we considered the mother tongue as the primary (first) language acquired in agreement with Jurášová and Kissová (2021) and Sokolová (2013). We considered the language pupils acquire

longer as the dominant language in agreement with Jurášová and Kissová (2021). Finally, we defined the language pupils acquire for a shorter period as a subdominant language. Another variable was the arithmetic mean of pupils' school grades in the languages taught (English, German, Russian, Spanish, French and Slovak) during their studies at a given secondary school. In the very end, we evaluated the results of our research and compared them with the results of other research by Caldwell-Harris (2014), Frances, De Bruin and Duñabeitia (2020), Ivaz, Griffin and Duñabeitia (2018) and Jurášová and Kissová (2021).

Subjective well-being

Subjective well-being is a subjectively experienced state resulting from a person's individual experience during everyday life, with the resulting state being the sum of positive and negative emotional states and habitual (persistent) subjective well-being, which is the result of a state of mind characteristic of the person (Pašková, 2009).

In its most general definition, subjective well-being encompasses how people evaluate their lives (Diener, 2000). In the domestic literature, Džuka (1996), Džuka and Dalbert (1997, 2000) deal primarily with this concept, and they base their definition on the German term *Subjektives Wohlbefinden* (Subjective well-being). In the literature (Džuka, 1996; Poláčková Šolcová, 2018), there are various forms of the term subjective well-being, such as life satisfaction, mental health, general health, psychological well-being, satisfaction, well-being, happiness, positive emotional balance, psychological well-being, positive health. In the Anglo-Saxon literature (Kebza, 2005; Krivohlavý, 2013), we mainly encounter the concept of well-being and its extensions: subjective, psychological, psychosocial and mental well-being. In terms of health, this concept is understood broadly as a state of complete physical, mental and social well-being (Pašková, 2009). Džuka (2004) characterises subjective well-being as the conditions of one's life evaluated by the emotional system.

Pašková (2009) and Džuka (2004) use the concepts of mental well-being and subjective well-being in the same sense, as evidenced by the following definition by Blatný (2001, p. 385): "Mental well-being is determined by the assessment of satisfaction with one's life, the presence of positive and the absence of negative emotions." In definitions of subjective well-being, the emphasis is on the emotional and cognitive aspects. "The cognitive component represents a conscious appraisal of one's life referred to in the literature as life satisfaction. The emotional component consists of all moods, emotions, and affections, both pleasant and unpleasant. People experience a certain level of satisfaction without often consciously thinking about it" (Pašková, 2011, p. 14). Cantril (1965), considered a pioneer in the field of research on subjective well-being, defined it as a cognitive experience related to an individual's comparison of what a person perceives in a given situation with what he or she aspires to. The discrepancy between the two is expressed by a measure of satisfaction-dissatisfaction, with a greater degree of satisfaction indicating the experience of subjective well-being. According to Cantril (1965), subjective well-being is a matter of subjective satisfaction with achieving the expected. He emphasises the cognitive aspect. Other influential pioneers in the cognition of subjective well-being are Bradburn and Noll (1969), who define the term as a lived state resulting from a person's individual experience in the course of everyday life, with the result being the sum of negative and positive episodes. Bradburn and Noll (1969) viewed subjective well-being, in agreement with Pašková (2011), as a balance of negative and positive emotions, emphasising the emotional aspect.

In his model of subjective well-being, Becker (1991) considers mainly positive emotions (joy, feelings of happiness, perceptions of competence) and positive moods (relaxation, enthusiasm, positive excitement) as initial concepts. Becker's (1991) model

includes psychological and physical aspects, considering subjective well-being's duration or temporal aspect in agreement with Brandstätter (1991). Combining the aspects results in four components of structure:

- current psychological well-being,
- habitual psychological well-being,
- current physical well-being,
- habitual physical well-being.

Current psychological well-being is characteristic of a specific point in time and can be captured by one particular emotion, mood or bodily sensation, and is definable through emotion. It is a momentary state of mind, a currently experienced subjective well-being (Pašková, 2009).

Habitual psychological well-being represents a relatively stable trait. It includes persistent positive feelings, moods and bodily sensations together with the absence of habitual difficulties, and its determination is complex (Pašková, 2009).

According to Diener's (2000) concept, subjective well-being consists of two components:

- Emotional component – frequency of experiencing positive and negative emotions.
- Cognitive-evaluative component – satisfaction with one's life.

Emotions and learning

Meyer, Schützwohl and Reisenzein (1993) write that emotions are instances of states such as joy, sadness, anger, fear, pity, disappointment, relief, pride, shame, guilt, and dependence, as well as instances of other kinds of states that are sufficiently similar to the above. At present, the understanding of emotions lags behind the understanding of almost all other aspects of life. We are physically fit, intellectually brilliant, and spiritually imaginative but underdeveloped emotionally. Emotions contain an essential vitality that can focus on self-knowledge, interpersonal perception, and deep healing. We categorise, celebrate, denigrate, suppress, manipulate, demean, deify or ignore emotions. To be empathic is to be able to perceive and understand emotions. We have learned to hide, suppress and camouflage our emotions (McLaren, 2018). From the above, it is not enough to use only innovative methods and forms of work in schools but to address more emotional aspects. Emotions are highly significant to a pupil's learning. Good learning and good results depend on positive emotions. Sometimes fear and stress can also bring results, but not long-term ones. Their prolonged effects can affect pupils very negatively (Petlák, 2018).

The role of emotions in learning

Positive and negative emotions affect the pupil's interest, his/her school achievements, and engagement in the teaching process. Emotions not only affect learning but also influence, support and disrupt the process of individual pupil development. Most often, only pupils are associated with emotions. We should be aware that pupils' emotions influence teachers' emotions (Petlák, 2018), and a teacher can influence pupils' emotions with his/her emotions. Overall, a teacher's emotions can significantly influence his/her teaching style, approach to teaching, and the pupils themselves. Emotions are highly influential in hormone production. Positive emotions (satisfaction, good mood, joy of cognition) contribute to dopamine secretion. They positively affect cognitive processes, the flexibility of thinking, creativity and interest in something new. Negative emotions (fear, anxiety, anger, worry) produce increased levels of noradrenaline, which represents a stress hormone that influences the results achieved in the learning process, and affects the development of pupils, their health, and psychological state. It also affects the teacher's approach to teaching (Petlák, 2018). Negative emotions can have a good effect on the learning outcome. The difference between positive and negative emotions is that negative emotions only affect the outcome, i.e. not the process of learning, which then

results in deficiencies such as forgetting the material, and problems with knowledge transfer (Petlák, 2018). The importance of emotions affects not only making pupils feel good in school but mainly their interest in learning and learning to understand themselves. Petlák (2018, p. 25) emphasises: „The greatest chance of retaining, understanding, and remembering the studied topic is to create an environment in which learning produces enjoyment.“

Emotional intelligence

Goleman (2017, p. 60) characterises emotional intelligence as „the ability to motivate oneself and persevere despite frustrations, to control one's impulses and delay gratification, to regulate one's moods, not to allow nervousness to limit one's ability to think, to be able to empathise with others, and not to lose hope.“ Emotional intelligence needs close attention for several reasons: many pupils avoid their peers, show dissatisfaction, and some do not perform satisfactorily at school despite a high intelligence quotient. The cause is nervousness and stress. We meet pupils who do not control their emotions and suffer from emotional tension in school. Some pupils are conflictive. There are pupils who suffer from fear of failure, ridicule, and humiliation, their intellectual performance decreases, and they work inefficiently. Pupils do not understand each other and do not understand themselves. The result is often misunderstandings and disputes. Motivation promotes emotionality, and emotionality promotes activity. This approach is the basis of good results (Petlák, 2018).

Language acquisition

In the past, monolingualism (mastery of one language to cope with common communication challenges, Jurášová & Szalatnyaiová, 2019) was sufficient for people's lives. Nowadays, individuals should be proficient in several languages, and the preference is for bilingualism (communicative proficiency in several languages, Jurášová & Szalatnyaiová, 2019; Straková & Sepešiová, 2013). Knowing several foreign languages has become part of the process of globalisation of society. The requirement to use more languages in everyday communication is shifting from the environment where it has its tradition and justification. Preschool children are encouraged to actively or passively acquire several languages, even though only the mother tongue predominates in family communication. Mastery of foreign languages brings many benefits, such as the possibility of a better-paid job, travelling, continuing studies at foreign universities, getting to know other people and being able to communicate with them, feeling more European, and others (Jursová Zacharová & Sokolová, 2013). However, it is questionable what is the emotional habitual subjective well-being of pupils in language acquisition during their studies in secondary school. We have tried to answer this question in our work. The process of acquiring the mother tongue differs from acquiring a non-native language. The cognitive impact of language learning is different in childhood than in adulthood because it is a different way of learning. Due to the critical and sensitive period, language acquisition can be a chimera for pupils. Some pupils may struggle with a lack of self-esteem and confidence in their abilities, may lose motivation to learn and acquire new knowledge, and may struggle with self-discipline and perseverance (Smetanová, 2020, p. 173). Language acquisition in a classroom setting may produce poorer school outcomes than acquiring language through natural contact. Acquiring a second language can be much more complicated than acquiring a third language. Different languages in the human brain use the same neural networks but at the same time show different patterns of brain activation, suggesting a degree of language specificity. Language acquisition changes our behaviour and identity (Duñabeitia, 2018).

Linguistic emotionality

Linguistic emotionality reflects the subjective emotional experience of using a particular language. For bilinguals, one language appears less personal and artificial, while the other

appears more intimate and natural (Jurášová & Kissová, 2021). Embodied cognition tells us that the sensorimotor areas of the brain are also activated during language use. The meaning of a word is processed in synergy with areas of the cerebral cortex responsible for encoding sensory, visual, auditory, motor, and affective information (Jurášová & Kissová, 2021). In a modular view of the mind, emotion and language should have little overlap in their processes and representations (Caldwell-Harris, 2014).

Research objectives

In our research, we tried to find out the possible difference:

- 1) in the emotional habitual subjective well-being in the mother tongue (the primary language acquired by the pupils), the dominant language (the language acquired longer time by the pupils) and the subdominant language (the language acquired shorter time) of the pupils of two secondary schools,
- 2) in the school performance (average school achievement in the taught languages of English, German, Russian, Spanish, French and Slovak) of pupils and emotional habitual subjective well-being in the mother tongue, dominant and subdominant languages in the language skills of reading, writing, and speaking.

Research questions

Given the theoretical and empirical findings of Iacozza, Costa and Duñabeitia (2017), Ivaz, Griffin and Duñabeitia (2018) and Jurášová and Kissová (2021), we decided to formulate the following research questions:

RQ1: Is there a difference in emotional habitual subjective well-being among pupils based on gender in their mother tongue in language skills of reading, writing, and speaking?

RQ2: Is there a difference in emotional habitual subjective well-being among pupils based on school type in their mother tongue in language skills of reading, writing, and speaking?

RQ3: Is there a difference between pupils' average school achievement in their mother tongue and emotional habitual subjective well-being?

RQ4: Is there a difference in emotional habitual subjective well-being among pupils based on gender in the dominant language in skills of reading, writing, and speaking?

RQ5: Is there a difference in emotional habitual subjective well-being among pupils based on school type in the dominant language in skills of reading, writing, and speaking?

RQ6: Is there a difference between pupils' average school achievement in the dominant language and emotional habitual subjective well-being?

RQ7: Is there a difference in emotional habitual subjective well-being among pupils based on gender in the subdominant language in skills of reading, writing, and speaking?

RQ8: Is there a difference in emotional habitual subjective well-being among pupils based on school type in the subdominant language in skills of reading, writing, and speaking?

RQ9: Is there a difference between pupils' average school achievement in subdominant language and emotional habitual subjective well-being?

RQ10: Is there a difference in emotional habitual subjective well-being for any of the languages studied and average school achievement?

2 Methods

We divided the research population into a group of participants studying in a bilingual secondary grammar school and a group of participants studying in a bilingual class of a business academy. The 38 (100%) member research population comprised 47.37% of the participants from the bilingual grammar school and 52.63% of the participants from the bilingual class of the business academy who attended the first to third year of the given secondary school. There were 34.21% of the girls and 13.16% of the boys from a bilingual grammar school, and

44.74% of the girls and 7.89% of the boys were from a bilingual class of the business academy.

In our research, we administered a non-standardised questionnaire that aimed to ascertain a) emotional habitual subjective well-being with the application of the Scales of Emotional Habitual Subjective Well-Being (SEHP) (Džuka & Dalbert, 2002) and b) information about the participants (gender, school, mother tongue, dominant and subdominant foreign languages). In the Scales of Emotional Habitual Subjective Well-being (SEHP) (Džuka & Dalbert, 2002), which have been applied to the language skills of reading, writing, and speaking, Džuka and Dalbert (2002, p. 245) identified four nouns to describe the positive mood and six nouns to describe the negative mood. They organised them into two scales, with positive mood defined by the items of joy, happiness, enjoyment, and bodily freshness (Cronbach's alpha across seven studies ranging from 0.67 to 0.80; stability coefficient $r = 0.63$). They defined the negative mood by the items of shame, guilt, fear, sadness, pain, and anger (Cronbach's alphas ranging from 0.68 to 0.74; stability coefficient $r = 0.66$; mean intercorrelation between the two scales $r = -0.23$). The descriptors such as anger, guilt, shame, fear, joy, sadness, and happiness represent items classifying emotions. Items classifying bodily sensations that exclusively mediate the perception of one's own body are the descriptors: pleasure, bodily freshness, and pain (Džuka & Dalbert, 2002, p. 245). Participants commented on the frequency of experiencing these states on a six-point response scale with the options: hardly ever (1) – rarely – sometimes – often – very often – almost always (6). Furthermore, the questionnaire included five multiple-choice questions and three open-ended questions. It included questions to find out information about the participants, such as their gender, school, and mother tongue. Subsequently, a question followed regarding the choice of first (dominant) and second (subdominant) foreign language, and then the subjective emotional well-being of the chosen foreign language and mother tongue was surveyed. Participants could choose from English, German, Russian, Spanish, French, Italian, and Slovak for all three languages. We collected the pupils' arithmetic mean of the school grades in the given languages (English, German, Russian, Spanish, French, and Slovak) during their previous secondary school studies (from the first to the third year of the given secondary school). We distributed the questionnaire online. The statistical processing method was descriptive statistics.

3 Results

Emotional habitual subjective well-being among pupils based on gender and mother tongue in the language skills of reading, writing and speaking

We were interested in whether there is a difference in emotional habitual subjective well-being among pupils based on gender in the mother tongue language skills of reading, writing, and speaking. When examining which mother tongue the participants had acquired, we found that out of the total research population ($n = 38$), 97.37% of the participants had acquired Slovak, and 2.63% had acquired French. For the skill of reading in their mother tongue, 68.42% of girls and 21.05% of boys experienced a positive emotional state. For boys, this represents 100% of the total number of boys. 10.53% of girls and no boys experience a negative emotional state. For the writing skill in the mother tongue, a positive emotional state is experienced by 50% of girls and 15.79% of boys. 23.68% of girls and 5.26% of boys experience a negative emotional state. The frequency of negative and positive emotional states was the same for 5.26% of girls. A positive emotional state is experienced by 57.89% of girls and 21.05% of boys in their speaking skills. 10.53% of girls and no boys experienced a negative emotional state. The frequency of positive and negative emotional states of mind was the same for 10.53% of girls. There was no congruence of emotional states in boys.

According to the frequency of experiencing emotions in reading skills, we found that both genders rarely experience negative

emotional states. Positive emotions were experienced frequently by boys and occasionally by girls. For the skill of writing, both boys and girls experienced positive emotional states occasionally and negative emotions rarely. The frequency of negative emotional state was experienced occasionally by boys and frequently by girls in the skill of speaking. For the skill of speaking, positive emotions were experienced frequently by boys and occasionally by girls (Table 1).

Table 1: Mother tongue and frequency of emotional experience based on gender.

Gender	READING		WRITING		SPEAKING	
	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR
girl	1.90	3.23	2.00	2.77	3.84	3.27
boy	1.54	3.70	1.95	3.05	3.08	3.79
	1.72	3.47	1.98	2.91	3.46	3.53

Legend: AMR = arithmetic mean

Participants have a gender difference in emotional habitual subjective well-being in mother tongue language skills. The frequency of often experienced positive emotions was higher for boys in the language skills of reading and speaking, while for girls, there was a higher frequency of occasionally experienced experiencing positive emotions. For the skill of speaking, the frequency of experiencing negative emotions was found frequently for girls and occasionally for boys. The frequency of experiencing positive emotions for both boys and girls was occasionally for the skill of writing. For this skill, the frequency of experiencing negative emotions was rarely in both genders.

Emotional habitual subjective well-being among pupils based on school type and mother tongue in the language skills of reading, writing and speaking

For the skill of reading, 39.47% of the participants from the bilingual secondary grammar school experience a positive emotional state and 7.89% of the participants experience a negative emotional state. For the pupils of the bilingual business academy class, 50% of the participants experience a positive emotional state, and 2.63% of the participants experience a negative emotional state for the skill of reading. For the skill of writing, 23.68% of the participants from the bilingual grammar school experience a positive emotional state and 21.05% of the participants experience negative emotions. 42.11% of the participants of the bilingual business academy class experience positive emotions, and 7.89% experience negative emotions in the skill of writing. The frequency of positive and negative emotional states was the same for 2.63% of the participants in both schools. We found the same result of 39.47% of the participants experiencing positive emotions in the skill of speaking in the participants of both schools. The frequency of positive and negative emotions was the same for 7.89% of the bilingual secondary grammar school participants and 2.63% of the business academy class pupils, respectively. 10.53% of the bilingual business academy class participants experience negative emotions in their speaking skills.

The frequency of experiencing a negative emotional state in participants from both schools was rarely evident in their reading skills. For this skill, the frequency of positive emotional state was experienced occasionally by the bilingual grammar school class participants and frequently by the bilingual business academy class participants. The frequency of experiencing positive and negative subjective well-being was the same for the skill of writing, in which the frequency of negative emotional state was rarely experienced, and positive emotional state was experienced occasionally by the participants. For the skill of speaking, the frequency of negative emotional state was experienced frequently by the participants of the bilingual grammar school class and occasionally by the participants of the bilingual business academy class. The participants of both schools often experienced a positive emotional state. We present the results of the frequency of positive and negative emotional states in Table 2.

Table 2: Mother tongue and frequency of emotional experiencing based on school type.

School	READING		WRITING		SPEAKING	
	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR
bilingual grammar school	1.58	3.19	1.96	2.55	3.58	3.45
bilingual class of BA	1.85	3.74	1.99	3.27	3.17	3.61
	1.72	3.47	1.98	2.91	3.38	3.53

Legend: AMR = arithmetic mean; BA = business academy

The research found differences in emotional habitual subjective well-being in mother tongue by school type for the skill of reading when experiencing positive emotions and for the skill of speaking when experiencing negative emotions.

Emotional habitual subjective well-being and average school performance in mother tongue

We investigated whether there is a gender difference among pupils in a bilingual secondary grammar school and a bilingual business academy class in average academic achievement in their mother tongue and emotional habitual subjective well-being. The average school grade represents the participants' achievement in their mother tongue during their studies at secondary school. The research results indicate that boys' average school achievement in their mother tongue is worse for pupils of both schools (1.50 participants in bilingual grammar school, 1.73 participants in bilingual class of business academy). Despite having a lower average school achievement (1.73) in the bilingual business academy class, boys often experienced positive emotional habitual subjective well-being in all three language skills (reading, writing, and speaking). They rarely experience negative emotional habitual subjective well-being. Boys from the bilingual secondary grammar school experience positive emotions occasionally in the skills of reading and writing. They experience positive emotions frequently in the skill of speaking. The frequency of negative emotion was experienced frequently for the skill of speaking and rarely for the skills of reading and writing. The girls of the bilingual secondary grammar school class had an average school achievement of 1.23; the girls of the bilingual business academy class scored an average of 1.35 in their mother tongue. The girls of the bilingual business academy class often experienced positive emotions in the skill of reading and occasionally experienced positive emotions in the skills of writing and speaking. They rarely experience negative emotions in the skills of reading and writing, and they often experience negative emotions in the skill of speaking. For the girls from the bilingual grammar school, positive emotion was experienced occasionally in all three language skills. They rarely experienced a negative emotional state in reading and writing skills. For the skill of speaking, negative emotions were experienced by girls occasionally. We present the results of the research in Table 3.

Table 3: Mother tongue and comparison of emotional habitual subjective well-being with average school grade.

School	Gender	Average school grade AMR	READING		WRITING		SPEAKING	
			Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR
bilingual grammar school	girl	1.23	1.69	2.98	1.85	2.50	3.33	3.25
	boy	1.50	1.47	3.40	2.07	2.60	3.83	3.65
The total value of the bilingual grammar school		1.37	1.58	3.19	1.96	2.55	3.58	3.45
bilingual class of BA	boy	1.35	2.10	3.49	2.15	3.04	4.00	3.29
	girl	1.73	1.61	4.00	1.83	3.50	2.33	3.92
The total value of the bilingual class of BA		1.54	1.85	3.74	1.99	3.27	3.17	3.61
Total		1.45	1.72	3.47	1.98	2.91	3.37	3.53

Legend: AMR = arithmetic mean; BA = business academy

There is a difference between average school performance in the mother tongue and emotional habitual subjective well-being.

Emotional habitual subjective well-being among pupils based on gender and dominant language in the language skills of reading, writing and speaking

100% of the participants showed evidence of English language acquisition for the dominant language. We were interested in whether there was a difference in emotional habitual subjective well-being among pupils based on gender in the dominant language in the language skills of reading, writing, and speaking. Based on the results obtained, we found that girls experience positive emotional habitual subjective well-being in all language skills (reading – 65.79%, writing – 65.79%, speaking – 60.53%), but there is also matching of the emotional states of mind in all language skills. This congruence is experienced by a minimum of 2.63% (reading and writing) and a maximum of 5.26% (speaking) of the participants. More than 65% of boys experience a positive emotional state for all language skills. There was no emotional state of mind congruence for boys in any of the language skills. 7.89% of boys experience negative emotions in the skill of writing, 5.26% in speaking and 2.63% in reading. From our research findings, it is evident that the frequency of positive emotional state is frequent among boys and girls in the reading and speaking skills. In the skill of writing, positive emotions are experienced occasionally. The frequency of negative emotional states was rarely for all three language skills and both genders (Table 4).

Table 4: Dominant language and frequency of emotional experience based on gender.

Gender	READING		WRITING		SPEAKING	
	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR
girl	1.97	3.48	2.03	3.29	2.16	3.48
boy	1.81	3.53	2.00	2.94	1.96	3.56
	1.89	3.51	2.02	3.12	2.06	3.52

Legend: AMR = arithmetic mean

We found no gender differences in emotional habitual subjective well-being for the language skills of reading, writing, and speaking for the dominant language.

Emotional habitual subjective well-being among pupils based on school type and dominant language in the language skills of reading, writing and speaking

From the results, we can further see that positive emotional disposition prevails among the pupils of bilingual grammar school (in the skills of reading – 44.74%, writing – 36.84% and speaking – 42.11%). We found negative emotions in 2.63% of participants in reading, 7.89% in writing and 5.26% in speaking. For the bilingual business academy class participants, positive emotions are also prevalent in all three language skills (reading – 39.47%, writing – 42.11% and speaking – 34.21%). 10.53% of these participants experience negative emotions in reading, 7.89% in writing and 15.79% in speaking. The frequency of positive and negative emotional states was the same for the participants of the bilingual grammar school for the skill of writing and the participants of the bilingual business academy class for all three language skills, with 2.63% of the participants of both schools. A positive emotional state is experienced frequently by bilingual grammar school pupils in reading and speaking skills. For the skill of writing, positive emotions are experienced occasionally. The frequency of negative emotional states was rarely experienced in all three skills in this school. The pupils of the bilingual class of the business academy occasionally experience positive emotions for all three skills. For the skills of reading and writing, the frequency of negative emotional states was rarely experienced by the pupils of the bilingual class of the business academy. For speaking skills, pupils of this school occasionally experienced negative emotions.

Emotional habitual subjective well-being and average school achievement in the dominant language

The average school grade represents the participants' achievement in the dominant language they achieved while studying in secondary school. Our research results show the average school performance of boys and girls in the bilingual grammar school and bilingual business academy classes. Both boys and girls in the bilingual business academy class demonstrated worse average school performance (boys = 1.68, girls = 1.45) than the participants in the bilingual grammar school (boys = 1.10, girls = 1.23). The boys of the bilingual business academy class achieved the worst average school performance; the average school grade was 1.68. Despite the poorer average school grade, boys from the bilingual business academy class often experienced positive emotional states for the skill of reading and occasionally for the skill of speaking and rarely for the skill of writing. Girls experience positive emotional states occasionally in all three language skills. They rarely experience negative emotions for the language skills of writing and reading, and for the skill of speaking, negative emotions are experienced occasionally for both genders. The negative emotions that boys from the bilingual grammar school rarely experience for the skills of writing and speaking and rarely for the skill of reading reflect their best average school achievement for all participants in both schools (n = 38). The mean school grade achieved was 1.10. The frequency of positive emotional states in the boys of the bilingual grammar school was often for speaking and reading skills. Positive emotion frequency occasionally appeared in the skill of writing. Similarly, the girls of the bilingual grammar school experienced negative and positive emotions like boys, except for negative emotions in the reading skill, which they rarely experienced, even though their average school grade was slightly worse. Girls achieved an average school grade of 1.23. We present the results of the research in Table 5.

Table 5: Dominant language and a comparison of emotional habitual subjective well-being with the average school grade.

School	Gender	Average school grade AMR	READING		WRITING		SPEAKING	
			Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR
bilingual grammar school	girl	1.23	1.46	3.56	1.55	3.31	1.62	3.58
	boy	1.10	1.43	3.55	1.77	3.35	1.63	3.90
The total value of bilingual grammar school		1.17	1.45	3.55	1.66	3.33	1.62	3.74
bilingual class of BA	girl	1.45	2.35	3.43	2.40	3.28	2.57	3.40
	boy	1.68	2.44	3.50	2.39	2.25	2.50	3.00
The total value of bilingual class of BA		1.57	2.40	3.46	2.40	2.76	2.53	3.20
Total		1.37	1.92	3.51	2.03	3.05	2.08	3.47

Legend: AMR = arithmetic mean; BA = business academy

We found differences in the frequency of positive and negative emotional states and the average school grade for pupils in both schools.

Emotional habitual subjective well-being among pupils based on gender and subdominant language in the language skills of reading, writing and speaking

The subdominant language represents the second language the participants acquire during their studies in secondary school. According to the subjective responses, we found that participants (n = 38) acquired German the most (39.47%), which was also the most acquired subdominant language among participants of the bilingual grammar school (26.32%). In the bilingual class of the business academy, we found that Russian and Spanish were the most acquired subdominant languages (18.42%). In this class, 2.63% of the participants acquired French.

The following results emerged from the research. For the skill of reading in subdominant language, out of 100% of participants, 26.32% of girls experience a negative emotional state and 50% experience a positive emotional state for this skill. For boys, 15.79% experience positive emotions and 2.63% experience negative emotions for the skill of reading. We found the same

results for writing skills in boys (15.79% experience positive emotions and 2.63% experience negative emotions). 47.37% of girls experience a positive emotional state, and 28.95% experience a negative emotional state for the skill of writing. For the skill of speaking, the same results showed that 42.86% of girls experience negative and positive emotions. For boys, 11.43% experience negative emotions and 2.86% experience positive emotions. The frequency congruence of positive and negative emotions was the same for reading and writing skills for both girls and boys at 2.63%. Based on the frequency of positive and negative emotional states, both genders rarely experience a negative emotional state. Positive emotions are experienced by both boys and girls in all three language skills for subdominant language occasionally. We present the obtained results in Table 6.

Table 6: Subdominant language and frequency of emotional experience based on gender.

Gender	READING		WRITING		SPEAKING	
	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR
girl	2.04	2.75	2.03	2.58	2.24	2.72
boy	1.81	3.16	1.83	3.25	2.17	3.19
	1.93	2.96	1.93	2.92	2.21	2.96

Legend: AMR = arithmetic mean

The research did not find differences in emotional habitual subjective well-being based on gender for subdominant language.

Emotional habitual subjective well-being among pupils based on school type and subdominant language in the language skills of reading, writing and speaking

Out of the research population, for the skill of reading in the subdominant language, a negative emotional state of mind was experienced by 10.53% of the participants in the bilingual grammar school and 31.58% of the participants experienced a positive emotional state of mind. We found the same result for speaking skills in bilingual grammar school pupils. In speaking skills, 23.68% of the participants experience positive emotions, and 21.05% experience negative emotions. The frequency of experiencing positive and negative emotions was the same for the skills of reading and writing – 5.26% and for the skill of speaking – 2.63%. In the bilingual business academy class, 34.21% of the participants experience positive emotions, and 18.42% of the participants experience negative emotions in the skill of reading. For the language skill of writing, 21.05% of the participants experience negative emotions, and 31.58% experience positive emotions. The same result occurred in experiencing positive and negative emotions for 26.32% of the participants in the skill of speaking. Pupils at both schools experienced positive emotions occasionally for all three language skills. The frequency of experiencing negative emotions was low for reading and writing skills for pupils of both schools. For the skill of speaking, the pupils of the bilingual grammar school experienced negative emotions rarely, and those of the bilingual class of the business academy experienced negative emotions occasionally.

Emotional habitual subjective well-being and average school achievement in a subdominant language

In the research population, we found that the girls of the bilingual grammar school have, on average, the best school performance (arithmetic mean of school grades in the languages of English, German, Russian, Spanish, French and Slovak, 1.23) than the participants from both schools, and the boys of the bilingual business academy class have the worst average school grade (1.80). We found a correlation between the frequency of experiencing negative emotions and the average school grade of the girls in the bilingual grammar school. Girls achieve the best average school grade (1.23) and rarely experience negative emotions in all three language skills. The frequency of girls experiencing positive emotions was occasionally for the skills of reading and speaking and rarely for the skill of writing. The boys

in the bilingual grammar school experienced negative emotions as rarely as girls in all three language skills and positive emotions occasionally in all language skills. The girls in the bilingual class of the business academy achieved a better average school grade (1.39) than the boys in the same school (1.80). Girls occasionally experienced positive emotions in reading, writing and speaking skills. They rarely experience negative emotions in the skills of reading and writing and occasionally in the skill of speaking. Boys rarely experience negative emotions for all language skills. They often experience positive emotions for reading and writing skills and occasionally for speaking skills. We present the results obtained in Table 7.

Table 7: Subdominant language and a comparison of emotional habitual subjective well-being with average school grade.

School	Gender	Average school grade AMR	READING		WRITING		SPEAKING	
			Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR
bilingual grammar school	girl	1.23	1.72	2.77	1.69	2.44	1.76	2.62
	boy	1.28	1.73	2.95	1.97	3.10	2.17	3.15
The total value of bilingual grammar school		1.26	1.73	2.86	1.83	2.77	1.96	2.88
bilingual class of BA	girl	1.39	2.28	2.74	2.29	2.69	2.62	2.79
	boy	1.80	1.94	3.50	1.61	3.50	2.17	3.25
The total value of the bilingual class of BA		1.60	2.11	3.12	1.95	3.10	2.39	3.02
Total		1.43	1.92	2.99	1.89	2.93	2.18	2.95

Legend: AMR = arithmetic mean; BA = business academy

On average, girls from both schools are more successful in subdominant language. However, boys rarely experience negative emotional subjective well-being.

Emotional habitual subjective well-being, languages studied and average school achievement

The participants experience a positive emotional state of mind in the mother tongue in all three language skills (reading – 89.47%, writing – 65.79%, speaking – 78.95%). 10.53% of the participants experience negative emotions in reading, 28.95% in writing and 10.53% in speaking. The frequency matching of positive and negative emotions occurred for writing for 5.26% of participants and speaking for 10.53% of all pupils. For the dominant language, 84.21% of participants experience positive emotions in reading, 78.95% in writing and 76.32% in speaking. 13.16% of the participants experience negative emotions in reading, 15.79% in writing and 21.05% in speaking. The frequency of positive and negative emotions coincided for all three language skills (2.63% for reading, 5.26% for writing, and 2.63% for speaking). In the subdominant language, 65.79% of the participants experience positive emotions in reading, 63.16% in writing, and 50% in speaking. The frequency of positive and negative emotions coincided for all language skills (reading – 5.26% of participants, writing – 5.26%, and speaking – 2.63% of participants).

We found no difference in the average school grade for languages. The frequency of negative emotions was rare for all languages. Participants occasionally experienced a positive emotional state for the mother tongue and subdominant languages for reading and speaking skills. It is experienced frequently in the dominant language. For the skill of writing, the frequency of positive emotions is experienced occasionally in all three languages. We present the results in Table 8.

Table 8: Comparison of frequency of emotional states and average school grade for all three languages studied.

Language	Average school grade AMR	READING		WRITING		SPEAKING	
		Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR	Negative frequency AMR	Positive frequency AMR
mother tongue	1.36	1.84	3.34	2.01	2.84	2.18	3.38
dominant	1.35	2.11	3.49	2.03	3.22	2.11	3.49
subdominant	1.35	1.99	2.94	1.99	2.72	2.23	2.82
	1.35	1.98	3.26	2.01	2.93	2.17	3.23

Legend: AMR = arithmetic mean

There is no difference in emotional habitual subjective well-being between the languages studied concerning average school performance. The results indicated the existence of slight differences.

4 Discussion

The purpose of the research was to compare emotional habitual subjective well-being in the mother language, dominant language, and subdominant foreign language. Another aim was to compare the school performance (average school achievement) of pupils with emotional habitual subjective well-being in their mother tongue, dominant language and subdominant language in the language skills of reading, writing and speaking.

The research found the difference in emotional habitual subjective well-being among pupils based on gender in mother tongue language skills of reading and speaking. It is evident from the research that boys experience a positive emotional state of mind frequently in reading and speaking skills. Girls experience positive emotions in these skills occasionally. According to the frequency of positive and negative emotions experienced in the skill of reading, we found that both girls and boys rarely experience negative emotional states. For writing skills, boys and girls experience positive emotional states occasionally and negative emotions rarely. Girls experience negative emotional states frequently, and boys occasionally for the skill of speaking.

Concerning the emotional habitual subjective well-being of pupils in a bilingual grammar school and a bilingual business academy class, we found a difference in emotional habitual subjective well-being among pupils based on the type of school in their mother tongue in the language skills of reading and speaking. Knowing the answer as to why this is the case (e.g., whether pupils at each type of school are different, come from different social backgrounds, have different expectations and goals, or teachers have different expectations or different teaching approaches and styles) provides us with a focus for conducting further research.

Boys at both schools had a worse average school grade than girls. Boys in the bilingual business academy class experienced positive emotions frequently and negative emotions rarely for all language skills. The boys from the bilingual grammar school rarely experienced negative emotions except for the speaking skills, where they experienced negative emotions frequently. They experienced positive emotions occasionally for the skills of reading and writing and frequently for the skill of speaking. The frequency of negative emotional states in girls of both schools was rarely for reading and writing skills. For the skill of speaking, the frequency was occasionally for the girls from the bilingual grammar school and frequently for the girls from the bilingual business academy class. Similarly, we found differences in the frequency of experiencing positive emotions in the skill of reading. Girls from the bilingual business academy class experienced positive emotions frequently, and girls from the bilingual grammar school class experienced positive emotions occasionally. There was no difference in writing and speaking skills, for which girls from both schools occasionally experienced positive emotions.

The research found no differences in emotional habitual subjective well-being among pupils based on gender in the dominant language in the language skills of reading, writing, and speaking. The frequency of positive emotional states of mind was frequent for boys and girls in reading and speaking skills. In the skill of writing, positive emotions were experienced occasionally. The frequency of negative emotional states was infrequent for all three skills and both genders. The frequency congruence of positive and negative emotional states for boys was not the same for any of the language skills.

In their study, Jurášová and Kissová (2021) found that the mother tongue displays a more pronounced emotionality than subsequently acquired languages. The preferred language for expressing emotions may not only be the mother tongue but later acquired language may also become it.

In their study, Ivaz, Griffin and Duñabeitia (2018) found that the simultaneous development of the emotional system and language skills make the mother tongue and emotions inextricably intertwined.

There was a difference in emotional habitual subjective well-being among pupils based on school type in the dominant language in the language skills of reading and speaking. The frequency of positive emotional well-being is experienced frequently by pupils in bilingual grammar school in reading and speaking skills. In the skill of writing, positive emotions are experienced occasionally. The frequency of negative emotional states was rare in all three skills in this school. Occasionally, pupils of the bilingual class of the business academy experience positive emotions for all three skills. For the skills of reading and writing, the frequency of a negative emotional state was rarely experienced by the pupils of the bilingual class of the business academy. For the skill of speaking, the pupils of this school experience negative emotions occasionally.

We also found a difference between an average school grade and emotional subjective well-being. The result of the average school performance of the pupils for both the schools was interesting. The research involved specific classes where the assumption is that pupils should perform equally. Equally interesting was the result for the boys of the bilingual grammar school, who achieved better average school results than the girls of the same school, and they achieved the best average school performance when comparing the pupils of the two schools. In the bilingual business academy class, boys performed worse in average school achievement than girls. Despite the poorer average school grade, boys often experienced positive emotional states for the skill of reading and rarely for the skill of writing and occasionally for the skill of speaking. Girls experience positive emotional states occasionally in all three skills. They rarely experience negative emotions for the skills of writing and reading, and for the skill of speaking, negative emotions are experienced occasionally for both genders.

The negative emotions experienced by bilingual grammar school boys are rarely experienced in the skills of writing and speaking and seldom in the skill of reading, and they are related to their best average academic achievement for pupils in both schools. The frequency of a positive emotional state in the boys of the bilingual grammar school was often in speaking and reading skills. Positive emotion was found occasionally in the skill of writing. Similarly, the bilingual grammar school girls experienced negative and positive emotions like the boys, except for negative emotions in their reading skills, which they rarely experienced, despite their worse average school grades.

There was no difference in emotional habitual subjective well-being between the pupils based on gender in the subdominant language.

Both genders rarely experience a negative emotional state. For all three language skills, both boys and girls experience positive emotions occasionally.

The results speak to the existing differences in emotional habitual subjective well-being among pupils based on school type in the subdominant language skill of speaking. The frequency of negative experiences was rarely manifested among the pupils of the bilingual grammar school and occasionally among the pupils of the bilingual business academy class.

Iacoza, Costa and Duñabeitia (2017) write that language acquisition fosters a degree of emotional distance. The presentation of emotional linguistic stimuli in acquired languages modulates behavioural, hemodynamic, and physiological responses compared to the mother tongue, which has been possible to see in reduced attention when using the language skill of speaking. The contexts of acquired languages influence people's automatic responses to emotional stimuli. Strong effects of language reflect in higher-level cognitive processes, which are usually influenced by cognitive biases such as reliance on heuristics during decision making. Reading in an acquired language can engage the sympathetic nervous system to a weaker extent. Responses to emotional verbal expressions reduce themselves in acquired languages. Learning acquired languages in a formal school environment does not establish such firm boundaries between linguistic and emotional content. Further, Ivaz, Griffin and Duñabeitia (2018) found that contexts in an acquired language impose relative psychological and emotional distance in bilingualism. There is a blunting in the context of the acquired language. Bilinguals experience less discomfort than native speakers when discussing emotionally uncomfortable, embarrassing situations in a non-native language. Acquired languages serve as a buffer that absorbs strong emotional impact in the context of the acquired language. Typically, we speak and understand less fluently and more effortfully in a foreign language than in our mother tongue, which is why the process has been considered and characterised as cognitively exhausting. Acquired languages are not rooted in the emotional system. The frequency of use of an acquired language affects its emotional resonance. When not using an acquired language in everyday situations, its use will not favour emotionality. Emotional distance from the acquired language is related to physical distance and culture. The study confirmed differences in emotional well-being between the mother tongue and the acquired language.

There was also evidence of a gender difference in average school achievement in subdominant language and emotional habitual subjective well-being. Girls in the bilingual grammar school had the best average school grade compared to other pupils, which was related to experiencing negative emotions in all language skills. Girls rarely experience negative emotions. In summary, the finding that in subdominant language, girls from both schools are on average more successful and yet boys rarely experience negative emotional subjective well-being prompts us to ask the following questions: Could it be that boys are not that bothered by the results? Alternatively, could it be that it is enough for them if they have reached a basic communicative level (i.e., they can communicate when they need to) but do not stick strictly to language rules (grammar, orthography, orthoepy, reading comprehension, and others)? Again, knowing the answers to the above vivid questions prompts us to research the topic.

There was a slight difference in the average school grade between the languages studied.

The frequency of experiencing negative emotions was infrequent for all three languages and all language skills. There was a difference in the experience of negative emotions in the dominant language, frequently experienced in reading and speaking. The frequency of experiencing positive emotions was occasionally in the skill of writing for all languages. For the mother tongue and subdominant language, positive emotions were occasional in reading and speaking skills.

In the following section, we attempt to describe the limitations and implications of our research and recommendations for future research. In our research, we did not expect that there might be a

different representation of the mother tongue than Slovak. One participant reported French as his mother tongue. It was stimulating that the participant also listed French as a subdominant language, which is another challenge for us for new research. He achieved a school grade average of two in his mother tongue and his subdominant language. Therefore, it would be appropriate to ask the question: „Why is it like this?“ and address this question in future research, applying a causal research design in addition to a comparative research design. We assessed school achievement through the arithmetic mean of school grades in the taught languages (English, German, Russian, Spanish, French and Slovak) for all years completed (from the first to the third year of a given secondary school), which may be a shortcoming of the current research. In the future, it would be desirable to consider other factors such as time frame, teacher perceptions of the participants, and others, which may influence the result and extend the knowledge by, for example, qualitative indicators (teachers' subjective assessment of pupils' school success). In future research, we would process the results in descriptive statistics and respect the level of substantive significance. Considering that we conducted the research in two bilingual school classes where the dominant language was English in the upcoming investigation, it would be appropriate to conduct the research among participants who attend bilingual classes with a different dominant language and include non-bilingual classes in the research. A shortcoming of our research was the uneven representation of participants in terms of gender in the research population. In future research, we would consider this variable and work with it as one that needs more attention. The research population would not be a random selection, but it would be a deliberate selection.

In the subsequent investigation, we can focus on the emotional habitual subjective well-being manifested in specified school subjects taught in a language other than the mother tongue. The current research has highlighted the existing differences in the experience of emotional habitual subjective well-being between the mother tongue and acquired languages.

5 Conclusion

We focused on whether there is a difference in emotional habitual subjective well-being in the mother tongue, dominant and subdominant languages in the three language skills of reading, writing and speaking in bilingual grammar school and business academy classes, our variables also being gender, average school achievement in the languages and school type. The results showed a difference in the emotional habitual subjective well-being in all three languages. We also found a difference between boys and girls. Although we obtained the results based on the arithmetic mean, we could see the aroused disparity.

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Primary Paper Section: A

Secondary Paper Section: AN

SUPPORT FOR FAMILIES WITH HEALTHY DISADVANTAGED CHILDREN. ANALYSIS OF THE RESULTS OF QUALITATIVE RESEARCH

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This research was supported by a grant from the University of Trnava in Trnava, no. 10/TU/2024 entitled "Counseling in social services. The integration potential of the counseling method in Slovak conditions".

Abstract: The article analyzes the needs of families with children with disabilities through qualitative research based on the focus group method. The results show that these families need customized educational programs, social integration and support in the form of self-help groups. Parents emphasize the importance of special classes and pedagogical teams, as well as the lack of day care centers. These services would help them better manage childcare and attend to their own needs. According to the findings, supporting parents through self-help groups is crucial. The research brings recommendations to improve the quality of life of these families.

Keywords: focus group, families with disadvantaged children, quality of life, support services

1 Introduction

Support services play a key role in the daily lives of families facing the challenges of raising children with disabilities. The paper not only focuses on the current availability and quality of these services, but also identifies gaps that could be filled to improve the quality of life of these families. The research focuses on identifying support services that parents of children with disabilities use, but also on those that they would like to use, but are not available to them for various reasons.

When focusing on families with a disabled child, it is undeniable that this is a specific situation and experience that affects all aspects of the family. Raising and caring for a child with a disability also brings a number of negatives - significant financial and time costs, increased emotional, psychological and physical demands, the search for logistical options, information, financial resources, the search for social support, as well as a sense of understanding and belonging or other necessary help. These negative effects depend on the type and severity of the child's disability, as well as on the physical, emotional and financial resources of the family (Šmidová, Kollárová, Šmid, 2019).

In 2018, as part of the project APVV-15-0189 entitled "Selected factors of a pro-family strategy and support of a stable family in a multicultural environment", quantitative research was carried out, the focus of which was to present the quality of life of families with a child with specific needs, with an indication of possible solutions for assistance to these families in the conditions of the Slovak Republic.

The aim of the quantitative research "Application of counseling in Slovakia within selected helping professions", which was carried out as part of the KEGA project "Distance module of education in the field of pastoral counseling", was to focus on investigating the need and possibility of using counseling in selected helping professions. One of them is the need for the position of counselor when accompanying families with a child with a disability.

It was also important to ask the respondents a projection question regarding whether they would be willing to contact a specialist for guidance if they were to experience a difficult life situation in the future. Other findings focused on the imaging and concretization of various life situations in which the respondents would be willing to contact a specialist for guidance. The results of the research show that they would be most willing to contact a specialist for guidance when

experiencing a crisis in their personal life, i.e. in a burden related to a close person. The research dealt with the following questions: How is a child with a severe disability accepted into his/her family? What affects the optimal quality of life of a family if their child has a disability? What needs to be done and how to help such families to use their own possibilities, the capacities of their informal social environment, communities, organizations, public institutions, as well as municipalities so that they not only cope with the given situation, but also prosper despite many problems and challenges? (Šmidová, Žuffa, Nemčíková, 2022). It turns out that counseling at the level of the content of counseling activities can significantly help parents of children with disabilities to manage a wide range of situations and problems that they encounter on a daily basis (Urbančok, 2023).

In order to obtain a more detailed view of the quality of life of families with a child with a disability, a qualitative research was carried out by a group of researchers at the Faculty of Theology of the University of Trnava. This research, conducted in the form of a focus group, provided new insights into the experiences and needs of families with children with disabilities. Focus groups are an effective tool for gathering quality data because they allow for in-depth discussion and exchange of views between participants, resulting in detailed information. It is a group form of interview, an in-depth qualitative interview. Group interaction is used when collecting data (Bačíková, Janovská, 2018). This method provided a space for parents to share their experiences, opinions and suggestions for improving services that are crucial for them and their children.

2 Research focused on supporting families with disabled children

2.1 Research methodology

The main focus and research problem was to find out the needs of families with a disabled child. This research problem is crucial because families with children with disabilities often face specific challenges and needs that require specialized services and supports. The main goal was to identify and understand the needs of families with a child with a disability and thus create effective recommendations for practice. A focus group was chosen as a qualitative research method. This method is a commonly used tool in qualitative research that allows for a deep and nuanced understanding of participants' experiences and perspectives (Barbour, 2007). It is suitable for investigating complex social and health issues, as it enables direct and interactive data collection through discussion between participants.

The preparatory phase of the research process was carried out in the first half of 2024, the actual data collection and subsequent processing of the research results was carried out in June 2024. The focus group was carried out with 11 respondents who were selected on the basis of voluntary registration for an email sent to the organization covering families with children with special needs stemming from their health handicap. This selection ensured that all participants had personal experience of raising a child with a disability, which ensured relevance and a deep understanding of the topics discussed (Kitzinger, 1995). The number of respondents was chosen in such a way as to ensure a sufficient diversity of opinions, but at the same time it enabled an effective and controlled discussion. The participants were both men and women, men (fathers of children with disabilities) – 3, women (mothers of children with disabilities) – 8. It is also necessary to mention the specific type of disadvantage of children. The focus group participants were most often parents of children with moderate intellectual disabilities, Down syndrome, and in two cases of children with combined disabilities (mental disabilities and physical disabilities). The

results of the findings must therefore be perceived in the context of the selected target group's perspective.

Data collection through a focus group was carried out in an informal environment of a recreational type of facility in a neutral space of the common room. The environment in which data collection takes place is important to ensure an open and confidential atmosphere that supports honest discussion (Stewart, Shamdasani, 2014). The participants were informed about the anonymous processing of the research data, which gave them the assurance that their contributions would not be linked to their identity and could thus freely share their thoughts and experiences (Hennink, 2013).

Research objectives

O1: To identify support services used by families with children with disabilities.

O2: To find out which support services for this type of family are missing or insufficiently covered. The goal includes identifying gaps in the current support system.

O3: To determine specific proposals for support services for families with a child with a disability.

O4: The ultimate goal is to contribute to improving the quality of life of families with children with disabilities by identifying and addressing their specific needs and problems.

These research goals aim to provide a comprehensive view of the situation of families with children with disabilities and to propose practical and effective solutions for their support.

The discussion was divided into three main topics, which were also research questions:

RQ1: Which services (social, health) and forms of support are important to you and why? Which services are available to you and do you use them?

RQ2: Which important services and forms of support are you missing?

RQ3: What changes would you like to see in the community in which you live or the local church due to the increase of your support and availability of services?

Each topic was discussed separately, with the group moderator asking questions and encouraging participants to share their experiences. All discussions were recorded and subsequently transcribed for detailed analysis. The chosen research methodology made it possible to gain deep and personal insights into the everyday life of families with children with disabilities and to identify specific areas that need improvement..

2.2 Analysis of research results

Analysis of the first research question: Identification of support services used by families with children with disabilities.

The main goal of this part of the research was to find out what specific needs they have and which support services are used by families with children with disabilities. Based on the results of the focus group, several key support services were identified, which cover several areas from education, to day care, to self-help groups and social integration. A more detailed summary and specification of these areas follows.

Education of children with disabilities is the first important need and perceived area of support. All parents participating in the focus group agreed that school integration (inclusion) is not suitable for the effective education of their children, as they not only need special educational methods, but also a smaller class group, barrier-free spaces, a special pedagogical support team and the same target group of children, such as their child. The participants gave the following explanations of their opinions: "Our son is very happy to be around people from his group, from his circle. He recognizes a child with Down syndrome even in a crowd on the street, in a TV commercial, and at the swimming pool, which I, as an adult, do not notice at all, because not all these children have specific external signs of their handicap. Children with Down syndrome form one family with each other, they may not even know each other, but they know that they belong together. They immediately hug and call each other siblings. For this reason, it is important that they are given special education, which school integration would not allow, or our children would be in a classical education environment more than in the background." Another participant adds: "I agree, our children need their own protective zone where they can be themselves. They need to create their own communities, which is possible within special education." The starting factor in the education of children with disabilities is therefore targeting the needs and possibilities of children with disabilities. For this reason, the participants prefer special education rather than inclusion in a classic school environment.

Social integration and social support are the second important supporting factor for these families. The participants agreed that inclusion in society is crucial for them and their children, not only from the point of view of their children, but also of society. The participant states: "It is important for us that our child is nothing special in society. We want and try to be a part of society, we don't need people to look at us in a strange way. We are people, all of us, our children have something to offer society. They have their disadvantage, but something extra has been given to them. Our children know how to give society more humanity. Through them, we see what is really important." Another participant joined the discussion as follows: "Our children are a source of humanity, they know how to present it very appropriately and put it into practice in society. They don't care if they hug a stranger or even a homeless person on the street. They do not distinguish between people. This is their advantage, and we, healthy people, have a lot to learn from our children".

All participants (parents) agreed that a kind of "protected space", a self-help group, where they can meet freely and thus gain mutual support is important for them. They are happy when they have a systematic framework available to support them as parents as well as children, where the specifics of their handicap and the specifics of stressful situations associated with the given disability are taken into account. The parent states: "It is important for us that we can all meet as we are. Our surroundings, apart from our family, don't understand us, but this is a place where we don't have to fake anything. We complain to each other, we tell each other what's new, what progress our children are making, or what problems are bothering us at the moment." Another parent adds: "It's very important to know each other, to share the same experiences, to be able to support each other. It is such an oasis of humanity where we can confide in other parents. Because the parents of healthy children do not understand us." Here, there is a pronounced need for the systematic creation of support self-help groups for parents who have children with disabilities.

Several parents highlighted the use of daily outpatient care in the environment of day care centers. Those who have the opportunity use the day care center as a place where several times a week their children can spend their time effectively, in a group where they are taken care of and where they can use their talents. In this way, parents are offered time to fulfill their needs. A participant in the group states: "My daughter looks forward to going to the hospital, they make bracelets there, and she happily gives them away afterwards. It is a space for their self-

realization, while we, the parents, can go shopping, can go to the office, and some, who are allowed by their child's condition, also go to work. We put (child's name).... in the hospital three times a week for 4 hours, so I can't work. However, I use this time differently and it is efficient for both parties." "I am very thankful that this service is available to us. That way, I can also do my own things, and my daughter is happy in the hospital," adds another participant. Here, the need for self-realization on the part of children and parents is highlighted, which the regular use of the day care center enables them to do.

Analysis of the second research question: Absence of specific support services in the care of a child with a medical handicap.

The aim of this part of the research was to find out which support services are missing or insufficient, and why these services are unavailable or inadequate for families. This includes identifying gaps in the current support system.

Special schools are an important aspect of support for children with disabilities. They provide customized education that takes into account the individual needs of each child. However, parents face challenges associated with these schools, such as large numbers of students and insufficient capacity. Parents often emphasized the need for the availability of special schools and related educational programs that address the specific needs of their children. The main emphasis was on the principle that the pedagogical approach and teaching methods should participate with the interests and possibilities of the children, so that the educational results would be achieved as efficiently as possible. For example, one of the parents stated: "special schools are suitable for our children, later lower secondary education, practical school, but then they stay at home because they have nowhere to go. After graduating from these types of schools, there are no educational programs that would continue to develop our children". Another parent added: "although our children attend compulsory schooling in special education, where they develop. After graduation, however, they remain at home, without further development, which they still need. They can't just sit and watch TV, there is no progress there. They are capable of further development, but for that they need an educational institution, an organization that would develop them comprehensively even after finishing a special school." Another parent states "these children have potential, but it is difficult to find a suitable school. We don't want them to be integrated into mainstream education, they need special education methods, which they get in special education. The problem is that we don't know how to develop this potential after they leave school. It is difficult for them to find their place in the world."

According to parents, the education system for children with disabilities has serious gaps. There is a need for more practical programs and better specialized teaching that takes into account the individual needs of children. An important insight was provided by a participant who states: "We were not satisfied with the content of studies at a special elementary school. They taught them the alphabet all around, to read, which our son was not able to master. It seemed more beneficial to us to teach him practical skills that would prepare him for life. These skills could be the main content of further educational programs after completing compulsory schooling" This statement points to the problems with the availability and financing of specialized educational programs and the need for effective methods of education.

Parents also perceive shortcomings in day care for children with disabilities. **Day care centers** and **inpatients** are often not available, or they do not have sufficient capacity to cover the demand. In various parts of the discussion, parents repeatedly emphasized the lack of ambulatory social services. These services are necessary so that parents can either work, take care of routine duties, and at the same time ensure that the child spends time effectively. The participant states: "I am lucky that my daughter is placed in a day care center several times a week. This stay helps her and me, she is always happy there. However, I know that there are 7 more applicants on the waiting list for the hospital, but they cannot accept them, as they do not have the

financial means to cover the care of other clients. Also, when we were still looking for day care options for our daughter, I was told at the office that I could put her in a nursing home. They would put her, a 24-year-old lady, in the seniors' home. It would be unimaginable for me or her. We are not interested in this kind of care." Another participant adds: "Our child also attends a day care center. He has a program there. However, I know an adult girl in our village who graduated from practical school and has been at home with her mother ever since. She does nothing but walks on the streets. She has no interest activity. Nothing, only she and her mother, who takes care of her, are surviving." "There is a hole in the system, after they graduate from school we have nowhere to put these children to further develop their potential." The participant concludes the discussion. On the basis of these reported experiences, it is possible to state the lack of outpatient social services (day care centers), which clients with a disadvantage could visit and continue to develop their potential here, and their parents could thus have time for work and hobbies.

Sports and recreational activities (leisure interest activity)

Sports activities provide children with the opportunity for physical activity and socialization, which is important for their overall development. Parents would appreciate that leisure and sports clubs are more accessible for their children with special needs. They agreed that until now they had not encountered optimally created opportunities for the development of their children's talent among intact children in leisure centers or sports fields. The participant states: "It is not possible for our son to attend a football or other sports club, because he needs special guidance methods." Another parent adds: "our son always just started attending some club, he never finished the school year, because there was no staff to was able to attend to him. They only had one lecturer and that was not enough. It's a shame, because he was interested in the club he had chosen, but due to insufficient staffing in the leisure center, it was not possible to keep him there." Here are identified shortcomings in the area of adapting the activities of leisure centers also for applicants with a disadvantage.

Acceptance of a disabled child in society

Parents declare the importance of integration and acceptance of their children in society, with the recommendation that they should have the possibility of social interaction and be accepted in the community. One parent expressed: "It is important that our children are accepted, integrated, which can also be very beneficial for other people." Parents expressed the need for better integration into the community and better support from social services. One of the parents mentioned: "You need to have your own community where you can feel free, but you also need to go out a little so that people can have that experience, after the experience with our children they will perceive our situation differently. They get to know them" Another parent claims: "The way people look at my son when we walk down the street is not always just nice. I would like to change that. He is a human after all. But I also understand those people. It also always freaked me out when I saw a person on the wheelchair on the street. But our son shattered my ideas about disability and changed me completely. I thank him." Another participant opens a new topic in this area, regarding the unprofessional approach to their children at the labor, social affairs and family offices or other institutions. Social workers often do not know how to communicate with this type of client: "...they lack both expertise and humanity. Social workers often meet similarly disabled people only in the practice of their profession, not during their studies, which is very much felt and seen. And how can society accept us when even the social workers themselves don't know us?" Similar statements point to the need for inclusive social activities and services, the need for acceptance and tolerance by the entire society.

Support groups and counseling

Support groups and counseling for parents are essential for coping with stress and sharing experiences. Parents also appreciated the services of social workers: "We have good experience with social workers who work with us in the civic

association, we have space for regular support group activity there." "We cannot praise the civic association enough, it would be good if there were more of these organizations so that they would be available to all parents with children like ours. We can get a lot out of these informal meetings." Another parent adds that both parents and children need counselling: "they also need further development on several levels and this is where there is room for professionals to attend to them in the field of occupational therapy to learn more practical skills." This type of service and guidance is sorely lacking here." These support services represent the basic infrastructure that enables families with children with disabilities to meet their needs and support their development. At the same time, their parents marked them as insufficiently covered.

These areas represent key challenges faced by families with children with disabilities. Parents emphasized that improving and expanding these services would significantly improve the quality of life for their children and entire families.

Analysis of the third research question: Specific proposals for support services for families with children with disabilities.

During the focus group, parents of children with disabilities discussed specific proposals that could improve the quality of life of their children and families. These proposals include improving existing services, expanding educational programs, introducing new therapy and support services, and strengthening community support. A more detailed summary and specification of these proposals follows.

Parents emphasized the need to **improve and expand existing services such as day care centers and special schools**. For example, they suggested increasing the capacity of day care centers and improving the quality of care: "The fact that I can place my daughter three times a week for 4 hours in a day care center, I am thankful for that. However, we could imagine that she would be there for more hours every day of the week." Another participant states: "In the day care center, even if she is there, not all the therapists work with them in the same way. Only when a specific person is on duty he does work with them, the others don't do so much..." Several participants expressed the opinion that not all professionals they meet in social services are able to respond in the right way to the demands of children/clients and their approach is also not always at a professional level.

Parents pointed to the need to introduce practical educational programs that would enable children to learn practical skills and be better prepared for life: "but it must be said that our child does not need to be taught to read, write, count, he simply will not use it in life. In school and aftercare, they should focus on the development of practical life skills from the first grade."

Parents expressed the need for better support and **acceptance from the community and the church**. They would suggest more inclusive activities and the creation of a space where they could meet and share their experiences without prejudice: "I would be happy if they accepted our children in the church, at least a little bit... because not everyone accepts that my child sometimes disturbs during St. mass. He sings loudly or simply dances at the holy mass and the eyes of the people around... they don't understand, they ask if he does it on purpose and why he does not prefer to sit at home". Non-acceptance of a child's disability is crucial for parents and is not often present in the community.

These proposals represent concrete measures that could significantly improve the quality of life of children with disabilities and their families, ensure better integration into society and support their overall development.

2.3 Discussion and recommendations for practice

The discussion of the results clearly indicates that families with children with disabilities face several challenges that affect not only education, but also social integration and access to support

services. Based on these findings, it is possible to formulate recommendations for practice that could improve the quality of life of these families and make the provision of necessary services more efficient.

In the field of education, according to the respondents, it is clear that the current model of inclusive education does not suit all children with disabilities, especially those who carry mental or combined disabilities. Parents clearly point to the need for smaller classes, adapted learning aids and environments that would reflect their specific needs. Therefore, it is important for the current education system to rethink its approach and focus on improving the availability of special schools with individual adapted educational programs. The concepts of "inclusion for all" and "inclusion for some" are also analyzed by the authors Leien, Arcidiancono and Bauca (2021), who summarized various aspects of the school integration of disadvantaged children as well as the reality when it is more effective for a child to be educated in special education. At the same time, it is necessary to expand practical educational programs in schools that would enable children to acquire skills that can be used in everyday life. Such programs should mainly focus on the development of manual, communication and social skills (Hvalby, Guldbrandsen, Fandrem, 2024).

Another critical point is increasing the capacity of day care centers and other social outpatient services. Day care centers provide clients (including respondents' children) with disabilities not only a space for socialization and self-realization, but also a relief for parents who, thanks to these services, can devote time to work or personal activities. Therefore, it is necessary to expand the network of these facilities throughout Slovakia and ensure their sufficient funding so they can receive a larger number of recipients. In addition, it is necessary to improve the quality of care in these facilities, which could be achieved by regularly evaluating the quality of the services provided and emphasizing an individual approach to the needs of clients (Neda, Angel, 2023).

Another key issue is the support of parents through self-help groups. Parents of children with disabilities they often experience social isolation and emotional exhaustion. Self-help groups for parents of children with disabilities provide important emotional and practical support to help them cope with everyday challenges. These groups create a space for sharing experiences between parents facing similar situations, reducing feelings of isolation and stress. Research shows that parents who are members of such groups often experience an improvement in their emotional well-being, an increase in their sense of self-confidence and competence in caring for their child. These groups can be expert-led or function as peer-to-peer support where more experienced parents share their experiences with new members (Jackson, et al, 2018). It is therefore necessary to establish several regional support groups that would provide space for regular meetings of parents. These groups should be organized in cooperation with social workers and experts who could also provide professional advice and psychological support. At the same time, it is important to support civil associations that deal with this issue so that they can expand their activities and provide even more effective help to families (Dew et al, 2019).

In the field of social integration, it is important to ensure that children with disabilities have equal opportunities to participate in sports and leisure activities. Such activities not only contribute to their physical and social development, but also to their better integration into the wider society (Geidne, Jerlinder, 2016). To improve this area, it would be appropriate to create inclusive sports and interest clubs that would be adapted to the needs of children with disabilities. At the same time, it is important to improve public awareness of the challenges faced by families with children with disabilities. Better information and education of the public could reduce the level of stigmatization and misunderstanding, which would contribute to greater acceptance of these children in society (Hepperlen et al, 2021).

Social workers play a key role in supporting families with children with disabilities. However, it is clear from the results that not everyone is sufficiently prepared to work with these families. Therefore, it is necessary to strengthen the education and professional training of social workers, especially with a focus on the specifics of caring for children with disabilities and effective communication with their families. The introduction of mandatory training for social service workers could help develop empathy, communication skills and the ability to provide psychological support to families (Bennett, Harvey, 2019).

3 Conclusion

By implementing these recommendations, significant progress can be made in improving the quality of life of families with children with disabilities. Emphasis on specialized education, expanding the capacity of support services and supporting parents are key steps that should be a priority of current social policy.

The basis of this study is a better understanding of the problems faced by these families and the search for solutions that could improve their quality of life. By expanding the understanding of these problems and their context, we can not only identify current shortcomings in support services, but also propose concrete steps that could lead to their improvement. This approach is particularly important in social policy and practice, where it is necessary to constantly adapt to the changing needs and circumstances of families with disabled children.

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Primary Paper Section: A

Secondary Paper Section: AM, AN

CHANGES IN HUMAN RESOURCE MANAGEMENT IN SMALL AND MEDIUM-SIZED ENTERPRISES DUE TO COVID-19

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This paper was supported by the Slovak Ministry of Education's Scientific grant agency VEGA 1/0718/22 "Human resources development in small and medium-sized enterprises in the context of the 21st century challenges."

Abstract: The COVID-19 pandemic is an unprecedented health crisis that has shaken the entire world. It has significantly affected economies, companies, employees and organizations. It represents a great challenge for managers of all businesses operating in various business areas. The main challenge for companies is to constantly adapt to changes. To cope with the changing business environment in connection with the onset of the global pandemic, employers are demanding new skills and abilities from their employees. HR managers have had to adapt their strategies and practices to respond to the challenges that the pandemic has brought. The study aims to assess changes in human resource management in small and medium-sized enterprises as a result of the COVID-19 pandemic. Data were collected from 128 SME owners/managers through a questionnaire instrument.

Keywords: human resources management, small and medium-sized enterprises, questionnaire, COVID-19 pandemic.

1 Introduction

The Covid-19 pandemic is over. However, the consequences of the pandemic have had far-reaching implications, including changing many aspects of working and non-working life, forcing many organisations to introduce, adapt or improve new working arrangements to address employee wellbeing, health and safety. The pandemic has been described as a form of 'career shock', signalling how environmental changes can have a direct impact on individual work experiences. These changes are about more than just reconfiguring working practices and attitudes. Rather, they are part of an evolution in the way companies in general, and human resource management (HRM) in particular, are rethinking the nature of work for the post-pandemic era.

There are several reasons why human resource management professionals should be motivated to investigate SMEs. The first relates to the socio-economic impact of SMEs as the largest employers in the private sector. Globally, SMEs account for more than 95% of all firms and 60% of private sector employment, playing a key role in innovation, knowledge diffusion and social cohesion (OECD, 2019). In emerging markets, SMEs account for up to 40% of GDP and create 7 out of 10 new jobs. Second, the limited resources and hierarchically contractual nature of SMEs mean that the impact of HRM, whether formal or informal, intended or emerging, is all the more transparent and telling. Third, SMEs offer an ideal platform for exploring contextual issues, including when, why and under what conditions HRM does (or does not) have an impact. Finally, from a practical perspective, the resource-poor and labour-intensive nature of SMEs means that they are, by definition, more reliant on the effort, commitment and discretionary effort of employees. This implies that successful employee management can be critical to the survival and development of SMEs (Amarakoon & Colley, 2023). All of this should imply that SMEs are a standard target for human resource management and employment studies, when in fact the opposite is true. A recent review found that only 0.5% of articles published in employment/HR journals provided dedicated research on the SME context (Harney & Alkhalaf, 2021).

Small and medium-sized enterprises play a key role in the Slovak economy. Small and medium-sized enterprises in Slovakia account for 99.9% of the total number of business entities in Slovakia. Their position is important in terms of job creation, added value creation, they have a positive impact on supporting the local economy and balancing regional development disparities. Their number has a significant impact on the state and development of macroeconomic indicators. These enterprises provide employment opportunities for almost

three quarters of the active workforce in the economy. SMEs are the main job creators in the Slovak economy. Between 2015 and 2019, employment in the SME sector grew continuously. This steady increase in employment suggests that SMEs have been able to create new jobs and contribute to Slovakia's overall economic growth during this period. However, the years 2020 and 2021 were exceptional, mainly due to the coronavirus pandemic that had a negative impact on the whole world. The pandemic caused significant disruption to economic activity and SMEs were no exception. Many businesses had to adapt to the new conditions. The coronavirus pandemic and the subsequent adoption of anti-pandemic measures have left a negative impact on employment and on the overall economic development of the SME sector. The anti-pandemic measures adopted restricted business activities of a significant number of enterprises in the economy, which created pressure for redundancies even in small and medium-sized enterprises. Despite the support measures taken by the state to maintain jobs, the average number of persons employed in the SME sector in 2020 and subsequently in 2021 will decrease by almost 3% (by 40.8 thousand persons) compared to 2019. After this pandemic-induced two-year decline, the situation gradually improved the following year and employment in the SME sector began to recover (Jašková et al., 2024).

SMEs account for around half of GDP and employ almost two-thirds of the country's workforce. This share suggests that without SMEs, the Slovak economy could not function at its current level and the country's overall economic performance would be significantly weakened. In addition to their contribution to GDP and employment, the role of SMEs is also visible in their share of total business turnover, their contribution to investment generation and their ability to produce for foreign markets. SMEs are often flexible and able to adapt quickly to changing market conditions, enabling them to compete successfully internationally. Their ability to generate business turnover and investment strengthens Slovakia's overall economic stability and growth.

2 Literature review

Over the last two decades we have witnessed several global crises including the Global Financial Crisis and the COVID-19 pandemic, regional crises such as the energy crisis resulting from the war in the Ukraine, and local crises such as the bushfires in Australia, the tsunami in Japan and wildfires in California. These crises, especially the COVID-19 pandemic, have fundamentally led organizations to rethink how best to manage their human resources during the early to middle stages of a crisis, which are characterized by high levels of uncertainty, and in the later stages of the crisis and post-crisis stages, as organizations and their employees readjust to the 'new normal' and in some cases return to the pre-crisis environment (Butterick & Charlwood, 2021; Collings et al., 2021).

In particular, the COVID-19 pandemic has impacted the management of human resources in several main ways that were not evident across previous crises. First, across certain sectors of the economy, such as the tourism and hospitality sectors, human resource (HR) professionals were responsible for managing the mass layoffs of workers or obtaining support from government support schemes, as businesses and consumers changed their behavior because of government imposed lockdowns and health regulations (Butterick & Charlwood, 2021; Stuart et al., 2021). Post the COVID-19 pandemic, as countries have come out of lockdown and removed health regulations, HR professionals have had to manage the rapid recruitment of replacement employees in such sectors, as demand for services have increased. This has been challenging due to almost full employment, limited migration, and resultant labour market shortages. We have also witnessed the phenomenon referred to as the 'great resignation' where an increasing proportion of

employees are re-evaluating their career options and deciding to change jobs and even occupations (Newman et al., 2022). This has exacerbated the problems faced by HR professionals in recruiting talent for their organizations (Serenko, 2023)

Second, HR professionals had to facilitate employees' transition to new ways of working as across many sectors of the economy organizations required employees to work from home because of government-imposed lockdowns and health regulations (Carnevale & Hatak, 2020). HR professionals had to support employees to work effectively at home through the provision of technology, assist employees with care responsibilities to manage work-life demands (such as having to work whilst home-schooling their children) and help employees that live alone to deal with the loneliness and boredom that resulted from working from home (Carnevale & Hatak, 2020). As employees and organizations began to understand the benefits of working from home during the crisis, flexible working arrangements have become the new normal across many industries in the post pandemic period, as organizations and their employees recognize the productivity that such arrangements bring. HR professionals were also required to balance this with an amplified focus on employee mental health and well-being (Ripamonti et al., 2020), employee psychological and physical safety, supporting where they can, employees working in environments that were not always conducive to productive work. HR professionals have had to manage employees' return to work across many industries where employers require it and manage the demands by some employees for continuing flexibility in their work arrangements (Collings et al., 2021).

Third, as the face of the organizations response to the pandemic (Collings et al., 2021), HR professionals were required to maintain currency of public health orders and government mandates, while interpreting the consequences for the organization and mitigating any associated risks. In addition, HR professionals have had to manage employees' compliance with health regulations, especially regarding the use of personal protective equipment and vaccination requirements (Collings et al., 2021; Zacher & Rudolph, 2022). In some countries, and in certain sectors of the economy, such as the education and healthcare sectors, HR professionals have had to enforce mandatory vaccination requirements and manage employees who were non-compliant.

The COVID-19 pandemic has disrupted social life as well as economic activities across the globe (Clark et al., 2020). Some studies have found that SMEs, despite their disadvantages compared to large enterprises due to their flexibility, entrepreneurship, and community inclusiveness, have unique capabilities to respond effectively to a crisis and ultimately emerge stronger and more resilient (Wengel & Rodriguez, 2006). Human resources management is at the centre of this chaos, particularly in relation to the impact of COVID-19 on staff and the need to ensure their health and safety, as well as the need to manage staff in the new environment. There were many actions and decisions, both incidental and strategic, that HRPs had to make and enforce, such as ensuring employee health and safety, introducing new working arrangements, maintaining employee morale and commitment, and dealing with redundancies and downsizing (Adikaram et al., 2021). The pandemic crisis has severely worsened the economic, business and investment environment, with companies making mass redundancies and insolvencies, putting the financial sector at risk, and businesses postponing spending and investment. Small and medium-sized enterprises (SMEs) play an important role in the economy of most countries and have been hit the fastest and hardest by the pandemic crisis. Governments in many countries have responded proactively to compensate for SME losses and avoid bankruptcy through appropriate policy measures. A number of mechanisms were prepared and quickly implemented, while it was also very important to develop new optimal strategies for the post-crisis period (Wojcik & Ioannou, 2020).

A number of researchers have investigated cases of the negative economic impact of the COVID-19 pandemic on small and

medium-sized enterprises. The authors have conducted quantitative and qualitative research on selected samples of SMEs that were affected by the pandemic to identify the most important factors that affect entrepreneurship, workforce, supply chain and cash flow in SMEs (Al-Fadly, 2020). Wojcik and Ioannou (2020) see the impact of the pandemic in broader, macroeconomic terms. The authors also suggest that financial regulation may slow down, corporate consolidation processes may continue, and business services in the financial sector may grow because of the pandemic crisis. The authors, however, dispute the differences between local, regional and international financial centres and their importance in financial markets.

COVID-19 has changed the work experience of the vast majority of staff. It has forced organizations around the world to adapt work organization and job design. Most of the problems that directly affect human resource management practices as a result of COVID-19 are the result of people management aspects. According to Brown, Hirsh and Reilly (2019), in HRM, people management is identified as involving the strategies set by the organization in managing their workforce and changing practices.

From a general perspective, workplaces are identified as becoming more agile and responsive as a result of the changing phenomenon in the wake of the COVID-19 pandemic. Agile human resource management practices would be ready to proactively respond to changes in their business environment instead of only taking on a monitoring and reactive role. For example, if organizations continued their management practices as they did before the pandemic, their operations would be more productive and coordinated. In general, staff must now quickly learn to support the work of proactive reporting. This phenomenon is also evident in areas of performance, changing benefit scenarios and overall psychological well-being (Heilmann, Forsten-Astikainen, Kuitalahti, 2020). Most of the existing discussions on the impact of COVID-19 on work practices and human resource management are largely general and primarily focused on defining a new normal. For example, the discussions discuss the possibility that flexible working or teleworking would be the new norm (Elayan, 2021). Despite the validity of these discussions, it is essential to assess the impact of the COVID-19 pandemic on existing work practices, wellbeing and human resource management in a more specific context. Aviso et al. (2018) noted in their study that human resource management affects employees and the overall workforce. All organisations need to be prepared in their human resource management to mitigate the consequences associated with the occurrence of such pandemics. There is a need to ensure that human resource professionals facilitate the transition of employees to new ways of working, as in many sectors of the economy, organizations have required employees to work from home due to government-mandated lockdowns and health regulations (Carnevale & Hatak, 2020).

The researchers also examined specific human resource practices that were effective in creating a supportive work environment during the COVID-19 crisis. For example, Vu et al. (2022) found that when employees had positive perceptions of workplace safety practices in place during a pandemic, they were less likely to experience burnout syndrome, and that such perceptions reduced the negative impact of employee perceptions of health risks associated with COVID-19. In addition, Ortiz-Bonnin et al. (2023) examined the perceived impact of strategies adopted by organizations to support employees during the COVID-19 pandemic on employee performance and well-being. They found that when employees were satisfied with the support provided by their supervisor and the organization to continue working during the pandemic, they had higher levels of satisfaction with their work-life balance, which had a positive impact on their performance and psychological well-being. These findings highlight the impact of a supportive environment in helping employees cope with a crisis. At the individual employee level, McDaniel Sumpter and Gibson (2022) identified the importance of human resource management for crisis recovery, focusing on the ways in which

employees receive energy from their colleagues to help them successfully manage their recovery from a crisis. They found that HR can harness relational energy from others to help with individual crisis, which is a positive way to help individuals recover. The COVID-19 pandemic has resulted in a new set of challenges, many of which stem from government blockades in many parts of the world. HR managers in many industries have had to manage mass layoffs of employees or obtain government support to compensate their employees, facilitate employee transitions to telecommuting, and manage employee compliance with health regulations.

Current research and published findings bring unquestionable existing interrelationships and influences between important concepts such as human resource management and SMEs. As a result of the pandemic situation caused by the spread of the SARS-CoV-2 virus (COVID pandemic), the importance of human resource management has increased significantly, and in the face of an unclear situation and an unpredictable future, it has become necessary to manage people in such a way that they can cope with stress and continue to work remotely, and as such, the business continues to operate. SMEs have also been greatly affected by the situation. The results of various studies show the concern of SMEs in terms of various aspects of business and the lack of knowledge in dealing with human resource management issues in SMEs. Businesses need to prepare for such possible changes, which creates scope for shaping new approaches to human resources development (Jašková et al., 2024).

COVID-19 has changed the work experience of the vast majority of staff. It has forced organizations around the world to adapt work organization and job design. Most of the problems that directly affect human resource management practices as a result of COVID-19 are the result of people management aspects. According to Brown, Hirsh and Reilly (2019), in HRM, people management is identified as involving the strategies set by the organization in managing their workforce and changing practices. From a general perspective, workplaces are identified as becoming more agile and responsive because of the changing phenomenon in the wake of the COVID-19 pandemic. Agile human resource management practices would be ready to proactively respond to changes in their business environment instead of only taking on a monitoring and reactive role. For example, if organizations continued their management practices as they did before the pandemic, their operations would be more productive and coordinated. In general, staff must now quickly learn to support the work of proactive reporting. This phenomenon is also evident in areas of performance, changing benefit scenarios and overall psychological well-being (Heilmann, Forsten-Astikainen, Kultalahti, 2020).

3 Methodology and Data

The aim of the study was to identify current trends, approaches and challenges related to human resource development in SMEs. Subsequently, we focused on the challenges faced by the enterprise in managing human resources in the context of the COVID-19 pandemic. Data were collected from 128 SME owners/managers through a questionnaire instrument. The questionnaire was distributed online, using Google Forms platform. It consisted of closed and open-ended questions. The respondent expresses his/her attitude (agreement) on items classified into several areas, a five-point Likert scale is used (1 - strongly disagree, 2 - disagree, 3 - neither agree nor disagree, 4 - agree, 5 - strongly agree). The questionnaire survey was carried out on a sample of 128 respondents who were part of the management or ownership structures of SMEs.

The largest group of analysed enterprises, in terms of size category, were micro-enterprises with 0-9 employees, which represented 45% of the enterprises in the survey. In absolute terms, this represents 58 entities. Micro-enterprises also have the highest number of enterprises in the Slovak Republic as a whole. They account for more than 90% of the total number of active business entities in Slovakia and their number has been growing

steadily in recent years and growing at a faster rate than the number of business entities of other size categories.

Table 1: Structure of respondents (n - frequency)

Enterprise size	n	%	Sector	n	%
Micro-enterprise	58	45	Services	77	60
Small enterprise	36	28	Production	36	28
Medium-sized enterprise	20	16	Services and production	15	12
Large enterprise	14	11	Market presence	n	%
Region	n	%	Less than 1 year	12	9
Bratislava region	42	33	1-5 years	38	30
Trnava region	15	11	6-10 years	20	16
Trenčín region	20	16	11-15 years	17	13
Žilina region	15	12	More than 15 years	41	32
Nitra region	13	10	Ownership	n	%
Banská Bystrica region	9	7	Owner	69	54
Košice region	8	6	Manager	59	46
Prešov region	6	5	Age	n	%
Gender	n	%	Baby Boomers	6	5
Male	74	58	Generation X	32	25
Female	52	41	Generation Y	67	52
Not specified	2	1	Generation Z	23	18

28% of the enterprises analysed were small enterprises with a maximum of 49 employees. In absolute terms, this represents 36 business entities. The structure of the surveyed business entities is further supplemented by medium-sized enterprises with 50-249 employees, which accounted for 16% of the enterprises in the survey, which means 20 entities in absolute terms. The share of large enterprises with more than 250 employees was 11% in the survey, in absolute terms it was 14 enterprises.

In terms of sectoral structure, the provision of services is significantly predominant. Up to 60% of the enterprises surveyed are pure service providers. In comparison, only 28% of enterprises are engaged in product manufacturing. The remaining 12% of enterprises participating in the survey have both service provision and product manufacturing in their portfolio of activities.

The largest group among the respondents were enterprises operating on the market for more than 15 years, their share was 32% of the enterprises participating in the survey. Enterprises operating in the market for 11-15 years accounted for 13% of respondents. Enterprises operating in the market for 6-10 years accounted for 16% of respondents. 30% were enterprises operating in the market for 1-5 years and start-ups accounted for the smallest share of respondents (9%).

From the regional point of view, business entities from the Bratislava region were predominant among the respondents. They accounted for 33% of enterprises participating in the survey. This is followed by the Trenčín region, where 16% of respondents are concentrated. Small and medium-sized enterprises from 61 regions of Nitra, Trnava and Žilina participated in our survey with more than 10% share. The smallest representation was in the Banská Bystrica (7%), Košice (6%) and Prešov regions (5%).

In terms of gender, men predominate in SME ownership or management positions. In 58% of the enterprises participating in our survey, it was men who held ownership or management positions. Women managed 41% of the enterprises analysed.

4 Results

Human resource management practices were assessed in the questionnaire using the items listed in table 2. The initial analysis of the individual HRMP items shows that the mean values are around 3. This means that respondents expressed a neutral attitude on average when assessing the significance of the formulated aspects of human resource management procedures after the COVID-19 pandemic. We identified the highest average item score in the case of HRMP1 item. Respondents therefore

expressed strong agreement in the case of whether “The company’s managers are fully aware of the needs and development of strategies in the area of human resources”. However, in this case, the status of the respondent, who was the owner/manager of the surveyed company, must be considered. Given the nature of the respondents (mostly business owners), the answer to the question of whether the company’s managers are fully aware of the needs and development of strategies in human resources is likely to be subjectively influenced.

Table 2: Items assessing human resource management practices (HRMP)

Item designation	Item text
HRMP1	The company's managers are fully aware of the needs and development of strategies in human resources.
HRMP2	Employees are informed about the company's financial situation, customer needs, product/service quality, costs, etc.
HRMP3	The company's human resource requirements are systematically identified, and an appropriate plan is formulated to ensure their provision.
HRMP4	All major jobs are subject to formal job analysis.
HRMP5	Performance standards are carefully developed based on employee input.
HRMP6	The company has a wide network of computerized human resources information systems with the latest software.
HRMP7	The performance evaluation system is extended to all employees of the company.
HRMP8	The company has a formal policy for employee career planning and development.
HRMP9	There are clear career paths and internal promotion standards within the company.
HRMP10	It is relatively difficult to dismiss a permanent employee from a company.
HRMP11	The company applies a formal procedure for assessing employee potential.
HRMP12	The company uses an assessment center/development center to identify and develop the potential of managers.
HRMP13	The business conducts succession planning to ensure the availability of executives to fill gaps in key management positions.
HRMP14	The business prefers to delegate authority and responsibility to individuals at a lower level of the hierarchy.
HRMP15	Employees have access to a profit-sharing/employee stock ownership plan.
HRMP16	The company has experience in conducting employee attitude/employee satisfaction surveys.
HRMP17	The company encourages employees to suggest improvements to products (services)/processes.
HRMP18	The business has employee recognition and appreciation programs in place.
HRMP19	The business manages change by integrating human resource issues with business strategies and the strategic change process.
HRMP20	Employees have room for self-realization.

The lowest average item score was recorded for indicator HRMP15 (Employees have access to a profit-sharing/employee share ownership plan). The average response was 2.53 and the most frequently occurring response was 3. Also interesting is the assessment of item HRMP12, whether the company uses an assessment center/development center to identify and develop the potential of managers. In this case, the most frequent response was disagreed. The survey shows that the education of managers/owners has a significant impact on the implementation of some HRM practices. The difference found concerned managers/owners with secondary education with a high school

diploma and managers/owners with a university degree of the 2nd degree.

The size category of the company has an impact on the following items of human resource management practices:

- an established computerized human resources information system with the latest software,
- performance evaluation systems extended to all company employees,
- the existence of clear career paths and internal promotion standards,
- using development centers to identify and develop the potential of managers,
- established employee recognition and appreciation programs.

In the given areas, large enterprises mostly expressed a positive opinion, while micro and small enterprises, on the contrary, had a more negative opinion.

When assessing the challenges businesses faced in connection with the COVID-19 pandemic, we focused on the following areas:

Table 3: Problems related to the COVID-19 pandemic

Item designation	Item text
C1	Employee absence
C2	Supply chain disruption
C3	Transportation (materials, goods)
C4	Financial problems
C5	Production reduction
C6	Profit reduction
C7	Sales decline
C8	Reducing demand

The respondents' answers showed that the biggest problem for the owners/managers of the surveyed companies was the aspect of employee absence. The largest number of answers (84), of the type “I definitely agree” or “I agree”, concerned problems with employee absence. Financial problems were considered a problem by up to 76 respondents. The least problematic aspect was the perceived reduction in production.

Table 4: Frequency of responses to COVID-19 pandemic issues (n - frequency)

	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
C1	23	18	7	6	14	11	35	27	49	38
C2	22	17	14	11	31	24	32	25	29	23
C3	31	24	17	13	26	20	28	22	26	20
C4	14	11	16	12	21	16	34	27	42	33
C5	10	8	13	10	30	23	39	31	36	28
C6	24	19	17	13	18	14	35	28	34	27
C7	20	15	20	16	23	18	31	24	34	27
C8	24	19	16	13	29	23	29	23	30	22

In small businesses, agreement prevails with disruption of the supply chain and reduced profits, the fewest respondents expressed agreement with the absence of employees. Similarly, in medium-sized businesses, the biggest problem was disruption of the supply chain. In contrast, in large businesses, the absence of employees was the biggest problem. And large businesses perceived the reduction in production as the smallest problem.

The problems with employee absence were most differently felt by owners/managers of micro-enterprises and small businesses, in micro-enterprises the problem of employee absence was not perceived as strongly as in small and medium-sized enterprises.

The different perception of supply chain disruption was significant between micro-enterprises and medium-sized enterprises. Owners/owners of medium-sized enterprises felt this problem more strongly. According to respondents, financial problems caused more serious problems in micro-enterprises than in small and medium-sized enterprises. We did not observe

a difference between small enterprises, medium-sized enterprises and enterprises with more than 250 employees.

Microenterprises also differed from other enterprises in their perception of problems with reduced production. The largest difference is between microenterprises and enterprises with more than 250 employees. The difference in the average item score is 1.581 in favour of large enterprises. Owners/managers of large enterprises expressed an average of up to 1.5 greater average agreement with problems with reduced production than owners/managers of microenterprises.

Decreased profits and decreased demand were assessed very similarly by enterprises of all size categories as problems caused by the COVID-19 pandemic. Regarding problems with reduced sales, the largest difference was identified between medium-sized enterprises and enterprises with more than 250 employees. We can conclude that for medium-sized enterprises, the problem with reduced sales and demand represented a much more prominent problem than for other enterprises.

Given that the biggest problem arising from the COVID-19 pandemic was perceived as the problem of employee absence, employees in most companies were allowed to work from home. In our survey, 56.3% of the analysed companies allowed working from home. Subsequently, we evaluated in the survey which facts respondents perceived as advantages of working from home, and which, on the contrary, they perceived as disadvantages of working from home.

Table 5: Advantages of working from home

Item designation	Item text
A1	Creating a sense of belonging to the organization
A2	Increased employee satisfaction due to work-life balance
A3	Stress reduction
A4	Reducing commuting time
A5	Increasing work flexibility in the organization
A6	Creating social distancing during the pandemic and optimizing the work environment

Businesses of all sizes agreed that the biggest benefit of working from home was creating social distancing, optimizing the work environment, and reducing stress. Fewer businesses agreed with creating a sense of belonging to the organization, so this item is not considered an advantage of working from home by managers and owners of small and medium-sized businesses.

Table 6: Frequency of responses - advantages of working from home (n - frequency)

	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
A1	20	16	23	18	44	34	16	12	25	20
A2	10	8	18	14	40	31	24	19	34	27
A3	11	9	17	13	42	33	29	23	29	22
A4	10	8	11	9	30	23	25	19	52	41
A5	11	9	14	11	42	33	29	22	32	25
A6	10	8	15	11	42	33	32	25	29	22

When assessing the disadvantages of working from home, most organizations agreed and therefore considered the mixing of personal and work life to be the biggest disadvantage. This is also related to the disadvantage of "Insufficient dedication to work", which was more often agreed with as a disadvantage by small and medium-sized enterprises, while large enterprises expressed a more neutral attitude in this item.

Table 7: Disadvantages of working from home

Item designation	Item text
D1	Social isolation
D2	The need for new forms of governance

D3	Mixing personal and work life
D4	Costs of setting up a home office
D5	Insufficient dedication to work

Large companies increasingly perceive the need for new forms of management, and related human resource management, as a disadvantage. This confirms the need to adapt human resource management procedures to post-crisis conditions and the need to respond to the consequences of the crisis within human resource management as well.

Table 8: Frequency of responses - disadvantages of working from home (n - frequency)

	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
D1	10	8	10	8	31	24	23	18	54	42
D2	12	9	10	8	33	25	39	31	34	26
D3	12	9	8	6	42	33	29	23	37	29
D4	18	14	16	12	34	27	30	23	30	23
D5	11	9	11	9	30	23	33	26	33	26

5 Discussion and conclusion

The present study focuses on human resource management practices in SMEs and the challenges faced by enterprises in the context of the COVID-19 pandemic. The pandemic had wider economic and social implications, with enterprises forced to seek new survival strategies and create existential forecasts for business operations. The COVID-19 pandemic brought a wide range of problems to SMEs in Slovakia. Businesses perceived some problems more intensely, some less intensely. Predictably, businesses with different numbers of employees faced different problems as a matter of priority. In our survey, we were interested in which problems associated with the COVID-19 pandemic most affected the activities of enterprises, broken down by different external characteristics of the enterprise. Staff absenteeism and financial problems appeared to be the most prominent problems. However, they were perceived differently in terms of the size category of enterprises. The problem of the absence of employees was perceived as the least serious in micro-enterprises. From the pairwise comparison, we found that the problem of employee absenteeism was the most severe in small and medium enterprises. The difference in perception of supply chain disruption was significant between micro and medium enterprises. Owners/managers of medium-sized enterprises felt this problem more strongly. Financial problems caused more serious problems in micro enterprises than in SMEs. Micro-enterprises also differed from other enterprises in their perception of the problems of reduced production. The biggest difference is between micro and large enterprises. Microenterprises perceived the greatest problem arising from the COVID-19 pandemic to be in the areas of financial performance and production reductions.

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Primary Paper Section: A

Secondary Paper Section: AH

A EUROPEAN VIEW ON THE ETHICAL USE OF ARTIFICIAL INTELLIGENCE (AI)

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Abstract: Artificial intelligence (AI) is one of the most exciting technology topics of recent years. It has the potential to fundamentally change the way we work, study, and use modern technologies in many areas, such as text and image generators. However, as the use of AI becomes more widespread, it is also worth being aware of the potential problems it brings. Given the increasing dependence of our systems on AI, how we address these dilemmas could have a key impact on the future of society. Among AI industry specialists, China (Taiwan) is said to produce the components for AI development, the United States is said to research and develop AI technologies, and Europe is said to implement the regulations surrounding it. In this article, we will present the ethical dilemmas that AI research and use bring, with a focus on the relevant regulations introduced by the European Union.

Keywords: Artificial Intelligence (AI), ethical issues of AI use, European Union regulations on AI.

1 Introduction

The roots of artificial intelligence (AI) as a field of research are usually traced back to a workshop held in 1956, in New Hampshire (USA), at Dartmouth College (McCarthy et al., 1955), when mathematicians, computer scientists, and neuroscientists met to test the hypothesis that any aspect of learning or any other characteristic of intelligence could be described so precisely that a machine could be built to simulate it (Kaplan, 2022).

Some notable examples are Turing's seminal paper on computing machinery and intelligence (Turing, 1950), the program called Logic Theorist that could prove mathematical theorems using symbolic logic (Newell, Simon, 1956), the first neural network machine in 1951 (Crevier, 1993), and early efforts at a self-taught checkers player (Sammut, Webb, 2010).

Outside of the United States (US) and the UK, Japan began to invest in the field (Shapiro, 1983). This period saw a great deal of interest in knowledge representation and a resurgence of interest in neural networks (McCorduck, 2004). The period is also characterized by a sharply growing commercial interest. However, commercial providers failed to develop viable solutions to real-world problems. The late 1980s and early 1990s also saw hundreds of AI companies close and funding for AI decline dramatically (Newquist, 1994). AI research was revitalized in the late 1990s and accelerated during the new millennium.

The 21st century has seen the evolution of AI into an integral part of our daily lives. From personalized recommendations on streaming services to virtual assistants in our smartphones, the applications of AI are vast and diverse. This era has seen AI innovations in areas such as healthcare, finance, and autonomous vehicles. The integration of AI with other technologies such as the Internet of Things (IoT) and big data analytics has further expanded its capabilities and applications, making it a cornerstone of the current technological landscape.

2 Important features of AI

Artificial intelligence (AI) is a branch of computer science that develops computational systems capable of exhibiting human-like behavior to perform tasks such as learning, planning, knowledge presentation, problem solving, and creativity (European Commission High-Level Expert Group on Artificial Intelligence, 2018). Using algorithms and rules, AI programs analyze large amounts of data of different nature, allowing to reduce the elements of reality to binary codes, with the aim of

initiating the corresponding appropriate actions, either through human interventions or autonomously, through the systems themselves (Sadin, 2019). Artificial intelligence systems are able to adapt their way of acting by analyzing the effects of previous actions and working autonomously. Artificial intelligence technology, defined as integral, is designed to be applied to all aspects of individual and collective life, in the relationship with ourselves, with others and with the surrounding environment, in the organization of cities, transportation, work, healthcare, banking, finance, justice, etc.

When it comes to AI, it is easy to confuse it with machine learning, which is the use and development of computer systems that can learn and adapt without following explicit instructions, using algorithms and statistical models to analyze and draw inferences from patterns in data. Technically, machine learning is a branch of artificial intelligence, but AI has grown so much that it is no longer a branch of artificial intelligence. Unlike machine learning, what AI does is teach computers how to do what we humans do best (Domingos, 2016). Until recently, AI was confined to research laboratories, but in recent years it has disrupted our daily lives. The promise of growth and development that this new technology brings seems endless, as does the possibility of each of its myriad areas of application becoming more reliable.

3 Impact of Artificial Intelligence (AI) on society

The impact of artificial intelligence on society, the economy and even the environment is set to become more widespread. Starting from definitions, we want to better understand the areas of its impact on human life. Artificial intelligence (AI), as defined by the European Commission's High Level Expert Group on Artificial Intelligence, refers to systems that exhibit intelligent behavior by analyzing their environment and taking actions, with a certain degree of autonomy, to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and facial recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications). As a scientific discipline, AI includes several approaches and techniques, such as machine learning (of which deep learning and reinforcement learning are specific examples), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimization), and robotics (which includes control, perception, sensors and actuators, as well as the integration of all other techniques into cyber-physical systems).

To better understand the new challenges and opportunities that Artificial Intelligence presents to us, it is useful to examine the prospects of its development in three areas of the world that become crucial for its future development. China is investing heavily in the development of AI technology with massive investments (Jochheim, 2021). Among the most recent steps in AI, in addition to the New-Generation Artificial Intelligence Development Plan of 2017, we find the government's allocation of 2 billion dollars in research and development and another investment of 2.1 billion dollars in the Beijing AI technology park in 2018. The government has also made huge amounts of data available and liberalized access to these sources. It is also fair to highlight the investments in AI research by Chinese giants such as Baidu, Alibaba and Huawei, as well as investment companies (such as Sinovation Ventures and others). To date, however, China has stated that it wants to become the world's largest AI power by 2030 to make AI applications and technologies internationally competitive. China plans to expand AI into many areas of manufacturing, governance and defense by that date (Roberts et al., 2021). Even today, the country is still in second place worldwide in AI, even if it still has to overcome significant challenges, especially in terms of talent and production of highly sophisticated semiconductors, which are mostly produced in Taiwan (considered by China as its own

territory and subject to potential invasion). With this precise objective, it is starting to attract researchers from other parts of the world to increase research that is currently very focused on computer vision while lacking in language processing and knowledge representation. The investment in training and research is impressive, even if the number of citations of articles at an international level denounces a still not very international approach and a lack of collaboration with other realities (Arcesati, 2023). Government support is constant and important even at the startup level. The funds are considerable and aim to enable the diffusion of solutions to transform cities, the transport system, payments, distribution and education. In China there are also much fewer hesitations to apply AI systems in consideration of privacy protection regulations or other individual protection regulations.

The United States has maintained its leading role in AI research and development. Important premises that position the USA as one of the countries with a strong immigration of talents thanks also to salaries and competitive conditions. The USA appears as a leader in the international competition on AI for the consolidated structure of the academic world that boasts a long tradition of interdisciplinary laboratories and the tendency to create collaborations at a global level.

The development of AI in the United States of America is characterized, on the one hand by an economy increasingly based on market giants such as Google, Amazon, Microsoft, Apple or Facebook, and on the other by a strong military capacity represented by the government agency of the Department of Defense of the United States of America (Defense Advanced Research Projects Agency - DARPA).

Today, the main focus of the US Department of Defense is "common sense reasoning", that is, the basic ability to perceive, understand and judge themes and subjects of discussion that are commonly shared and that can be reasonably predicted. A skill not yet within the reach of current AI constructs and that represents a significant step forward also in the ability of machines to explain their behavior, one of the main limits of current deep neural networks.

In recent years, there has been a strong increase in funding for research and commercial initiatives on AI (Mousavizadeh et al., 2021). On July 29, 2021, the National Science Foundation (NSF) announced the creation of 11 new NSF National Artificial Intelligence Research Institutes. The combined investment of 220 million dollars expands the reach of these institutes to include a total of 40 states and the District of Columbia (U.S. National Science Foundation, 2021). This step marks an effort to advance the development of AI research for decades to come. Also significant is the role played by DARPA, which has formulated a 2 billion dollars strategic plan for AI with the goal of overcoming the limitations of current technologies and achieving what is called Contextual Adaptation.

If we want to consider the European approach to AI, we must consider that Europe is still a fragmentation of States. So far, investments in the European AI ecosystem have not managed to reach the global competitiveness of "AI made in Europe". They have been insufficient in terms of size and poor focus. Europe's dependence on AI made in other countries is increasing rapidly, which is eroding European economic, strategic and cultural sovereignty. There is clearly no common strategy, of aggregation of research centers capable of consolidating industrial research. Added to all this is a lack of vision on the part of companies that is causing not only a brain drain but also and above all one of the most significant critical issues. To date, the Eurozone is focusing on data protection rules that represent a significant source of knowledge for algorithms to learn. Regulation without innovation will not solve the problem of the effectiveness of AI development at a global level. This approach could prove detrimental in terms of market and research growth, unless solutions are found that protect people's data and their rights, without weakening the possibility of using them for the common good. Europe, despite having the highest level of scientific production and international collaboration, has witnessed in

recent years a significant loss of talent in the world of research who emigrate to countries with greater career and salary opportunities (USA and China). A rather worrying trend because if it is not reversed soon, it will lead Europe to quickly lose its ability to compete in the field of AI.

The Confederation of Laboratories for Artificial Intelligence Research (<https://cairne.eu/>) initiative seems valuable, which in Europe was born from a grassroots movement of researchers, laboratories and scientific associations. The primary objective consists in strengthening research and innovation by creating a confederation of laboratories for AI research capable of including a network of centers of excellence and an infrastructure operating as a central hub. In detail:

- focus on AI applications for humans that do not aim to replace them but to support and facilitate them; increase the funds dedicated to ongoing research, new opportunities and key interests for the continent.
- attract stakeholders to find mechanisms for the participation of citizens, industry and the public sector together with innovative startups.
- define and solve challenges in various sectors and in a wide range of applications, including health, manufacturing, transport, scientific research, financial services and entertainment.

4 European guidelines - AI Act

According to the European Parliament Resolution on AI (2017), legal responsibility for the action (or inaction) of an AI is traditionally attributed to a human actor: the owner, developer, manufacturer or operator of an AI, for example. However, issues arise when considering the involvement of third parties and advanced systems such as self-learning neural networks: if an action cannot be predicted by the developer because an AI has changed sufficiently since its design, can a developer be held liable for that action? Furthermore, the current legislative infrastructure and lack of effective regulatory mechanisms pose challenges in AI regulation and attribution of blame, argue Atabekov and Yastrebov (2018), with autonomous AI in particular raising the question of whether a new legal category is needed to encompass their characteristics and limitations.

Lo sviluppo dell'IA in un vuoto normativo ed etico ha innescato una serie di dibattiti sulla necessità del suo controllo legale e della sua supervisione etica. L'impatto delle attuali tecnologie di IA sul godimento dei diritti umani, dalla libertà di espressione, alla libertà di riunione e associazione, al diritto alla privacy, al diritto al lavoro e al diritto alla non discriminazione alla pari protezione della legge, deve essere attentamente esaminato insieme al potenziale dell'IA di esacerbare le disuguaglianze e ampliare il divario digitale.

The development of AI in a regulatory and ethical vacuum has triggered a series of debates on the need for its legal control and ethical oversight. The impact of current AI technologies on the enjoyment of human rights, from freedom of expression, freedom of assembly and association, the right to privacy, the right to work and the right to non-discrimination to equal protection of the law, must be carefully examined alongside the potential of AI to exacerbate inequalities and widen the digital divide.

With regard to the presence of AI in various living environments, European public opinion (European Parliamentary Research Service, 2020):

- agrees with the use of robots and digitalisation in work sectors that present risks or difficulties for humans (such as space exploration, manufacturing and the military);
- seems concerned that automation and digitalisation could lead to job losses and is unsure whether they would stimulate and increase job opportunities across the EU;
- does not approve of the use of robots in sectors that involve caring for vulnerable members of society (elderly, ill or undergoing medical procedures);

- expresses concerns about accessing and protecting their data and information online;
- is not willing to drive a driverless car (only 22% would be happy to do so);
- distrusts social media (only 7% consider stories published on social media to be "generally trustworthy");
- does not believe that widespread use of robots will occur in the short term, assuming this is a scenario that will occur at least 20 years from now.

Given the potential of AI to act autonomously, its enormous complexity, the lack of transparency and the uncertainty surrounding its functioning have called for a comprehensive regulatory response to prevent the ever-expanding applications of AI from causing social harm between individuals and social groups. Given the potential of AI to act autonomously, its enormous complexity, the lack of transparency and the uncertainty surrounding its functioning have called for a comprehensive regulatory response to prevent the ever-expanding applications of AI from causing social harm between individuals and social groups (Slezáková, 2024). In the European Commission, in addition to those invited to monitor the development of AI systems, there are increasingly frequent calls for the adoption of rules that address, on the one hand, the ethical design of AI and, on the other, the ethical use of the results of its development (Villani, 2018).

The 2017 European Parliament resolution on civil law rules on robotics – comprising a 'code of ethical conduct for robotics engineers', a 'code for research ethics committees', a 'licence for designers', and a 'licence for users' can serve as a governance model for a detailed process-based architecture of technology ethics in the AI field. The charter on robotics contained in the resolution combines an ex-ante ethics-by-design approach with a reflexive framing and a meta-ethical analysis of the governance process employed for the embedding of ethics into the structures for the development of this disruptive technology (European parliament, 2017). Finally, the European Commission adopted a communication on 'Artificial intelligence for Europe' on 25 May 2018, laying down the European approach to benefiting from the opportunities offered by AI and addressing the new challenges AI poses. The Commission proposed a three-pronged approach: increasing public and private investment, preparing for socioeconomic changes brought about by AI and ensuring an appropriate ethical and legal framework.

In recent years, a proliferation of ethics principles and guidelines for AI have been adopted. On 12 February 2019, the European Parliament adopted a resolution on a comprehensive European industrial policy on artificial intelligence and robotics. On 8 April 2019, the High-Level Expert Group on AI, established by the European Commission, presented Ethics Guidelines for Trustworthy Artificial Intelligence (European Commission. High-Level Expert Group on AI, 2019). An assessment checklist to help assess whether the AI system being developed, deployed, purchased or used meets the seven requirements of trustworthy artificial intelligence:

1. Human agency and oversight: AI systems should empower human beings, allowing them to make informed decisions and fostering their fundamental rights. At the same time, proper oversight mechanisms need to be ensured, which can be achieved through human-in-the-loop, human-on-the-loop, and human-in-command approaches;
2. Technical Robustness and safety: AI systems need to be resilient and secure. They need to be safe, ensuring a fall back plan in case something goes wrong, as well as being accurate, reliable and reproducible. That is the only way to ensure that also unintentional harm can be minimized and prevented;
3. Privacy and data governance: besides ensuring full respect for privacy and data protection, adequate data governance mechanisms must also be ensured, taking into account the quality and integrity of the data, and ensuring legitimised access to data;

4. Transparency: the data, system and AI business models should be transparent. Traceability mechanisms can help achieving this. Moreover, AI systems and their decisions should be explained in a manner adapted to the stakeholder concerned. Humans need to be aware that they are interacting with an AI system, and must be informed of the system's capabilities and limitations;
5. Diversity, non-discrimination and fairness: Unfair bias must be avoided, as it could have multiple negative implications, from the marginalization of vulnerable groups (Urbančok, 2023, 20-28), to the exacerbation of prejudice and discrimination. Fostering diversity, AI systems should be accessible to all, regardless of any disability, and involve relevant stakeholders throughout their entire life circle;
6. Societal and environmental well-being: AI systems should benefit all human beings, including future generations. It must hence be ensured that they are sustainable and environmentally friendly. Moreover, they should take into account the environment, including other living beings, and their social and societal impact should be carefully considered;
7. Accountability: Mechanisms should be put in place to ensure responsibility and accountability for AI systems and their outcomes. Auditability, which enables the assessment of algorithms, data and design processes plays a key role therein, especially in critical applications. Moreover, adequate an accessible redress should be ensured.

Finally, the European Community has prepared guidelines on AI, considering the opportunities and risks associated with it. In particular, on 19 February 2020, the "White Paper on Artificial Intelligence: a European approach to excellence and trust" (European Commission, 2020) was published, outlining policy options on how to promote the adoption of artificial intelligence (AI) and address the risks associated with certain uses of this new technology.

In April 2021, the European Commission proposed the AI Act which underwent a process of approvals and significant amendments, in particular following the spread of generative Artificial Intelligence systems at the end of 2022. The Council and the European Parliament reached a political agreement on the wording of the regulation in December 2023, and the official approval by the Parliament came on 13 March 2024. The EU AI Act is the first comprehensive legal framework in the world on artificial intelligence. It reflects European values by focusing regulation on risks that can be identified today and in the near future and by promoting responsible innovation based on artificial intelligence in Europe. The AI Act also aims to make a substantial contribution to the development of global rules and principles, respecting fundamental human values and rights.

The AI Act will officially come into force in the first half of 2024, with the implementation of its provisions taking place gradually:

within 6 months: prohibited AI systems will have to be banned from member states;

within 1 year: the rules for general-purpose AI systems will come into force;

within 2 years: the rest of the AI Act will be applicable;

within 36 months: the obligations for high-risk systems will come into force.

The AI Act encompasses and harmonizes the efforts made so far, it is therefore a set of rules that aim to protect the rights of citizens, imposing a "human-centric" approach to anyone who develops or uses Artificial Intelligence systems. The ultimate goal of the legislation is to ensure that AI systems placed on the Union market are safe and respect citizens' rights.

5 Ethical issues surrounding artificial intelligence

Ethical issues in AI are a complex and evolving field of interest. As AI technology continues to advance, it raises various ethical dilemmas and challenges. Here are some of the key ethical issues associated with AI:

- Bias and fairness: AI systems can inherit and even amplify biases present in their training data. This can lead to unfair or discriminatory outcomes, especially in hiring, lending, and law enforcement applications. Addressing bias and ensuring fairness in AI algorithms is a critical ethical concern;
- Privacy: The need for large amounts of data to train algorithms raises strong concerns about provenance and proper data collection. AI systems often require access to large amounts of data, including sensitive personal information (Urbančok, 2018 a). The ethical challenge lies in collecting, using, and protecting this data to prevent privacy violations;
- Transparency and accountability: Many AI algorithms, especially deep learning models, are often considered “black boxes” because they are difficult to understand or interpret. Ensuring transparency and accountability in AI decision-making is critical to user trust and the ethical use of AI (Urbančok, 2018 b);
- Autonomy and control: As AI systems become more autonomous, there are concerns about the potential loss of human control. This is particularly relevant in applications such as autonomous vehicles and military drones, where AI systems make critical decisions;
- The digital divide: While AI technologies are emerging rapidly in wealthier nations, developing nations may not have the infrastructure and knowledge to keep pace;
- Job displacement: AI automation can lead to job displacement and economic inequality. Ensuring a just transition for workers and addressing the social impact of automation is an ethical issue;
- Security and misuse: AI can be used for malicious purposes, such as cyberattacks, deepfake creation, and surveillance. Ensuring the security of AI systems and preventing their misuse is an ongoing challenge;
- Accountability and liability: Determining who is responsible when an AI system makes a mistake or causes harm can be difficult. Establishing clear lines of accountability and liability is essential to addressing AI-related issues;
- Ethical AI in healthcare: The use of AI in healthcare, such as diagnostic tools and treatment recommendations, raises ethical concerns about patient privacy, data security, and the potential for AI to replace human expertise (Šmidová, Šmid, Jamborová, Andraščíková, Trębski, Urbančok, 2023);
- AI in criminal justice: Use for predictive policing, risk assessment, and sentencing decisions can perpetuate bias and raise questions about due process and fairness;”
- Environmental impact: The computational resources required to train and run AI models can have a significant environmental impact. Training complex AI models requires a significant amount of energy, which adds to carbon emissions. According to research from the University of Massachusetts Amherst, training several large, common AI models can produce the equivalent of nearly five times the emissions of a typical American car (and that includes the production of the car itself) (Hao, 2019). This means that AI development methods need to be more sustainable. Ethical considerations include minimizing AI’s carbon footprint and promoting sustainable AI development;
- AI in warfare: The development and use of autonomous weapons raises ethical concerns about the potential of AI to make life-or-death decisions in armed conflict;
- AI in education: The use of AI in education, such as automated assessment and personalized learning, raises concerns about data privacy, the quality of education

(Šmidová, Slezáková, 2023, 243), and the role of human educators;

Addressing the ethical issues raised by AI development requires a multidisciplinary approach involving technologists, ethicists, policy makers, and society at large. This involves developing ethical guidelines, regulations, and best practices to ensure that AI technologies are developed and deployed in ways that benefit humanity, minimize harm, and ensure fairness and accountability.

6 Conclusion

Scientific research and technological innovations are not neutral, but subject to cultural influences. The contemporary context seems to give primacy to an artificial intelligence that becomes increasingly subordinate to experimental technology and thus forgets that every science must always safeguard man and promote his effort towards authentic good. Stephen Hawking, a renowned cosmologist, physicist and mathematician, in his December 2, 2014 interview with the BBC, said: “The development of full AI could spell the end of the human race... it would take off on its own and redesign itself at an ever-increasing rate. Humans, who are limited by slow biological evolution, could not compete and would be overtaken. (...) Computers can, in theory, emulate human intelligence and surpass it. The success in creating effective AI could be the greatest event in the history of our civilization. Or the worst. We simply do not know. So we cannot know whether we will be infinitely helped by AI, or ignored and sidelined, or presumably destroyed by it. (...) The primitive forms of AI that we already have proven very useful. But I think the development of full AI could spell the end of the human race. If we do not learn to prepare for and avoid potential risks, AI could be the worst event in the history of our civilization. It brings with it dangers, such as powerful autonomous systems, weapons systems, or new ways for the few to oppress the many” (Cellan-Jones, 2014).

Without the full involvement of the companies that design and deploy AI systems, without a full awareness of the ethical and social implications of their management and operation, it will not be possible to ensure the safety of people in the digital environment. Ethics and AI are intertwined in a complex dance, requiring constant vigilance, collaboration and critical thinking. As AI continues to permeate our society, it is essential to address the ethical dilemmas it presents. The European Community’s effort to regulate the development and use of AI focuses on fairness, privacy, accountability and the safety of its use for citizens. Finding the right balance between technological progress and ethical considerations is essential to fully exploit the potential of AI for the betterment of our global community. AI should best accompany human potential and the highest human aspirations, not compete with them (Francis, 2024).

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Primary Paper Section: A

Secondary Paper Section: AA, IN, JD

QUALITATIVE RESEARCH DESIGN IN EDUCATION: TOOLS, CHALLENGES, AND PRACTICAL IMPLICATIONS

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This article was created at AMBIS University within the project "Risk Behavior Models in Education – Economic Benefits of Preventive Activities" number SVV/2024/6103 supported by funding for Specific University Research provided by the Ministry of Education, Youth and Sports in 2024 and 2025.

Abstract: The main aim of this paper is to present the benefits of a qualitative research design. This design is based on the interconnected use of research tools and methods, such as interviews, observations, case studies, grounded theory, and interpretative phenomenological analysis. The presented research design has been employed in numerous research projects and has proven highly effective. In this paper, we highlight the advantages of the proposed research design and address its challenges. We consider qualitative research design to be a vital tool in the field of educational sciences.

Keywords: Qualitative Research Design, Educational Sciences, Grounded Theory, Interpretative Phenomenological Analysis, Pedagogical Practice

1 Introduction

Research and research methods, whether qualitative or quantitative, are integral to pedagogical practice and have long since transcended the confines of an exclusively academic environment. In today's dynamic and rapidly changing education system, educators are increasingly faced with the need to reflect on their practice, analyse the results and seek effective intervention strategies based on the information gained. Thus, research is becoming a tool that enables a deeper understanding of pedagogical processes and social phenomena and supports innovative educational approaches. The ability to apply research methods in practice strengthens the professionalism of educational staff. It opens the way to practical solutions to current educational problems related to risky behaviour, children's educational needs and other complex phenomena related to education. Research is not only the domain of academics but is a practical and effective tool for everyday educational practice.

The main aim of this paper will be to present a qualitative research design that has proven successful in our previous research projects. Our paper will focus on a few essential research tools and methods. Our findings are based on several previous research projects. We were led to choose a qualitative design because we needed to gain a deeper and more detailed insight into pedagogical practice. These fine details can be omitted in purely quantitative methodological design. This approach allowed us to understand better the current educational needs of the participants in the educational realities we examined. The choice of a qualitative design was motivated by the need to gain deeper insights into specific educational situations and contexts of pedagogical practice that often escape attention in purely quantitative measurement. This approach allowed us to understand the real needs of educators and their students and identify the strengths and pitfalls of existing methodological practices.

Our research has taken place in various educational realities - from primary school settings to art schools, orchestral ensembles, and the specific environments of children's homes. This diversity of settings allowed us to understand better how different research tools contribute to reflection and improve educational processes. Based on the positive feedback from the educational staff who participated in our research and from the professional community to whom we presented our research design, we gradually built a research model that has proven itself in research projects covering a wide range of educational realities from music schools, to residential care facilities, to standard school settings. We have explored issues of special educational needs, exceptional giftedness, and risky behaviour.

Our qualitative research design has considerable potential in academia, especially as a practical tool that can significantly enrich everyday educational practice.

In the first part of the article, we will present educational realities in which we have carried out research activities in the past. We describe the time frame of the research, and immediately, in this introductory section, we highlight the ethical aspects of the research conducted. In the second part of our paper, we will examine the different research tools and methods we have applied during our projects. Special emphasis will be placed on qualitative methods that have proven highly effective in pedagogical practice. In particular, we will discuss interviews, observations, and case studies. This part of the paper will conclude with an introduction to Grounded theory and Interpretive phenomenological analysis. Both methods have proven to be practical research methods capable of mapping the phenomena in detail and also allowing us to look for new connections. In the third part of the article, we will explore the limits of our research design. Despite the considerable advantages of qualitative methods, their limitations, such as time, subjective interpretation of data or difficulty in generalising results, cannot be overlooked. We will also discuss the need to complement the qualitative approach with quantitative methods to provide a broader scale for interpreting the results and confirming key trends identified during qualitative research. Particular attention will be paid to the possibilities of data triangulation and modifications to the research design to ensure the highest possible validity and reliability of our results. In the paper's final part, we will reflect on the critical need for intensive integration of pedagogical practice with current trends in educational research.

2 Research background

We have been conducting research activities in various educational settings since 2015. First, we explored the possibilities of music activities for children in residential childcare settings. This research took place not only in these particular environments but also during the actual implementation of the research musical activities, which were carried out in a leisure music ensemble. This orchestra operated in a standard primary school setting, and its members were not only children from the researched residential childcare setting but also children from the intact population. Later, we extended our research scope to the Czech music education system. In primary art schools, we investigated the readiness of the music education environment to work with pupils with special educational needs. In 2020, we focused our research mainly on residential childcare institutions. Here, we directed our research to different types of school facilities for the execution of institutional education, extended the scope of our research to the international level, and started research activities in Slovakia.

We are now penetrating more profound levels of the issue of residential institutions and are currently researching gender and environmental issues in children's homes. We participate in the educational process in all the projects we implement. We have developed a composite research design that combines different methods and research tools for this rich spectrum of topics, educational settings, and realities under investigation. We continuously refine and critically revise this research design. We continuously enrich it with appropriate research tools and adapt it to the fluid educational realities of today's changing society. Yes, as society changes, so must the approach to educational research. Especially for the inclusive paradigm, pedagogical research is an absolute critical necessity. A heterogeneous society requires flexible and comprehensive research approaches. Our research design is based on a synergistic combination of qualitative research tools and methods. Because our research projects are conducted in settings where children are present, we strictly adhere to privacy principles in all

research. We are aware of the ethical considerations associated with similar educational settings. A particularly sensitive research approach is needed in educational realities where we may encounter vulnerable individuals, such as the environment of a children's home.

3 Interviews

In qualitative research, interviews are one of the most commonly used methods of collecting information (Atkins and Wallace 2012; Švaříček and Šed'ová 2014). Interviews can benefit qualitative research by allowing for rich and in-depth data collection (Brinkman 2023). The purpose of the interview in educational research is to gain a deeper understanding of the perspectives and experiences of interviewees and to identify patterns, themes and insights that can inform educational policy and practice. We can observe a significant change in the researcher's view of the interview process. Previously, the emphasis was on the researcher's professional distance from the interviewees. However, Schulman (2006) argues that, in contrast to this grasp of interviews, it is necessary to allow the researcher to reconcile the personal component with the professional position. For the settings we studied, it was imperative to reconcile the research and personal levels as sensitively as possible, as we observed a range of negative experiences gained during the interviewees' life journeys, particularly for interviewees in institutional settings. We had to be aware that many of our respondents had been involved in interviews in the past, during which sensitive topics were handled. These topics can be uncomfortable for respondents during interviews (Indah 2022). Thus, it was necessary to balance the personal and research levels (DeJonckheere and Vaughn 2019).

The researcher seeks to obtain information about the respondents' experiences, perceptions and attitudes regarding a particular educational topic or issue by interviewing them. These interviews can take many forms: from structured interviews with a set list of questions to semistructured interviews to the most relaxed, i.e. unstructured, interviews with more general and open-ended questions (Georgescu and Anastasiu 2022). In our research projects, unstructured interviews have been the most successful. In the literature, the unstructured interview is the most challenging (Gavora 2010). A well-conducted interview creates a confidential atmosphere between the respondent and the interviewer, which leads to greater openness (Váňová and Skopal 2002). When this openness is linked to a trusting relationship between respondent and interviewer, the interview is an invaluable research tool. Skill, sensitivity, concentration, interpersonal understanding, and discipline are required of the researcher (Hendl 2016; Powney and Watts 2018). Interviews are a key research tool in educational research. However, conducting interviews is time-consuming and requires thorough preparation and professional execution. Even so, interviews remain indispensable in qualitative research and provide rich data that enrich pedagogical practice and contribute to a deeper understanding of pedagogical phenomena.

4 Observations

Observation is among the most challenging qualitative research methods (Papatheodorou et al. 2013; O'Leary 2013). Although they are demanding in terms of preparation, observations enable the acquisition of complex data through other research techniques (Maněnová and Skutil 2012). We believe a passive researcher cannot achieve better results than one actively involved in the research setting (Charmaz 2006). We benefit significantly from being actively involved in the educational realities or activities under investigation during the research conducted. We try to make the researcher himself a research instrument (Žháněl et al. 2014). In our qualitative research, we are in constant contact with the researched group, which is seen as a significant benefit in the literature (Creswell 2009). Being involved in the researched environment allows us to make long-term observations. Due to the researcher's involvement, we can spend much time in the research setting, which is of considerable importance for pedagogical research (Toušek 2015). It also

removes the distrust of respondents we sometimes encounter when the research setting is a very closed community. However, we need to be constantly aware of possible attempts by the observed to modify their behaviour because they are aware that they are research subjects. We speak of the *guinea pig effect*, whereby research subjects know they are being observed and modify their behaviour according to the researcher's expectations (Disman 1998). We have been able to eliminate this danger precisely by the aforementioned long-term presence of the researcher in the research setting. Pedagogical observation is a demanding research method that requires detailed knowledge of the environment under investigation and meticulous preparation (Fix et al. 2022). Observation is a valuable educational research method that captures spontaneous behaviour and interactions in the environment under study. Observation can be very effective in closed communities, such as special schools or educational institutions. However, observation requires considerable preparation, execution, and data analysis. The presence of a researcher can change the behaviour of respondents. Observation provides qualitative research with a deep insight into the reality of the researched educational system.

6 Case studies and working with pedagogical documentation

Interviews and observations should be informed by knowledge of the individual or group that is the subject of our research activities. Pedagogical documentation can provide us with this critically important information. If we conduct research in a residential childcare setting, we have access to the complete educational records that the residential childcare setting maintains on each child and young adult. These include social worker reports, court decisions, records of case conferences, medical reports, and more. This documentation is entirely inaccessible to the standard researcher because it is subject to the regulations of the children's home. If we conduct research in other educational realities, we should obtain the consent of the statutory representatives to inspect the educational documentation. The information obtained from the available documentation can be summarised in a case study.

In the Czech pedagogical environment, we encounter a rather loose understanding of case studies as a research tool. Case studies are often the subject of professional conjecture about how much of a research tool they are (Takahashi and Araujo 2019). Case studies have significant potential to help researchers delve into deeper levels of the phenomena under investigation, especially in the social sciences (Byrne and Ragin 2013). When working with case studies, the researcher needs to be familiar with the specificities of the target group (Patten and Newhart 2023). Case studies are very important for qualitative research (Hendl 2005). They are not mere information summaries; case studies are full-fledged research tools (Chrastina 2021). Case studies are a very effective way of finding detailed facts (VanWynsberghe and Khan 2007). A case study seeks to offer understanding to a much larger group of individuals through the information contained within it (Gerring 2004). Case studies provide a deep understanding of individual cases and contexts, offering a holistic view of how environments, experiences, and behaviours are interconnected. Their flexibility allows researchers to adapt to emerging problems. However, case studies are time-consuming and involve complex data analysis, which can lead to subjective bias. Their primary limitation is their low generalizability. Case-based studies are valuable, bring practical knowledge, and serve to provide a comprehensive understanding of the researched educational realities.

8 Grounded theory

Grounded theory is a qualitative research method that dates back to the 1960s. It was developed by Anselm Strauss and Barney Glaser (Strauss and Corbin 1999). Grounded theory is a theory inductively derived from the phenomenon under study. It uses the simile of feet firmly anchored in the phenomenon under study and heads in the clouds where the researcher seeks inspiration. It is not simply data analysis. Some scholars argue that grounded theory is a qualitative research method that some

experts consider the most comprehensive qualitative method available to create a theory or model of a phenomenon (Eger and Egerová 2017). Grounded theory allows us to understand the phenomenon under study comprehensively. The researcher seeks to obtain respondents' perspectives on the area under study (Saliya 2022). Theories are not formulated at the beginning of the research to be further confirmed or sought. The researcher approaches the problem under study with an open mind and must discard possible confirmation biases. The findings are continuously analysed and supplemented. The theory is then inductively inferred from the emergent facts (Briks et al. 2009). The researcher continues to collect and analyse information until theoretical saturation occurs (Hendl 2016). Theoretical saturation is when new facts no longer emerge, and the data collected are repetitive. The essential tool of grounded theory is coding what is being investigated.

Grounded theory works with open, axial, and selective coding (Charmaz and Thornberg 2021). Grounded theory is suitable for domains where it is difficult to quantify results (Chun Tie et al. 2019). The research process is controlled only by emerging theories, and we continuously generate preliminary concepts and analytical hypotheses (Disman, 1998). A significant benefit to the research design was the freedom to gain new insights into areas that we had not considered relatively marginal at the beginning of the research. However, new research challenges emerged during the investigation. Grounded theory works using an inductive approach that reveals new perspectives and connections throughout the research process. Its flexibility allows for a deep understanding of the phenomenon under study and draws attention to previously unrecognised areas. This method is particularly effective in examining complex social and pedagogical problems. However, the grounded theory is time-consuming and methodologically demanding. Grounded theory is a valuable tool for in-depth qualitative research, offering new perspectives and enriching both theoretical and practical aspects of educational practice.

9 Interpretive phenomenological analysis

Interpretative phenomenological analysis is a modern qualitative research method. The main aim of this not-often-used method is to explore an individual's world in detail, to find out how that individual perceives the world and to capture how he or she explains life situations (Smith et al. 2009). Interpretative phenomenological analysis was initially used primarily in psychology. Like grounded theory, this method seeks the essence of an agency, a phenomenon, or an experience. By its very name, this research method is theoretically based on phenomenology. Phenomenology analyses facts so that the essential facts stand out above all. Like all philosophy, phenomenology asks about the very essence of things. Interpretative phenomenological analysis wants to be part of the process being analysed. It argues that subjective experience is necessary for an objective outcome (Smith 2015). It is always influenced by the person of the researcher (Řiháček et al. 2013). It emphasises the insider perspective; we talk about the so-called *insider* perspective. This method works on the principle of two-stage analysis: the participant indicates an understanding of his/her experience, and the researcher tries to understand the participant. Interpretative phenomenological analysis is an inductive and idiographic method. It is described as ideal for areas where theory is lacking (Nizza 2021). A design incorporating interpretive phenomenological analysis allows for the interpretation of 'lived experience' (Alase 2017). Interpretive phenomenological analysis is qualitative and inductive, favouring the absence of a single truth with an emphasis on the subjective interpretation of individual respondents (Gulova and Šíp 2013).

Since our research designs are heavily directed at the respondents' living space and work with intimate information, interpretive phenomenological analysis is an ideal research method (Biggerstaff and Thompson 2008). For a more profound acceptance of this not-so-common research method, we have paraphrased the adage "*the full does not believe the hungry*" to

"*the researched does not believe the researcher*". We had to accept wholeheartedly that our perceptions of the environment and the educational realities under investigation must differ from those of the children and young adults who inhabit these realities. Aware of this reality and supported by our long-standing presence in the environments under study, we have opened the way to a richer use of the possibilities of interpretive phenomenological analysis, which has recently gained increasing support across disciplines (Rajasinghe et al. 2024). Interpretative phenomenological analysis is a qualitative method that deeply examines individuals' subjective perceptions and inner experiences. It captures how respondents interpret life situations, with the researcher actively trying to understand these experiences through their perspective. A two-step process, where participants reflect on their experiences and researchers interpret these reflections, provides a meaningful connection between data and insight. Focusing on unique individual experiences significantly limits generalizability. Interpretative phenomenological analysis is an effective tool for understanding lived experiences and offers authentic insights into the examined realities that enrich educational theory and practice.

10 Discussion

The qualitative research design presented in this paper allows for a deep dive into the issues under investigation. With the methodological design presented, we have demonstrated in our earlier research projects that exceptional giftedness in the residential childcare setting can be hidden under layers of special educational needs (Daněk 2024). With the help of this research design, we have highlighted the significant differences between different national grasps of institutional childcare (Daněk et al. 2023). In other project, we have identified the impact of alcohol on relational patterns, confirming the destructive role of alcohol in accelerating a range of serious social problems (Daněk et al. 2024). The theme of objectivity was present across all the research projects undertaken. A key requirement of any research is the objectivity of the results. In the case of a qualitative design based on the researcher's presence in the research setting, there is a risk that the results could be biased precisely by too much contact with the research setting. For this reason, we place considerable emphasis on the objectivity of the research. We use the principle of triangulation as a tool to enhance the objectivity of our research projects. Triangulation is a research method in which we subject our findings to the critical perspective of other research methods or researchers (Flick 2009). The term triangulation refers to the combination of different methods (Hendl 2016). We strive to use a wide range of research methods. We support interviews with observations and confront partial results with the outcomes of the analysis of pedagogical documentation.

Triangulation helps establish credibility by providing multiple forms of evidence to support conclusions. It can also help identify and resolve inconsistencies or conflicting information using a single method or data source. Triangulation is intended to ensure that research, especially qualitative research, is an objective tool of modern science. We gathered information using various methods while reflecting on the results observed by other experts working on the subject (Gavora 2010). Confronting our partial results with a plenum of experts proved to be a very effective triangulation tool. We offer our results to other colleagues for comment and critical review. We only publish outputs relevant to the educational realities we have studied and to other colleagues' home environments. With this critical feedback, we avoid a subjective grasp of the issues under investigation.

It can be said that virtually every research has to address specific ethical issues (Švaříček and Šedová 2014). In qualitative research, ethical aspects can reach the edge of legal requirements, especially regarding personal data protection (Eger and Egerová 2017). Ethical issues are crucial for our research conducted in educational realities. It is important to remember that the researcher is working with sensitive information, the misuse of which could harm the research participants. Failure to

follow privacy rules could result in the subsequent identification of research participants.

It is a matter of course for our research that we obtain consent to conduct the research from the statutory representative of the school environment under investigation. It is also necessary to obtain consent from the research participants themselves. Providing informed consent and the ability to refuse to participate in research are among the fundamental ethical obligations of the researcher. While implementing the research activities, we informed the participants that the research activities were ongoing. We presented the results, such as published articles, to the respondents for evaluation and regularly discussed our findings. We knew that if the research participants were under the impression that they had become mere objects of research, the trust built up over a long period would be undermined. Critically, we see the major limitation of methodological design as its considerable entanglement with the environments under study. Our results are complicated to generalise. Nevertheless, the results obtained by the qualitative design presented here have the potential to inspire other social settings.

11 Conclusion

Qualitative research design provides the opportunity to gain a comprehensive and in-depth understanding of the phenomena investigated in various educational settings. A significant benefit of this approach is its ability to capture nuances, details and hidden connections that are very difficult to capture by quantitative methods. Qualitative methods have proven particularly effective in examining dynamic and sensitive phenomena such as risk behaviour, inclusion or specific educational needs. Using qualitative research methods allows the creation of a comprehensive picture of educational reality and then identifies the strengths and weaknesses of existing pedagogical practices. The qualitative approach allows educators to better reflect on their practice, identify specific educational problems, and design effective intervention strategies. Despite its many advantages, it is necessary to think critically about the limitations of the qualitative research design presented. The subjective nature of qualitative research requires a high degree of reflexivity and discipline on the researcher's part to minimise the risk of data bias. Generalisation of results in this context is limited, but the knowledge gained has the potential to enrich specific environments and offer valuable insights that can inspire broader educational practice. Our experience and results show that qualitative research design is a flexible and effective tool for exploring various pedagogical phenomena. Qualitative research design undoubtedly has a firm place in today's dynamic society.

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Primary Paper Section: A

Secondary Paper Section: AM

GALLERY AS AN INCLUSIVE SPACE OF HUMAN INTERACTION WITH ART IN UPBRINGING AND EDUCATION

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The paper is one of the outputs of the project KEGA 002UK-4/2024 Museum and gallery exhibitions: art-expression-enjoyment

Abstract: As the gallery is a cultural institution, this paper aims to explore its use as an educational space, a venue for knowledge, and a platform for the development of cultural awareness for each person. As part of the study, the research aimed at analyzing the contexts resulting from this relationship was carried out through qualitative research methods in a territorial setting. The research aimed to explore the possibilities and limitations of educational activities in a gallery setting. In terms of content, the research was projected on both an intact and a minority population of gallery visitors. The results of the research identify specific educational opportunities as well as certain limitations and assumptions for the visitor with a disability, even though society tends to be inclusive. The gallery is a space where one encounters art and is confronted as a viewer. This implies that the gallery itself should not only be a cultural and educational institution, but as an inclusive institution open in favour of the heterogeneity of visitors.

Keywords: gallery, gallery programs, cultural institution, educational institution, inclusion.

1 Introduction

The presented paper has the ambition to highlight the gallery as an open space for every visitor's benefit regardless of age, health condition or cultural difference (Kováčová, 2023). The aforementioned heterogeneity helps visitors educate themselves, shape themselves in favour of the perception of culture and know the unknown through visualization (Benčíč et al., 2023). The fact that galleries are no longer just places for exhibiting art can also be observed in the offer itself, and at the same time their role has been significantly enriched in terms of competences. It is a cultural institution, just as a museum provides its visitors with contact with certain artistic artefacts, according to its focus. Galleries are places of learning where education is seen as a process of interaction between the exhibited work, the educator and the visitor (Hooper-Greenhill, 2007).

The gallery as terminus technicus, is not very different from the term museum in other countries. In our conditions, in Slovakia they are differentiated based on the expositions and exhibitions that are offered. This fact is determined by the historical framework of the development of cultural awareness in our conditions. The term gallery can be understood as an institution that deals with the visual arts. They are also engaged in collecting activities, unlike in Western countries where galleries primarily perform the function of selling works of art. Thus, it could be argued that Slovakia still has some way to go in this respect (Valachová, 2021a). The public in our country is accustomed to a different conception of this institution and it is possible that the mentioned approach imaginatively creates a certain distance of people from it (Valachová, 2021b). Nevertheless, it might evoke "business" and thus the artistic, mysterious spirit of the place would disappear. However, fine art is not only presented in galleries but also in art museums. The museums, unlike galleries, have a broader range in terms of the possibilities of focus and the artefacts they can offer to their visitors (Valachová, Kováčová, 2024). Due to the nature and themes of the artworks, the presence of a curator, a professional staff member or a gallery educator in this institution is essential and significant. They can appropriately and professionally explain the artworks in question concerning the target group to which it is presented (Bergerová, 2024).

1.1 Gallery pedagogy through time

Cultural institutions - museums and galleries - are now an integral part of our culture. Their origins and content are the subject of research and scientific studies. We also present the broader theoretical concept in the following text.

The issue of gallery and museum pedagogy is well known within our territory, but less systematically elaborated. At the same time, there is no systematic training of educators focused on this area.

Abroad, the terms gallery and museum are used as one unit, regardless of the precise definition of the concept of gallery and museum. Institutions that present and work only with the visual arts are defined as museums in the global context.

In the global terminology, the term gallery is referred to as an "art operator" for the reason that, unlike a museum, it presents works of art that are intended to be traded, sold or bought, i.e. it does not collect works of art in the form of a collection (Jůva, 2014).

The process of the development of museum and gallery pedagogy from a societal perspective has undergone several social reforms. These were mainly cultural, economic and political changes that also affected these institutions. Based on these facts, museums and galleries have had to rethink their attitude towards the public, and towards their visitors. Therefore, their main strategy became to attract visitors through art education and also through cooperation with schools. It was from this point onwards that the educational activities of museums and galleries began to be increasingly supported. In the 1960s and 1970s, when educational activities began to increase, the concept of museum (gallery) pedagogy was introduced as a scientific discipline. However, the main turning point came in the 1980s and 1990s, when cultural literacy was joined by visual literacy.

Sokolová (2010) discussed this shift as a fact that, within gallery pedagogy, manifested itself in the concept of so-called museum/gallery literacy as a special ability of an individual acquired by deepening visual literacy into the ability to fully orient the individual in the medium of the museum and gallery (ibidem, p. 30). Thus, the very essence of art museums and schools has been fulfilled both practically and theoretically and their common problem has become visual literacy, cultural perceptual competence and the professional platform of gallery pedagogy (Sokolová, 2010).

The formation of gallery pedagogy in Slovakia and the Czech Republic could not be formed quickly and easily, even though its practical form had a continuous development. The main consequence was mainly the social changes that took place after the Second World War. Nevertheless, their 'cultural and educational activity' was considered one of the most important educational tools during the period of socialism (communism). In contrast to the Western countries, where the development of gallery pedagogy progressed significantly, in our territory it did not yet manifest any basic features of science. In the 1980s and the first half of the 1990s, gallery pedagogy did not contain basic elements, such as an underdeveloped theoretical background (in the form of publications), nor was it reflected in the content of university teacher education. Thus, in the 1980s, no significant change had yet taken place, and therefore the cultural and educational activities of this institution were captured only in very rough outlines in the form of seminars or proceedings (Sokolová, 2010).

Since the birth of gallery pedagogy in Slovakia and the Czech Republic, we can say that this institution has tried to develop work for the public, so it had its social mission, which was applied based on the results of professional work. As the development of gallery pedagogy did not progress significantly until the 20th century, its decline and disappearance occurred in the 1990s. This was mainly because the emphasis was placed on other priorities for the institution. In particular, new ways of presenting galleries and museums were coming to the fore, which focused on activation, exhibition and grant activities that

presented new opportunities for art life (Čarná, Tribulová, 2018). An intense interest in this discipline emerged in the Czech Republic around the mid-1990s, when the greatest interest was shown mainly by university professors, who contributed to the domestic development with their interest. In the domestic development of gallery pedagogy, authors such as Jůva (2014) and Horáček (1998) were especially involved, who, based on the authors' publications, introduced the issue of art mediation from an educational point of view. Fulková (2008), Slavík (2011) and Horáček & Zálešák (2007) are also among the leading authors in this field, who have elaborated this issue into a theoretical form with possible insights into its development and expansion into the space of practice.

Based on their research intentions in the field of gallery pedagogy, the issue of gallery education in the Czech Republic has become one of the most dynamically developing fields of study.

In Slovakia, the situation concerning gallery pedagogy developed mainly based on the Bratislava City Gallery, which introduced the Child's Gallery project in 1979-1993. Until 1993, the Children's Gallery was represented in the Bratislava City Gallery, but in that year it reduced its professional educational work. As a replacement, it became a public relations workplace department (Čarná, Tribulová, 2018). The Slovak National Gallery began its educational work in 1999, establishing a centre for marketing and public relations, which also led to the creation of the Slovak National Gallery's Education Department and Children's Workshop (Sokolová, 2010).

A very significant role in the development and professionalization of gallery pedagogy in Slovakia was also played by the nationwide educational programme Closer to the Museum, which was implemented between 2004 and 2007. This programme was created with the help of Lukáčová & Sprušanská and was aimed at developing the educational function of galleries and museums in Slovakia. It was inspired by the functioning of galleries and museums at that time, whose educational activities for visitors were perceived as very limited or not at all. In particular, the programme was intended to help the staff of these institutions to expand the educational function of these organisations and thus to contribute to the functioning of the educational department of the galleries or museums. Through this programme, the general public also had a greater insight into the perception of gallery pedagogy, museums and galleries are thus an example that communication does not have to be only verbal, but also the object of communication can be whatever object, whether created by mankind or by nature, which is presented by a given institution and accepted by the other party (Dolák, 2015).

Nowadays, gallery pedagogy is becoming an integral and essential part of galleries. In collaboration with educational departments, they contribute to making the work of galleries more visible to the public. Through gallery pedagogy, the gallery seeks to make the most of its potential, which aims to expand its educational field not only for the child viewer but also for young people and adults of all ages. Thus, we consider gallery pedagogy to be an important factor in the relationship between the gallery's future and art education.

We would like to mention that gallery pedagogy in Slovakia should nowadays be emphasized more in the direction that galleries, as institutions, can expand their theoretical and practical possibilities among its visitors.

2 Research findings with a focus on the gallery space

The research design was based on assumptions and available but untested information about realising the possibilities and limitations of educational activities in a gallery setting. The aim of the research in terms of a qualitative approach is to interpret and understand the phenomena through exploration and description. The data collection methods used in qualitative research will focus on texts and words. According to Handel

(2012), the types of analysis and interpretation in qualitative research will be the use of interpretive methods.

The object of investigation is the conceptual representation of the reality under study - the possibilities and limitations of educational activities in a gallery environment. The research aimed at analysing the contexts arising from this relationship was carried out using qualitative research methods in a territorial setting.

The aim of the research was to explore the possibilities and limitations of educational activities in a gallery environment. In terms of content, the research was projected on both an intact and a minority population of gallery visitors.

The basic research findings are formulated in several constructs, which are approximated and then described in the graphic treatment.

Figure 1: Constructs of the research findings



Source: own elaboration

The first area we studied in the scope of the research is the area named Gallery and School. We found that there is still current cooperation between the gallery as a cultural institution and the schools as educational institutions. The alternative environment of the gallery promotes the development of a critical approach to the perception of visual representations of contemporary media. It leads to the recognition, naming, as well as the creation of individual elements of visual imagery in the creative process. The actors are thus led to become aware of the communicative and informative nature of contemporary visual imagery (Kováčová et al., 2021). Cooperation creates a space for children's independent, critical and creative approach not only to art and culture but to the whole society. It deepens the interest in creative approach and dialogue in the field of visual cognition and communication, thus expanding education to all visual signs and stimuli that we are confronted with on a daily basis (Kováčová, 2023).

Thus, gallery pedagogy refers to an interdisciplinarity that goes beyond the visual arts and relies on other areas of education, in all contexts (Horáček, Zálešák, 2007).

2.1 The second area we explored in our field research is Gallery and Gallery Programmes

Based on the analysis that we have carried out as part of the research; we can conclude that the development of gallery education programmes depends on the exhibitions and displays that the gallery offers at any given time. The main component for the functioning of a gallery education programme becomes the guided tour of exhibitions or displays or specific exhibits on display. Nevertheless, the use of the original works offered by the gallery is considered to be very essential, which are linked to the distinctive characteristics, methods and quality of the communication of art.

Table 1 Theoretical programmes

THEORETICAL PROGRAMMES	
Guided tours by a lecturer	The focus in theory must be: professionally correct, reasonably extensive, comprehensible and attractive
Guided tour with a teaching aid	Supplemented by a small activity, without a tutor, preprepared aid - indirect facilitation
Discussion	occasional activity, knowledge addition,
Lecture	Theoretical form, monologue of the lecturer not suitable for children

Source: own elaboration

Theoretical programmes have the longest tradition and are probably the most familiar to the public. The form used mainly talks with artists, e.g. illustrators of children's books, where children have a live experience with the artist.

Table 2 Practice programmes

PRACTISE PROGRAMMES	Art workshops	Art studios	Art courses
	The common denominator is a practical art activity related to a specific exhibition. They can also function independently from the exhibition.		

Source: own elaboration

Practice programmes are part of the public programmes. When selecting, it is best to keep in mind the length of the programme and the content of the programme, which includes both theoretical and practical art activities, so that they correspond to the age of the participants.

Table 3 Combined programmes

COMBINES PROGRAMMES	Animations	Projects	Creative etudes
	Animating activities which in their principles, technologies and content focus are related to the observed artwork.	Combinations of different long-term events based on project-based learning.	Is a short and practice activity that is part of the animation

Source: own elaboration

Currently, gallery animation is one of the most sought-after educational programmes. Gallery animation actively combines the physical, mental and creative abilities of children. Visitors are active participants in an educational programme in which they are drawn into the world of the exhibits through learning, imagination and self-reflection (Valachová, Juhász Muchová, 2023). Through these programmes, visitors have the opportunity to glimpse the world of art, which can often seem unexciting and uninteresting to them. Despite the fact that these programmes are mainly designed to create a positive relationship between children and art, they also indirectly develop a person's inner spiritual world.

The third area that we investigated in the field research is the area named Working with Materials in Galleries. The materials offered by galleries include various types of catalogues for specific exhibitions and methodological materials for educational activities.

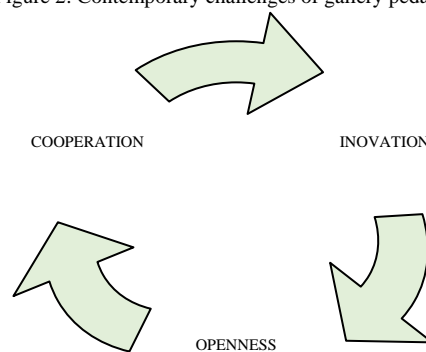
The publications are the following:

- informative to inform about ongoing and upcoming events,
- methodological-didactic to activate the visitor's perception interestingly and engagingly,
- playful to guide the visitor through the exhibition or exposition in a playful way,
- motivational they serve as catalogues, books and other forms of publications, which should provoke the visitor to search for answers to the questions raised and thus motivate him/her to visit again after the visit to the gallery/museum.

3. Challenges and limitations of contemporary gallery pedagogy

Research results suggest various opportunities for education and certain limitations and assumptions for visitors with diversity. A gallery can become not only an educational institution but also an inclusive one.

Figure 2: Contemporary challenges of gallery pedagogy



Source: own elaboration

Among the current challenges of gallery pedagogy, we can consider the three attributes listed in Figure 2. Collaboration is one of the main attributes. Collaboration should be directed towards schools, but also towards other groups of actors, such as adult groups, seniors and other specific groups. Within the attribute of innovation, it is appropriate to implement activities that correspond to the latest trends in information technology. These can be instrumental in communicating the artistic experience to different disadvantaged groups of actors. This will also help to open up the institution to disadvantaged groups. In this regard, our findings correspond with the view of Kováčová et al. (2024), who list three basic attributes for working with disadvantaged groups in a gallery space.

Figure 3. Attributes: disadvantaged groups in a gallery space



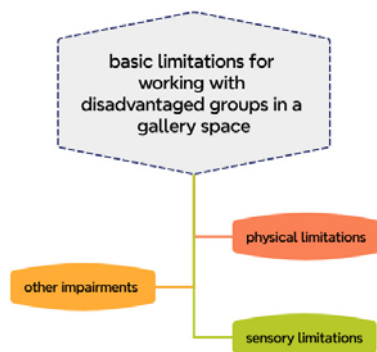
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Source: adapted from Kováčová et al. (2024)

The gallery should be a place where people with disabilities can meet, share their experiences and build community. The research also confirmed the basic limitations that visitors with disabilities register when visiting galleries.

We agree with the opinion of Kováčová et al. (2024), who focused their attention on the limitations for visitors in a study oriented towards opportunities and limitations for visitors with comorbidity as part of the gallery experience.

Figure 4: Limitations: disadvantaged groups in a gallery space



Source: adapted from Kováčová et al. (2024)

3 Conclusion

In the realm of art, individuals often find themselves in dynamic situations that, upon initial examination, appear to present a coherent structure enriched with internal logic and expressive modalities. However, a deeper exploration reveals that these structures are profoundly influenced by the viewer's personal experiences, background, and the varying interactions with their environment and others. As Kováčová (2023) observes, the gallery must be conceptualized as a nuanced and highly individualized space in which people can engage with art unhindered by barriers (Kováčová, 2020). This accessibility is paramount in the quest to foster inclusive interactions that respect the diverse needs of all visitors.

Moreover, the gallery plays an indispensable role in nurturing cultural awareness across all demographics. It serves as a gateway through which individuals of all ages can engage with the richness of human expression, thereby instigating a lifelong journey of aesthetic appreciation and personal growth. The experiences offered by gallery exhibitions have the potential to enrich the lives of visitors by encouraging a profound connection to art that transcends mere observation. Exhibits thoughtfully designed for diverse audiences can foster interactive experiences for younger visitors while providing older individuals with rich visual and sensory stimuli that resonate with their life experiences (Kováčová, Valachová 2024).

In addition to acting as a facilitator for cultural exchange, the gallery emerges as a vital arena for mental interaction and cognitive engagement. Eco (2015) posits that any form of artistic endeavour facilitates open mental interaction, allowing for an array of interpretations and emotional responses that can lead to stimulating dialogues both within oneself and with others. By embracing this idea, galleries can become more than just repositories of art; they can transform into living entities where ideas are exchanged, emotions are shared, and community bonds are fortified (Brendza, Dimová, 2019).

It is crucial to acknowledge that the journey towards inclusivity within gallery spaces demands ongoing commitment and innovation. Gallery curators, educators, and administrators must prioritize the development of programs that actively consider the diverse needs and preferences of their audiences, ensuring that

all visitors feel valued and included. This involves not only physical accessibility but also adaptive educational practices that cater to different learning styles and cultural backgrounds.

In conclusion, the gallery stands as a powerful medium for human interaction with art, contributing to personal development and cultural awareness while challenging the norms of accessibility. By fostering an inclusive atmosphere that embraces human diversity, galleries can cultivate enriching experiences that resonate across generations, ultimately serving as transformative spaces within our communities.

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Primary Paper Section: A

Secondary Paper Section: AL, AM

IMPACT OF SOCIAL NETWORKS AND INFLUENCERS ON FAMILY FUNCTIONS: AN EXPLORATORY STUDY USING SELF-REPORTED QUESTIONNAIRE

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Abstract: This study investigates the impact of social networks and influencers on family functioning, with a particular focus on how these external influences affect family communication and economic stability. We explore the associations between family members' purchasing behaviors—prompted by influencers—and the communication patterns within families, specifically between parents and children. A quantitative questionnaire was used to examine how products and services promoted by influencers affect family dynamics and communication patterns concerning social networks. Family functioning was assessed using the McMaster Family Functioning Scale, supplemented by the Economic Strain Scale to evaluate financial stress within families. The sample comprised 93 respondents, with significant correlations found between parent-child communication about social networks and family roles. Economic strain emerged as a key factor influencing both social network usage and interactions with influencers. The results underscore that increased family communication predicts higher social network usage within families, while economic strain plays a pivotal role in influencing both the consumption of social network content and interactions with influencers. The findings suggest that social networks and influencers have a profound effect on family functioning, often impairing family dynamics and overall well-being. Economic strain and diminished communication appear to exacerbate the negative impacts, highlighting the need for greater awareness of the potential risks posed by these external influences on families.

Keywords: Family functioning, social media usage, influencers, parent-child interaction, economic strain

1 Introduction

The influence of social media on human behavior has become a focal point of research in recent years. Despite widespread interest, there is limited research exploring how social media affects family dynamics, particularly in the Slovak context. This study aims to bridge that gap by investigating the impact of social networks and influencers on family functioning in Slovakia.

Previous research has highlighted the substantial role influencers play in shaping consumer lifestyles. For instance, Nadányiová et al. (2020) found that influencers significantly impact the consumer habits of Slovak individuals, particularly those under the age of 35. Building on this, our study focuses on parents, following Nikken's (2017) findings, which indicate that parents' media habits are key predictors of their children's social media usage. We hypothesize that parents' social network behaviors may similarly influence their children's engagement with social networks and influencers. Family functioning is a well-established determinant of personal development and intra-family relationships (Bočková et al., 2024). Roman et al. (2015) define family functioning as the capacity of family members to communicate effectively, maintain relationships, make decisions, and resolve conflicts collectively. Healthy family dynamics, as noted by Atkin et al. (2015), reduce the time children spend on digital devices, suggesting that a stable family environment can mitigate the excessive use of social media.

Research by Huisman et al. (2012) and Blinn-Pike (2009) underscores the complex effects of technology on family life, noting that while digital devices can facilitate connection, they also introduce new sources of conflict. Further, Capri et al. (2019) found that lower digital consumption within families correlates with better family functioning, whereas higher consumption leads to dysfunction, particularly when both parents and children engage excessively with digital devices. Given the potential for social media influencers to affect decision-making, attitudes, and behavior which was proven in

case of television (Lappiere et al., 2020), this study seeks to answer several research questions, including how influencer exposure affects family communication and purchasing behavior. This exploratory study contributes to the growing body of literature by focusing on the family unit, examining both the positive and negative consequences of social media use and influencer interaction.

To better define social media influencers, Haugtvedt et al. (2005) describe them as individuals with hundreds to millions of followers on platforms such as Facebook, Instagram, TikTok, YouTube, or Snapchat. According to Amato et al. (2016), online social networks allow influencers to share their lives with their followers. Of particular relevance to our study is the claim by van Lappiere et al. (2007), who argue that television influencers can affect consumerism, decision-making, opinion, attitude, and behavior. Therefore, further research in this area is essential to fully understand the power of Internet celebrities.

Therefore, we postulate research questions:

RQ1: Which family functions appear to be related to greater exposure to social network use versus increased exposure to influencer interaction?

RQ2: Does following influencers affect family buying behavior?

RQ3: How is communication with children about social networks related to the functions of families?

RQ5: Which of the subscales of family functions significantly predicts an increased percentage of exposure to social networks?

RQ6: Which of the subscales of family functions significantly predicts the increased percentage of exposure to interacting with influencers?

2 Methods

This study utilized a quantitative research design, employing a self-report questionnaire to explore the relationship between social networks, influencers, and family functioning. The questionnaire aimed to capture sociodemographic information and assess several key variables, including family functioning, economic strain, purchasing behaviors influenced by social networks, and communication about social media use within the family.

The study sample consisted of 93 respondents, all of whom were parents. The participants were recruited through non-profit organizations, ensuring diverse representation across sociodemographic backgrounds. Sociodemographic data collected included age, gender, number of children, children's ages, and marital status.

The statistical analysis was performed using SPSS software (version 25.0). Pearson's correlation was used to explore relationships between family functioning, social network usage, influencer interaction, and economic strain. Linear regression analysis was conducted to identify predictors of increased social network use and interactions with influencers. To ensure adequate statistical power, a power analysis was conducted using GPower software (version 3.1.9.7), which indicated that 91 respondents were required to achieve a power of 0.8. The final sample size of 93 respondents was deemed sufficient for the analysis.

The questionnaires were distributed both online and in person through non-profit organizations. Respondents were given sufficient time to complete the surveys at their convenience. Participation was voluntary, and respondents were assured of confidentiality and anonymity in handling their data.

The first scale we employed was the McMaster Family Functioning Scale, developed by Epstein et al. (1983), which assesses the functioning of the family unit. This scale consists of

six dimensions; for our purposes, we used the following subscales: problem-solving ($\alpha=0.64$), communication ($\alpha=0.56$), roles ($\alpha=0.47$), affective responsiveness ($\alpha=0.82$), and behavior control ($\alpha=0.62$). We used a 4-point scale (1=strongly agree; 4=strongly disagree). The overall McMaster Family Functioning Scale had a reliability of ($\alpha=0.83$).

To examine the economic functioning of the family, we employed the Economic Strain Scale, developed by Hilton and Devall (1997). This scale utilizes a 5-point Likert scale (1=never; 5=almost always), with a reliability coefficient of ($\alpha=0.92$).

To assess purchasing behavior, we asked the question: "How often did you or someone in your family purchase an item or rent a service that was promoted by an influencer?" Respondents answered using a 5-point Likert scale (1=never; 5=almost always). To explore communication about social networks, we asked respondents: "How often do you discuss with your child/children what they follow on social networks?" Responses were collected using a 5-point Likert scale (1=never; 5=almost always). Finally, we included two additional questions: "How much time do you spend on social networks per day?" and "What percentage of your time on social networks do you spend watching influencers and their content?"

3 Results

RQ1: Which family functions appear to be related to greater exposure to social network use versus increased exposure to influencer interaction?

Pearson's correlation analysis revealed several significant relationships between family functions and both social network usage and interaction with influencers. The results indicated that increased time spent on social networks is significantly correlated with impaired family communication ($r = 0.225$, $p < 0.05$), disrupted family roles ($r = 0.247$, $p < 0.05$), overall family functioning ($r = 0.249$, $p < 0.05$), and heightened economic strain ($r = 0.349$, $p < 0.01$). Additionally, interaction with influencers was correlated with behavioral control ($r = 0.263$, $p < 0.05$) and economic strain ($r = 0.266$, $p < 0.05$). These results suggest that increased exposure to social networks and influencers tends to worsen family dynamics and increase financial stress as shown in Table 1.

Table 1: Correlation matrix between the subjective percentual perception of spending daily time on social media per day and the interaction with influencers in association with family functions and economic strain.

Variables	SMU (% per day)	Interaction with influencer (% per day)
Problems solving	0,137	0,143
Communication	0,225*	0,213
Roles	0,247*	0,093
Affective response	0,146	0,056
Behavior control	0,138	0,263*
Family functioning	0,249*	0,231
Economic strain	0,349**	0,266*

Note: Own dataset, * $p < 0,05$; ** $p < 0,01$; *** $p < 0,001$

RQ2 Does following influencers affect family buying behavior?

Our analysis demonstrated a significant positive relationship between the percentage of time spent on social networks and increased buying behavior related to products promoted by influencers ($r = 0.327$, $p < 0.01$). Similarly, the time spent interacting with influencers was positively correlated with buying behavior ($r = 0.272$, $p < 0.05$). These findings indicate that exposure to influencers on social media platforms drives consumer behavior within families, particularly with regard to purchasing products and services promoted by influencers.

RQ3 How is communication with children about social networks related to the functions of families?

There was a moderate negative correlation ($r = -0.411$, $p < 0.01$) between communication with children about social network usage and overall family functioning. Increased communication was associated with improved family roles ($r = -0.422$, $p < 0.01$), better affective responsiveness ($r = -0.287$, $p < 0.05$), and reduced economic strain ($r = -0.383$, $p < 0.01$). These findings suggest that open communication between parents and children about social network usage may mitigate some of the negative effects of social media on family dynamics.

RQ4 How does buying behavior relate to each family feature?

Our analysis found that buying behavior promoted by influencers was significantly related to impaired family communication ($r = 0.289$, $p < 0.05$), disrupted family roles ($r = 0.312$, $p < 0.01$), increased economic strain ($r = 0.403$, $p < 0.001$), and overall family dysfunction ($r = 0.311$, $p < 0.01$). These correlations suggest that purchasing products promoted by influencers negatively affects various aspects of family functioning, particularly in families experiencing financial stress.

RQ5 Which of the subscales of family functions significantly predicts an increased percentage of exposure to social networks?

Linear regression analysis revealed two key models predicting the percentage of time spent on social networks.

Table 2: Social networks Model 1 summary

R	R2	Adj. R2	P
0,225	0,050	0,039	0,040
Predictors	Beta	t	P
Constant	8,448	1,052	0,001
Communication	1,348	0,646	0,040

Own dataset

We identified a 5 % explanation for the variable social networks exposure, which was statistically significant on a p basis < 0.05 . In terms of comparing both models, we focus on the adjusted R^2 , which compares both models better. Communication emerged as a significant predictor of social network usage, explaining 5% of the variance ($R^2 = 0.050$, $p < 0.05$). The results indicate that poorer communication ($\beta = 1.348$, $p < 0.05$) leads to a 1.35% increase in time spent on social networks per day.

Table 3: Social networks Model 2 summary

R	R2	Adj. R2	P
0,349	0,122	0,111	0,001
Predictors	Beta	t	P
Constant	10,682	2,354	0,210
Economic strain	0,522	3,372	0,001

Own dataset

As table 3 shows Model 2 seems to be of better quality in the number of percent explanation of the variable percentage use of social networks by the variable economic strain, this is a 12.2% explanation, as well as a greater p value of $p < 0.01$. Comparing adjusted R^2 we found that this 0.111 model is better than Model 1. Economic strain was a stronger predictor, explaining 12.2% of the variance ($R^2 = 0.122$, $p < 0.01$). The analysis revealed that higher levels of economic strain ($\beta = 0.522$, $p < 0.01$) were associated with a 0.52% increase in time spent on social networks.

RQ6: Which of the subscales of family functions significantly predicts the increased percentage of exposure to interacting with influencers?

Table 4: Influencers Model 1 summary

R	R2	Adj. R2	P
0,263	0,069	0,052	0,049
Predictors	Beta	t	P
Constant	-2,742	-0,327	0,745
Behavioral control	0,832	0,263	0,049

Own dataset

Table 4 shows that this model explains 6.9% of the variable interaction with influencers. The model is significant on a $p < 0.05$ basis. Equally, adjusted R^2 we will apply this to a specific comparison of models. Behavioral control was a significant predictor, explaining 6.9% of the variance ($R^2 = 0.069$, $p < 0.05$). Poorer behavioral control ($\beta = 0.832$, $p < 0.05$) was associated with a 0.83% increase in interaction with influencers.

Table 5: Influencers Model 2 summary

R	R2	Adj. R2	P
0,266	0,071	0,056	0,044
Predictors	Beta	t	P
Constant	5,766	1,339	0,186
Economic strain	0,25	2,043	0,04

Own dataset

As tables 8 shows Model 2 is slightly better than Model 1 within the adjusted R^2 . This model explains 7.1% of the variable with a significant $p < 0.05$. Likewise, we conclude that this model is better within the adjusted R^2 than Model 1. Economic strain again emerged as a significant predictor, explaining 7.1% of the variance ($R^2 = 0.071$, $p < 0.05$). Higher economic strain ($\beta = 0.295$, $p < 0.05$) was associated with a 0.30% increase in interaction with influencers

4 Discussion

Consistent with previous research (Huisman et al., 2012; Capri et al., 2019), this study found that increased time spent on social networks is associated with impaired family functioning. Specifically, we observed significant correlations between social network use and diminished family communication, disrupted roles, and heightened economic strain. These findings align with the notion that excessive digital engagement reduces the quality of family interactions and can exacerbate financial stress (Blinn-Pike, 2009; Pellerone et al., 2019). Families that engage heavily in social media use, particularly when it involves influencers, may experience a breakdown in traditional family roles and responsibilities, as well as an erosion of effective communication.

One of the more striking findings of this study is the significant impact of influencers on family purchasing behaviors. Similar to prior studies (Nadályová et al., 2020; Lappieri et al., 2020), our data indicate that influencers play a substantial role in shaping consumer habits within families, with increased interaction with influencers correlating with more frequent purchases of promoted products and services. This suggests that influencers not only affect individual consumer behavior but also have the potential to influence entire family units.

The correlation between buying behavior and family functioning further emphasizes the potential consequences of influencer-driven consumption. Families that frequently purchase items promoted by influencers reported higher levels of economic strain, impaired communication, and disrupted family roles. We assume that influencers also have some influence on sociopathological phenomena that occur in schools. According to qualitative research by; Jarmoch et al. (2022) on a sample of students, they found that the current sociopathological phenomenon in Slovak schools is alcohol and soft drugs such as marijuana. Therefore, it is very necessary to address the issue of influence and responsibility for the content created by influencers on social networks. We expect similar behavior from parents of children. These findings suggest that the commercial pressures of social networks extend beyond individual consumption to impact broader family dynamics. As financial resources become strained, family relationships may suffer, leading to conflicts and reduced overall well-being. This underscores the importance of understanding the far-reaching effects of influencers, particularly in families already facing economic challenges (Higashi et al., 2017; Jiang et al., 2020). Interestingly, our study also highlights the protective role of communication within the family. Greater communication about

social network use was associated with improved family functioning, including better role distribution, affective responsiveness, and reduced economic strain. These findings are consistent with previous research (Procentese et al., 2019; Osenica Kostić et al., 2022), which suggests that open communication within families can mitigate some of the negative effects of social media and technology use.

In particular, parents who actively engage in conversations with their children about their social media consumption seem to foster healthier family environments. This suggests that promoting open dialogue about social media may serve as a buffer against the negative impacts of social network usage and influencer interactions. Our findings indicate that improving family communication could reduce the time spent on social networks, which in turn may help alleviate some of the negative consequences associated with excessive digital engagement (Tadpatkar et al., 2021).

The relationship between behavioral control and interaction with influencers was another significant finding of this study. Families with poorer behavioral control reported higher levels of interaction with influencers, suggesting that a lack of structure and oversight within the family may contribute to increased exposure to external influences. This aligns with the work of Wallace (2022), who found that parents who actively monitor and limit their children's social media use can help reduce the time spent on such platforms.

The content promoted by influencers—ranging from lifestyle choices to risky behaviors—can have a significant influence on younger family members, particularly in families with lower levels of behavioral control. Future research should explore this connection further, particularly with regard to the potential influence of influencers on problematic behaviors such as substance use and risky consumerism within the family context. Despite the insights gained from this study, several limitations must be acknowledged. First, the sample size of 93 participants, though sufficient for statistical power, limits the generalizability of the findings. Future research should aim to replicate this study with a larger and more diverse sample to enhance the robustness of the results. Additionally, our study did not explore gender and marital status differences in depth, which could provide valuable insights into how these factors interact with social network usage and family dynamics.

Another limitation is the reliance on self-reported data, which may introduce bias related to social desirability or inaccurate reporting. Future research could benefit from employing mixed-method approaches, including qualitative interviews or observational studies, to gain a more comprehensive understanding of family dynamics in the digital age. Furthermore, qualitative exploration of predictors such as behavioral control could provide deeper insights into how and why these factors influence social network usage and interaction with influencers.

5 Conclusion

This study has demonstrated that social networks and influencers can profoundly influence family functioning, particularly in terms of communication, economic strain, and family roles. Our findings suggest that excessive use of social media, especially interaction with influencers, is associated with impaired family dynamics, contributing to economic stress and disrupting traditional family roles. The results emphasize the dual role of social networks: while they provide a platform for connectivity and information, they also pose risks to family well-being, particularly when engagement with influencers promotes consumerism that exacerbates financial strain. This impact on family economic conditions is significant, as it can lead to further deterioration in communication and relationships within the family unit. However, the study also highlights the importance of open communication as a protective factor. Families that engage in regular discussions about social network usage—particularly between parents and children—appear to

mitigate some of the negative impacts of social media. Enhanced communication not only improves family functioning but also reduces the time spent on social networks, potentially curbing the influence of external factors such as influencers.

Given the far-reaching effects of social networks and influencers, it is critical that future research continues to explore these dynamics, particularly with a focus on economic strain and behavioral control. Further investigation into how these factors affect family well-being will provide a deeper understanding of how to mitigate the negative impacts and promote healthier family environments in the digital age. In conclusion, while social networks offer numerous benefits, their influence on family life should be carefully monitored. Families, policymakers, and educators must work together to foster healthier digital habits and ensure that social media usage does not come at the cost of family cohesion and well-being. Promoting open communication, media literacy, and responsible consumption of digital content will be essential steps toward protecting family functioning in an increasingly digital world.

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Primary Paper Section: A

Secondary Paper Section: AN

ANALYSIS AND ASSESSMENT OF MODERN TIME MANAGEMENT TOOLS USED IN BUSINESS AND EDUCATION

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The paper was undertaken as a part of a research projects CIS 07711134 and VEGA 1/0551/24.

Abstract: Nowadays, it is essential to realise the importance of time in a person's life. It is necessary to know how to manage it effectively. Today's time management involves us with many tools, thanks to which we can properly manage our time and keep it under control. The paper deals with time management, which, in the current result-oriented era, is of the highest importance in business and education. The topic of this paper is based on the fact that the most valuable resource for success is time. It has a significant value called the value of life because we lose the opportunity to fulfil our goals and needs every minute that is not fully used. Time is necessary for work, education, thinking, rest, friendship or entertainment. The paper aims to perform a comparative analysis of modern time management tools used in business and education. Based on the literature review, we have chosen individual criteria for assessing those tools. We considered their form, efficiency, compatibility, quality, reliability, availability and cost when evaluating. The main scientific research methods were research, processing and collection of sources, excerpting, analysis and comparison, synthesis, and induction. Based on research conducted by TrackTime24, Reclaim, Stanza.com, ECAL, Robert Half Management Resources, ThePredictive Index, Professor John Hunt, Cloudwards, Lifewire and Profitwell, it was possible to carry out the planned comparative analysis. As a result, we can state that in the corporate and educational spheres, users usually use online applications such as Google Calendar and Outlook calendars.

Keywords: Time management, paper tools, electronic tools, business, education, comparative analysis.

1 Introduction

Time management is probably a familiar term for everyone, and we understand it as an effective process of time coordination as we plan and organise given tasks and work. With the right time management tools, no special effort is required, but careful planning is required.¹ The correct distribution of time does not make work difficult. On the contrary, it makes it easier, especially for those who try to be productive during the day.² Time management is the process of organising and planning how to allocate time between specific activities. Proper time management allows you to work smarter - not harder - to get more done in less time, even when time is limited and pressure is high.³

The essence of time management is to guide managers in learning how to manage their time correctly and efficiently. Purposeful planning and time regulation are fundamental prerequisites for his work. Knowing how to manage time properly means getting the most out of the invested time, concentrating mainly on important and urgent things.⁴

Time management aims to learn how to be more competitive by organising your life correctly, effectively use time according to

your needs, and handle all set tasks, mainly in education.⁵ Time cannot be saved or bought or multiplied; we all have it to the same extent without any difference, which makes it unique. That is why it is essential to be able to plan the time for the given tasks before we start.⁶

In the field of time management, we recognise several levels of time-related generations.⁷ Four successive generations were created, which are interconnected and are intended to represent approaches within the issue of time management.⁸

- The first generation is characterised by recording tasks in task lists. The advantage is their ease of use. The disadvantage is that no information about the completion date will be recorded for tasks that have been completed.
- Second generation - the tools of this generation are diaries and calendars, in which, unlike the first generation, it is possible to record their completion date.
- The third generation is typical in that it unifies activities in the organisation and associates priorities with individual tasks and goals. He orients himself to long-term results and can decide which are the most critical tasks.
- The fourth generation - we instead call it life management, which distinguishes it from classical time management. The systems are designed to help users guide and determine what is most important in their lives.

In time management, we come across two categories of time management aids, namely classic paper aids and digital aids. Paper tools are the oldest time management tools known for their low cost and ease of use (diaries, calendars, to-do lists, etc.). Electronic tools are a more modern version of paper organisers, with the difference that they have a more comprehensive range of essential functions (for example, electronic diary, electronic calendar, electronic notes, etc.).⁹

2 Methodology

This paper aims to perform a comparative analysis of modern time management tools used in business and education. Based on the literature review, we have chosen individual criteria based on which it is possible to assess those tools. We considered their form, efficiency, compatibility, quality, reliability, availability and cost when evaluating.

The following scientific research methods were used in the creation of individual parts of the paper:

- the method of research, processing and collection of sources when defining theoretical starting points,
- the method of excerpting when citing sources,
- the method of analysis and comparison when determining the current state of the given topic,
- the method of synthesis in the integration of the obtained information using the method of analysis into a single unit,
- induction method in the evaluation and formulation of results.

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⁷ Pacovsky, P.: *Člověk a čas, Time management čtvrté generace*. Praha: Grada Publishing, 2006.

⁸ Covey, S.R.: *The 7 Habits Of Highly Effective People*. New York: Simon & Schuster, 2020.

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² Lup, L.: *Základy time management-u: Ako byť pánom svojho času?* 2024. Retrieved from <https://www.akosizarobitpeniaze.sk/zaklady-time-management-u-ako-byt-pano-m-svojho-casu/>

³ Mind Tools Content Team: *What is Time Management*. 2020. Retrieved from https://www.mindtools.com/pages/article/newHTE_00.htm

⁴ EuroEkonom.sk: *Manažment času*. 2022. Retrieved from <https://www.euroekonom.sk/manažment/manažment-casu/>

3 Results and Discussion

Currently, businesses can get by without time management tools, but surprisingly, all of the businesses that use paper-only tools indicated a need for improvement in time management. On the other hand, of businesses that use time management applications, 25% showed a need for improvement. The same applies to educational institutions.¹⁰

Intending to determine the use rate of time management tools in small and medium-sized enterprises, the TrackTime24 agency conducted a survey. They found that up to 57.10% of enterprises do not use any time management tools, and 42.90% use them. The results showed that 75% of companies with 20 or more employees use time management tools. 62% of businesses with 1 to 5 employees and 67% with 5 to 10 employees do not use them at all. 60% of micro-enterprises and all enterprises with a maximum number of up to 20 employees are interested in improving time management. The need to use time management tools is mainly in large companies and educational institutions, but even the smallest ones are aware of their importance.¹¹

More and more managers are realising how important and necessary time is to perform practical work. In connection with this issue, a survey was also conducted, in which 253 managers at all levels of management participated. The first question was oriented to managers' satisfaction with the management of their time or the occurrence of possible stressful situations:¹²

- 27% of middle management managers and 3% of top management managers said that they feel stress caused by lack of time.
- 88% of senior managers and 39% of middle managers revealed that they are satisfied with their time management.
- 85% of all managers confirmed that time management training significantly improved their results.

In addition, most managers (26%) use a paper calendar to organise their time. Other managers (23%) are comfortable with a mobile phone, and some managers (20%) plan their time using a to-do list. Managers (18%) also prefer classic paper notes and an Outlook calendar (11%).¹³

Almost 100 employees of Czech and Slovak companies took part in another survey, the results of which were published by author Marek Šulík on his blog. The survey was aimed at finding out the tools most commonly used by companies. The tools are categorised according to their use in different areas, such as communication for project management, file sharing, planning and time management, CRM and document creation.¹⁴ In companies, Google Calendar (50.72%), Outlook calendar (21.74%), bulletin board or paper (15.94%) and Toggli (11.60%) are used for time measurement. Some companies prefer tools in paper format and do not use electronic ones.¹⁵

To find out the habits related to organising and planning the calendar in private, the company Reclaim conducted a survey in which 37 respondents participated. The respondents were employees from various areas: product management, sales, carpentry, HR, finance, program management and marketing. The findings showed that the respondents usually use the Google Calendar application, followed by the iOS calendar, for work

and personal purposes. The respondents stated that the Outlook calendar is unsuitable for personal purposes.¹⁶

Other research results on the use of calendars were published on the Stanza.com blog, while 430 respondents took part in the research, of which up to 71% use the calendar for work and personal purposes. 28% of respondents use the calendar only for personal purposes, and 1% of respondents only for work purposes. Most respondents (49%) use Google Calendar, Apple (20%), Outlook (17%). The least used calendar among respondents is Yahoo (5%), and a total of (8%) of respondents said they were thinking about changing their calendar.¹⁷

The ECAL company published the results of a survey on its blog, aiming to find out what tools people use to organise their time. One thousand people participated in the survey. 70% of respondents (740) use an electronic calendar for their time management, of which 46.7% of respondents (470) use an electronic calendar on a mobile phone, 23.3% of respondents (234) prefer a calendar on a personal computer. 28.3% of respondents (278) use paper calendars and diaries. The preference for an electronic calendar in different age groups is relatively the same, ranging from 70% - to 75%, among people aged 55-64 (62.8%). The age groups from 24 to 34 years and 35 to 44 years, with an average of 74% and 75%, have the highest percentage of electronic calendar use. The results show that the most used electronic calendar on a smartphone is Apple (25.38%), followed by Google Calendar (25.11%), followed by Windows Live (4.52%). The most used electronic calendar in personal computers is the Google calendar (15.44%), Apple (7.77%), Outlook (5.15%) and Windows Live (4.76%).¹⁸

In the area focused on time management, 35% of the surveyed chief financial officers (CFOs) claim that using digital technologies contributes to more efficient work. Through digital technologies, we understand calendars, applications, and to-do lists. The survey was conducted by Robert Half Management Resources.¹⁹ 2100 CFOs from a random sample of companies were interviewed. Another 35% of CFOs said they prefer to delegate tasks to their subordinates. Proper delegation of your team is a crucial aspect of long-term job retention. A fifth of them think limiting the time spent on meetings is correct, and 8% are convinced that the solution is to restrict travel. 2% of CFOs indicated the option I don't know.²⁰

The ability to delegate and control your time is what every manager should know. From a survey conducted by ThePredictive Index, we know which skills managers have the most outstanding deficiencies. A total of 1,038 employees commented on the skills of their managers from 13 industries. Among the skills in which they have the most exceptional deficiencies are insufficient time management and delegation. Employees estimated that 11% of managers have a problem with delegation skills, and 14% have issues with team management. Finally, 28% of managers have a problem with teamwork, and 17% have issues with feedback. 10% of managers have difficulties with communication, and 20% of managers marked the option other, while no specific answer was given.²¹

A study by Professor John Hunt shows that 30% of managers think they have delegation skills. The study also reports the opinions of the employees of these managers, who claim that

¹⁰ Gajanova, L., Kliestikova, J., Nadanyiova, M.: Building and Managing the Value of Higher Education. *14th International Technology, Education and Development Conference (INTED)*, Valencia, Spain, pp. 2578-2582, 2020.

¹¹ Unrubble: Time for change: Survey shows 57% of Small and Medium Enterprises don't use time management tools. 2018. Retrieved from <https://medium.com/@TrackTime24/time-for-change-survey-shows-57-of-small-and-medium-enterprises-dont-use-time-management-tools-2d3b95677e16>

¹² Skorkova, Z., Thomasova, E.: Time Management of Slovak Managers. *International Journal of Economics Finance and Management Sciences*, vol. 3, no. 3, pp. 311-318, 2015.

¹³ Skorkova, Z., Thomasova, E.: Time Management of Slovak Managers. *International Journal of Economics Finance and Management Sciences*, vol. 3, no. 3, pp. 311-318, 2015.

¹⁴ Vartiak, L.: Achieving excellence in projects. *Procedia Economics and Finance*, vol. 26, pp. 292-299.

¹⁵ Visibility: Aké nástroje používajú slovenské a české firmy. 2020. Retrieved from <https://visibility.sk/blog/ake-nastroje-pouzivaju-slovenske-ceske-firmy/>

¹⁶ Shapiro, H.: Here's how your coworkers manage their calendars. 2019. Retrieved from <https://medium.com/reclaim-ai/how-your-peers-do-calendar-management-7c9d80e49fb0>

¹⁷ Stanza: Seeking social proof ~App survey results (phase 1). 2019. Retrieved from <https://medium.com/stanza-co/seeking-social-proof-app-survey-campaign-results-phase-1-e4786ac29d68>

¹⁸ ECAL: 70% OF ADULTS RELY ON DIGITAL CALENDAR. 2018. Retrieved from <https://ecal.com/70-percent-of-adults-rely-on-digital-calendar/>

¹⁹ Schwartz, H.: CFOs See Technology Tools, Delegating As Top Time Management Strategies. 2014. Retrieved from <https://businessfacilities.com/2014/07/cfos-see-technology-tools-delegating-as-top-time-management-strategies/>

²⁰ ECAL: 70% OF ADULTS RELY ON DIGITAL CALENDAR. 2018. Retrieved from <https://ecal.com/70-percent-of-adults-rely-on-digital-calendar/>

²¹ Moisan, J.: 5 Best Practices For CFOs In Today's Modern Workplace. 2020. Retrieved from <https://www.forbes.com/sites/forbesfinancecouncil/2020/02/12/5-best-practices-for-cfos-in-todays-modern-workplace/?sh=6ebd5b142918>

only one out of ten managers know how to apply delegation to their subordinates and develop their skills properly. Delegation is a science that confirms that it brings definite results when used correctly. The most common reason for not delegating is the need to invest too much time in this activity, and no company owner or manager currently has that extra.²²

A questionnaire survey was conducted to determine the use rate of paper and electronic tools in educational institutions. Two hundred sixty-one questionnaires were distributed to respondents, of which all validly filled ones were returned. Many people use paper tools (74%) than electronic tools (18%). Paper tools are more difficult for users (45.33%) when creating notes than electronic ones (25.83%). The most significant advantage of paper tools for users is the possibility of writing notes by hand and their ease of use. Electronic tools allow for a simple search and the chance to use data history or share the necessary information with family, loved ones, or friends. With paper tools, the disadvantage for users is the inability to record images, sound or video. From the point of view of time, they are lengthy for taking notes and limiting due to the need to carry them with you all the time. The disadvantage of electronic tools for users is the impossibility of drawing by hand in notes, and many are concerned about data security.²³

The website Cloudwards has published a comparison of the three most competent online applications in the category of to-do lists focused on productivity and education. Todoist, Wunderlist and Any.Do were compared according to interface, sharing and calendar integration criteria. Any won the interface criterion, the sharing criterion was won by Wunderlist, which allows sharing tasks with a maximum of 25 users, while Todoist only allows sharing tasks with five users and Any.do with only one user. Todoist and Wunderlist won the third-party integration criterion. Todoist charges extra for attaching files, sharing tasks with more than five users, and setting reminders. Any.Do application does not provide any calendar integration, files can be attached up to a maximum of 1.5 Megabytes (MB). Wunderlist provides these functions for free and simultaneously contains the highest number of functions compared to the mentioned applications. That's why this application is marked as the winner of applications from the category of to-do lists. However, Wunderlist was transferred to Microsoft in May 2020. All data from the Wunderlist application can be exported to the Microsoft To-Do application that replaced Wunderlist.²⁴

In the educational process, note-taking applications are used in particular. In the category of online note-taking applications, the most popular ones on the market are Google Keep, Microsoft One Note, and Evernote, according to the Lifewire website. The Versus website compares online productivity apps based on their features. All three compared online applications, Google Keep, Microsoft One Note and Evernote, offer a free version, are cross-platform and work on synchronisation with email from the Gmail service. Online applications can be accessed via a widget, and an image, audio recording or PDF document can be attached to each task and event. Google Keep and One Note allow you to distinguish tasks by colour, but Evernote does not. One Note does not allow setting notifications the ability to repeat tasks and record them by voice.²⁵ Neither application enables you to set a priority for functions. Evernote is the winner of the compared applications, with a score of 73. In second place is Google Keep, with a score of 65, followed by Microsoft One Note, with a score of 58.²⁶

Profitwell published a report on an Evernote study in which 277 users were interviewed. When asked how Evernote benefits them, 22% of users said it helps them organise their notes, and 12% said it's easy to use. Another 11% of users cited synchronisation between devices (smartphone, laptop, desktop) as a benefit. When asked what improvements they would welcome in the Evernote application, 32% of users said it is as good as it is and does not need improvements. 7% of users would welcome a better interface, and 5% would welcome more integrations.²⁷ As an alternative to Evernote, 18% of users mentioned the Microsoft One Note application, and 11% Google Keep. As many as 177 users (64%) recommend the Evernote application, and 98 users (36%) do not recommend the Evernote application.²⁸

4 Conclusions

The paper aimed to perform a comparative analysis of modern time management tools used in business and education. Based on the results obtained, we can state that in the corporate and educational sphere, users usually use online applications such as Google Calendar and Outlook Calendar. Employees commonly use Google Calendar for both personal and work purposes.

The popularity and usability of digital technologies are increasing in business and education, but many people still prefer paper tools for their time management. In small and medium-sized enterprises, more than half do not use any time management tools in paper or electronic form. However, most of them expressed their need for improvement in this area. Several companies identified time management as one of the challenges they will face during the year. For effective time management, financial directors recommend using digital technologies, which means using applications, calendars and to-do lists.

Among online applications, Todoist, Any.Do, Google Keep, Microsoft One Note, and Evernote are among the most complete applications. The use of digital calendars is significantly higher among users of all age groups (mainly students) than the use of paper calendars. The most significant number of electronic calendar users is in the age category from 35 to 44 years old. The advantage of the recommended online applications is their usability on various end devices, of which the smartphone dominates the current market. Penetration of the use of smartphones is most pronounced in the age category from 18 to 24 years, as well as the use of mobile applications, of which the most popular category is applications aimed at productivity. From the Buildfire website, we found that most of the apps downloaded by users globally are free. Price is one of the most important factors for users, dramatically influencing the user when downloading applications. Users are also significantly influenced by the application's rating, user reviews, or the fact that someone from family and friends uses the application.

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²⁵ Johnston, M.: *Trello Vs Asana - The Battle of the Productivity Apps*. 2019. Retrieved from <https://cmscritic.com/trello-vs-asana>

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Primary Paper Section: A

Secondary Paper Section: AE, AH, AM

DIFFERENCES IN THE SELECTION AND PROCESSING OF ELECTRONIC AND PRINTED TEXTS FROM THE PERSPECTIVE OF CZECH SECONDARY SCHOOL STUDENTS

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The paper was created with the financial support of the SGS project at the Faculty of Education of the University of Ostrava. The authors thank for the support provided to SGS17/PDF/2024 Understanding of (e)non-artistic texts among students of secondary vocational schools with a technical orientation in the Moravian-Silesian and Zlín regions.

Abstract: In the context of ongoing digitisation and robotisation processes, there is an increasing necessity for comprehending texts in electronic formats, which prompts a re-evaluation of the concept of reading literacy. This study aimed to investigate the current reading preferences of 614 secondary school pupils, focusing on their choices concerning text types and genres that facilitate the acquisition of new knowledge. Additionally, the research sought to elucidate the strategies employed by pupils to comprehend unknown vocabulary and the methods utilised for verifying the accuracy of the information read. A particular focus was placed on exploring whether variations in the strategies for understanding unfamiliar words and verification methods are associated with pupils' preferences for specific text formats. The questionnaire survey findings indicate that 75% of participants preferred reading printed books, with science fiction and fantasy genres as the primary sources for acquiring new knowledge, chosen by 34.2% of respondents. Over half of the pupils (51.3%) reported that their approach to understanding unfamiliar words involves inferring meaning from the context of the surrounding text. When verifying their comprehension of the material read, 63% of respondents indicated a reliance on the strategy of repeated reading. Interestingly, the study did not reveal a significant correlation between pupils' preferences for electronic versus printed texts and their chosen strategy for understanding unknown vocabulary. However, it was revealed that pupils' preferences for text formats exhibit statistically significant differences concerning the methods employed to assess their comprehension of the information studied.

Keywords: e-reader, reading literacy, understanding words and information, strategies and ways of working with text

1 Introduction

In everyday life, including personal, school, and work, the need to be functionally literate, flexible, creative, communicative, and open to changes in searching, processing, and evaluating information in printed and electronic texts is growing.

In the international PISA educational outcomes surveys, reading literacy is defined as "pupils' capacity to understand, use, evaluate, reflect on, and engage with texts to achieve one's goals; develop one's knowledge and potential; and participate in society." (NCES, 2024-113). The fundamental reading processes in these surveys are information retrieval, comprehension, assessment, and reasoning.

"Reading competency is a combination of knowledge and skills that allow a person to select, understand, organise information provided in sound and letter form, and successfully use it for public and personal purposes." (Toshtemirova, 2019, p. 362).

Průcha et al. (2009, p. 42) conceptualise reading literacy as an active engagement of readers with texts encountered in everyday life. They position reading literacy as a critical component of functional literacy, comprising a complex array of "knowledge and skills that empower individuals to navigate the written texts they encounter in their daily existence." The interaction with diverse textual forms necessitates cultivating specific reading strategies and skills, enabling individuals to emerge as proficient readers. The authors characterize reading skills from the level of mechanical reading to understanding the read information, emphasizing the importance of reading strategies: searching, processing, comparing the information contained in the text, reproducing the content of the text, etc. These reading strategies are described as intentional procedures that are activated during engagements with text. Similarly, Barry (2002, p. 132) articulates reading strategies as "intentional, focused procedures that regulate and enhance the reader's endeavours to decode text,

comprehend vocabulary, and construct meaning from the written material."

The PIRLS (Progress in International Reading Literacy Study) international survey, which has been employing both electronic and written methodologies to assess the reading literacy of nine-year-old primary school pupils since 2021, emphasises the functional dimensions of reading, particularly concerning the comprehension of diverse text types and the application of information obtained from various reading activities (Mullis et al., 2023). Reading literacy is conceptually categorised into purposeful reading and reading focused on procedures and strategies that facilitate reading comprehension. In the PIRLS survey conducted in 2021, pupils' reading competencies were evaluated based on two distinct purposes: a) reading for literary experience, involving engagement with literary texts characterised by artistic expression, and b) reading to acquire and utilise information, encompassing the interpretation of informational texts. The texts read can also be viewed in terms of their reader appeal and reader attractiveness. The PIRLS 2021 research worked with literary texts, informational texts and informational e-texts. The "literary texts" category featured complete traditional or contemporary narratives. In contrast, the "informational texts" category comprised coherent or disjointed informational texts that integrated elements of ethnography, science, biography, history, practical information, or everyday life concepts.

Čechová et al. (2008, p. 98) propose a taxonomy of functional styles encompassing six text types: 1. simply informative, 2. journalistic, 3. professional, 4. administrative, 5. artistic, and 6. rhetorical. Presently, it is feasible to delineate at least three classifications of texts: printed, electronic, and hybrid. Printed texts are regarded as traditional mediums, whereas electronic and hybrid texts are recognised by contemporary society as representative of 21st-century textual forms and the future of reading. Karlík et al. (2002, p. 450) define electronic texting as "a non-linear way of organising text in computer processing of optical and audio information." Within the educational domain, educational texts are categorised into artistic and non-artistic classifications.

Readers can be systematically categorised primarily based on the frequency of books read over a specified period, distinguishing between readers and non-readers. Trávníček (2008) establishes four reader categories grounded in the dichotomy of reader versus non-reader, further delineated according to annual book consumption and reading frequency: 1. non-reader (defined as an individual who does not engage in book reading, completing 0 books in one year), 2. sporadic reader (an irregular participant in reading who may read between 1 to 6 books per annum, either randomly or with specific intent), 3. regular reader (characterised as a systematic reader who engages with 7 to 12 books per year out of an intrinsic interest in the content or for knowledge acquisition and pleasure), and 4. frequent reader (identified as an individual who avidly participates in reading for both knowledge and pleasure, typically reading 13 or more books annually).

A recent study investigating the reading preferences of secondary school pupils regarding various text types revealed significant insights concerning non-fiction reading habits. The research conducted by Vicherková et al. (2024) indicated that pupils predominantly engage with educational professional electronic texts both during their academic pursuits and leisure time. The findings showed that 412 (69.36%) respondents utilise smartphones for reading electronic texts. Printed books are regarded as traditional texts and enjoy greater popularity among secondary school readers than electronic books. In terms of accessibility, flexibility, innovation, and complexity, Czech pupils demonstrate a preference for electronic and hybrid texts for their reading. However, they allocate less time to these formats than printed educational materials. The primary focus of

secondary school pupils' reading interests is on current social events, with 30.30% of respondents indicating this preference, followed by fantasy and fiction at 24.58%. Alarmingly, the interest in scientific topics and cultural texts was notably low, attracting only 5.56% of responses. Among non-fiction texts, pupils predominantly favour electronic forms of scientific and professional literature during academic and recreational reading sessions.

While pupils express a general disinterest in administrative texts, they acknowledge the importance of such materials in everyday life. The authors characterise readers of printed materials as traditional and conservative, viewing them as apprehensive about integrating digital technologies into their learning, professional environments, or leisure activities. Conversely, individuals who engage with digital texts are inclined to utilise digital technologies in various capacities, including academic study, work, and problem-solving activities.

Moreover, Hejsek (2015) emphasised the necessity of developing effective reading strategies and competencies and underscored the importance of adept engagement with diverse text types. Procházková (2006, p. 12) identified individual preferences as a crucial factor influencing pupils' reading motivation and their perceptions regarding reading difficulty and volume. She asserted, "It is important to provide pupils with various types of texts, not only in terms of their difficulty and prevalence but also about their individual preferences." Zápotočná (2013, p. 114) further highlighted the need to implement strategies that enhance reading comprehension within secondary education. In a complementary vein, Krashen (2002, p. 39) proposed a dual approach to fostering pupils' reading literacy, encompassing reading comprehension strategies and developing phonological correspondence skills.

In addition, Bresó-Grancha et al. (2022) examined university pupils' reading performance concerning printed and digital texts, focusing on the contextualisation of reading through two distinct processes: reading comprehension (RCT) and lexical decision making (LDT) following the reading of a specified narrative. Their findings revealed that university pupils tended to read printed texts slower than their digital counterparts, with no statistically significant variations observed in RCT accuracy. Furthermore, the task appeared to demand greater cognitive resources when engaging with printed media for individuals exhibiting poorer reading comprehension. In contrast, those displaying superior performance exhibited a more traditional reading pattern in the digital RCT context.

In examining the influence of text comprehension on the secondary school pupil community—encompassing factors such as motivation to read, reading environment, and preferences concerning text types—we draw upon insights derived from prior research, notably conducted on a sample of university pupils. A qualitative case study by Fitriana (2018) focused on learning strategies, explicitly reading strategies, utilised by 22 university pupils enrolled in Business Administration. This study employed a multi-faceted methodology comprising interviews, questionnaire surveys, and documentary analysis to gather pertinent data. The data analysis involved data reduction, data display, and conclusion drawing. Fitriana (2018) notably investigated the reading strategies adopted by pupils with varying levels of English proficiency, revealing that most participants struggled to fully comprehend texts characterised by lengthy paragraphs and a plethora of unfamiliar vocabulary. The findings underscored that effective reading comprehension necessitates extensive background knowledge and is significantly influenced by factors including reading motivation, language proficiency, reading interest, text type, and the reading environment.

Furthermore, Elleman and Oslund (2019) synthesised a decade of theoretical and empirical research addressing reading comprehension among American adolescents and highlighted stagnation in cognitive performance. They advocated for sustained collaboration among researchers, educators, and

policymakers to enhance reading proficiency. Similarly, recent findings indicated that one-third (226, 34%) of secondary vocational school pupils preferred engaging with traditional textbook formats in engineering-focused courses. Additionally, it was noted that pupils utilising social networks in these subjects tended to enhance their technical engineering vocabulary by engaging more frequently with texts on social networks when compared to their peers who did not utilise these platforms (Vicherková, 2020, p. 85).

Research directed at digital reading and reading strategy performance, encompassing a sample of 211,899 adolescent pupils across 31 countries, highlighted the challenges faced by a technology-driven 21st-century society, particularly the increasing prevalence of digital reading. This study illuminated the contributions of metacognitive reading strategies and the reader's self-concept to overall digital reading performance. Conversely, it identified the opportunities and support provided by educational institutions in facilitating reading and interaction with ICT resources, alongside pupils' socio-economic status, as significant yet lower-order factors influencing reading motivation (Xueliang et al., 2024). Additionally, Merga and Mat Roni (2017) discovered that children aged 8 to 12 generally did not use electronic devices, such as Kindles, iPads, computers, or mobile phones, despite frequent reading of books. Access to mobile phones was linked to decreased reading frequency, with findings indicating that reading habits were less intensive among children exposed to a broader array of devices. Lastly, Kutlutürk (2020) explored the typology of readers, focusing on the application of metacognitive and cognitive strategies employed while reading English texts within a sample of 27 pupils (aged 18–22) enrolled in evening studies at Malatya University in Turkey.

2 Research Methodology

The goal formulated in this way was decomposed into research questions, which are always stated before presenting the relevant empirical findings. The research method was an author's questionnaire, which contained more items, mostly closed, than those used for this study. The research sample consisted of 614 respondents from three regions of the Czech Republic (i.e. the Moravian-Silesian, Olomouc, and Zlín regions). Data collection took place between March 2024 and September 2024.

3 Results

Research Question (hereinafter referred to as R.Q.) 1: What are the current preferences of secondary school readers regarding the types of texts? The investigation yielded the following findings: a substantial majority, comprising 461 individuals (75.08%), preferred reading printed books, while only 153 respondents (24.92%) preferred electronic texts. Among the respondents, 233 individuals (37.95%) identified the ability to carry multiple books within a single electronic device as a significant advantage of reading electronic texts. Additionally, 121 respondents (19.71%) cited easier access to a global range of literature as a noteworthy benefit of e-books. Another 120 respondents (19.54%) recognised the facilitation of information retrieval when engaging with electronic texts as an advantage. Furthermore, 72 respondents (11.73%) pointed to environmental benefits related to reduced paper consumption as a positive aspect of e-book usage. Notably alarming was the finding that 39 individuals (6.35%) reported they do not engage in reading electronic texts, indicating an inability or unwillingness to perceive this absence as either an advantage or disadvantage of reading. Lastly, 29 respondents (4.72%) identified the capability to adjust the font size in electronic texts as a technically oriented advantage.

R.Q. 2: What are genre preferences in reading materials to acquire new knowledge? The survey reveals significant insights. Data indicates that 210 respondents (34.20%) prioritise science fiction and fantasy genres, whereas a notable portion, 175 respondents (28.50%), prefer professional literature (non-fiction) as their primary resource for knowledge acquisition.

Additionally, 114 respondents (18.57%) identify classical fiction as an essential source for enhancing knowledge and 87 (14.17%) individuals have this opinion about biographical literature. A noteworthy fifth of the participants, comprising 28 respondents (4.56%), reported a lack of preference for any genre due to a disinterest in reading. Furthermore, 234 participants (38%) emphasised personal interest in the subject matter as the foremost priority when selecting printed books for knowledge enhancement. Another third, 168 respondents (27.36%), prioritised the quality of informational content in their reading selections. In contrast, nearly a third, 164 respondents (26.71%), highlighted the clarity of information as a crucial factor in their reading endeavours. Only 26 respondents (4.23%) identified the visual aspects of the text as a significant priority, and merely 22 respondents (3.58%) considered the text's structural organisation as the key determinant in their reading choices for knowledge acquisition.

R.Q. 3: What strategies do pupils employ to comprehend unknown words? The survey yielded the following findings: 315 respondents (51.30%) indicated that inferring the meaning of words from the surrounding context within a sentence is the principal strategy for understanding unknown words in a text. Additionally, 282 respondents (45.93%) identified utilising online resources to search for word meanings as the primary reading strategy for grasping unfamiliar concepts and vocabulary.

R.Q. 4: What methods of verifying comprehended information do pupils employ? The findings of this research question are as follows. To ascertain their understanding of the material read, a majority of 315 respondents (51.30%) reported utilising questions that prompt reflection on the meaning of the text. One-third of the respondents (36.64%), equivalent to 225 individuals, indicated that they pose questions aimed at comprehending the text through the lens of drawing connections between the information presented and their own experiences. In contrast, only 74 respondents (12.05%) inquired about the reading material in search of evidence or arguments grounded in the text's meaning. The targeted strategies employed for verifying comprehension, as reported by 389 respondents (63%), predominantly include repeated reading, wherein individuals revisit the text during the reading process—additionally, one-third of the respondents (196, 31.92%) identified keyword searching as a prevalent strategy. An intriguing observation is that 29 pupils (4.72%) acknowledged not verifying information while reading. Regarding alternative strategies for enhancing text comprehension, 164 respondents (26.71%) indicated increasing their reading frequency, while 159 respondents (25.90%) noted engaging in discussions about the text with classmates. Furthermore, 140 respondents (22.80%) reported taking notes to facilitate their understanding. Approximately one-sixth of the respondents (106, or 17.26%) indicated that they create visual representations to aid in memorisation and comprehension of the material. Another notable finding is that 45 respondents (7.33%) stated they refrain from using additional strategies to enhance their understanding of the text.

R.Q. 5: Are differences in strategies leading to understanding unknown words related to pupils' preference for the type of texts they read?

The research hypothesis H1, assuming that the preference of the type of text read (i.e. printed or electronic) will be related to applying a strategy leading to the understanding of unknown words, was tested using the Pearson chi-square test. The source data and the test result are presented in Table 1.

Tab 1. Detected and expected frequencies to H1

Pearson's chi-square = 1,445283	degree of freedom = 2
significance $p=0,485468$	

Q E1	Q H3 - I search for the meaning of words on the Internet	Q H3 - I try to guess the meaning of words from the context of the sentence	Q H3 - I do not read	Line totals
I prefer printed texts	206(211,73)	241(236,51)	14(12,76)	461
I prefer electronic texts	76(70,27)	74(78,49)	3(4,24)	153
Column totals	282	315	17	614

Hypothesis H1 was not affirmed at the 0.05 significance level. The findings from the hypothesis testing did not demonstrate a statistically significant relationship between pupils' preferences for electronic versus printed texts and their chosen strategies for understanding unfamiliar vocabulary. Consequently, the text presentation format unaffected the selection of strategies for comprehending unknown words. Instead, it may be attributable to other factors, predominantly cognitive.

R.Q. 6: Are differences in the methods of verifying the level of understanding of the information read by pupils related to the preference of the type of texts read by pupils?

The research hypothesis H2, assuming that the preference for the type of text read (i.e. printed or electronic) would be related to the application of the method of verifying the level of understanding of the read information, was also tested using the Pearson chi-square test (see Table 2).

Tab 2. Detected and expected frequencies to H2

Pearson's chi-square = 6,27424		degree of freedom = 2		
significance $p=0,043408$				
Q E1	Q H5 - I go back while reading	Q H5 - I look for key (most important) words while reading	Q H5 - I do not read, I do not verify	Line totals
I prefer printed texts	305(292,07)	136(147,16)	20(21,77)	461
I prefer electronic texts	84(96,93)	60(48,84)	9(7,23)	153
Column totals	389	196	29	614

Hypothesis H2 was affirmed at the 0.05 significance level. The data indicated that pupils who preferred printed text exhibited a greater frequency and variety in their methods to assess their reading comprehension than their peers who favoured electronic text. Consequently, this result demonstrates a statistically significant difference between these two groups' approaches to evaluating their understanding of the information in their respective reading formats.

4 Discussion and conclusions

A questionnaire survey with 614 pupils demonstrated that most respondents (75%) prefer reading printed books, while only a quarter (25%) favour electronic text. This finding aligns closely with the research conducted by Merga and Mat Roni (2017). Regarding genres utilised for acquiring new knowledge, pupils predominantly engage with science fiction and fantasy literature (34.2%), followed by professional texts (28.5%). Furthermore, more than half of the pupils (51.3%) reported that their strategy for deciphering unknown words involves inferring meanings from the context of the sentence. Secondary school pupils most frequently employ the method of repeated reading to enhance their comprehension of the material (63% of respondents), whereas nearly a third (31%) utilise keyword searches to extract relevant information. Additional strategies include discussing the text with peers (26% of respondents) and continuous notetaking, which aids 22% of the pupils in their comprehension efforts. A

smaller segment of the population (17%) resorts to visual aids, such as creating images, to enhance their recall and understanding of the information presented. Conversely, a minority (7%) indicates that they do not employ any strategies for text comprehension. The analysis found no statistically significant correlation between pupils' preferences for electronic or printed texts and their chosen strategies for understanding unfamiliar words. However, a distinction was noted in the methods employed to verify comprehension, correlating with the text format, a finding consistent with Fitriana's research (2018), highlighting discrepancies in text comprehension linked to the text type. It was further revealed that many pupils struggle to grasp the complete meaning of texts characterised by long paragraphs and numerous unfamiliar words, indicating that reading comprehension necessitates a more profound foundation of knowledge and is influenced by various factors, including reading motivation, language competence, interest in reading, type of text, and the reading environment. Similar research in this area is needed to improve the challenge of comparing this study's findings related to genre preferences, strategies for comprehending unfamiliar words, and verification methods. Additionally, the sample composition, confined to three regions of the Czech Republic, represents a limiting factor in this investigation, attributed to research funding from the university instead of a grant agency.

With the ongoing advancement of digital technologies that facilitate text access, alongside the increasing expectations of a digitally adept Generation Z (individuals born between 1996 and 2010), research must evaluate the educational efficacy of various information sources and strategies for assimilating and verifying comprehension. The authors of this study, echoing the sentiments of other scholars, assert that the level of reading literacy fundamentally impacts educational outcomes across various competencies and subjects delineated in contemporary educational curricula. The authors plan to address this pertinent issue in forthcoming research endeavours.

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Primary Paper Section: A

Secondary Paper Section: AM

FACTORS AFFECTING THE DELAY IN THE COMPLETION OF THE MASTERS DEGREE AMONG CAR (COMPLETE ACADEMIC REQUIREMENT) HOLDER TEACHERS IN BORONGAN CITY DIVISION: INPUTS FOR A PROPOSED EXTENSION PROJECTS

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Abstract: The study assessed the factors that may affect the delay in the completion of masters' degree among CAR holder teachers of Borongan City Division. Using the descriptive research design, findings shows that the respondents were predominantly CAR holder of Master in Education major in Educational Management who were mostly in the teachers 1 to 3 positions serving for 6 years. Moreover of the seven factors presented, Thesis skill was the factor that highly affect the delay on the completion masters' degree. Therefore it is highly recommended for the Graduate School of Eastern Samar State University to conduct an extension project that caters to the need focusing on capacitating the teachers with the skills in writing a thesis.

Keywords: CAR holder, masters' degree, completion, delay, factors, extension project.

1 Introduction

Education has the functions of transferring the social and cultural values of the current system to future generations, maintaining the lives of individuals and achieving satisfaction at the level of knowledge (Alhas, 2006). Gökçe (2000, p. 126) defined education as "a process in which young people are accustomed to old values, transformation of cultural heritage, professional training, a free art, mental development, personality development, equipping individuals with technological skills and maintaining the social-political system" (Gökçe, 2000; Alhas, 2006). Indeed, education is a lifelong process and it doesn't end once students finish their undergraduate education, this is the reason why students who graduated a bachelor's degree will opt to pursue a higher education in order to broaden his horizon especially in dealing with problems in the world around them (Duke, 2014). As for the teachers, they could best understand the nature of their students, superior, colleagues, working environment and their profession by availing a higher level of education, thus they become productive and are able to be a great contributory factor in placing their respective schools at the apex of excellence (Beere et al., 2011). Moreover, the more a person learns the better he becomes, the higher the educational attainment the better is his capacity to bring change (Reyes, 2023). The life of a teacher in a day to day basis is always bombarded with a lot of complications especially in actualizing goals to the betterment of their students, they are always confronted with problems that if just neglected and will not be given attention it will create a great commotion that will affect the entire system hence are interconnected, the only way to cut the tie is solve it at once (Nogueiras et al., 2016).

Universities, which are one of the educational institutions, carry out higher education. Higher education helps in the development of science, the advancement of technology and the solution of the problems of the country. Universities continue their education with various programs in line with their function to train qualified employee and competent person required by the society. One of the programs given in the continuation of the undergraduate program is the graduate (Ünal & İltar, 2010).

But a sad reality is quite alarming that many of the students were just stuck as being a CAR holder only having no intention of completing their Master's Degree. Records in the graduate schools of ESSU-Main campus shows that after passing the comprehensive examination, their journey of pursuing further education stops there. On the reason why it is happening as such needs to be studied in order to have a clear picture of the issue. Furthermore, the graduate school of every university envisions to develop and mold the skills of the adult students, making them highly competent and ready to face the world with confidence to make a difference (Chao, 2014). But behind this ideal purpose lies the reality that not all teachers are able to finish their

master's degree which leaves questions on their competence. How could they be effective in their respective working environment when they can't even finish their master's degree? (Santos et al., 2022) A lot of factors maybe associated in this matter and that one of the major goals of this project is to find out which of those factors that really delay the completion of their master's degree (Govender, 2011). It is also the goal of this project to explore the best practices of those teachers who were able to finish successfully their master's degree. The result of this study will be the basis for the graduate school in conducting extension services to help these CAR holder teachers to finish their master's degree.

There are a lot of reason why an adult students are experiencing delay in the completion of a master's degree, one the major problem that they are facing is the distance between the school and the university. The biggest crux of this problem is due to the fact that the place where they work and they place where they take graduate education are different. It is also seen that the conflict between their schedule in the school and their schedule in the graduate education causes problems. (Çalışoğlu et al. 2019). Another is, study pointed out that attrition rates were affected by time and financial management along with professional obligations, and amount of encouragement and support from thesis/dissertation advisers (Myers, 1999; Gill & Bernard, 2008). Moreover, Richardson (2013) states that adult learners require much higher levels of motivation in order to start and complete a learning programme, as compared to younger students. Many adult learners view the research process in the Master's programmes as characterised by anxiety, uncertainty and 'stuckness' (Batchelor & Di Napoli, 2006; Evans and Stevenson, 2010). The Master's programmes are generally rigorous, and may require that the adult learners are highly motivated in order to successfully pursue them. The adult learners are faced with a number of challenges and commitments which compete for their attention. The main responsibilities of most adult learners are work and family. Morris (2013) states that there already exists tension between work and family, and that this tension could be worse if the person is studying. The main sources of tension could be time available, family and social interactions, personal priorities and financial constraints (Morris, 2013; Duke & Hinzen, 2014). The time constraints imply that work, family and studying responsibilities share the limited time that the adult learners have at their disposal – leading to the neglect, postponing and mishandling of some of their responsibilities. Researchers in various parts of the globe have found that adult learners enrol in order to improve their status, productivity and income (Morris, 2013; Spaul, 2013; Rothes, Lemos & Gonçalves, 2013).

Thesen and Cooper (2014) who believe that an individual's writing is never neutral, but it is always influenced by factors such as background, culture, exposure and experiences – all which may be contradictory to scientific writing. African students need clear guidance in this regard, without which the contradictions they experience in their writing may lead to the risk of failure. The literature study indicates that there are various reasons for the delayed completion or non-completion of the Master's and Doctoral degrees. The first reason could be the adult learners' readiness to do research. Evans and Stevenson (2010) believe that the adult learners' readiness to engage in research may have a great effect on the time of completion and the quality of the research. Meerah (2010) found that many adult learners doing research generally felt that they have yet to acquire skills in seeking information for their research, and are also deficient in analytical skills.

It is quite possible that those reason are true in the Graduate School of ESSU-Main campus, but it has to be proven, a reason why this study has to be conducted in order to really describe the factors that affect in the delay on the completion of a master's

degree among the CAR holder teachers who happened to be the students of the said college in the context of Borongan City.

This was driven by the following objectives:

1. To identify the CAR holder teachers in terms of:
 - a. Master's program,
 - b. Academic rank, and
 - c. No. of years as a CAR holder
2. To determine the degree by which the following factors affect the delay on the completion of Master's Degree among CAR holder teachers of Eastern Samar in terms of:
 - a. Distance,
 - b. Thesis Skills,
 - c. Access to Resources,
 - d. Financial Constraints,
 - e. Workload,
 - f. Time Management Constraints, and
 - g. Family
3. To propose an intervention through an extension project design based on the result of the study

2 Methodology

2.1 Research Design

Descriptive research design in a quantitative research was used in this study. Orodho (2009) observes that the descriptive research studies are conducted to determine the current situation and with the gathering of facts and figures rather than the manipulation of variables. The descriptive research design is the most frequently used method for collecting information about people's attitudes, opinions, habits, or any of the variety of educational issues. Descriptive design is appropriate as it enabled the researcher to collect information concerning teachers' profiles, and describe factors that affect the delay on the completion of their master's degree in Borongan City Division without manipulation of variables.

2.2 Locale of the Study

The study was conducted in all elementary and secondary schools both public and private in Boornagan City Division where there are teachers who are CAR holders who happened to be students of ESSU-Main Graduate School.

2.3 Respondents of the Study

The CAR holder teachers both in elementary and secondary among the public and private schools of Borongan City Division was the respondents of the study who were students of ESSU-Main Graduate School. All of them will be involved considering the relatively small number of the target populations, hence, total enumeration was used as the sampling procedure in this study.

2.4 Research Instrument

The instrument used in this study is researchers' made. The instrument is specifically focused on the profiles of the CAR holder teachers and the factors that affect the delay on the completion of their Master's Degree. In order to test the validity of the instrument, it was pilot tested in the Eastern Samar Division. The test was made in order to validate if the respondents can easily comprehend and understand the questionnaire.

2.5 Data gathering Procedure

After seeking necessary approval and permits to conduct the study, the researchers administered the survey to the CAR holder teachers in Borongan City Division through Google Meet and Google Form.

Identified respondents were oriented by the researcher as to the nature and purpose of the study through google meet. A letter was presented and the survey form/instrument to better explain the aim of the study. They were likewise oriented on specific instructions in answering the questionnaire and then the respondents were given time to answer the required responses through Google Form. The respondents was guided by the researchers for fast and easy retrieval of the answered instrument.

2.6 Measurement of Variables

The responses of the respondents from the gathered information about the factors affecting the delay on the completion of Master's Degree among CAR holder teachers was measured using the following:

Mean Range	Descriptive Rating	Qualitative Description
3.25-4.0	Highly Affect	The statement was observed and even exceeded the expectation which means that the indicator highly affect the delay in the completion of a master's degree
2.50-3.24	Moderately Affect	The statement was observed which means that the indicator moderately affect the delay in the completion of a master's degree
1.75-2.49	Slightly Affect	The statement was observed but few irregularities was noticed which means that the indicator slightly affect the delay in the completion of a master's degree
1.00-1.74	Does Not Affect	The statement was not observed which means that the indicator does not affect the delay in the completion of a master's degree

2.7 Analysis of Data

For the translation of data into meaningful information descriptive statistics was used in the analysis of the gathered data.

Descriptive statistics was employed to discuss the demographic profile of the CAR holder teachers and the factors affecting the delay in the completion of Masters' Degree. Mean and standard deviation was used in analyzing the gathered data.

2.8 Ethical Considerations

This study observed the ethical guidelines protocol of the university before starting the data collection. The respondents were informed, and a consent form was provided. Only the researcher has a total restriction on access to all the surveys, and cannot be used in any legal actions against them to protect the confidentiality and safety of the respondents. With this, privacy was applied following the ethical consideration of not harming their personal and academic lives.

3. Result and Discussion

3.1 Demographic Profile of CAR holder teachers

The profile variables for the factors affecting delay in completing a master's degree among Borongan City CAR holder teachers were the master's program, academic rank, and number of years as CAR holder.

Table 1 shows that the Master of Arts in Education Major in Educational Management (MAED EM) 7 (33.33%) is the highest percentage among master's programs. The Master of Arts in Education Major in Physics (MAED Physics) has the lowest percentage (0.0%). The opportunity for career growth that a Master of Arts in Education with a major in Educational Management provides is one of the main reasons more teachers are enrolling in this program. Many educators enroll in this program since it prepares them for school leadership and administrative positions, such as department heads, principals, or supervisors (Lunenburg, 2010). Educational management programs emphasize the abilities required for school leadership, organizational administration, and policy implementation—

qualities highly valued in educational institutions—rather than other master's specializations that concentrate on classroom instruction or certain topic areas. According to studies, teachers are driven by the chance to have a more significant impact on school operations and enhance student results, which is usually possible in positions in educational management (Mitchell & Castle, 2005). Given the need for qualified school leaders in many educational systems, this pathway fosters their professional development and frequently offers financial incentives in the form of better compensation. Teachers are also drawn to educational management degrees because of the more significant career security and flexibility these positions provide. Since schools constantly need capable leaders to handle complicated educational innovations, financial restraints, and staff management, Huber (2011) asserts that educational management abilities are in high demand.

In contrast to curriculum or subject-specific content specializations, educational management gives graduates a more comprehensive skill set that they can use in education departments, government agencies, and non-profit organizations. Additionally, because they understand the need for internal leadership development, educational institutions frequently offer financial aid or tuition reimbursement to teachers seeking administrative degrees (Huber, 2011). Therefore, an MA in Educational Management provides a clear and valuable route to leadership roles for educators who want to increase their influence outside of the classroom, influencing their decision to pursue this specialization over others.

The respondents' academic rank composition shows that most are teachers 1-3, making up 18 or 85.71% of the total. The remaining respondents' academic ranks fell into three categories: Head Teacher 1-6, Master Teacher 1-3, and Principal 1-4, making up 4.76%. Compared to those in higher positions, a significant number of Teachers I-III in the Department of Education (DepEd) generally finish their educational requirements for master's degrees or certificates, primarily because of the department's criteria for qualification and professional advancement. Since educational achievement directly affects one's eligibility for higher positions, such as administration or Head Teacher posts, many entry-level teachers consider achieving Complete Academic Requirements (CAR) as a strategic step toward promotion (Llego, 2023). Since DepEd's promotion policies commonly emphasize qualifications like master's degree units or full completion in addition to years of experience and performance ratings, teachers can gain a competitive edge by completing advanced academic requirements early in their careers (DepEd Order No. 66, 2007). Additionally, the presence of scholarship programs and subsidies provided by DepEd for professional development encourages entry-level teachers to pursue these requirements, leading to a higher rate of CAR among Teachers I-III than those in more advanced roles who may have already met or exceeded such requirements (Bernardo, 2021).

As for the number of years as CAR holders, most respondents were CAR holders for 6 years (28.57%), and the lowest percentage was 2 years of CAR holders (9.52%). Teachers with Complete in Academic Requirements (CAR) often delay completing their master's degrees because they juggle work and school responsibilities. Lesson planning, classroom administration, grading, and other administrative duties are common burdens for teachers, which reduces the amount of time and effort they can dedicate to thesis or capstone requirements (Ingersoll & Strong, 2011). Further complicating their progress toward degree completion is the institutional lack of support that public school teachers frequently face for advanced academic efforts, such as insufficient study leave regulations or financial aid for thesis preparation (Santos & Medina, 2019). Many teachers prioritize their professional responsibilities due to this juggling act between work and academic obligations, which causes them to take longer to complete tasks. The difficulty of performing research is another vital consideration, particularly for individuals who may not have been exposed to research methodology throughout their undergraduate studies. Data

gathering, analysis, and writing for research projects take much time, and some teachers may find it difficult or time-consuming to acquire these abilities. Financial limitations might further impede development because finishing a thesis frequently requires expenses for materials, data collection, and professional editing that may not be entirely paid by the teacher salaries or stipends that are provided (Llego, 2023). Last but not least, personal circumstances like work-life balance and family responsibilities significantly affect CAR holders' capacity to concentrate on their studies, which causes them to put off finishing their theses and eventually postpone earning their master's degree (Santos & Medina, 2019).

Table 1. Demographic Profile of the CAR Holder Teachers

Demographic Profile	Frequency	Percentage (%)
Masters' Program		
MAED EM	7	33.33
MAED EE	3	14.29
MAED SE	1	4.76
MAED ELT	1	4.76
MAED FLT	1	4.76
MAED ST	1	4.76
MAED KE	1	4.76
MAED SCT	2	9.52
MAED TM	2	9.52
MAED Biology	1	4.76
MAED Physics	0	0.00
Others	1	4.76
Academic Rank		
Teacher 1-3	18	85.71
Head Teacher 1-6	1	4.76
Master Teacher 1-3	1	4.76
Principal 1-4	1	4.76
No. of Years as CAR Holder		
1 year	0	0.00
2 years	2	9.52
3 years	4	19.05
4 years	5	23.81
5 years	4	19.05
6 years	6	28.57

3.2 Factors affecting the delay on the Completion of Master's Degree among CAR Holder Teachers

3.2.1 Distance

The distance is one of the variables influencing the delay in Master's degree completion among CAR-holding teachers in Borongan City, as the table 2 below shows. With a mean of 2.095 (SD=0.700), the table indicates that the availability of transportation services required for university transportation has a minor impact on teacher completion of Master's degree programs. However, teacher completion of their Master's degree is unaffected by living in a remote location or on an island far from the university, with a mean score of 1.857 (SD=0.811).

The availability of transportation services marginally impacts university graduate students' access to campus; this has a more significant impact on attendance and punctuality than academic performance. Students may occasionally arrive late or miss portions of their classes due to delays caused by limited or unreliable transportation alternatives (Deka, 2017). However, these interruptions are usually low because students frequently learn coping mechanisms to deal with transportation issues, like planning around bus times or selecting alternate routes. The range of modes of mobility, including ridesharing, public buses, and even motorcycles, lessens the impact of any one transit interruption. Furthermore, studies have indicated that students with access to various transportation options report feeling less constrained by transportation-related problems, indicating that having various options helps mitigate the effects of service interruptions or restrictions (Ewing & Cervero, 2010).

Furthermore, universities' growing use of online resources and hybrid learning settings mitigates the impact of transportation availability. Nowadays, many colleges provide online access to lectures, meetings, and even tests, which is very helpful for students with transportation issues (Johnson, 2019). This change lessens students' reliance on physical access to the campus by enabling them to engage in academic activities remotely during

transit interruptions. According to studies, the adaptability of hybrid models has enhanced students' time and resource management skills, reducing the adverse effects of mobility constraints on their academic performance and engagement (Ewing & Cervero, 2010). Therefore, even if transportation services are necessary, university students are only marginally impacted by their availability because of personal flexibility and the increasing institutional support for remote participation.

Table 2. Distance

Item	Mean	SD	Interpretation
1. Long hour of travel from the residence to the university	1.857	0.478	Slightly Affect
2. Residing in a far-flung place or in an island distant from the university	1.571	0.811	Does not Affect
3. Availability of transport services necessary for the transportation to the university	2.095	0.700	Slightly Affect

3.2.2 Thesis Skills

The table 3 below shows that all three indicators for thesis skills highly affect the completion of master's degrees among CAR-holder teachers in Borongan City. It can be gleaned that the highest mean is the conceptualization of the thesis through the research matrix with a mean score of 4.00 (SD=0.000), followed by treatment of data gathered (X=3.905; SD=0.301) and Writing a proposal (X=3.810; SD=0.402). For teachers with CARs, conceptualizing a thesis through creating a research matrix can be difficult, and it frequently causes delays in finishing a master's degree. A systematic instrument known as a research matrix is the basis for the complete thesis framework by arranging the variables, research questions, objectives, and data sources. Nonetheless, developing this matrix necessitates thoroughly comprehending research techniques, which many educators may find difficult or time-consuming if they have never conducted organized academic research before (Thomas, 2017). According to research, establishing variables, matching techniques to aims, and planning data-collecting strategies can be difficult, particularly for practitioners balancing their studies with full-time teaching duties (Bagaka et al., 2015).

Table 3. Thesis Skills

Item	Mean	SD	Interpretation
1. Conceptualization of thesis through the research matrix	4.000	0.000	Highly Affect
2. Writing a proposal	3.810	0.402	Highly Affect
3. Treatment of data gathered	3.905	0.301	Highly Affect

Additionally, the iterative process of modifying a research matrix to satisfy academic requirements typically results in longer timeframes because instructors may need to regularly review and modify their frameworks in response to advisor comments, which further prolongs the time it takes to complete theses. Among teachers who possess CARs (Complete Academic Requirements), handling data collected for thesis completion is a significant cause of delays, mainly because of the intricate analysis and interpretation procedures needed. Data analysis is complex for many teachers, particularly if they lack access to analysis software like SPSS or NVivo, which are frequently necessary for thesis research, or if they have little expertise in statistical approaches (Santos & Bernardo, 2020). According to local research conducted in the Philippines, CAR holders usually struggle to code qualitative data or do statistical tests on quantitative data, which causes them to wait a long time for help from consultants or colleagues (Garcia, 2019). An extra element of difficulty is added by the requirement to match findings with the study's conceptual framework and research questions, which necessitates numerous revisions and adviser input. For many teachers who are otherwise nearing the finish of their academic obligations, the handling and analysis of data can constitute a significant barrier that delays the completion of a master's thesis.

3.2.3 Access to Resources

Table 4 presents the findings on access to resources as a factor influencing the delay in finishing a master's degree among CAR-

holder teachers in Borongan City. The table below shows that skill in accessing authentic research sites significantly affects the delay in completing a master's degree among CAR-holder teachers.

The ability to access authentic research sites is an essential factor affecting the timely attainment of master's degrees among teachers who have fulfilled their academic requirements. Studies indicate that teachers adept at employing reliable internet resources perceive fewer interruptions in their study activities (Gonzales & Reyes, 2021). Bautista and Lim (2022) assert that digital literacy plays a role in academic research since it empowers teachers to effectively seek, assess, and incorporate high-quality information into their theses. A gap in proficiency with academic databases may result in dependence on unverified sources, so undermining the quality of their work and prolonging the time required for completion (Ramos, 2021). Dela Cruz (2023) asserts that inadequate access to credible research sites hinders the research process and exacerbates fear and uncertainty among educators, hence prolonging their graduation timelines. Improving digital literacy and research competencies is crucial to alleviate these delays and assist educators in effectively attaining their master's degrees.

Table 4. Access to Resources

Item	Mean	SD	Interpretation
1. Knowledge in accessing legitimate sites for research purposes	3.810	0.402	Highly Affect
2. Internet connection	2.952	0.669	Moderately Affect
3. Access to the library	2.381	0.865	Slightly Affect

3.2.4 Financial Constraints

A contributing factor to the delay in completing master's degrees among CAR-holder teachers in Borongan City is financial constraints. The table 5 below indicates a moderate effect on other loans outside of the payslip, with a mean of 3.143 (SD=0.727), and the status of net take-home pay, with a mean of 2.524 (SD=1.123). The financial burden of loans not disclosed in payslips adversely impacts the timely attainment of master's degrees by instructors who have met their academic obligations. Studies demonstrate that teachers dependent on external loans frequently experience heightened financial stress, resulting in diminished academic focus and participation (Bautista & Cruz, 2022). This financial burden may require increased work hours or new employment, so constraining the time allocated for academic endeavors (Gonzales & Reyes, 2021). Moreover, Villanueva (2023) discovered that educators burdened with external debt had elevated anxiety levels and diminished motivation to finalize their degree programs, potentially leading to postponements in thesis submission and graduation. Consequently, comprehending the ramifications of financial commitments from loans beyond conventional salary frameworks is crucial in tackling the difficulties encountered by CAR-holder educators in their quest for additional degrees.

Table 5. Financial Constraints

Item	Mean	SD	Interpretation
1. Being responsible for the education of children/nephews/nieces who are in college	2.048	0.384	Slightly Affect
2. Status of net take home pay	2.524	1.123	Moderately Affect
3. Other loans outside the payslip	3.143	0.727	Moderately Affect

3.2.5 Workload

As stated in table 6, all of the three indicators on workload appeared to moderately affect the delay in the attainment of their masters' degree. It could be inferred that the workload of teachers hinders in finishing the graduate school journey of students who have met their academic requirements for master's degrees but have not yet conferred their degrees. Studies demonstrate that educators frequently have significant workloads due to a combination of instructional responsibilities, administrative duties, and extracurricular engagements (Santos & Flores, 2022). The significant load reduces the time and

energy teachers can devote to thesis preparation, research, and other degree completion obligations (Gonzales & Reyes, 2021). Bautista (2023) asserts that instructors with multiple responsibilities encounter considerable fatigue and reduced cognitive resources, which negatively impacts their ability to focus on complex academic tasks, resulting in delays in program completion.

Table 6. Workload

Item	Mean	SD	Interpretation
1. Overloaded subject assignment	2.571	0.507	Moderately Affect
2. Fully loaded subject assignment	2.810	0.814	Moderately Affect
3. loaded with subjects that calls for great demand	2.571	0.746	Moderately Affect

Furthermore, the relationship between workload and academic progress among educators is sometimes intensified by supplementary professional pressures, such as performance assessments and the requirement to comply with established teaching standards. Villanueva (2022) found that educators balancing professional and academic duties face considerable challenges in time management, leading to prolonged delays in completing thesis requirements. This pressure is particularly evident during peak academic periods when educators prioritize classroom responsibilities over their personal academic goals (Dela Cruz, 2021). Thus, managing workload and providing structured academic support may be essential for facilitating CAR-holder instructors in completing their master's degrees within a reasonable timeframe.

3.2.6 Time Management Constraints

The time component also contributes to the delays in the completion of master's degrees among CAR-holding teachers in Borongan City. Table 7 demonstrates that the demands for compliance paperwork significantly affect the timely completion of master's degrees among CAR-holder teachers in Borongan City. School activities on weekends, with a mean score of 2.667 (SD=0.856), moderately affect the delay in completing a master's degree among CAR-holder teachers. The obligations of adhering to administrative documentation can significantly impact the schedule for completing master's degrees among teachers who have fulfilled their academic prerequisites. Research indicates that the demands of routine paperwork, including lesson planning, reporting, and record-keeping, might inundate instructors, resulting in insufficient time and mental capacity for academic responsibilities pertinent to their degrees (Gonzales & Reyes, 2018). Bautista and Santos (2017) contend that this administrative burden poses significant challenges for instructors, who may find it difficult to reconcile institutional obligations with the stringent requirements of graduate research and thesis composition. The extensive documentation consumes considerable time and hinders teachers' ability to participate in higher-order thinking tasks, such as data analysis and literature review, which are crucial for fulfilling their master's requirements. The psychological effects of constant paperwork have been associated with burnout and diminished motivation among instructors seeking postgraduate degrees. Villanueva (2023) indicates that educators frequently experience irritation and diminished academic production while handling substantial paperwork in conjunction with their thesis responsibilities. This administrative burden has been shown to hinder teachers' advancement on graduate assignments, especially during peak reporting or evaluation periods (Dela Cruz, 2021). Consequently, optimizing administrative obligations or providing organized time management assistance could substantially enhance CAR-holder teachers' capacity to advance toward the completion of their master's degrees.

Table 7. Time Management Constraints

Item	Mean	SD	Interpretation
1. School activities on weekends	2.667	0.856	Moderately Affect
2. Demands on complying paper works	3.000	0.632	Highly Affect
3. Scheduled home visit to pupils/students	2.286	0.784	Slightly Affect

3.2.7 Family

Finally, last factor that may affect the delay on the completion of master's degree among CAR holder teachers in Borongan City is the family. As shown in table 8, all of the three indicators for the family portrays slightly affects the completion of master's degree among CAR holders. This study supports studies from the past decade show that family obligations such as caregiving, daily household tasks, and family events can limit the time available for academic pursuits but typically do not cause significant delays when balanced effectively (Garcia & Ramos, 2018). Teachers with strong family support systems often report fewer disruptions in their academic progress, as family members help with responsibilities or provide encouragement that allows them to focus on graduate tasks (Cruz, 2015). This support can mitigate the potential effects of family demands on academic timelines, helping teachers manage occasional family-related interruptions without major setbacks (Dela Torre, 2017).

However, some circumstances, like family health emergencies or sudden changes in household dynamics, may increase the impact of family responsibilities, potentially causing temporary pauses in academic work. For instance, Rivera (2016) found that teachers facing high-stress family events often struggle with time management and find it challenging to stay on track with thesis requirements. Nevertheless, these situations tend to be temporary and have only a moderate impact on the overall completion timeline for most CAR holder teachers. Research thus suggests that family-related factors slightly contribute to delays but are generally secondary to professional and workload-related challenges (Perez & Lim, 2019).

Table 8. Family

Item	Mean	SD	Interpretation
1. Being a bread-winner of the family	2.429	0.746	Slightly Affect
2. Having children who are still young	2.286	0.845	Slightly Affect
3. Living with old parents who needs care and attention.	2.000	0.837	Slightly Affect

3.3 Summary

Table 9 is the summary of the factors influencing the delay in the completion of master's degrees among CAR-holding teachers in Borongan City. Furthermore, the table results indicate that thesis skills possess the highest mean score of 3.905, which means that it highly affects the delay on the completion of master's degrees among teachers who have fulfilled their academic prerequisites (CAR holders). Thesis abilities include competencies such as study design, data analysis, and scholarly writing, which are crucial for producing a high-quality thesis or capstone project. Bautista and Cruz (2020) assert that numerous graduate students encounter challenges in these domains, perhaps resulting in prolonged thesis completion deadlines. Educators lacking thesis-related competencies may need supplementary assistance, such as targeted training or mentorship, to navigate their academic obligations effectively, as the cultivation of these abilities typically demands significant time and effort (Dela Cruz, 2018).

Conversely, distance was discovered to exert as the minimal factor that may affect on the delay in the completion of masters' degree, with a mean score of 1.841, indicating that it slightly affect on the delay of the above mentioned purpose. Distance often refers to the physical proximity of the educator to academic institutions or research facilities. Although distance may provide logistical difficulties, such as accessing university resources or attending advisory consultations, it seems that the majority of CAR-holder teachers manage to surmount these obstacles to a certain degree (Villanueva, 2019). Cruz (2016) posits that innovations in digital learning platforms and online consultations have alleviated the impact of physical distance, allowing educators to sustain their academic endeavors despite geographical separation from their institutions.

Table 9. Summary of the Factors Affecting the Delay in the Completion of Masters' Degree Among CAR Holder Teachers

Factors	Mean	SD	Interpretation
Distance	1.841	.663	Slightly affect
Thesis Skills	3.905	.234	Highly Affect
Access to Resources	3.048	.645	Moderately Affect
Financial Constraints	2.574	.745	Moderately Affect
Workload	2.651	.689	Moderately Affect
Time Management Constraints	2.651	.757	Moderately Affect
Family	2.418	.809	Slightly Affect
Factors	Mean	SD	Interpretation

3.4 Proposed Extension Project

As an output of this study, an extension project proposal was crafted based on the findings that could be considered in conducting extension services of the university.

Executive Summary	
Title: Project MASTER (Master's degree Attainment for a Secured and Transformed Educational Refinement) with Schools Division of Borongan City	Proponent: Dr. Virgilio P. Rapada Jr.
Beneficiary: CAR holder Teachers of Borongan City Division	Target Area: Borongan City, Eastern Samar, Philippines
<p>Rationale: Educational refinement is a learning process that involves moving to a higher level from the present status achieved. Through this process the person is given a chance to improve and polish more the behaviour, knowledge and attitude leading towards of becoming a dignified being.</p> <p>One of the ways and means of attaining educational refinement is engaging in further studies by enrolling in the Master's Degree and eventually attaining a Master Degree Holder.</p> <p>However, to some extent, It has been an observation from among the graduates in the diploma program of Eastern Samar State University Graduate School that there is just only a low number of the graduates who finishes their master's degree which leaves a fact that there is a problem that needs to be given focus and must be resolved.</p> <p>From the result of research conducted by Rapada (2022) on Factors Affecting the Delay in the Completion of Masters' Degree Among CAR Holder Teachers of Borongan City Division: Inputs for a Proposed Extension Project, it revealed that out of seven factors that affects the delay on the completion of their Master's Degree program such as Distance, Thesis Skills, Access to Resources, Financial Constraints, Workload, Time Management Constraints, and Family, Thesis skills seemed to be the top reason. That due to insufficiency of skill in writing a thesis, many of them are still CAR holders.</p> <p>Based on the findings of the research, a proposed intervention must be made, a reason why this project was conceptualized. Moreover, part of the conceptualization is aligning the plan of action to the MATATAG curriculum of DepEd specifically under "G" which is "Give support to teachers to teach better" by giving technical support and assistance with the needed skills in finishing their Master's Degree, wherein furthering their educational attainment will make them effective and efficient teachers and personnel. Furthermore, this project will also consider BEDRA which stands for Basic Education Division Research Agenda, so that, their researches will focus on what is actually needed in DepEd. Through this project it is projected that significant number of teaching personnel will be able to finish their Master's Degree an eventually cross the bridge towards a secured and transformed educational refinement.</p> <p>Description: Project MASTER (Master's degree Attainment for a Secured and Transformed Educational Refinement) is a research based extension project which aims at capacitating the DepEd CAR Holder Teaching Personnel finish their master's degree through a series of seminar and training on how to craft a thesis the clear and easy way. The approach will be personal in nature wherein they will be guided until they will be able to produce a proposal, work on the completion of their thesis and eventually earn a master's degree that will pave way for a secured and transformed educational refinement and promotion purposes.</p> <p>Objective: <i>General</i> To capacitate the CAR holder DepEd teaching and non-teaching personnel with the needed skills in finishing their master's degree. <i>Specific</i> To conduct series of trainings and seminar on thesis writing.</p> <p>Components: The following are the extension activities under Project MASTER: 1. Pre Implementation Stage 1.1 Launching of Project MASTER and Forging of MOA with Borongan city division 1.2 Call for prospective recipients 2. Implementation Stage) 2.1 Training-Workshop on Thesis Proposal Writing 2.2 Training-Workshop on Writing Result and Discussion, Conclusion and Recommendation.</p>	

3. Post Implementation Stage			
3.1 Monitoring and Evaluation of Project MASTER			
3.2 Impact Assessment of Project MASTER			
Logical Framework:			
Narrative Summary	Objectively Verifiable Indicators (OVI)	Means of Verification (MOV)	Assumptions/Risks
Goal To capacitate the CAR holder DepEd teaching personnel with the needed skills in finishing their master's degree.	DepEd teaching personnel who are competent in writing a thesis	Activity design, program, pictures, and post activity report, certificate of participation	Transportation allowances,food ,transportation risks, Prior commitments of the attendees and Conflict of schedule
Purpose To conduct series of trainings and workshops in writing a thesis	Produce a thesis proposal	Number of thesis proposals produced	Transportation allowances,food ,transportation risks, Prior commitments of the attendees and Conflict of schedule
Outputs Skilled and Trained DepEd teachers on writing a thesis	Number of DepEd teaching personnel who are full-fledged master's degree holders	Difference between of the number of full-fledged master's degree holder and the number who attended the training	Willingness of the teachers to attend
Inputs Skills and expertise from the resource speakers	Dr. Virgilio P. Rapada Jr. And other experts	Expert's Profile	Conflict of schedule
Financial Plan:			
Activities	Time Frame	Budget	
Launching of Project MASTER and Forging of MOA with Schools Division of Borongan City	August, 2024	₱ 1,000.00	
Call for prospective recipients	August 2024	₱ 1,000.00	
Training-Workshop on Writing Chapter 1 (Introduction)	September, 2024	₱ 2,000.00	
Training-Workshop on Writing Chapter 2 (Review of Related Literature)	September, 2024	₱ 2,000.00	
Training-Workshop on Citation and Referencing	October, 2024	₱ 2,000.00	
Training-Workshop on Writing Chapter 3 (Methodology)	October, 2024	₱ 2,000.00	
Training-Workshop on Writing Chapter 4 (Result and Discussion and 5 (Summary, Conclusions and Recommendations)	January, 2024	₱ 2,000.00	
Monitoring and Evaluation of Project MASTER	August, 2024	₱ 1,000.00	
Impact Assessment of Project MASTER	August, 2025	₱ 2,000.00	
Management Team:			
Name of Faculty	Position/Designation	Roles/Responsibilities	
Dr. Virgilio P. Rapada Jr.	Prof. I / Extension Coordinator	Leader, Resource Speaker	
Dr. Helen C. Fuentes	Asso Prof. II / Research Coordinator	Asst. Leader, Resource Speaker	
Dr. Sharon B. Singzon	Assoc. Prof. V / Dean	Member, Consultant	
Dr. Arnel A. Balbin	Assoc. Prof. V / Dean	Member, Consultant	
Dr. Riomar G. Obliopas	Assoc. Prof. III/	Member, facilitator	
Dr. Ma. Zosima L. Tejero	Assoc. Prof. V / Program Head, MATVE	Member, facilitator	
Prof. Czar Valerie Regis	Asst. Prof. III	Member, facilitator	
Impact Assessment Plan:			
Outcomes	Indicators	Data Collection Methods/Tools	
Successful launching	Launched project and	Face To Face	

of the project and forged MOA with Eastern Samar and Borongan city division	forged MOA with Eastern Samar and Borongan city division	launching of the project and declaration of duties and responsibilities
Identified recipients	Successful conduct of activity on calling for the prospective recipients	Conduct of a program
Written output on chapter 1	Number of written output on chapter 1	Frequency and percentage
Written output on chapter 2	Number of written output on chapter 2	Frequency and percentage
Written output on chapter 3	Number of written output on chapter 3	Frequency and percentage
Written output on chapter 4 and 5	Number of written output on chapter 4 and 5	Frequency and percentage
Monitored and Evaluated extension project (Project MASTER)	Tabular presentation of the monitoring and evaluation	Quantitative evaluation and interview
Assessed impact of Project MASTER	Fully accomplished impact assessment form	Extraction of the needed information from the monitoring and evaluation form
Sustainability Plan:		
Action Points for Sustainability	Risk Factors (Constraints/ Limitations)	Mitigating measures
<ul style="list-style-type: none"> Establish close coordination with the partner agency Request for capacitating the extensionists financially to the higher ups Orient the management team the value of sustaining the extension project 	<ul style="list-style-type: none"> Limited time No assurance for the travelling expenses No assurance for cell phone loads in contacting the trainees in monitoring and evaluation 	<ul style="list-style-type: none"> Strong support of the partner agency Good planning and implementation process Spending personal resources from the extensionists in case of financial inconvenience

4 Conclusion and Recommendation

Based on the result of the study conducted, the CAR holder teachers of Borongan City Division are predominantly under the program of Master of Arts In Education major in Educational Management which projects that most of them are aiming to become the school heads and eventually exercise their leadership skills. However most of them are still in the teacher 1-3 position that hinders the opportunity of leading a school for almost 6 years mostly. It could be concluded that they are trapped in a disconsolate situation for they are still CAR holders for various factors such as the distance, thesis skills, access to resources, financial constraints, workload, time management constraints and family. Moreover, among these factors, it was the thesis skills which emerged as the top most factor that highly affect the delay of attaining Masters' degree.

On this note, it is highly recommended fro the Graduate School of Eastern Samar State University to conduct an extension project that will cater to the needs of the CAR holder teachers focusing on capacitating their skills in writing a thesis for them to be able to attain eventually their masters' degree.

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Primary Paper Section: A

Secondary Paper Section: AM

THE PRESENT STATE OF AFFAIRS AND ECONOMIC ASPECTS OF THE PRISON SYSTEM IN THE CZECH REPUBLIC

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This article was created at AMBIS University within the project "The research of selected areas of contemporary prison system" number SVV/2024/6105 supported by funding for Specific University Research provided by the Ministry of Education, Youth and Sports in 2024 and 2025.

Abstract: This paper focuses on the current development of the Czech prison system, which feels the strain from prison overcrowding, the need to improve resocialization programmes, and to lower penological recidivism. The paper places particular emphasis on the growing share of women serving prison sentences. An additional area of discussion highlights the need for economic sustainability of the prison system. Said proposals could improve the financial circumstances of the prison system and raise the chances of successful prisoner reintegration into society, precisely because of the employment rate. This paper aims to illustrate the significance of the restorative approach in justice (in contrast to the retributive approach) in combination with economic effectiveness that it can assist in ensuring a stable prison system.

Keywords: Alleged offender, employment rate, imprisoned women, person serving a sentence, prisoner costs, the Prison Service of the Czech Republic.

1 Introduction

The Prison Service of the Czech Republic, in terms of expertise and management complexity, is among the most demanding state protective bodies because it also assumes the role of a specific public social service. Experts in the prison service work in direct contact with prisoners to provide education. These prisoners are a danger to society as they may be perpetrators of serious crimes, but they also need effective help, penitentiary education and therapy with regard to the depth of the personality disorders. It is here then the double meaning of punishment – not only the punishment of criminals and protection of society against dangerous perpetrators, i.e. individuals with behavioural disorders who threaten the lives, health and property of citizens on one hand, but also the provision of suitable rehabilitation programmes to increase the likelihood of successful reintegration of the sentenced into society after release to eliminate the risk of recidivism.

In recent years, the Prison System of the Czech Republic has undergone significant changes, especially in its attempt to react to the challenges connected with prison overcrowding and the necessity to improve the resocialization programmes for prisoners because of the high penological recidivism. This article provides an overview of the growth of the number of prisoners, the difference between an alleged offender and a person serving a sentence, and the economic costs for running a prison system in the Czech Republic over the last ten years. The context for these changes is the broader European trend that follows the development of the prison populations not only in numbers, but also in demographics, including gender composition.

Traditionally, men form the overwhelming majority of the prison population, but the portion of women in prisons in European countries has grown in recent times, not only in countries with high prison populations, but also in those where the capacities are rather low. The paper analyses this trend with an emphasis on the development in the Czech Republic, Germany, Spain and France – countries where the prison systems markedly differ from each other and which have dissimilar socioeconomic conditions and legislation. Key factors, such as penal policy, legislative amendments and broader socioeconomic influences have a fundamental impact on the number prisoners and their structure.

While men form a much larger majority of prisoners, the growth in women prisoners is a phenomenon that demands attention not only in terms of capacity but also in terms of the costs and

necessary support for their successful resocialization after return to society from prison.

2 Basic information on the Prison System of the Czech Republic

The Prison Service of the Czech Republic is under the authority of the Ministry of Justice. The Prison Service of the Czech Republic cooperates with the Probation and Mediation Services of the Czech Republic, though they are two independent organizational state units that operate under the Ministry of Justice. The Prison Service of the Czech Republic ensures the penitentiary care and Probation and Mediation Services ensures the subsequent postpenitentiary care.

There are 35 prisons and remand centres with approximately 20,000 prisoners, in the Czech Republic. The task of the Prison Service of the Czech Republic is to enforce detention, punishment, forensic detention, maintain order in court buildings and the Ministry of Justice, and also to provide escort services between prisons, to courts and to health facilities.

Czech prison staff is divided into two groups, where one group comprises uniformed officers and the other group comprises civilian employees. The uniformed officers form about two thirds of the staff, including for example the directors and their first representatives, supervisors and guards, preventive officers, escort officers or dog handlers, and one third of the staff are civilians, such as psychologists, social workers, teachers, educators, health workers, chaplains, administrative workers, workers in the logistics department and the economic department. The total number of employees is around 11,000. (Jůzl, Vlach, 2022)

2.1 The number of imprisoned individuals and the growth over time

Over the last ten years, the prison population in the Czech Republic has fluctuated between 18,000 and 23,000 prisoners. Based on data from the Prison Service of the Czech Republic, several significant changes occurred in this period. In 2012, the number of prisoners hovered above 23,000, which was at the time when the Czech prisons were conspicuously overcrowded. In 2012, overcrowding of Czech prisons approached 110% of their capacity. In 2013, the number of imprisoned individuals dropped to an average of 16,388, because of the presidential amnesty. After the significant drop in imprisoned individuals in 2013, a resurgence in the numbers is recorded, specifically from 2014 to 2017, when it almost reached the limit of 23,000. From 2018, there was a slight dip in the number of prisoners, which stabilized around 20,000 imprisoned individuals. The use of alternative punishment and improved conditions for imprisoned individuals upon release contributed to this change. Since 2020, the number of imprisoned people remains stable, at around 19,000 to 20,000. This number is influenced not only by punishment policy but also by the passing of the Act on Conditioned Release and alternative punishments, which helped lower the number of prisoners. (Statistical yearbook of the Prison Service of the Czech Republic)

According to available statistics, women comprise a small portion of the prison population in Europe, usually around 5% of the total number of prisoners, with minor differences between individual states. In 2022, women made up about 5.3% from the total number of prisoners in Europe, which amounts to one woman in every 12 prisoners. For example, women comprise 8.5% of the prison population in the Czech Republic, which is above the European average. In Germany and Spain, this share hovers around 5%. In several countries, women have a higher prison representation, for example in Northern and Western Europe, while in Eastern Europe this portion is a little lower. The number of women in prisons around the whole world in

recent years has been growing, even when the number of places has been falling. (Czech Statistical Office)

2.2 Structure of the prison population

In the Czech Republic, the prison population comprises two main groups, specifically the alleged offenders and the people serving a sentence.

Alleged offenders are individuals who have been charged with a criminal offence but have yet to receive final sentencing. This group includes both people in custody and those awaiting trial. On average, alleged offenders make up approximately 15% of the prison population in the Czech Republic. Individuals in this category may be in custody for a variety of reasons. For example, it could be to prevent their escape, their influencing of witnesses or repeat offences. The length of the custody can significantly vary, depending on the complexity of the case and on how quickly the trial proceeds. It is important to emphasize that alleged offenders are considered to be not guilty (due to presumption of innocence) until their guilt is proven in a trial.

In the Czech Republic, the length of custody is regulated by the Criminal Code (Act No. 141/1961 Coll. Sec. 72), and it depends on the severity of the criminal offence for which the individual has been charged. The maximum lengths of custody are as follows:

- 1 year for either-way offences where the upper limit of a sentence is a maximum of 5 years,
- 2 years for crimes where the upper limit of the sentence ranges between 5 and 10 years.
- 3 years for especially serious crimes where the upper limit of the sentence is at least 10 years,
- 4 years for especially serious crimes for which an extended sentence may be given.

Three types of custody exist that are distinguished by reasons and circumstances under which they may be imposed. (Act No. 141/1961 Coll. Sec. 67 Criminal Code)

Flight risk custody

This type of custody is imposed if there is a justified fear that the alleged perpetrator will flee or go into hiding to avoid prosecution or punishment. Typically, it is imposed on individuals that do not have a permanent address in the Czech Republic or who will avoid the criminal proceedings. One example would be individuals suspected of a serious crime who would flee abroad.

Anti-collusion custody

Anti-collusion custody is imposed in cases where there is a justified fear that the alleged perpetrator will influence witnesses or the co-accused, thus impeding the criminal proceedings. It is the strictest form of custody and is used, for example, in cases of organized crime or corruption where the alleged perpetrator could influence key witnesses.

Anti-reoffense Custody

This custody is imposed if there is a justified reason that the alleged offender will reoffend or will complete the offence they planned. It is intended to prevent an additional crime being committed such as individuals with prior criminal offences that could continue in illegal conduct.

Each type of custody has its specific conditions, and each is subject to a strict legal framework so as to ensure the protection of the rights of alleged perpetrators and the justice system. Alleged perpetrators often face psychological pressure and uncertainty because their future is unclear, which consequently has far-reaching impacts on their health. The prison system attempts to ensure delineated conditions to protect the rights of the alleged perpetrators. However, instances of isolation may lead to psychological impairment and anti-social behaviour. (Act No. 141/1961 Coll. Sec. 67 Criminal Code)

People serving sentences

People serving sentences comprise the majority of prisoners in the Czech Republic, approximating about 85%. These individuals were finally sentenced by a court and serve a prison sentence (see Graph 1). People serving sentences may be distinguished by the nature of their offence, the length of the sentence and other factors, such as their age, gender and criminal history.

Sentences may be of various lengths and often include not only the prison sentence itself, but also other injunction such as a fine or relinquishment of certain rights. As part of a prison sentence, people serving prison sentences have a set programme of rehabilitation that includes such activities such as education programmes, work activities and therapeutic interventions that aim to facilitate their reintegration into society upon release. (Vlach, 2021)

The life of people serving prison sentences is often characterized by strict rules and structure. People serving prison sentences must adapt to the prison regime and conditions which may pose an immense challenge to them. At the same time, it is important that the prison system is geared towards exemplary resocialization and preparation for the return to society, which also includes psychological support and assistance in searching for employment and housing upon release. In the Czech Republic, penological recidivism is very high – approximately 70% of prisoners return to prison after releases. (Statistics from the Prison Service of the Czech Republic)

Graph 1: Overview of the number of imprisoned individuals in the Czech Republic in the period 2013-2023



Source: own research (Statistical yearbooks Prison Service of the Czech Republic)

Individuals in prison are serving prison sentences that have their own rationale and reason, which is specifically to protect members of society from perpetrators of criminal offences and simultaneously prepare those perpetrators for a life of freedom upon release. Therefore, staff in prisons prepare for individuals serving sentences suitable rehabilitation programmes, such as a set of purposefully selected activities that, while taking into account the nature of the criminal activity and the specific length of the sentence, serve to prepare them for life upon release so that after serving the sentence they can reintegrate into society and lead, if possible, an independent life in accordance with the norms of the given society.

The success rate of a programme depends not only on the person serving the sentence and his inner motivation, but also on the professional high-quality expert staff of the Prison Service of the Czech Republic so the individual serving the sentence successfully reintegrates into society. For this reason, considerable emphasis is placed on the professional and expert qualities of the staff, but also their personal qualities that enable them to carry out the educational and therapeutic activities and be in direct contact with people serving prison sentences while simultaneously resisting their overt or covert pressure directed at obtaining unauthorized advantages, information or violation of external and internal security of prison facilities.

As stated above, the task of the staff of the Prison System of the Czech Republic is to prepare an individual serving prison

sentences for reintegration into society with the aim that said individual will lead a lawful life and not commit other criminal offences. This task is very demanding as the majority of prisoners have repeated conflicts with the law behind them and, at the same time, they are personally and extremely complicated individuals. (A number of prisoners suffer from a range of forms of personality disorders; the most common forms of addiction – primarily alcoholism, drug abuse, gambling addiction, etc. – are very widespread.) In the Czech Republic, penological recidivism hovers around 70%, i.e. the individual recommit a criminal act without consideration of its severity or the length from the previous sentence. (Jůzl, Vlach, 2022)

2.3 Women serving time

The number of women in prisons across Europe in recent years has slightly grown. This growth can be attributed to changes in criminal policy, especially connected with the criminalization of drug offences. Even when it grew or declined in several European countries, in other regions such as Asia, Africa and Latin America, the number of women in prisons has generally skyrocketed.

According to Eurostat statistics from 2002, one in twelve adult prisoners in Europe was a woman, which is reflected in the European Union numbers, where the share of women hovers around 5–6%. For example, a slight increase from 1,433 women in 2015 to 1,613 women in 2022 was seen in the Czech Republic. Furthermore, this trend is often connected to the growth of drug-related criminality.

The following summary provides a detailed glimpse into the situation in several European countries:

- **Great Britain:** The number of women in prisons in 2023 hovered around 4,000, which represents roughly 5% of the total prison population. This number has stabilized in recent years.
- **Germany:** The share of prisoners that are women has amounted to 5–6% over the long term. In 2023, there were approximately 3,000 women in prisons.
- **Spain:** The number of women in prisons slightly rose. In 2022, there were roughly 4,000 women, which represented about 7% of the prison population.

One of the main reasons for the incarceration of women is drug-related offences, which comprises a large part of their sentencing. This trend is noticeable not only in the Czech Republic but also in other European countries. Alternative punishments, such as house arrest or conditional sentencing, are often used, which contributes to the reduction in the number of women in prisons in several countries. In the Czech Republic, where a stricter criminal policy predominates, this trend, however, is not evident. While a drop or stagnation occurred in the number of women in prison in the majority of European countries, the numbers grew in Asia and Africa. In Asia the number of women in prisons in the last decade grew by more than 50%, while in Europe the share of women has remained between 2–9% of the total prison population. This difference can be attributed to a variety of approaches to criminal policy and socioeconomic factors. (Eurostat, online)

In the Czech Republic, the number of women in prison has grown over the long term. In 2015, there were 1,433 women in prisons. In 2022, the number had grown to 1,613, representing 8.5% of the total population. This growth can be explained primarily by the criminalization of minor drug offences and tougher penalties as part of the criminal policy. The year 2024 saw additional growth of up to 1,705 women, indicating a continuing trend. (Statistical yearbook of the Prison Service of the Czech Republic)

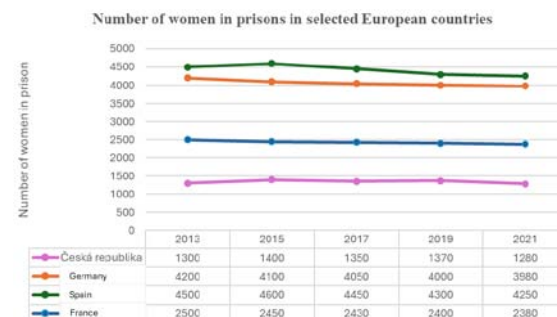
Statistics of women in prisons in Europe

According to available statistics, the share of women in the prison systems in Europe hovers around 5% of the total prison population. However, individual countries diverge from this average. For example, in the Czech Republic, women comprise

approximately 8% of all prisoners, which is higher than the European average. On the other hand, the share of women of the prison population is around 4%.

Graph 2 below depicts the number of women in prisons in selected European countries over the last ten years.

Graph 2: Overview of the number of women in prison in selected European countries

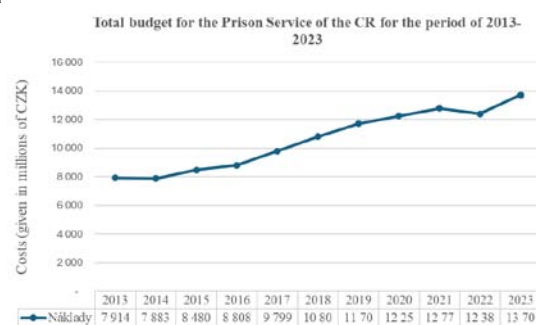


Source: own research (Eurostat, online)

3 Economic aspects of the prison system in the Czech Republic

The total costs for the prison system: The total operational costs for the prison system in the Czech Republic has been around 12 billion CZK annually in the latest years and has tended to spike recently due to inflation (see Graph 3). For example, costs for the Prison Service in 2014 was around 8 billion, and in 2023 this amount was about 14 billion. That is a growth of 75% over the course of ten years (Statistical yearbook of the Prison Service of the Czech Republic). These expenses include not only the direct prison costs, but also investment into infrastructure of prisons, rehabilitation programmes focused on resocialization and reintegration of prisoners and other associated expenses such as staff payroll, etc. Thus, the operation of the prison system in the Czech Republic represents a significant financial burden on the state budget.

Graph 3: Total operational costs for the Prison Services in the period 2013 to 2023



Source: own research (Statistics from the Prison Service of the Czech Republic)

Costs for a single prisoner in the Czech Republic

According to the available data, the cost for a single prisoner in the Czech Republic for the year 2023 approximately amounts 1,916 CZK per day (see Graph 4). These costs include meals, healthcare, prison operation, staff pay and other expenses. Annual costs for a single prisoner are around 700,000 CZK on average. (Statistics from the Prison Service of the Czech Republic)

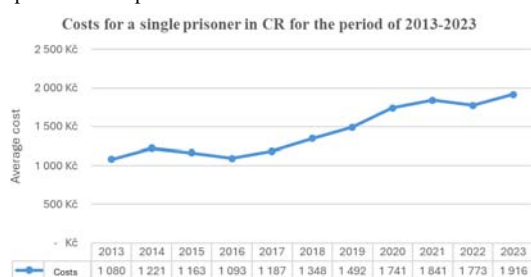
The rate of employment of prisoners in the Czech Republic

The percentage rate of employment of prisoners does not correspond to the real rate of employment. For example, the average state of incarceration over the past 6 years is 20,000 convictions, but only 14,346 people serving sentence were recorded as fit for work on average, from which the employment rate of incarcerated people is calculated. Inmates with adequate

medical fitness are included in the register of inmates eligible for work, and only prisoners for whom the prison in question, due to their skills and qualifications, has an appropriate place of work. The employment rate in Czech prisons is below 60%. (Juříček, Vlach, Kopencová, 2022)

If we express these real figures in terms of the prescribed costs for serving a sentence, the Prison Service loses the opportunity to increase the income of 40% of people in prison through this mechanism. The prescribed costs of CZK 1,500 per calendar month for serving a prison sentence, which the prisoner has to pay, inadequately reflect the real costs. The ineffective employment policy is therefore the main cause of the deficit in the prison system. The low reimbursement rate, and thus the return on the money invested back into the system, is also linked to the completely ineffective mechanism for collecting debts from prisoners during their incarceration and after their release, which creates a 'debt spiral' for most prisoners, which they experience during their imprisonment and are unable to break even after their release. (Juříček, Vlach, Kopencová, 2022)

Graph 4: Average costs for a single prisoner in the Czech Republic for the period 2013 to 2023



Source: own research (Statistics from the Prison Service of the Czech Republic)

4 Proposals to improve the prison service through economic self-sufficiency

The prison system in the Czech Republic faces significant financial and organizational challenges, among which are especially the need to lower operational costs and increase the efficacy of the resocialization programmes. One of the innovative solutions as to reach these goals is a legislative amendment that would allow prison facilities to operate as a business and generate profit. This reform would not only support the economic independence of the prison services, but it would also create new opportunities for effective reintegration of people in prison upon release into society. The following proposals are steps that may help implement this model:

Adaptation of the legal framework

For the prison services to be able to enter the market and effectively compete with commercial entities, it is necessary to change the relevant legislation. A new legal framework should allow prison facilities to establish businesses and sell products, thus generating their own income. This change would not only support their economic independence but also create opportunities for the people in prison to develop work skills and responsibilities, which are important steps for successful reintegration.

Corresponding regulation and protection of the rights of people in prison

Together with the adaptation of the legal framework, it is necessary to protect the rights of every person in prison. Legal protection should include clear rules for working conditions, wages and other benefits as to prevent the possible abuse of a low-paid workforce. Work should be focused on the development of practical skills that are in accordance with the requirements for the labour market, thereby increasing the chance of employment for incarcerated people upon release.

Development of business activities and cooperation with external partners

By supporting business activities directly in the prison facilities, prison services could not only generate their own profit, but also create new possibilities to cooperate with commercial partners. These activities could include the production of foodstuffs, which would not only improve the material conditions of the prisons, but also contribute to strengthening the work habits of prisoners and their future employability.

Increased quality of the resocialization programmes

Financial profits from the business activities could be invested into development of more high-quality education (requalification) and resocialization programmes that would assist prisoners better prepare for their return to everyday life. Education and therapeutic programmes can significantly contribute to the successful resocialization and reintegration and lower the risk of recidivism.

The proposals above would allow prison services to create profit through business activities, which would allow economic savings, but also benefits for the social and employment integration of prisoners. This approach could result in a more effective and modern prison system that would better fulfil both its security and resocialization missions.

Additional measures to lower the operational costs

Streamline the delivery services

- **Contracts with suppliers:**
Reviewing current contracts that have been entered into with suppliers on the grounds of reducing food expenses and costs for hygienic products and other operational materials.
- **Local sources:**
Prioritizing local suppliers, which not only lowers transport costs but also contributes to supporting the local economy.

Embracing technological innovation

- **Monitoring technology:**
The use of electronic bracelets to monitor alleged perpetrators or people serving sentences, which may lower housing costs in prison facilities and offer a cost-effective alternative to a traditional prison.

Support of alternative punishments

- **Alternative punishments:**
Broadening alternative punishments, such as house arrest with electronic monitoring, may lower prison costs.

5 Conclusion

In closing, it can be argued that the prison system in the Czech Republic, as well as Europe as a whole, faces challenges that are not only evident in the variable number of people serving prison sentences, but also in the demographic structure. The growth in the share of women in prison is one of the phenomena that reflect broader social and legal changes. In the Czech Republic, this trend is evident in absolute numbers – the number of women in prisons has been growing here in recent years.

A focus on preventive measures, alternative punishment and support for the resocialization process as part of penitentiary and post-penitentiary care is crucial for the future of the prison system and its financial sustainability. Alternative punishments represent a possibility to significantly help lower the prison system costs as well as lower the rate of recidivism. They are particularly proven for minor offences, in which case incarceration would be excessively repressive and ineffective (restorative and retributive approach in justice). For this reason, support of these alternative punishments may contribute to lower the prison overcrowding and provide a definite chance on the part of society to an individual who committed a criminal offence the possibility to reintegrate into society and atone for their act.

A very important factor, which is monitored by society, are the costs for prisoners as well as the whole prison system. So as to achieve economic efficiency in the prison system, it is necessary to optimize the operation costs of prisons. This includes not only

the reasonable use of living space and human resources but also the introduction of technological innovation that may lower staffing costs and improve the organization of the prison system. What is especially important is the implementation of educational and labour activities as part of the rehabilitation programme focused on skills increasing chances of employment upon release because it represents a key investment into the reintegration of prisoners into society. In this way, it both increases the chance for successful return to ordinary life and reduces the costs associated with the prison system.

An interesting proposal that could bring additional sources of finance to the prison system is the possibility of its partial economic self-sufficiency. Introducing business subjects directly in the prison facilities could open new opportunities to cooperate with commercial partners and offer prisoners the opportunity to engage in productive activities, which would consolidate their work habits and contribute to their successful resocialization and reintegration. Business activities not only generate sufficient income for the prison services, but could also contribute to the improvement of the material conditions in the prisons and to strengthening work and education activities. Here it is necessary to significantly support the work opportunities and business projects in the prisons through the employment of people serving prison sentences. Currently, the number of employed prisoners hovers under 60% from the total number of prisoners fit for work. (Statistical yearbook of the Prison Service of the Czech Republic)

The long-term goal remains the creation of the kind of prison environment that not only fulfils the expressed purpose of serving a sentence but at the same time respects the basic human rights and supports successful reintegration and resocialization of people serving prison sentences. This approach would not only lower the costs of repeated imprisonment, but at the same time it would contribute to a safer and more stable society that can effectively manage the issues of criminality and recidivism.

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Primary Paper Section: A

Secondary Paper Section: AH

THE CATEGORY OF EMPTINESS IN DMITRY PRIGOV'S SOVIET TEXTS

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The study was supported by a grant from the Russian Science Foundation № 23-18-01007, <https://rscf.ru/en/project/23-18-01007/>; F. M. Dostoevsky Russian Christian Humanitarian Academy

Abstract: The purpose of the work is to identify the main creative principle of the conceptual poet Dmitry Alexandrovich Prigov, who was a member of the Moscow Romantic conceptualism group in the late 1970s — mid-1980s. The article shows that the main object of Prigov's poetic searches was Soviet reality and the literature of socialist realism. Using the material of pseudo-Soviet texts, the poet demonstrated that the Soviet man was surrounded by a universal emptiness, that all the ideas and ideals of Soviet life were empty and aimless. It is shown that Prigov totally devastated all the components of the literature of socialist realism — from the idea, composition, plot, imaginative system to the style and language that had lost their individual origin. Prigov typified the Soviet in order to reveal its substantial and aesthetic primitivism.

Keywords: D. A. Prigov; Moscow conceptualism; strategy of emptiness; “zero writing”; templates and stencils.

1 Introduction

When talking about the poetic work of Dmitry Alexandrovich Prigov (1940–2007), the first and most important circumstance should be recognized that he is one of the leading figures of “Moscow romantic conceptualism” (Lipovetsky 1997; Epstein 2000; Leiderman 2003; Bogdanova 2004). Together with Ilya Kabakov, Prigov stood at the origins of a broad and powerful avant-garde movement of the 1960s — 1980s, called conceptualism. Prigov is recognized as a deep theorist and an active practitioner of conceptualism — visual and verbal, pictorial and literary. It is necessary to agree with the definition of the critic A. Zhukov, that Prigov is “the foremost master of conceptualism <...> his poetry is a kind of face of the current” (Zhukov 1994, 330).

The peculiarity of the poet's actual and complete involvement in the conceptualist literary (broader — cultural) process was the creation of the image of Dmitry Alexandrovich Prigov — one of the conceptual creations of the poet, who, like Koz'ma Prutkov, had his own view of the world, his own image-personality, a special creative gift and recognizable poetic style. According to the correct observation of modern criticism, Prigov “embodies conceptualism in person” (Kasyanov 1994, 82).

2 Literature Review

The absolute coincidence of the name, surname, patronymic of the real personality of the poet and the fictional image character makes it difficult to analyze the perception of poetry of the real Prigov, the separation of his (their) judgments in creativity and in the essays. But if you try to observe the parameters of the phantom image, not to go beyond its boundaries, then understanding the originality of the poet's creative heritage will be more accessible. The point is that Dmitry Alexandrovich Prigov wrote more than 24,000 poems (this was his creative plan by 2000), but it is very difficult to form a set of features of his artistic manner. It almost defies formalization (Those who overcame socialist realism 2023).

Meanwhile, the volume of Prigov's poetic heritage is enormous and provides a huge material for scientific reflection. According to the observations of the famous German researcher and narratologist V. Schmid, the abundance of Prigov's writing elevates him to the rank of “Stakhanovite of the poetic workshop” (Schmid 1994, 78). According to the conclusion of the postmodern critic V. Kuritsyn, in Prigov's legacy, “pure volume becomes an aesthetic event” (Kuritsyn 2001, 105).

The leading (dominant) subject-thematic orientation of Dmitry Alexandrovich Prigov's (DAP) poetry is the Soviet system, Soviet statehood, Soviet politics, the Soviet way of life, the Soviet man. According to O. Bogdanova, it is not even the image of a “communist dormitory”, but the “Soviet mentality” itself (Bogdanova 2004, 455). It is no coincidence that one of Prigov's most representative collections was named “Soviet Texts” (Prigov 1997), and the poet defined his creative method as Sovvitalism (Prigov 1997).

If we agree that Prigov “parasitized the forms of an obsolete culture” (Yerofeyev 1993, 137), then its name is undoubtedly Soviet culture, based entirely on the principles of the basic method of Soviet art — the Socialist realism. And this, perhaps, is the most important, in our opinion, and fundamentally significant representative feature of Prigov's work — a focus primarily on the sociologized Soviet discourse, earlier than on the aesthetic itself. Following the critic A. Zorin, we can agree that everything Soviet acquires a “poetic legitimization” in the poetry of the DAP (Zorin 1997, 16). The Soviet (in any of its forms) is put above all by Prigov, the conceptualist.

Such a Soviet attitude entails the leading creative principle of Prigov sovitalism — poetic work based on thematic priorities and principles (or imitation of principles) of the art of Socialist realism. According to the observations of Y. Dobrenko, a major Western specialist in the field of Socialist realism, on a superficial receptive level, the poet Prigov intentionally “seeks to realize the requirements of the aesthetics of socialist realism” (Dobrenko 1990, 176), even if this realization is based on mythologems, more precisely mythoideologems of the theory and practice of socialist realism.

3 Emptiness as a principle

So, Prigov creates texts (“objects”, “opuses”, “things”, “miniatures”, “pseudo-poems”) thematically predominantly Soviet, methodologically (from “method”) — socialist realism. The concentrated model of his work is Soviet and socialist realism. However, his “Soviet” texts, formally clothed in the socialist realist canon, are devoid of only one thing — a meaningful, semantic and ideological-political core. They are empty. It is in this, in our opinion, that the constitutive features of Prigov poetry manifest themselves — its emptiness, intentionally chosen emptiness, meaningful emasculation. Emptiness as a principle.

Whatever genre Prigov chooses, he never has the same genre, it does not coincide with any of the canonical genres — everything is *wrong* with him, everything is *like*, everything is *different*. That is, in terms of genre, DAP poetry is also empty — it does not correspond to any of the possible genres, therefore Prigov often has definitions of “pseudo-verse”, “quasi-verse”, “imitation of verse”, “strange ... combinations of words”. Prigov's semantic constants of the genre are being emptied: the sonnet will no longer become an expression of a love theme, the poem will lose its plot organization, the verse may even acquire the appearance of prose (or “not-prose”). Not only is there “genre purity” (Bogdanova 2004), as a rule, Prigov does not have any genre components at all, they are not observed in principle. According to B. Borukhov, the texts composed by Prigov only “pretend to be some kind of genre, in fact they are not” (Borukhov 1993, 114).

4 Images of a pseudo-author and a pseudo-hero

As is known, in classical literary studies, the most important poetical constant of a literary work is the images of the author and the hero (often the author's *alter ego*). Researcher O. Bogdanova says about this: "The question of the presence of the image of the author and the subject of the poetic text, the question of their relationship or <...> the question of constructing a conceptual personality is fundamental for Prigov's poetry" (Bogdanova 2004, 458). The question of authorship (the image of a pseudo-author) in Prigov's poetry has already been partially touched upon above. But it is important to recall that long before the appearance of the association "Moscow romantic conceptualism", the French poststructuralist theorist Roland Barthes in an essay in 1967 announced the "death of the author" in postmodern art (Barth 1994, 384–391). One of the options for the practical actualization of the "death of the author" in postmodern (and, accordingly, in conceptualist) texts is the maximum convergence of the image of the author and the image of the hero, the erasure of boundaries, their intentional equalization and assimilation. It is clear that it is on this path that the image of the hero, the image of Dmitry Alexandrovich Prigov, arises, explicating the unacceptable fusion of images of the author and the hero in traditional literature. Prigov, the *author*, acts as a Prigov *character*. Moreover, Prigov's images of the author and the hero do not just converge, they, as already mentioned, merge into a *single entity* — DAP.

Taken as the basis for the manifestational declarations of the conceptualists, the R. Bart's idea of the author's death, which was not fundamentally questioned or critically reflected by theorists and practitioners of Moscow conceptualism, was firmly supported by the principle of Soviet socialist realist art in Prigov. The point is that back in 1920, Lenin proclaimed the fundamental principle of the art of socialist realism: "Art belongs to the people". In the strategy of *literalization*, widely exploited by conceptualism, Prigov renounces authorship and, as mentioned earlier, counts all his creations as Dmitry Alexandrovich Prigov, the phantom author. That is, even at the level of authorship — phantom in nature — DAP's poetry turns out to be hollow.

As for the image of the lyrical hero in Prigov's poetic text, it can be assumed that here, too, the recipient reader will find emptiness. That's the way it is. Prigov declares: "I don't write poetry either confessional or personal, and I don't have a personal language" (Gandlevsky 1993, 5). Indeed, any lyrical self in DAP poetry is not a step towards personalizing a poetic character, but on the contrary, a path to targeted depersonalization. As the analysis of poetic texts shows, the image of a lyrical voice in any of Prigov's poems is an illusion of personality and subjectivity. Each of his characters is as compilative and syncretic as possible, he absorbs the most typical — or rather the most common — signs of the self that the poet models in verse. His characters, as a rule, do not have names (if they flash, then they are obviously precedent, in fact being mental facts and / or intertexts).

Most often, Prigov's character names are explications such as Militsaner ("Apotheosis of a militsaner"), Ballerina ("I'm a little ballerina..."), Locksmith ("A locksmith goes out into the winter courtyard..."), etc. Note that the sign of the lyrical self is not the quality of the personality, not its individual character, but its professional / social affiliation, a priori erasing the signs of the individual. This is exactly what the poet himself admits: "I work, of course, mainly with Russian culture. It has fixed images and roles, and behavioral models" (Zorin 1993, 123), while, according to the conceptualist poet, "image, behavior, gesture in the marked area of art means, if not more, then at least not less than an artistic object" (Zorin 1993, 123). Prigov exploits a generalized-typed, averagely-universalized image (*type*) of a Soviet man-citizen, the author does not provide for the measure of individualization of the character in principle, the maximum of the hero's isolation is his involvement in any Soviet production (in the typology of Soviet literature — to the factory, shop, school). Moreover, in the epicenter of the image — the

image of a policeman, a ballerina, a schoolboy, a locksmith, a husband, a conscious citizen (in the end) — the phantom personality of Dmitry Alexandrovich Prigov is invariably located.

5 The central role of the ego-character DAP

As the postmodern critic V. Kuritsyn notes, "There is a lot of Prigov..." (Kuritsyn 1993, 142). But it would be more correct to say "There is a lot of DAP...", because, of course, it is DAP, not Prigov, who is subject to character dressing. According to critic and writer fellow Vic. Yerofeyeva, the author in the Prigov text disguises himself "not only out of love for dressing up", but also because "from this, trouble of the most diverse properties is born at the level of tension of two cultures — folk and intellectual, at the level of tension of the state and the poet, at the level of tension of the poet and the crowd" (Yerofeyev 2001, 27). It is not Prigov who is the author, but DAP-image reshapes itself in accordance with those specific situational coordinates to which the poet author moves DAP, whether it is an apartment, a store, a subway, a street bench, a theater, etc.

Often, when discussing the author's role in Prigov's poetry, researchers speak of him as a director (Gandlevsky 1993, 5). It seems that Prigov himself is ready to agree with such an interpretation. However, in our view, in relation to Prigov texts, the definition of *director* does not work — Prigov the poet does not control the stage, not the theater, not the collective, but only DAP, the modern Prigov's Kozma Prutkov, a kitchen philosopher and an observant philistine. Prigov does not direct a dramatic conflict or a plot stage collision, he intentionally *mechanically* reproduces the psychology and mentality of an artificial DAP, on himself demonstrating behaviors of various types, faceless Soviet citizens of dummies. If you try to look inside the image — the image of a locksmith, a ballerina, a student, a subway passenger, etc. — then only DAP will invariably be at the epicenter, with its monotonously empty language, empty psychological warehouse.

In this sense, the narratologist V. Schmid is right, who does not agree with giving DAP significant functions as a director or conductor. The researcher asks: "How justified are all these concepts: role, mask, image, game. After all, such designations imply a kind of duality of the subject, which, as it were, splits into two forms, into a serious person and a grimacing character, into real and false subjects" (Schmid 1994, 78). As V. Schmid correctly recalls, postmodernists "do not believe in the existence of an authentic, authentic subject, which exists independently of all masks, games and roles. <...> There is only an image or a simulacra" (Schmid 1994, 78). And although Schmid's reflections go beyond the confluence of the author and the hero (for the German researcher, this is rather a question of postmodern worldviews about reality and illusion), even then it is not entirely true to talk about Prigov's directorial function.

The impersonality of Prigov's characters does not lie in the fact that each of them is devoid of individuality, but in the fact that the conceptualist poet has a *single* image represented — an image that, for one reason or another, takes on different guises and perceives reality from a certain and always *uniform* angle of view. This uniqueness and singleness are a manifestation of the same unchanging conceptual and conceptualized emptiness.

In empty poetry, in the intentionally devastated poetry of Prigov (or its likeness), the very need for any specialness, originality, specificity is lost and annihilated. Such a necessity is not inherent in the poetics of DAP, it is annulled initially and fundamentally, demonstratively and declaratively. The absence of signs of individualization at any level of a poetic (or prose) text is a constitutive feature of Prigov's poetics. The absence of a sign is a sign.

6 The verbal and stylistic emptiness of DAP poetry

The poetry of DAP, empty in its meaningful content, as a result, profanes literally everything — both the form and the content,

both the level of stylistic and verbal expression. The phantom DAP is not burdened with the selection of words, characteristic features of the voice of one or another self-character, it does not need punctuation marks or the distinction of grammatical forms of the nominative or predicate.

The generic feature of the subject/object within one mini-text can change two or even three times — according to the presence of three genera in the paradigm of the Russian language. The same subject in the text can be in the masculine, feminine and neuter gender at the same time (e.g., “Like a heavenly service of everyday life...”). A traditional character object may lose its gender altogether, or, conversely, an inanimate object may receive a generic attribute, a grammatical gender, which it has never had before.

Saturating the text with a multiplicity of uniform empty images-types, shapes and the plan of their expression, the utterances (their speech, style, language) translates into a desolate, meaningless and colorless sphere. It is no coincidence that the critic V. Kuritsyn notes that “Prigov’s poems, written under different images, very rarely differ greatly in intonation, rather resemble each other, personality, if declared, is declared only thematically, but not stylistically” (Kuritsyn 2001, 106). Friend and poet S. Gandlevsky states “Prigov’s purely dispassionate attitude towards different styles” (Gandlevsky 1993, 5). And this is understandable, since all images, styles, languages are just DAP.

In Prigov’s poetry, literally all the signs of a poetic text, that is, the size of the verse, the length of the line, the law of internal organization, the nature of rhyming, the proportionality of the lines, the volume of stanzas, etc., lose any obligation or necessity. And if this is so, then the end result of the empty poetry of DAP is also only emptiness. It is conceptually and constitutively for Prigov to create initially and fundamentally empty poetry, empty images, empty plots, empty meanings. Emptiness is chosen as a key conceptual feature of his poetry, which is why it is so difficult to identify some familiar originality that marks the poetic world, the artistic manner, the individual mentality of the poet.

Prigov has no formal features of verse *conceptually*, his emptiness is his basic fundamental concept. It is on this path — through the concept of emptiness — that DAP profanes Soviet literature, more broadly, Soviet culture, the Soviet world, Soviet life, and Soviet mentality, which he has chosen as a creative pseudo-orientation. The emptiness allows Prigov to carry out *deideologization*, *demythologization*, *discrediting* of the entire Soviet world at all its levels — “discrediting entities that have lost the right to our trust, values that have come under suspicion and require expertise to confirm their usefulness” (Borukhov 1993, 112).

To expect uniqueness and artistic originality from Prigov’s verse, to look for the peculiarities of his poetic world, means to miss the constitutive character of his emptiness, his empty poetry. Emptiness is the only significant and fundamental thing for Prigov. It is a condition for the form and meaning formation of his poetic works. Moreover, it should be understood that the *meaning* lexeme in relation to DAP is filled with emptiness — its meaning (content, semantics) is conceptually empty and meaningless.

These are the obituaries written and signed by “the Central Committee of the Communist Party of the Soviet Union, the Presidium of the Supreme Soviet of the Union of Soviet Socialist Republics and the Soviet Government” (Prigov 1997, 112), for example, on the death of A. Pushkin (or others). Undoubtedly, at first glance, when reading such obituaries, the absurdity catches the eye.

But such a perception corresponds to the reflection of the traditionalist recipient. In fact, this is once again an explication of emptiness (including the official emptiness of all party obituaries), which DAP actualizes in every line. Prigov does not destroy the “genre” from the point of view of formal and

meaningful, as some researchers believe, this is not his task. His task is different — through the emptiness (meaninglessness) of the content he generated (for example, an obituary), he demonstrates the total, universal emptiness of the Soviet world.

7 The author’s axiology in DAP poetry

In the perception of a literary work, the reader and the critic traditionally strive to grasp the author’s position and, as a result, to explicate the author’s axiology. In the empty poetry of DAP, there can initially be no writer’s assessments — firstly, because axiology was manifestly withdrawn from the sphere of artistic creativity by Western postmodern theorists, and secondly, the evaluative mode was also zeroed out in the context of voids exposed and demonstrated by Prigov himself. The axiological emptiness of Prigov’s poems becomes a reflection of the voids of Soviet ideology and its ideologized evaluativeness, a demonstration of their empty conventionality and falsity. The author and the hero of Prigov are “bearers of the Soviet official folklore consciousness” (Zorin 1993, 130), and therefore, according to DAP, they “by definition” cannot rise above the emptiness of Sovietism.

Modern researchers have long noted that, since there is no position of the author in Prigov’s poetry, one of the dominant conceptualist strategies his poetry should be considered the category *as if* (как бы). B. Borukhov qualifies it as “one of the most important categories of the poet’s artistic world, capable of claiming the role of the vertical norm of his style” (Borukhov 1993, 114). The empty world of the *as if* author of DAP seems to exist, *as if* the heroes act in it, *as if* endowed with a kind of Soviet consciousness. The category *as if* is a formal-speech marker of the conceptual emptiness of DAP poetry, a verbal signal of its total emasculation and zeroing.

Banality is another variant of the emptiness revealed by Prigov and served to create a whole cycle of platitudes (“Banal reasoning on the topic of freedom”, “Banal reasoning on the topic of solid foundations of life”, “Banal reasoning on an environmental topic”, “Banal reasoning on the topic: if you go camping tomorrow”, “Banal reasoning on the topic: man does not live by bread alone”, “Banal reasoning on the topic: take care of honor from a young age”, etc.). It seems, according to the titularly conceptualized title, therefore, stable folk phraseological units are being actualized, imbued with the moral potential of folk wisdom and requiring simultaneous interpretation. However, the result is banality and emptiness.

8 Results and prospects

It would be possible to further emphasize the signs of the emptiness of DAP poetry, but this has actually already been done by domestic and foreign critics, although they did not directly connect the “features” of Prigov poetry with intentional conceptualist and conceptual *emptiness*. In the tradition of classical literary studies, researchers inevitably try to highlight and actualize the features of the originality of the work of DAP, missing the poet’s own position. If the recipients had been more attentive to the statements of Prigov himself, the poet and the theorist of conceptualism, then they would not have needed to look for a complicated explanation for the mixing of images in his poetry, the mode of axiological indifference, the facelessness of his character types, the equalization of style and speech expression, etc.

In one of his long-standing interviews, Prigov openly stated: “To write no poem is the most personal thing” (Zorin 1993, 122), to embody the “vacuum of meaning” in the text (Dobrenko 1990, 176). This, in our opinion, should be the main research trend, which in each case will make it possible to explicate not the specifics, not the originality, but the emptiness, the fundamental conceptualist emptiness of DAP poetry.

The void contains the most unique and at the same time comprehensive expression of the originality of the creative manner of the conceptual poet Prigov, more precisely, his image-

deputy Dmitry Alexandrovich Prigov. Closer attention to the image of the DAP will allow us to better understand Prigov's conceptual poetry and his place in the Russian conceptual art of the 1980s.

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Primary Paper Section: A

Secondary Paper Section: AJ

THE IMPACT OF US THINK TANKS ON THE EVOLUTION OF US-JAPAN ALLIANCE

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Abstract: The US-Japan alliance is one of the most important alliances in the international community today. The development of the US-Japan alliance has been affected by think tanks. The existing literature believes that the reason why think tanks can promote the development of the alliance stems from the rationality of think tanks' suggestions and the discourse construction role of think tanks. However, the unequal hierarchy and dependence between the United States and Japan have hardly been mentioned in the existing literature. The current dependency theory provides a more insightful method to supplement the above discussion. Based on the Armitage Report and the adjustments made by the US-Japan alliance after the report, this research points out that think tanks have promoted Japan's dependence on the United States through the way of market, leverage, and linkage, thus promoting the development of the United States-Japan alliance relation.

Keywords: US-Japan Alliance; Think Tank; Policymaking; Armitage Report; Dependency Theory

1 Introduction

The US-Japan alliance is a significant strategic alliance in the international community today, and its importance in the study of international relations is self-evident. Think tanks play an irreplaceable role in the US foreign policy making. The National Center for Strategic Studies of the United States, as an official platform for a non-governmental think tank on international relations, has been putting forward its own relevant opinions and suggestions for consolidating the development of the US-Japan alliance since the beginning of 2000.¹² A valuable question still remain unsolved: How does the think tank affect the U.S.-Japan alliance? So far, five in-depth analysis reports on the US-Japan alliance have been published. These reports have also been named Armitage Report by the academic community of international relations due to the academic achievements of Richard L. Armitage and Joseph Nye, the principal authors. Besides, the policy formulation of the development of the US-Japan alliance from 2000 to now is basically similar to the recommendations given by the Armitage Report: not only in the traditional international relations fields such as security and military but also in the non-traditional fields such as economy and environment, Armitage Report has had a profound impact on the cooperation between the United States and Japan.³⁴⁵⁶⁷ Thus, using a case of Armitage Report, these paper try to figure out impact of think tank on US-Japan alliance.

As a think tank, why can Armitage Report promote the development of the US-Japan alliance? Previous literature pointed out that the impact of think tanks on policy formulation is often generated through a series of unofficial channels, such as lobbying and outside groups. The degree of its effect on policy formulation is derived from its theoretical and authoritative nature.⁸⁹¹⁰ This research supplements the political and economic

practical effect of the Armitage Report on the US-Japan alliance with the theory of political economy and focuses on the "unequal hierarchy" in the US-Japan alliance. This research believes that Armitage Report increases Japan's dependence on the United States through the three ways of Market, Level, and Linkage, thus promoting the development of the US-Japan alliance.

2 Literature Review

2.1 Think tank and Policymaking

The functions of think tanks include: mediating between the government and the public; identifying, elaborating, and evaluating current or recent important issues, problems or suggestions; turning ideas and problems into policy issues; making an informal and independent voice in the policy debate; Provide a constructive forum for the exchange of ideas and information among important stakeholders in the process of policy formulation.¹¹ The impact of think tanks on alliance relations is the impact of think tanks on alliance policy formulation. It has been pointed out in the literature that the impact of think tanks on policy formulation is often generated through a series of unofficial channels, such as lobbying and outside groups. The degree of its influence on policy formulation comes from its theoretical and authoritative nature.¹² Through the application of scientific theories and the analysis of actual data, think tanks have played a very good role in the decision-making process, evaluation and supervision, thus making the decision-making process full of diversity and competitiveness.¹³ Therefore, in the general trend of multiple interest groups competing, in order to make their own scientific decisions, interest groups often choose to seek the help of think tanks. In this case, think tanks will also have a greater impact on policy formulation.

2.2 Think tanks and social construction

As a result of the debate between "materialism" and "empiricism" in epistemology, constructivism has aroused widespread concern in the academic community since its birth--many scholars believe that constructivism is "a widely recognized 'methodological practice' in the field of social science, especially effective in the study of social science."¹⁴ In the field of international relations, constructivism has also been widely recognized and developed. Scholars believe that the structure of social consciousness - beliefs, norms, concepts, and cognition - endows the material structure of international relations with meaning, which affects the social identity of actors, and also makes social identity affect the interests and behaviors of actors.¹⁵ Meanwhile, they state that the identity generated can change the identity of the actors so that the interests of the actors can be changed, thus affecting the development of international relations.

The United States and Japan are always affected by such constructive identities. In the new era, such constructive identity often comes from the influence of the think tanks of the two countries. The reasons for this identification include the influence of the western political system and political operation

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¹⁴ Delanty, G.: Social science: Beyond constructivism and realism. Minneapolis: Univ of Minnesota Press; 1997.

¹⁵ Lu L. and Hu, Y.: Main theoretical schools of international relations after World War II. China Soc Sci J. 2018. Available from: http://www.cssn.cn/zx/bwyc/201808/t20180803_4523124.shtml

mode mentioned above and the think tank itself under the constructivism narrative. The impact of think tanks on politics is often discussed from its origin. Constructivists believe that the essence of the impact of think tanks on politics is a social construction. Social construction is that constructivism forms the understanding and understanding of things in the process of social behavior, social interaction, and social time, endows things with specific cultural significance, and this set of understanding, discourse, and meaning - guides the daily behavior and practice of social members including government members and state leaders in the form of social knowledge.¹⁶ Social construction is the construction generated by the interaction between the constructors; otherwise, it is difficult to generate a variety of construction identities.¹⁷ This kind of interaction is essentially a spiritual activity between subjects: it takes language and its carrier as the intermediary, takes equal negotiation as the form and takes inter-subjective understanding and meaning construction as the purpose.¹⁸

The interaction between the think tanks of the United States and Japan and the governments of the United States and Japan is in line with the process of construction and identification of the two countries at this time. Under the influence of the modern administrative context and the idealized policy formulation system, the US and Japanese think tanks, which are already powerful, have played a crucial role in both factors. They are both the embodiment of policy rationality and the representative of publicity. The US and Japanese think tanks that meet these two factors would have an impact on the development of the US-Japan alliance. The construction of identity is also an essential theoretical source to prove the impact of the US-Japan think tanks on the US-Japan alliance.

Indeed, the above documents explain that adopting the reasonable "think tank proposal" to promote the US-Japan alliance will promote the alliance relationship and the contribution of think tanks to the "social construction" of the US-Japan alliance in the current social discourse context. However, the above documents are not enough to explain the contribution of the "think tank proposal" to the US-Japan alliance in political and economic practice. In fact, under the influence of the Armitage Report, the political and economic results of the decisions of the governments of the United States and Japan have further deepened the alliance between the United States and Japan. These political and economic results can strengthen the alliance between the United States and Japan because of the "unequal hierarchy" in the relationship between the United States and Japan - dependency.

2.3 Dependency theory

The current dependency theories point out that in an open global economic system, the more developed countries have the power to influence the political economy of other open economies.^{19,20} Although the dependency theory initially focused on the global north and the global south in the 1970s, with the development of non-western economies, the dependency theory tends to focus more and more on the political and economic development level of the research objects. Emmanuel Wallerstein further supplemented the dependency theory from the perspective of political and economic development and put forward the world system theory: the formation of the world system is the inevitable result of the development of a capitalist economy. If the existing system cannot accommodate the scale of the development of today's capitalist economy, the status of the

world system and the state will inevitably change.²¹ Specifically, he put forward the "core - half border - border" theory, which believes that the relationship between border countries, half-border countries, and core countries can change at any time, and the rising development of border countries is just the embodiment of dependency development.²² In addition, some scholars have deconstructed the influencing factors of dependency, such as Barbara Stallings. She summarized the relationship into three factors: first, market dependence, that is, one country has a dependence on another economic power; The second is leverage, which means that the significant economic countries and developed countries will influence the economic development of another country in various ways, such as economy and politics. The common influence is political and economic cooperation and security guarantee; The third is the connection, that is, between the economic powers and other countries. Due to various transnational activities, there will be many links between countries, including education, training, and civil exchanges. It can be seen from this that the elements contained in the newly developed dependency theory can also be used as indicators to measure the development of alliances formed between countries with a disparity in strength, such as NATO, the India-Pacific Alliance, and the United States, Japan, and South Korea Alliance.²³

Compared with the alliance between the United States and other allies, the relationship between Japan and the United States is "special." This particularity stems from the fact that the alliance between the United States and Japan is "unequal." Some scholars believe that in the traditional bilateral alliance, due to the national gap between the two sides, the weak side often has a certain degree of dependence on the strong.^{24,25} Due to the special historical background and political reality of Japan, after the end of World War II, the new Japanese democratic government has developed to this day, and their foreign policy has always been supported by the "US-Japan axis." The alliance established on this basis is slightly different from the traditional "formal or informal arrangements made by two or more sovereign countries in various aspects to achieve security cooperation." The asymmetric alliance between the United States and Japan includes both security and diplomatic, security, and economic cooperation.

3 Armitage Report

The Center for Strategic and International Studies, as an official platform of non-governmental international relations and think tanks, has been making suggestions on developing the US-Japan alliance since the beginning of 2000. It has published five in-depth analysis reports on the US-Japan alliance so far. These reports are also well-known for the academic achievements of Richard L. Armitage and Joseph Nye, the main authors, namely, "Armitage Report" or "Armitage-Nye Report" by the academic circles of international relations. The report's content is often the guidance for the analysis and response of the US-Japan alliance at the strategic development level.

Since the publication of the first article in 2000, the Armitage Report has been playing a strategic role in guiding the formulation of the policy of the US-Japan alliance and is the "wind vane" of the US-Japan alliance. The recommendations from the Armitage Report have primarily promoted the policy formulation on developing the US-Japan alliance since 2000. Chen (2007) wrote in the article "Analysis of the U.S. Policy towards Japan during the Bush Administration" that the

¹⁶ Wang, Z and Yu, M.: The benign interaction between government decision-making and the knowledge of new think tanks: a study based on the perspective of social constructivism. *Polit Sci Res*. 2016.

¹⁷ Burr, V.: *An Introduction to Social Constructionism*. London, New York: Routledge; 1995.

¹⁸ Wang, Z. and Yu, M.: The benign interaction between government decision-making and the knowledge of new think tanks: a study based on the perspective of social constructivism. *Polit Sci Res*. 2016.

¹⁹ Frank, AG.: "Capitalism and Underdevelopment in Latin America: Historical Studies of Chile and Brazil." 1967 New York: Monthly Review Press.

²⁰ Cardoso, FH. and Faletto, E.: *Dependencia y Desarrollo en América Latina*. Mexico, DF: Siglo XXI; 1969.

²¹ Wallerstein, I.: *The Modern World-System: Capitalist Agriculture and the Origins of the European World Economy in the Sixteenth Century*. New York: Academic Press; 1974.

²² Wallerstein, I.: Semi-Peripheral Countries and the Contemporary World Crisis. *Theory Soc*. 1976;3(4):461-483.

²³ Stallings, B.: *Dependency in the Twenty-First Century?* Cambridge: Cambridge University Press; 2020. pp. 11-14.

²⁴ Yang, G.: On the dependence of Japan's military strategy after the war. *Mil Hist Res*. 2005;(3):72-7.

²⁵ Xiang, H.: An Examination of Japan's Strategic Dependence on the United States in the U.S.-Japan Alliance. *Northeast Asia Forum*. 2022;(06):72-86,126. doi:10.13654/j.cnki.naf

adjustment of the Bush Administration's foreign policy toward Japan was directly affected by the Armitage Report in 2000.²⁶ One reason is that the essence of the Armitage Report published in 2007 is to draw a blueprint for the US-Japan alliance to play a regional role and even play a role in the world. The essence is to maintain the leading position of the United States in East Asia at the grass-roots level of the US-Japan alliance.^{27,28} Another reason why the Armitage Report in 2000 played a role in the adjustment of the policies of the United States and Japan is that the report not only conforms to the Bush administration's plan to strengthen the defense cooperation in the Asia-Pacific region and strengthen the interests of the US-Japan alliance but also meets the expectations of the Koizumi cabinet to reform the defense policy. The report also promoted the introduction of the National Defense Program Guidelines--2004.²⁹ Armitage also has been committed to providing suggestions and methods on how the United States can use its smart power to pull in alliances, maintain interests and balance regional strategies.³⁰ Yang (2014) pointed out that the three reports from 2000 to 2012 reflected the vision of the United States to promote the Asia-Pacific strategy based on the US-Japan alliance, and the solutions provided by the report were also the inertia ideas and policies formed under the United States hegemonism.³¹ Liu (2019) analyzed from the perspective of Japan's defense policy formulation and believed that the Armitage Report in 2018 played a guiding role in the formulation of Japan's new defense policy.³² In addition to its role in traditional international relations such as security and military, the Armitage Report also has a profound impact on the cooperation between the United States and Japan in non-traditional fields such as economy and environment.³³

The above discussion explains the reasons for adopting the think tank research - Armitage Report - by the United States and Japan and its impact on the US-Japan alliance from the perspective of the vision and policy rationality of the United States and Japan. Nevertheless, the above cannot discuss and explain the functional role of the "think tank proposal" in strengthening the political and economic aspects of the US-Japan alliance. Although Schoff discussed the impact of the report on the economy and environment of the United States and Japan, he ignored the fact that the economic and social guidance of the think tank for the two countries economies is also to promote the development of the US-Japan alliance. In addition, the above discussion oversimplifies the unequal relationship between the United States and Japan, which makes these discussions ignore the significance of think tanks to the US-Japan alliance in political economics and leads to their lack of critical discussion on the "US-Japan think tank proposal conforms to the US-Japan alliance hierarchy."

4 The evolution of the US-Japan alliance and the Armitage Report

4.1 The Bush Administration and the Armitage Report 2000

The first Armitage report was released after the collapse of the Soviet Union, and the US-Japan relationship was facing challenges. As an important alliance of the United States to contain the Soviet Union during the Cold War, the US-Japan alliance lost its common interests and coherence of coordinated policies with the collapse of the Soviet Union and faced more threats and potential risks. The United States and Japan ignored the urgent and practical pursuit of bilateral relations and thus

lacked effective communication and dialogue. At this time, the contradiction between the two sides was greater than the common interests of the former containment of the expansion of the Soviet Union. Therefore, the differences between the two sides on many major issues are greater than the consensus. At this time, the relationship between the United States and Japan is also gradually deteriorating due to the Okinawa US military incident, the Korean Peninsula crisis, and the Taiwan Strait crisis, which makes the implementation of the White Paper on US-Japan Defense Cooperation issued in 1996 extremely difficult, and even fell into a quarrel for a time. Poor policy coordination is because the United States continues to pursue its hegemonic policy in Asia, which has caused serious dissatisfaction from Asian countries including Japan. In terms of the strength of countries in the Asian region, China, which has greatly developed its comprehensive national strength, has become an inseparable strategic partner of the United States and Japan in terms of economy - which makes the United States and Japan have to reconsider the relationship with China. Therefore, the relationship between the United States and Japan must be adjusted during this period, and the first Armitage report was born for this purpose. From the first paragraph of the report, it is clear that the focus of the study is the sustainability and strategy of the development of the US-Japan relationship. The research team also believes that studying the US-Japan relationship is indispensable to studying the US Asian policy.

Indeed, even the release of the Armitage report did not change the changes of the US-Japan alliance in this period at the earliest time. At the earliest time, President Bush still adhered to the global strategy and principles of the Clinton era and thus steadily developed the US-Japan alliance. However, the emergence of the "9/11 incident" made the US-Japan alliance must be adjusted to a new level acceptable to both the United States and Japan in a short time. The ruling idea of the Bush administration began to develop in the direction of "Bushism," which is a realistic foreign policy with conservative color based on the two principles of the supremacy of national strength and the pursuit of peace by strength.³⁴ Once this policy was launched, it attracted the opposition of most countries, including the United States' allies. On the premise that most countries are against the "Bush Doctrine," the United States urgently needs to establish a stronger alliance with Japan, which is willing to cooperate more with the United States and needs to achieve higher results quickly. Therefore, the Armitage Report issued during this period became increasingly crucial for the Bush administration to develop the US-Japan alliance.

4.1.1 Market

Although the bilateral economic relations between the United States and Japan have experienced many fluctuations in the 1990s, there is no doubt that the report suggests that the United States and Japan should give the highest priority to the long-term bilateral economic relations.³⁵ Driven by the report, the United States and Japan did not take measures to limit trade and balance trade surplus. According to the figure below, the total bilateral trade volume remained high, and Japan's trade surplus with the United States continued to expand. During this period (2000~2007), the United States has always been one of Japan's most indispensable trade exporters, and Japan's economy is also highly dependent on exports to the United States.³⁶

For Market independence, the report suggests that the United States and Japan should prioritize long-term bilateral economic relations. As suggested in the Armitage report, Junichiro Koizumi's government has promoted privatization and marketization, the most important of which is the privatization of the postal and insurance industries. This will make it possible for some of Japan's previously inaccessible markets to allow

²⁶ Chen, K.: Analysis of American Policy towards Japan during the Bush Administration. *Jpn Stud.* 2016.

²⁷ Sun, R.: Interpretation of the new version of the Armitage Report. *People's Daily*, 2006.

²⁸ Gu, J. and Li, X.: New Trends in American Asian Strategy from the "Armitage Report. *Mod Int Relat.* 2007.

²⁹ Konishi, W.: The Changing U.S.-Japan Alliance: Implications for U.S. Interests. Congressional Research Service, 2007.

³⁰ Armitage, RL. and Nye, JS Jr.: Smart Power and the U.S. Strategy for Security in a Post-9/11 World. *CSIS*, 2007.

³¹ Yang, B.: Analysis of the Inherent Contradictions and Regional Strategic Impacts of the U.S. Policy towards Japan. *Jpn J.* 2014.

³² Liu, X.: On the New Progress and New Challenges of the US-Japan Alliance -- A Perspective of Japan's Defense Policy. *Mod Int Relat.* 2006.

³³ Schoff, JL.: Transformation of the U.S.-Japan Alliance. *Fletcher Forum World Aff.* 2007;3(1).

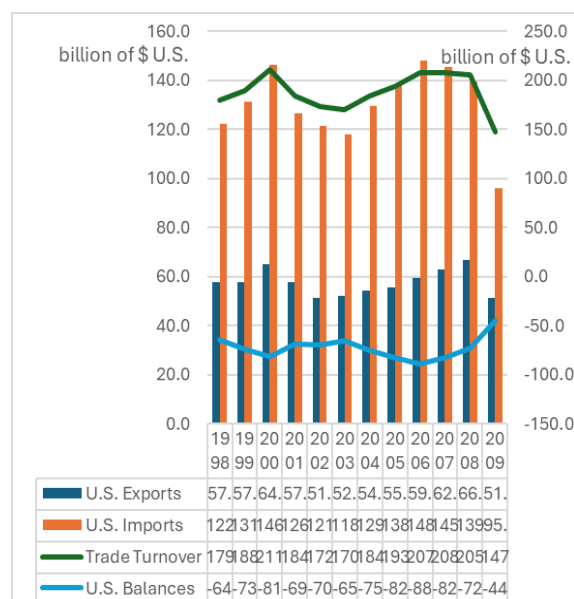
³⁴ Zhou, Q.: Bush Doctrine and American Neoconservatism. *Am Study.* 2007;21(2):7-27.

³⁵ Armitage, RL. and Nye, JS.: The U.S. and Japan: Advancing Toward a Mature. 2000;1.

³⁶ Cooper, WH.: US-Japan economic relations significance, prospects, and policy options. Washington DC: Congressional Research Service, Library of Congress; 2010.

American capital to enter investment smoothly. With the relaxation of investment restrictions, Japan's economy will further rely on the investment of the United States.

Figure 1 the trade between the U.S and Japan³⁷



Source: UN Comtrade

4.1.2 Leverage

According to the dependency theory, the use of leverage includes direct use of power, commitment to reward and punishment, and implementation (or non-implementation) of an action that affects bilateral relations.³⁸ The security guarantee and military support the US-Japan alliance provides for Japan conforms to this theory. The Armitage report also increased Japan's dependence on the United States through leverage. A series of principles and policies during the Bush administration are highly consistent with the recommendations and opinions in the first report. It is like the redefinition of the US-Japan alliance in the Armitage report: the significance of the existence of the US-Japan alliance is that when Japan is attacked, the United States should also regard it as an attack on itself.³⁹ In this case, the United States took the following actions to maintain the leverage relationship between the United States and Japan. First, the United States encouraged Japan to strengthen its independence and initiative by signing a treaty so that Japan could consciously join the "collective defense" policy pursued by the United States. To this end, in 2006, the United States and Japan reached a consensus on the military integration plan, and the United States encouraged Japan to break the restrictions of the peace constitution.⁴⁰ Second, the United States provides Japan with a "security guarantee" through the US-Japan alliance. The United States has made more commitments on "security guarantees" to Japan, and the so-called "security commitments" also include the support of the United States for Japan after the dispute between Japan and its neighboring countries.⁴¹ In addition, Japan's dependence on the United States has deepened regarding military technology. The United States and Japan have carried out more military cooperation. On September 21, 2001, when the aircraft carrier battle group of the Seventh Fleet of the United States set sail for the Indian Ocean, the Japanese Maritime Self-Defense Force and the United States carried out

the first joint escort operation.⁴² Since then, the United States and Japan have also cooperated in interceptor missile technology and anti-missile system construction, which also means that Japan will further deepen its dependence on the anti-missile system of the United States.

The Armitage report further deepened Japan's dependence on the United States by encouraging the US-Japan alliance to meet Japan's political demands. Specifically, with the help of the continuously strengthened US-Japan alliance, Japan will be easier to realize its political aspirations. After 9/11, Japan strengthened the US-Japan alliance -- cooperating with the United States plan to launch a "war on terrorism" around the world, and quickly issued the "Special Measures against Terrorism Law," "Amendment to the Self-Defense Forces Law," and other laws. Secondly, between 2001 and 2006, Japan spared no effort to provide logistical support to the US military and its allies, whether in Afghanistan or the Second Gulf War. For Japan, cooperating with the United States to launch the "war on terror" will bring more political autonomy to Japan - this will enable Japan to openly expand its military strength under the premise of cooperating with the United States to launch military operations and at the same time, it can also participate more in international affairs in the military and political fields. The development of leverage linkage between the United States and Japan during this period confirmed the relevant recommendations in the Armitage report. This further confirms that the think tank's view on the more significant impact of the development of the US-Japan alliance in terms of political leverage is established, but the impact of the think tank will also be different due to the actual situation of the international community.

4.1.3 Linkage

Dependency theory points out that "Linkage" is not the traditional metaphysical linkage between countries, regions, and regions but is driven by common interests and formed by interest groups between the two countries. This kind of linkage often generates linkage with people in other countries through cultural exchange, transnational training, and economic interaction, thus forming a Linkage network and ultimately deepening mutual dependence. As suggested in the report, the United States helped improve Japan's intelligence capability through transnational training, which further promoted the linkage between the two countries. In the Japanese Defense Guidelines issued in 2004, Japan proposed for the first time to establish a defense force with "high-tech intelligence capability" to cope with "the complex surrounding security environment that is difficult to cope with by traditional containment methods."⁴³ Since then, with the assistance of the United States, Japan has continuously strengthened its intelligence collection capacity, including but not limited to technical cooperation between the United States and Japan. The training of intelligence officers of the intelligence headquarters of the Japanese Self-Defense Force and the Japanese Public Security Department by the US intelligence department. Such intelligence cooperation and exchange finally met the expectations of the Armitage Report and strengthened the degree of linkage between the United States and Japan.

4.2 The Obama Administration and Armitage Report 2007 & 2012

When the second and third Armitage reports were launched, the United States government had transitioned from the Bush administration to the Obama administration. During this historical period, the international situation has also evolved in a different way. With the September 11 incident, extremist terrorist organizations became a common problem faced by the international community at that time. During the Bush administration, a large amount of military expenditure was

³⁷ Source: UN Comtrade

³⁸ Stallings, B.: *DEPENDENCY IN THE TWENTY-FIRST CENTURY?*. Cambridge University Press; 2020. p.13.

³⁹ Armitage, RL. and Nye, JS.: *The U.S. and Japan: Advancing Toward a Mature*. Oct. 2000. p.2.

⁴⁰ See Sina Military News. Available from: <http://mil.news.sina.com.cn/2006-08-26/1710393042.html>

⁴¹ See <https://www.reuters.com/article/oukwd-uk-china-japan-usa-idAFBRE88J1G220120920>

⁴² See U.S Department of Defense. <https://www.defense.gov/News/Feature-Stories/Story/Article/2306658/us-japan-alliance-increasingly-strengthened-since-end-of-wwii/>

⁴³ See Prime Minister of Japan and His Cabinet https://japan.kantei.go.jp/policy/2004/1210taikou_e.html

consumed in the "war on terror," which made the financial problems of the United States government more serious; Externally, Bush's act of "safeguarding the security of the United States" through unilateralism has aroused many voices of criticism from the international community. When the second and third Armitage reports were launched, the United States government had transitioned from the Bush administration to the Obama administration. During this historical period, the international situation has also evolved in a more different way. With the September 11 incident, the extremist terrorist organizations became a common problem faced by the international community at that time.

In the face of the ensuing difficulties, the Obama administration must make changes to maintain the United States hegemony in the world. In the 2007 report, it was emphasized that the establishment of a "correct" US-Japan alliance: the United States and Japan should rely on their existing strength and international status to promote cooperation between the US-Japan alliance and other countries in the region, regional international organizations and their influence in the region (for example, ASEAN and Australia), and emphasize the free economy, the rule of law and political freedom in American-style values.^{44,45,46}

The 2012 report was born amid uncertainty in the US-Japan relationship. The US-Japan government is facing numerous challenges. Therefore, although it is not intended to propose how the alliance status will develop, the report defines the important role of Japan - the key for the United States to maintain stability and strategic balance in the Asia-Pacific region; It is also an important part of maintaining the vitality of the world economy.⁴⁷ This also means that the report suggests that the United States should adopt an equal attitude towards the alliance between the United States and Japan. Japan should boldly carry out equal communication and dialogue with the United States. At the same time, Japan should strive to become the "leader" of Asian countries in cooperation with the United States.⁴⁸

4.2.1 Market

The economic relationship between the United States and Japan is far better than the political relationship. Specifically since the Koizumi cabinet has continued to maintain economic liberalization reform. From 2007 to 2012, the United States direct investment (FDI) in Japan increased significantly (Table 2-1). This change is inseparable from the principle that both sides should adhere to the same principle of free trade, as suggested in the Armitage report.⁴⁹ In addition to a large amount of direct investment, the United States has increased its investment in Japan in the form of stock market securities investment: between 2007 and 2012, American investors held a total of 429.4 billion US dollars in Japanese corporate stocks and 45.7 billion US dollars in Japanese bonds.⁵⁰ This is also the result of both sides encouraging external investment and relaxing the investment threshold, which is still consistent with the report's recommendations. Further, the recommendations of the Armitage report strengthen Japan's dependence on the United States from both bond and investment aspects.

Table 2-1 The amount of direct investment from the United States to Japan from 2007 to 2012 (in billions of dollars)⁵¹

Year	U.S FDI to Japan
2007	85.2

⁴⁴ Armitage, RL. and Nye, JS.: The U.S.-Japan Alliance: Getting Asia Right through 2020. 2007 Feb; pp.21-25.

⁴⁵ Armitage, RL. and Nye, JS.: The U.S.-Japan Alliance: Getting Asia Right through 2020. 2007 Feb; pp.21-25.

⁴⁶ Armitage, RL. and Nye, JS.: The U.S.-Japan Alliance: Getting Asia Right through 2020. 2007 Feb; pp.21-25.

⁴⁷ Armitage, RL. and Nye JS.: The U.S.-Japan Alliance: Anchoring Stability in Asia. 2012 Aug; p.1.

⁴⁸ Armitage, RL. and Nye, JS.: The U.S.-Japan Alliance: Anchoring Stability in Asia. 2012 Aug; p.1.

⁴⁹ Armitage, RL. and Nye, JS. The U.S.-Japan Alliance: Getting Asia Right through 2020. 2007 Feb; pp.21-25.

⁵⁰ Survey of Current Business, July 2013, pp18-21.

⁵¹ Data source: U.S. Department of Commerce, Bureau of Economic Analysis

2008	99.8
2009	96
2010	102.6
2011	126
2012	134

In terms of trade, as stated in the 2007 report, the United States and Japan should "connect East and Southeast Asian countries and build a high-quality regional free trade network."⁵² The report believes that to realize this mechanism, Japan should continue to promote economic reform, encourage the development of free trade, eliminate trade barriers and promote external investment.⁵³ The 2012 report strongly advocates for Japan to develop trade with the United States. The report believes that the Obama administration advocates the Pacific Partnership Agreement (TPP) as an agreement with bright prospects for cooperation. Japan's participation in this free trade agreement is conducive to activating and safeguarding the economic relations between the United States and Japan.⁵⁴ According to UN Comtrade, even after the 2008 financial crisis, Japan's exports to the United States continued to grow, and its dependence on the United States continued to increase.

4.2.2 Leverage

Through a "security guarantee," the United States has increased Japan's dependence on employing leverage. According to the implication of "containing the rise of China" in the 2007 report, the United States and Japan, as called for in the report, stated in the "Shared Vision Future," an official document adjusting the US-Japan alliance, that both sides will improve the alliance's ability to respond to and deal with emergencies.⁵⁵ Encouraged by the Armitage report, Japan continues to exert pressure on China on the disputed territory between China and Japan - "Shankaku Island"⁵⁶, and the United States has repeatedly reaffirmed that the Diaoyu Islands issue is applicable to the US-Japan Security Treaty to eliminate Japan's security concerns.⁵⁷ Armitage's proposal not only conforms to Japan's vision of disputed territory but also ensures that Japan will be more dependent on the United States on security issues while pursuing this vision.

In 2012, in the face of the Japanese government's protest against the US garrison during the Hatoyama Yukio period, the third Armitage report strengthened Japan's dependence on the US through leverage. The report questioned whether Japan wants to become a "first-class country or is willing to continue to be a second-rate country."⁵⁸ This kind of leverage paradigm -- full of power color and a certain degree of threat -- made the cabinet of Yoshihiko Noda and the cabinet of Shinzo Abe, who was committed to repairing the alliance between the United States and Japan, pay great attention to the Armitage Report. The two prime ministers said successively that "the Japan-US alliance is the biggest asset for Japan's security and diplomacy",⁵⁹ and "Japan certainly wants to become a first-class country".⁶⁰ This response by Shinzo Abe is also the first time Japanese leaders

⁵² Armitage, RL. and Nye, JS.: The U.S.-Japan Alliance: Getting Asia Right through 2020. 2007 Feb; pp.21-25

⁵³ Armitage, RL. and Nye, JS.: The U.S.-Japan Alliance: Getting Asia Right through 2020. 2007 Feb; pp.21-25.

⁵⁴ Armitage, RL. and Nye, JS.: The U.S.-Japan Alliance: Anchoring Stability in Asia. 2012 Aug; p.6.

⁵⁵ The White House, Office of Press Secretary, "U.S.-Japan Joint Statement: A Shared Vision for the Future," April 30th, 2012, <http://www.whitehouse.gov/the-press-office/2012/04/30/united-states-japan-joint-statement-shared-vision-future>.

⁵⁶ Since the "purchase of the islands" in the period of Yoshihiko Noda, Japan has repeatedly announced that it has "exercised power" over the Diaoyu Islands, and has repeatedly sent sea patrol boats and right-wing people to patrol around the Diaoyu Islands. See Reuters. <https://www.reuters.com/article/japan-china-islands-clash-idCNCNE86A00T20120711>. See Ministry of Foreign Affairs of Japan. https://www.cn.emb-japan.go.jp/territory/senkaku/pdfs/senkaku_pamphlet.pdf

⁵⁷ Tao W.: Three adjustments of the US-Japan alliance after the Cold War. Am Stud. 2015; Pp27

⁵⁸ Armitage, RL. and Nye, JS.: The U.S.-Japan Alliance: Anchoring Stability in Asia. 2012 Aug; p.1.

⁵⁹ Lv, Y.: Deepening the alliance mechanism: the strategic vision of Japan-U.S. bilateral interaction -- review and analysis of the Common Blueprint for the Future. J Japan. 2012.

⁶⁰ Tao, W.: Three adjustments of the US-Japan alliance after the Cold War. Am Stud. 2015

have responded to the contents of the Armitage Report, which shows that the Armitage Report has shaped the relationship between the United States and Japan. In addition to saying that the relocation of the Futenma base should be resolved as soon as possible, the United States and Japan also decided to establish a joint training base belonging to the Japanese Self-Defense Force and the US military in Guam and the Mariana Islands.⁶¹ And these above are consistent with the suggestion in the 2007 report that the armed forces of the United States and Japan should strengthen coordinated training and cooperation.

4.2.3 Linkage

For education and training, the recommendations of the Armitage report during this period are also conducive to Japan's dependence on the United States. Armitage suggested that the United States help Japan to strengthen "cooperation capabilities including upgrading military facilities, strengthening anti-missile capabilities, and the necessary operational command, communication, military intelligence, detection and other aspects of conventional operations, and ultimately enhance Japan's national defense capabilities."⁶² During this period, the cooperation between the United States and Japan in interceptor missile technology and constructing an anti-missile system made Japan make more remarkable progress in military science and technology. During Abe's term of office, the United States helped Japan accelerate the development of a backward intelligence system. Regarding the issue, the guide proposes that the US-Japan alliance should expand the information sharing between the two countries at all levels.⁶³ At the suggestion of Armitage, this deeper "Linkage" between the United States and Japan further promoted Japan's dependence on the United States.

4.3 Trump Administration and Armitage Report 2018

During this period, the protectionism advocated by the Trump government -- all taking the domestic interests of the United States first -- was harmful to the gradually improved US-Japan alliance. In 2018, the Trump government strengthened tariff barriers against Japan to protect domestic trade. This is opposed to the Armitage Report, which seeks to develop the US-Japan alliance. Therefore, this report in 2018 expressed concern about the US government's turn while still trying to give suggestions for the development of the US-Japan alliance.

4.3.1 Market

During this period, the United States' economic policy towards Japan ran counter to the Armitage report. The Armitage report believes that the "United States first" and protectionist policies pose unprecedented challenges to the economic cooperation between the United States and Japan.⁶⁴ The report calls on the United States to stop undermining bilateral economic relations, re-establish an open trade and investment system and establish a broader regional economic strategy.^{65,66} Unfortunately, the withdrawal of the United States from the TPP and the imposition of tariffs on Japan have become facts. The Trump government has yet to take more measures to promote economic cooperation between the United States and Japan and consolidate Japan's dependence.⁶⁷

4.3.2 Leverage

There was little market means to promote the US-Japan alliance and Japan's economic dependence during this period. However, in terms of leverage, under the recommendations of the Armitage report, the US-Japan alliance has continued to consolidate, and Japan's dependence on the United States has also further increased. The Armitage report believes that "the United States needs a strong and confident Japan, and Japan also needs an active and constructive United States".⁶⁸ Therefore, the United States and Japan need to play a more critical role in maintaining the "peace and prosperity and international order" sought by other allies.⁶⁹ In this context, the Outline of the Defense Plan issued by Japan claimed that Japan, as a sovereign country, must assume more responsibilities in the US-Japan alliance and improve the ability of the alliance to resist threats - essentially at the strategic level, it supports the United States to promote security cooperation and support the "Indo-Pacific strategy" of freedom and openness.⁷⁰ Although different from the recommendations of the previous version of the report - the Armitage report in 2018 encourages Japan to participate more in regional security affairs and maintain international order; more participation in regional security affairs and maintaining international order will also lead to Japan's greater security dependence on the United States. After all, Japan's security needs to rely largely on the United States.⁷¹

4.3.3 Linkage

Through intelligence technology training and cooperation, the United States also strengthened Japan's dependence through this kind of linkage during this period. The Armitage report calls for Japan to be included in the Five-Eye Alliance, strengthen intelligence cooperation with Japan, and train intelligence personnel for Japan.⁷² Also, the Armitage report suggested that the United States and Japan should also complement each other in different fields and strengthen the exchange and technical complementarity of the military industry of the two countries.⁷³ In the 2019 congressional report of the United States, Japan has also become an intelligence gathering partner of countries with the same importance as the Five Eyes Alliance.⁷⁴ Subsequently, Japan accelerated the pace of entering the Five Eyes Alliance. During this period, Japan promoted information exchange and technical training with the United States alliance and strengthened intelligence cooperation with the Five-Eye Alliance.⁷⁵ It is consistent with the Armitage report's suggestion that the United States and Japan should strengthen intelligence cooperation and training and encourage Japan to join the Five Eyes Alliance. This linkage further promoted Japan's dependence on the United States. The Five Eyes Alliance needs Japan to cooperate with more countries to carry out intelligence work, thus further expanding Japan's demand for intelligence. Meanwhile, Japan's intelligence work depends largely on the exchange and training of the United States. In this case, joining the more robust demand will promote Japan's greater dependence.

⁶¹ Consultative Committee, "Joint Statement of Security Consultative Committee," Aug 26th, 2012. <http://www.state.gov/r/pa/prs/ps/2012/4/188586.htm>.

⁶² Armitage, RL. and Nye, JS.: The U.S.-Japan Alliance: Getting Asia Right through 2020. 2007 Feb; pp.3-5, 21-25.

⁶³ 《日本防衛力のための方策》. 2015. See http://www.mod.go.jp/j/approach/anko/shishin/pdf/shishin_20150427j.pdf

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⁶⁶ Armitage, RL. and Nye, JS.: More Important than Ever: Renewing the US-Japan Alliance for the 21st Century. 2018 Oct; pp.6-12.

⁶⁷ The White House, "President Donald J.Trump is Addressing Unfair Trade Practices That Threaten to Harm Our National Security" Mar 8th, 2018.

⁶⁸ Armitage, RL. and Nye, JS.: More Important than Ever: Renewing the US-Japan Alliance for the 21st Century. 2018 Oct; pp.6-8.

⁶⁹ Armitage, RL. and Nye, JS.: More Important than Ever: Renewing the US-Japan Alliance for the 21st Century. 2018 Oct; pp.6-12.

⁷⁰ See Ministry of Foreign Affairs of Japan. https://www.mofa.go.jp/fp/np/p1we_000082.html

⁷¹ Xiang, H.: An Examination of Japan's Strategic Dependence on the United States in the U.S.-Japan Alliance. NORTHEAST ASIA FORUM. (06).72-86+126. doi:10.13654/j.cnki.naf.2022.06.005.

⁷² Armitage, RL. and Nye, JS.: More Important than Ever: Renewing the US-Japan Alliance for the 21st Century. 2018 Oct; pp.6-10.

⁷³ Armitage, RL. and Nye, JS.: More Important than Ever: Renewing the US-Japan Alliance for the 21st Century. 2018 Oct; p10.

⁷⁴ Congressional Research Service. Artificial Intelligence and National Security. Nov.2019.

⁷⁵ See <https://international.caixin.com/2019-08-23/101454100.html>

4.4 Biden Administration and Armitage Report 2020

4.4.1 Market

During this period, the US-Japan alliance faced an economic situation that was under the impact of the COVID-19 epidemic. Under the report's recommendations, the US-Japan alliance began to develop its market dependence from three aspects. First, the two sides began to focus on repairing the supply chain in the high-tech field. After Suga Yoshihide took office, he held many consultations and negotiations with the United States on the issue of repairing the supply chain in the high-tech field.⁷⁶ The US-Japan alliance has also carried out high-tech cooperation under the framework of QUAD, which will also enhance the broader and deeper market cooperation between Japan and the United States in the field of high-tech.⁷⁷ This is consistent with the proposal in the Armitage Report to strengthen the high-tech cooperation between the United States and Japan. Second, to ensure the stability of the Japan-US dependency relationship, the Armitage report recommends that Japan and the United States work together to protect economic security and prevent damage to the bilateral economy.⁷⁸ During his term of office, Japan issued an economic security policy - to ensure the local safety of strategic materials and the leakage of core technology, to establish a safe supply chain to maintain Japan's economic security, and to cooperate with the "economic security strategy" of the United States.⁷⁹

4.4.2 Leverage

The goal of the report during this period is to "promote the construction of the security alliance": the US-Japan alliance establishes a new security framework for competitive coexistence in the Asia-Pacific region.⁸⁰ According to the report, Japan and the United States need each other more in terms of security -- to deal with both "crisis" and "long-term challenges"⁸¹ More deeply, the Armitage report suggested that the US-Japan alliance should deal with the threat from China.⁸² Subsequently, the military cooperation carried out by the US-Japan alliance directly aimed at containing China. In 2021, the "2+2" talks between the United States and Japan stated that China had become "the biggest security threat in the Asia-Pacific region" in the concept of the US-Japan alliance. For this reason, the United States stressed that the Diaoyu Islands still applied to the contents of Article 5 of the US-Japan Security Treaty.⁸³ Thus, under the influence of Armitage, the US-Japan alliance further increased Japan's security dependence. On the one hand, Japan needs the security support of the US-Japan alliance to pursue its disputed territory - Senkaku Islands; On the other hand, the increasing threat from China has further stimulated Japan's security aspirations.

4.4.3 Linkage

Intelligence training for Japan remains the key to increasing Japan's dependence during this period. The report recommends that Japan join the Five-Eye Alliance, so as to better promote Japan to establish the so-called "regional cooperation" with other allies of the United States in the Asia-Pacific region and integrate its strength in the region.⁸⁴ The rise of China has

caused anxiety of the Five-Eye Alliance and Japan, which has prompted the Five-Eye Alliance to pay more attention to China.⁸⁵ At this time, Armitage encourages Japan to participate in the Five-Eye Alliance, which will further increase Japan's greater intelligence demand -- to cooperate with the Five-Eye Alliance in monitoring China's dynamics in the Asia-Pacific. This demand for information is bound to increase Japan's dependence on the United States in technology and equipment. With the call of the Armitage report and the help of the United States, Japan's own intelligence collection capability and technological progress are obvious to all. During the Biden period, the United States continued to promote cooperation between Japan and the Five-Eye Alliance so as to strengthen intelligence cooperation and training within the US-Japan Alliance. In 2021, with the help of the United States, Japan acquired RQ-4 reconnaissance aircraft with a surveillance capability of up to 100000 square kilometers.⁸⁶ With the equipment provision and training of the United States, Japan will provide more intelligence assistance to the United States and its Asia-Pacific allies. In 2022, U.S. - Japan established the Bilateral Intelligence Analysis Cell (BIAC), which aims to use MQ-9 to help Japan monitor abnormal military activities in surrounding areas more efficiently.⁸⁷

5 Conclusions

It is preliminarily feasible to analyze the development of the US-Japan alliance with the three elements of the new attachment theory. The Armitage report shaped the US-Japan alliance to a certain extent. The Armitage report increased Japan's dependence on the United States in three ways: market, leverage, and contact, thus promoting the development of the US-Japan alliance.

For the market, the Armitage report is committed to maintaining the economic dependence between the United States and Japan. The Armitage report has repeatedly recommended that Japan conclude trade agreements and economic liberalization reforms with the United States to maintain Japan's trade surplus and facilitate the wider absorption of American investment. In this way, Japan's economy will also grow with the economic prosperity of the United States and Japan. Regarding leverage, the Armitage report constructs a model of "security issues - US-Japan alliance - dependence." Armitage, while encouraging Japan's military expansion and protecting the security of disputed territory, stressed that the US-Japan alliance faced a threat from the rise of China. Whether it is to develop its own military power, resolve disputed territory or deal with potential threats, Japan needs the security support of the United States to realize these visions. In order to solve the vision proposed by Armitage, Japan will increase its security needs, which will help Japan to rely on the US-Japan alliance to a greater extent. As for linkage, like leverage, in order to better involve Japan in solving the above security problems, the Armitage report encourages the United States to strengthen training and cooperation with Japan's military forces and intelligence agencies. This action not only increased Japan's security dependence but also increased the dependence of Japan and the United States on cooperation and exchange through closer intelligence training and cooperation.

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⁸² Armitage, RL. and Nye, JS.: The U.S.-Japan Alliance in 2020: An Equal Alliance with A Global Agenda. 2020 Dec; pp.1-3.

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Primary Paper Section: A

Secondary Paper Section: AD, AO

GAME STRATEGIES IN VICTOR PELEVIN'S SHORT STORY "SIGMUND IN THE CAFÉ"

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Abstract: The purpose of the article is to demonstrate the game strategies of Viktor Pelevin, one of the most prominent representatives of modern Russian literature, using the example of the short story "Sigmund in the café". In comparison with the stories of T. Tostaya or L. Petrushevskaya, Pelevin's game poetics is more postmodern, it excludes the moral perspective of the narrative, but exposes the principles of playing with the reader, involving him in a postmodern text. The author appeals to the knowledge of modern man about the theory of Sigmund Freud and on this basis enters into a creative game. The "deception" of the reader who believes in the realization of Freudian ideas turns into a talented practical joke.

Keywords: Victor Pelevin; short story "Sigmund in the café"; postmodernism; game poetics; reader and writer.

1 Introduction

Victor Pelevin's short story "Sigmund in the café" (1993) is one of the early stories of the novelist. It is extremely small in volume and does not seem to offer anything unexpected to the reader. However, the analysis of the text reveals interesting perspectives on the study of the theme of love in Russian postmodernism, the consideration of a love story and its traditional motives.

Many modern Russian and foreign researchers have turned to the analysis of V. Pelevin's work, such as N. Leiderman (Leiderman 2003), M. Lipovetsky (Lipovetsky 1997), M. Epstein (Epstein 2000), I. Skoropanova (Skoropanova 2002), O. Bogdanova (Bogdanova 2004), etc. However, criticism had not previously addressed the direct analysis of the text, the story "Sigmund in the café" was usually mentioned only in the general enumeration series as a story demonstrating the principles of a postmodern worldview. It is all the more interesting and important to carry out a direct analysis of Pelevin's text.

2 Headline associations

First of all, the peritext of "Sigmund in the café" attracts attention, that is, those peripheral elements of the text that, by definition, J. Genette (Genette 1987, 1997), precede the main narrative block. First of all, this is undoubtedly the title.

As you know, the title of the work is semantically significant. It sets the initial perspective of the perception of plot events, forms a program of semantic perception of the depicted. The title, as a rule, reflects the epicentric sphere of the text, bringing to the fore either the problem ("Crime and Punishment" by F. Dostoevsky), or the central question ("Who is to blame" by A. Herzen), or bringing the main character to the forefront ("Eugene Onegin" by A. Pushkin).

Pelevin does exactly this — the precedent name Sigmund is brought into the title position of his story, giving rise to a chain of inevitable associations, among which the name of Sigmund Freud stands first. The title "Sigmund in the café" seems to include a marker of cultural intertextuality, the anthroponym sets the semantic code of perception, creates an additional context (Ermolovich 2001; Supranskaya 2009).

It is unlikely that today one can find a person who would not know the name of Sigmund Freud (1856–1939), an Austrian psychiatrist, the founder of the theory and practice of psychoanalysis, an authoritative psychoanalytic school at the turn of the nineteenth and twentieth centuries, the direction in medicine, sociology, philosophy and even culture, according to which the dominant area in human behavior is determined by the unconscious (animals) impulses that contain deep sexual overtones and active vital energy. In this regard, the love plot takes on a very specific and unexpected turn in Pelevin's text.

As is known, Sigmund Freud's sphere of interest in the field of psychoanalysis was dreams, hypnosis and, most importantly, the sexual nature of man, sexual impulses and instincts, according to Freud, unconscious, but invariably dominant in human nature and its natural and social behavior. In this regard, the love story in Pelevin's text appears in an unconscious (almost) Freudian way.

Having named his titular hero Sigmund, placing him in a Viennese cafe ("in Vienna", "in a café"), defining him as an elder ("to fall into a light senile doze"), Pelevin subtly and not obsessively, but very effectively sets the context of the initial situation and actively forms the perspective of perception — the reader involuntarily obeys the author's instructions and follows him to a cozy Viennese cafe, where the father of psychoanalysis, Sigmund Freud, is sitting in a corner at a small observation table. With such an exposition, every action of the participants in the events in the Austrian cafe, every movement of the characters-visitors, every subsequent remark of Sigmund acquires a significant inner subtext. The process of psychoanalysis was launched by Pelevin from the first paragraph of the text.

3 The character system of the story. Lady and gentleman

Three pairs of characters become the "patients" — objects — of Pelevin's psychoanalysis. The first of them is "a gentleman with sideburns and a lady with a high chignon" (Pelevin 1999, 499), dressed in the fashion of the turn of the XIX–XX centuries, emphasizing the accents of the past, former Austria, Vienna and the life realities of practicing Freud. The first pair of characters is written out in such a way that can be qualified as conditionally basic in the Freudian psychoanalysis system, that is, the characters are presented in such a way that the story about them gives rise to an idea of the courtship process, mutual sympathy that arose, and the time of falling in love. The lady and the gentleman are (conditionally) classical objects of Freud's psychoanalysis.

According to the initial setting, in Pelevin's story, each "medical" case chosen for observation by the hero Sigmund consists of a multiplicity of details conveyed with emotionless narrative objectivism. The inner narrative of the hero Sigmund (improper direct speech) is strictly organized, scientifically concise and characterologically exploratory. Freud's shadow seems to loom on the backdrop of Pelevin's narrative.

There are no unnecessary details in the Pelevin description. The actions of the characters are reproduced in short sentences that grammatically correctly reflect the sequence of actions performed by the characters, conditionally by the patients. Sigmund, who is in the cafe, seems to observe the behavior of visitors and accurately fixes them, almost "records" them, ensuring the "purity" of the practical experiment and subsequent Freudian conclusions.

Moreover, throughout the narrative, only Sigmund has the right to vote, whereas all participants in the events are voiceless, and up to the end of the narrative none of the characters utters a single word. The zone of silence, which is formed around the patient characters, further enhances the atmosphere of observation and internal Sigmund's psychoanalysis, as if

rejecting unnecessary — other people's — words and comments, allowing you to focus only on the view of the psychoanalyst.

Since events are displayed for the reader from the point of view of Sigmund (Freud), the lexical series used by Pelevin to describe the actions, movements, mannerisms of the characters (and conditionally their love stories) turns out to be mediated by erotic and sexual shades and associations. Pelevin uses such words and phrases, images and details that are stylistically and semantically ambiguous and marked with "Freudian" connotations at the level of reader perception. So, entering a cafe, a gentleman with sideburns and a lady with a high chignon do not just *take off* their coats, but *undress* (Pelevin 1999, 499). The stylistic norm of using the verb has not been violated, but the emphasis in the upcoming (possible) love story is outlined. It is no coincidence that after the words about undressing, the patients were awarded a replica of the elder Sigmund, watching them from the corner: "Aha! — Sigmund said softly and shook his head" (Pelevin 1999, 500).

The interjection "aha" is not deciphered or commented on by the author, but in the context of the "psychoanalysis session" conducted in the story, the exclamation is perceived as semantically significant. Verbal commentary is excluded, but psychological commentary is invisibly explicated.

In the development of the love story, the description of the dinner scene of the lady and the gentleman was created by Pelevin through and through sexological. Outwardly, the novelist seems to neutrally describe the dishes from the menu ordered by customers, but the choice of characters hides a certain semantic subtext. So, the lady and the gentleman chose unusual and non-random dishes in the food culture, endowed with symbolic meaning — oysters and champignons (Pelevin 1999, 501). As for oysters and other mollusks enclosed in marine or river shells, the dictionaries of symbols offer the first and clearest interpretations in this regard: "The shell is the personification of the feminine principle, vulva, the symbol of the mother's womb, giving birth to all living things <...>" (Korolev 2003, 422–423).

Even more has been written about the erotic symbolism of mushrooms than about shells, in particular, on the basis of folklore records about mushrooms and their sexual symbols, the Russian folklorist V. Dahl argued, and after him other researchers (Toporov 1979, 234–297).

In the process of reading the story, at first glance, there is nothing special about the gastronomic order of the lady and the gentleman, but for dedicated recipients — in this case, oriented to the theory of Sigmund Freud — the sexually erotic allusions of the snack order of the heroes are clearly marked. Erotic allusions appear even more openly in the scene of the characters' treatment of dessert. The word "dessert" in modern Russian includes connotations of ambiguity and stylistic shades of eroticism (such as "strawberry", etc.). In other words, the episode of the love game and sexual intercourse of the characters is conveyed by Pelevin subtly, masterfully, but at the same time correctly, at the external speech level — neutrally. Even the smoking of the gentleman at the end of the love game is modeled in the spirit of traditional erotic scenes from American bestsellers.

As part of the mini-plot "lady — gentleman", the ambiguous, ambiguous actions of the actors are expected to be accompanied by sighs and exclamations from the observer Sigmund: "Aha! — Sigmund said softly" (Pelevin 1999, 500). "Aha! — said Sigmund" (Pelevin 1999, 501). "Aha! — Sigmund exclaimed" (Pelevin 1999, 504). The increasing emotionality in Sigmund's words becomes a sign of the rapid development of the lovers' relationship, visible from the outside.

4 Images of a boy and a girl

The second pair observed by Pelevin's psychoanalyst Sigmund are children — a boy and a girl, brother and sister playing in a

far corner of the cafe (Pelevin 1999, 500). The description of the appearance of the child characters and their clothes (diamonds, a cage, black and white contrasts) allows Pelevin to complement the characteristic Western Austrian (near-Freudian) flavor.

Let's pay attention, the host's children play on the floor, thereby strengthening the sexual associations of the love theme of the story (in Russian, the floor (*pol*) of the house and the sex (*pol*) of the person are homonyms).

The appearance of a child's couple in the context of Freudian psychoanalysis in Pelevin's story is not accidental. As you know, the Austrian psychologist deduced the impulses of the sexual unconscious from the childhood of a child, representing the nature of the animal principle in childhood and especially adolescence. A girl and a boy play on the floor with cubes and coins, demonstrating human behavior patterns that go far beyond their age. Pelevin's boy builds a house (later a fortification wall), the girl cunningly destroys the structure. The boy's role is creation, the girl's function is coquetry and flirtation. Pelevin's child characters, as well as Freud's, demonstrate their sexual nature, which develops in adulthood. Therefore, like the adult gentleman and lady, Pelevin's children receive an appropriate qualifying assessment: "Aha, — said Sigmund" (Pelevin 1999, 501).

5 A couple of a hostess and an employee

The third pair of characters who are psychoanalyzed by Sigmund are the hostess of a Viennese cafe and her employee, a "stocky and mighty waiter" (Pelevin 1999, 501). Pelevin identifies another typological pair of patients interesting to Sigmund (Freud) — lovers, adultery. But if the "lady — master" pair was dominated by a man, then in the new pair of heroes the leading role belongs to the female hostess: she manages, she commands, she orders (Pelevin 1999, 502).

The partner-waiter is put in the position of a dependent, the active role is transferred to the (apparently lonely) female hostess. But the epithet *mighty*, used by the prose writer and expressively portraying the hero, makes it clear that the waiter is singled out by the hostess and, one can assume, is singled out in a partner-sexual way. It is no coincidence that the energetic exclamation "Aha!" (Pelevin 1999, 503) accompanies the observed interaction of a new pair of heroes.

As in the case of the description of the "gentleman — lady" couple, it would seem that the ordinary household activity of the characters of the hostess and the waiter is conveyed by the writer with erotic overtones. Sigmund observes two stages of action: first, the waiter climbs into the black basement (in Russian, "under the floor" // almost "under the hem") — then the hostess takes the initiative into her own hands (and into her mouth too) and screws in the lamp burned out under the shade (Pelevin 1999, 503).

In the above episode, Pelevin has a Freudian "slip of the tongue", more precisely, a characteristic detail in the hero's behavior: "Clutching the ladder with strong hands, the waiter spellbound watched the movements of plump palms of the hostess, from time to time passing the tip of his tongue over parched lips" (Pelevin 1999, 503). The phrases "strong hands", "plump palms", "parched lips" and the "tip of the tongue" transform an outwardly ordinary everyday scene into a deeply intimate, loving one. And at the moment when the hostess, who almost fell down the stairs, "pale with fright, jumped onto the parquet and stood exhausted in the soothing embrace of her partner" (Pelevin 1999, 503), Sigmund's loud exclamation is heard: "Aha! Aha! — Sigmund said loudly" (Pelevin 1999, 503).

Pelevin plays on his staunchly supported associations to Freud and stylistically on the reception of speech understatement. Indefinite pronouns and adverbs "something", "someone", "somehow", "somewhere" are abundantly scattered in the writer's text. Pelevin describes the things or actions of the patient characters, but also makes the reader think of *something* about them.

The attention of the narrator (author) to every little thing, to every barely perceptible gesture of characters, seems to reproduce the logic of Sigmund's research interest, forcing us to assume that the plot of the story is moving towards new discoveries by a medical scientist based on the analysis of sexual manifestations in human behavior, observed by the example of various characters in a small Viennese cafe. The accuracy and objectivity of observations in the sphere of ordinary everyday life, as in the real Freud, leads (should lead) to serious conclusions, explicated by the ambiguous Sigmund's "Aha". The different intensity of pronouncing the interjection "aha" — either *quietly*, then *loudly*, then *once*, then *twice*, then *said*, then *shouted* or even *exclaimed* — conveys the process of increasing the emotionality of the utterance and, as a result, the increase in the semantic fullness of the ambiguous interjection. There is an increase in the estimated weight of what is happening and what is being observed. The author and the hero conditionally move from observation and statement to conclusions and results: to doubt or indignation, to denial or (maybe) admiration.

The degree of emotionality of Sigmund's exclamations acquires characterological qualities, the meaningless "aha" seems to be filled with a capacious and meaningful meaning. In an atmosphere of understatement and ambiguous "aha", any gesture of the characters is perceived as non-accidental and significant in its own way. Life episodes become overgrown with interpretation, the ordinary passes into the status of the extraordinary, the Freudian unconscious grows with some additional knowledge (including knowledge and sexual experience of the recipient-reader).

6 Hero parrot Sigmund

The final part of the story "Sigmund in the café" is distinguished by Pelevin's deliberate postmodern chaos — a violation of logic, hierarchy, sequence, integrity, reasonableness. Overcoming the postmodern chaos is achieved only thanks to the final remark of the gentleman: it becomes clear that Sigmund is not a psychiatrist researcher, not even a human being, but a parrot.

The characterization of the character — the parrot — takes the reader by surprise. Now the recipient's entire system of images and motives for the behavior of the characters in the story, the interpretation of events, turn out to be incorrect, completed only by his own consciousness and confidence that the hero of the Viennese cafe was the psychiatrist Sigmund Freud.

In Pelevin's story, the effect of the so-called "deceived expectation" is triggered. All the serious — semi-scientific — conclusions that came to the recipient-reader's mind turned out to be debunked and ridiculed.

The essence of Sigmund's "Aha", which seemed ambivalent or even multivalent, instantly loses its semantic content when recognizing the real source of the exclamations — the author's task is decoded simultaneously. The comic comes to the fore with a swift surprise. Freud's scientific unconscious turns into a truly unconscious parrot.

The automatism of perception has been destroyed, and with it, it seems, the theory of psychoanalysis itself is being ironized. The concept of the psychoanalyst consistently built up in the story is brought to the point of absurdity and is subjected to ironic reinterpretation.

Meanwhile, it can hardly be argued that Pelevin is being ironic about Freud, as critics believe. In our opinion, Pelevin's irony is directed not so much at Freud and his theory as at us, the recipient readers, who are easily ready to succumb to someone else's (here the author's) influence and imagine themselves homegrown Freudians. Pelevin's game with the reader's expectations turns out to be focused on the reader himself, provoked not to rely on the author's text (as noted above — quite correct and restrainedly neutral), but on his own illusions and allusions, frivolous conjectures and personal sexual

experience. Pelevin's mastery of playful provocative writing is triumphant.

7 Results and prospects

Thus, summing up, we can conclude that, unlike the sentimental romantic stories of Tatyana Tolstaya and the harsh prose of Lyudmila Petrushevskaya, in the male prose of Viktor Pelevin, the love story, as a rule, fades into the background, and if it turns out to be directly affected by the writer, it acquires a pronounced ironic and playful shade. The gender approach allows us to differentiate the nature of the interpretation of love stories in the female prose of Russian women writers and in the male prose of Pelevin.

Pelevin wittily plays with the love theme, masterfully discrediting traditional approaches to it, offering to comprehend almost the theory of love, its unconscious, but interpreting this theory jokingly, anecdotally, postmodernly absurd. Pelevin's traditional metaphor that love is a deception, seems to be artistically realized.

In Pelevin's love world, human feelings still remain unknown, but not for those complex and deep psychological reasons that are interesting to T. Tolstaya or L. Petrushevskaya, but because a postmodern writer, a male novelist approaches this topic in a masculine and postmodern way easily, translating it from the semantic level to the stylistic, with the problematic one is in the language. In Pelevin's postmodern world, both life and love appear as categories of being incomprehensible and unknowable.

The postmodernist writer Pelevin intentionally facilitates the comprehension of the traditional "eternal problems" and "damned questions" of Russian classical literature, offering new — non-traditional — ways of interaction between the hero and the author with unreal reality, with illusory reality, with a ghostly life-mirage (dream, fog, etc.). Victor Pelevin's leading trick in the short story "Sigmund in the café" is a postmodern game.

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Primary Paper Section: A

Secondary Paper Section: AJ

CULTURAL COMPARISON OF MODERN SEXISM, DOGMATISM, AND FEMINISM AMONG DIFFERENT AGE GROUPS IN PAKISTAN

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This work is supported by Project "Theoretical Construction and Practical Exploration of Chinese Education Modernization" (Grant No. VAA230006) and "The Historical Logic and Contemporary Value of the Spread of Chinese Sericulture as "Belt and Road" (Grant No. SWU2403008)

Abstract: The current study was intended to explore the Cultural Comparison of Modern Sexism, Dogmatism, and Feminism among different age groups in Pakistan. In addition, this research also intended to identify mean differences in study variables across demographic variables including culture, and age. The main objective of the study was to study the relationship between modern sexism dogmatism and feminism among young adults. The study was based on a cross-sectional survey research design. Participants comprised Adolescents and adults ($N = 500$) from Pakistan using a purposive sampling technique. Linear regression analysis was applied to test of proposed research question. Modern Sexism and Dogmatism negatively correlate with feminism. Sexism positively correlates to dogmatism among participants of different sub-cultures. However, there are significant age group differences in feminism, dogmatism, and sexism among participants of different sub-cultures, feminism is high in adolescents as compared to adults and Modern sexism is high in adults as compared to adolescents.

Keywords: Modern Sexism, Dogmatism, Adolescents, Adult.

1 Introduction

In an ever-evolving global landscape, the complex interplay between culture, tradition, and social ideologies shapes the attitudes and behaviors of individuals within a society. Pakistan, a nation rich in cultural diversity and historical significance, stands as an intriguing case study for exploring the dynamics of modern sexism, dogmatism, and feminism across different age groups. In recent decades, Pakistan has undergone significant sociocultural transformations, influenced by a combination of global forces and local dynamics, resulting in varying perspectives on gender roles and empowerment.

This paper embarks on a comprehensive exploration of modern sexism, dogmatism, and feminism within the Pakistani context, with a particular focus on understanding how these notions manifest differently among distinct age cohorts. The complex interplay between tradition and modernity in Pakistan's society offers an intricate backdrop for assessing the changing attitudes towards gender equality, the role of women in various spheres of life, and the evolving dynamics of feminism and dogmatism. The significance of this study lies not only in shedding light on contemporary gender-related attitudes but also in unraveling the nuanced differences that exist among different age groups within the country.

By examining the attitudes of young, middle-aged, and elderly individuals, we aim to elucidate how the sociocultural narrative surrounding gender has transformed over time, and whether these changes are reflective of a broader global trend towards greater gender equity or unique to the Pakistani context.

1.1 Modern Sexism

Modern sexism, often referred to as "benevolent sexism," represents a subtle but insidious form of gender bias that has adapted to contemporary societal norms. Unlike the overt and hostile sexism of the past, modern sexism operates in a more covert and socially acceptable manner. It manifests as seemingly positive attitudes and behaviors toward women but ultimately reinforces traditional gender roles and limitations.

Individuals who hold modern sexist beliefs may express chivalrous or protective attitudes toward women, but beneath the surface, these attitudes often convey the idea that women are

weaker, more nurturing, or less capable than men. Modern sexism perpetuates stereotypes and subtly maintains gender hierarchies while cloaking itself in a facade of politeness and concern. Modern sexism can manifest in various ways, from expecting women to fulfill certain traditional roles in family and society to undermining women's competence in male-dominated fields. Recognizing modern sexism is crucial, as it challenges the notion that progress toward gender equality is linear and unimpeded. By identifying and addressing these subtle biases, societies can move closer to achieving true gender equity.

1.2 Dogmatism

Dogmatism, as a concept deeply embedded in human cognition and belief systems, has played a significant role in shaping ideologies, worldviews, and social dynamics throughout history. At its core, dogmatism refers to an unwavering, often authoritarian, adherence to a set of beliefs or principles, accompanied by a refusal to entertain opposing viewpoints or engage in critical examination. While the term is frequently associated with religious and political contexts, it permeates various aspects of human life, including philosophy, science, culture, and personal convictions.

Throughout the ages, dogmatism has been both a source of strength and a point of contention within societies. On one hand, it can provide stability and cohesion to groups by establishing clear guidelines and norms. On the other hand, it can stifle intellectual progress, hinder open dialogue, and lead to conflicts when rigid belief systems clash. Understanding the nature of dogmatism and its manifestations in different contexts is crucial for comprehending the dynamics of belief formation, the preservation of tradition, and the resistance to change.

1.3 Feminism

Feminism, a dynamic and multifaceted social and political movement, emerged as a response to historical and contemporary gender inequalities, advocating for the rights, opportunities, and social recognition of women on par with men. Rooted in the recognition of systemic discrimination and the need for gender equity, feminism encompasses a diverse range of perspectives, theories, and strategies that challenge traditional gender norms, patriarchal structures, and institutionalized sexism.

1.4 Modern Sexism and Dogmatism

Modern society, despite significant advancements in gender equality and social progress, still grapples with the persistence of attitudes and beliefs that perpetuate gender-based discrimination and inequality. Two prominent and interconnected phenomena that continue to shape and influence these attitudes are modern sexism and dogmatism. While these concepts are distinct, they often intersect, reinforcing and amplifying one another in complex ways within contemporary cultural and social contexts.

Modern sexism, sometimes referred to as ambivalent sexism, represents a subtle yet insidious form of gender bias that has adapted to the changing societal landscape. Unlike overt, explicit sexism, modern sexism manifests in more covert and socially acceptable ways. It often involves the endorsement of seemingly benevolent stereotypes about women, such as the belief that women are inherently nurturing or in need of protection, while simultaneously harboring hostile or negative attitudes towards women who challenge traditional gender roles or assert their rights.

Modern sexism thrives on the idea that gender equality has been achieved and that any remaining gender disparities are the result of inherent differences between the sexes, rather than societal discrimination. Dogmatism, on the other hand, encompasses a

broader set of beliefs characterized by rigid, inflexible thinking and resistance to change or new ideas. In the context of gender dynamics, dogmatism can manifest as an unwavering commitment to traditional gender roles and norms.

Individuals with dogmatic views on gender may be resistant to acknowledging the fluidity and diversity of gender identities or may cling to traditional notions of masculinity and femininity as the only valid expressions of gender. The intersection of modern sexism and dogmatism creates a fertile ground for the perpetuation of gender inequality. Individuals who hold dogmatic beliefs about gender may be more prone to endorsing modern sexism.

1.5 Modern Sexism and Feminism

Modern society stands at a pivotal crossroads in the ongoing struggle for gender equality. Two key ideological forces that have shaped and continue to shape this battle are modern sexism and feminism. These two concepts represent opposing sides of the spectrum when it comes to perceptions and attitudes toward gender roles, equity, and women's rights. Understanding modern sexism and feminism is essential for comprehending the complex dynamics that influence contemporary discussions on gender in various aspects of life, including politics, economics, culture, and interpersonal relationships.

2 Literature Review

Modern sexism is a multifaceted concept rooted in gender discrimination and stereotyping that often manifests in subtle and covert ways. Studies like Glick and Fiske's *Ambivalent Sexism Theory* (1997) and its subsequent revisions have shed light on the ambivalence surrounding modern sexism. They distinguish between "benevolent sexism," which involves seemingly positive but patronizing attitudes toward women, and "hostile sexism," which encompasses more overtly negative attitudes.

Research on modern sexism has highlighted its persistence and adaptability in contemporary societies. Dogmatism as a psychological construct reflects an individual's resistance to change and open-mindedness. Rokeach's work on the *Authoritarian Personality* (1956) and Altemeyer's *Right-Wing Authoritarianism* (1981) have been influential in understanding the psychological underpinnings of dogmatism. Additionally, research in social psychology, such as the concept of cognitive closure by Kruglanski (1989), has contributed to our understanding of how individuals with dogmatic tendencies approach information and belief systems. Feminism as a socio-political movement has a rich and diverse history.

First-wave feminism, associated with suffragettes like Susan B. Anthony and Elizabeth Cady Stanton, focused on securing women's right to vote. Second-wave feminism, led by figures like Betty Friedan and Gloria Steinem, concentrated on issues such as reproductive rights and workplace discrimination. The third wave, which emerged in the 1990s, incorporated intersectionality, acknowledging the experiences of marginalized women, as seen in the work of Kimberlé Crenshaw. Contemporary feminist scholarship, including Bell Hooks' exploration of feminism as a transformative social and political movement, continues to expand and evolve the movement's theories and practices.

2.1 Cultural Context in Pakistan

To understand modern sexism, dogmatism, and feminism in Pakistan, it is essential to explore the country's unique cultural and historical context. Pakistan's complex social fabric is influenced by factors such as religion, tradition, colonial history, and globalization.

Traditional Gender Norms: Traditional gender norms in Pakistan have historically been characterized by a strong emphasis on distinct roles for men and women. Men have traditionally been

associated with the public sphere, including work and politics, while women have been primarily responsible for domestic duties and childcare. These norms have been deeply rooted in societal expectations and cultural traditions. (Mahmood, N., & Tariq, N. 2019).

Changing Gender Roles in Urban and Rural Areas: The transformation of gender roles in Pakistan has not been uniform across urban and rural areas. Urbanization and economic changes have led to shifts in gender roles in urban settings, with more women entering the workforce and participating in decision-making processes. In contrast, rural areas have often retained more traditional gender roles due to factors such as limited access to education and employment opportunities for women. (Shah, N., & Thapa, S. 2017).

Influence of Religion and Culture on Gender Expectations: Religion, primarily Islam, plays a significant role in shaping gender expectations in Pakistan. Interpretations of Islamic teachings have both conservative and progressive dimensions, and they influence societal norms regarding women's roles, dress codes, and participation in public life (Afzal, S., & Ali, S. 2018). Cultural traditions, such as the concept of "purdah" (veiling), also impact gender expectations and interactions. These studies provide insights into the traditional gender norms, the divergence in gender roles between urban and rural areas, and the profound influence of religion and culture on gender expectations within Pakistan's society. They reflect the complexity and nuances of gender dynamics in the country, which are essential for understanding the context of modern sexism, dogmatism, and feminism among different age groups.

Forms of Modern Sexism in Contemporary Pakistan: Modern sexism in contemporary Pakistan manifests in various forms. One prevalent form is benevolent sexism, where women may be perceived and treated as delicate or in need of protection, despite the seemingly positive nature of such attitudes. This often involves well-intentioned but patronizing behavior. Hostile sexism, on the other hand, can also be observed, where overtly negative attitudes towards women persist, sometimes leading to harassment and discrimination.

A study by Abrar-ul-Hassan and Khaleel Ahmad (2015) titled "Ambivalent Sexism in Pakistan: Translation and Validation of the Ambivalent Sexism Inventory" investigated the presence of modern sexism in Pakistan. The research employed the Ambivalent Sexism Inventory (ASI) to examine the dual nature of sexism, and findings indicated that both benevolent and hostile sexism were evident in Pakistani society, reflecting the coexistence of seemingly positive and overtly negative attitudes towards women.

Gender Discrimination in Workplaces: Gender discrimination in workplaces is a critical issue in Pakistan, affecting women's access to employment opportunities, career advancement, and equal pay. Discrimination may manifest through biased hiring practices, wage disparities, lack of opportunities for women in leadership roles, and workplace harassment. The World Bank's report "Pakistan: Gender Disparities in Economic Opportunities" (2019) highlights the challenges faced by women in the Pakistani labor market. It discusses how gender disparities persist in terms of labor force participation rates and earnings, emphasizing the need for policy interventions to address workplace gender discrimination.

Intersectionality and Modern Sexism: Intersectionality in the context of modern sexism in Pakistan refers to the intersecting identities and experiences of individuals, particularly women, who face multiple forms of discrimination simultaneously. These intersections may include gender, class, ethnicity, and religious identity.

Modern sexism can affect women differently depending on their various identity markers. Scholars like Faiza Ali and Huma Aslam (2017) explored the intersectionality of gender and religion in Pakistan in their paper titled "Intersectionality and

Religious Discrimination against Women in Pakistan: An Analysis of Personal Laws." This study examined how religious laws and cultural practices intersect with gender discrimination, illustrating how women's experiences of modern sexism are shaped by a complex interplay of factors. These examples demonstrate the existence and complexity of modern sexism in Pakistan, encompassing both benevolent and hostile forms, as well as the specific challenges related to gender discrimination in workplaces and the influence of intersectionality on women's experiences of sexism in the country.

Dogmatic Belief Systems: Dogmatic belief systems in Pakistani society often find their roots in deeply ingrained religious and cultural norms. This phenomenon has been extensively examined in scholarly literature. In her book "Fundamentalism Reborn? Afghanistan and the Taliban," William Maley (1997) explores the rise of religious fundamentalism and dogmatic belief systems in the region, including Pakistan. Maley's analysis sheds light on how rigid interpretations of religious doctrine can lead to dogmatism. Additionally, in the article "Interpretation of Jihad in South Asia," Tariq Rahman (2020) discusses the presence of dogmatic belief systems within the broader South Asian context, emphasizing their impact on society and politics, which extends to Pakistan. These studies emphasize the role of religion as a source of dogmatism in Pakistani society, influencing attitudes and behaviors.

Dogmatism in Political and Religious Contexts: The presence of dogmatism in political and religious contexts in Pakistan is well-documented. Pakistan's political landscape has witnessed the influence of dogmatic belief systems on policymaking and governance. In the paper "Pakistan: Political Roots and Development 1947-1999," Craig Baxter (1999) analyzes the role of religious parties and the impact of dogmatism on Pakistani politics. Baxter's work highlights how political actors with dogmatic ideologies have shaped the country's political landscape. Moreover, in the article "The Impact of Islamic Fundamentalism in Pakistan," Rizvi and Haqqani (2000) discuss how dogmatic religious ideologies have influenced political decision-making and policy formulation in Pakistan, particularly in the context of Islamic fundamentalism. This literature underscores the interplay between dogmatism and politics, which is a salient feature of Pakistani society.

Impact of Dogmatism on Gender Attitudes: Dogmatism's impact on gender attitudes within Pakistani society is a critical area of study. Scholars have explored how rigid belief systems can reinforce traditional gender roles and perpetuate gender inequalities. In her book "The Clash Within Democracy, Religious Violence, and India's Future," Martha C. Nussbaum (2007) discusses how religious dogmatism can limit women's rights and reinforce patriarchal norms, drawing parallels to Pakistan's context.

Historical Development of Feminist Movements: Feminist movements in Pakistan have a rich history that can be traced back to the country's independence in 1947. One of the earliest feminist organizations was the Women's National Guard, founded by Fatima Jinnah, sister of Pakistan's founder Muhammad Ali Jinnah. However, it was during the 1980s that feminist movements gained significant momentum. The Women's Action Forum (WAF), established in 1981, emerged as a prominent voice advocating for women's rights and gender equality in Pakistan. WAF's activism was instrumental in resisting regressive laws, such as the Hudood Ordinances, which were seen as discriminatory against women. (Kazi, S., & Naqvi, B. 2009).

2 Research design

In this study, the correlational research design was used. The method used in this study was survey method.

3.1 Sample

The sample of this study includes late adolescents and young adults ($N = 500$). The sample was further classified as males ($n = 277$) and females ($n = 223$). The age range of participants was 17-55 years. ($M=26.22$, $S. D=$) The sample was approached through social media.

Table 1: Demographic Characteristics of Participants (N = 500)

Demographic Variables	f	%
Gender		
Male	277	55.4
Female	223	44.6
Age Groups		
Adolescence (17-19)	243	48.6
Adults (20-55)	257	51.4
Cultural Groups		
Punjab	97	19.4
KPK	100	19.4
Sindh	93	18.6
Balochistan	100	20.0
GB/Kashmir	110	22.0

Note. Frequency = f

Table 1 shows the frequency and percentage of participants based on demographics. The total sample was ($N = 500$). Total male participants were ($f = 277$, 55.40%) and female participants were ($f = 223$, 44.6%). Out of the total participants, adolescents (having an age range of 17-55 years) were ($f = 243$, 48.6%) and adults (having an age range (20-38) were ($f = 257$, 51.4%). The frequency and percentage of Punjab is ($f = 97$, 19.4%), of KPK ($f = 100$, 20.0%), of Sindh is ($f = 93$, 18.6%), of Balochistan is ($f = 93$, 18.6%) and of GB/Kashmir is ($f = 110$, 22.0%).

3.2 Procedure

Data was collected through Google Forms. Participants from different cultures were approached through social media. Adolescent adults from Punjab, Sindh, KPK, Balochistan, GB, and Azad Kashmir participated in this study. Inform consent with brief instructions was part of the Google form. The Data was analyzed through SPSS-26. Alpha reliability was calculated to find out the correlation between scales. Mean comparisons on gender and age groups were calculated through the Independent Sample T-test. Mean comparisons on provinces of Pakistan were done through One-way ANOVA.

4 Results

The present study explores cultural differences in modern sexism, dogmatism, and feminism. Data analysis was carried out through SPSS-26. Initially, descriptive statistics (frequency & percentage) of the demographic characteristics were carried out. The alpha reliability coefficient for all the scales was computed. Pearson Correlation was carried out to find out the correlation. The mean comparison was done through an Independent Sample t-test and one-way ANOVA.

Table 2: Psychometric Properties of Scales (N = 500)

Scale	M	SD	Range	Cronbach's α
Feminism	80.25	9.26	47-112	.62
Modern Sexism	25.47	3.77	17-40	.70
Dogmatism	39.65	4.34	27-55	.72

Table 2 reveals the psychometric properties of scales. The Cronbach's α values range from .62-.72. The lowest reliability is of Feminism subscale which is .62 and the highest reliability is of Dogmatism subscale which is .72. Greater than .70 indicates higher reliability while less than .70 is low.

Table 3: Pearson Product Moment Correlation

Variables	1	2	3
1. Feminism	–		
2. Modern Sexism	-0.28***	–	
3. Dogmatism	-0.45***	0.28***	–

Table 3 describes the inter-correlation between all subscales of three scales. It suggested that there was a significantly positive correlation between Feminism and modern sexism ($r = .28$, $p < .001$). Dogmatism was negatively correlated with feminism ($r = -.45$, $p < .001$) and positively correlated with modern sexism ($r = .28$, $p < .001$).

Table 4: Mean Comparisons on Age Groups

Variables	Adolescence (M)	Adolescence (SD)	Adults (M)	Adults (SD)	t (498)	p	Cohen's d
Modern Sexism	25.88	3.97	24.89	3.48	2.36	.04	.21
Feminism	80.11	10.53	80.39	7.88	0.34	.02	.03
Dogmatism	39.92	4.51	39.41	4.17	1.32	.74	.12

Table 4 shows the mean differences in modern sexism, dogmatism, and feminism. On Modern sexism and dogmatism, adolescents and adults show significant mean differences. On modern sexism, adolescents scored higher on modern sexism ($M = 25.88$, $SD = 3.97$) than adults ($M = 24.89$, $SD = 3.48$). Moreover, on feminism adults scored higher ($M = 80.39$, $SD = 7.88$) than adolescences ($M = 80.11$, $SD = 10.53$)

Table 5: Mean, Standard Deviation, and One-Way Analysis of Variance in Modern Sexism, Dogmatism, and Feminism Across Sub-Culture Groups

Variables	Punjab (M)	Punjab (SD)	KPK (M)	KPK (SD)	Sindh (M)	Sindh (SD)	Balochistan (M)	Balochistan (SD)	GB/AK (M)	GB/AK (SD)	F	η^2	Post-Hoc
Modern Sexism	39.62	4.92	39.69	3.87	39.82	3.78	39.49	4.47	39.68	4.60	1.87	.00	-
Dogmatism	26.21	3.89	24.89	3.45	25.80	3.14	25.19	4.17	25.34	3.99	0.07	.01	-
Feminism	81.42	9.49	80.44	8.51	79.19	8.16	79.86	9.60	80.30	10.29	0.74	.01	-

Table 5 shows mean standard deviation F values for Modern Sexism, Dogmatism, and Feminism across cultures. Results indicated non-significant mean differences in all three variables across cultures.

5 Discussion

The current study was interested in exploring the Cultural Comparison of Modern Sexism, Dogmatism, and Feminism among different age groups. In addition, this research also intended to identify mean differences in study variables across demographic variables including culture, age, etc. All three variables were important in their unique way as well as collectively. Initially, psychometric analysis was run on the SPSS to ensure that the instruments used in the present research were reliable.

The instruments were used on the sample of 500 individuals including adolescents and adults. For the measurement of dogmatism, the 11-item short scale of dogmatism was used. Its items are rated on a 5-point Likert scale ranging from 1-strongly disagree to 5-strongly agree. The alpha reliability of the dogmatism scale originally found is .72 which shows high internal consistency and proves the scale is a reliable instrument. To measure Modern sexism, a Modern sexism scale was used.

It is comprised of 8 items. Its items are rated on a 5-point Likert scale ranging from 1-strongly disagree to 5-strongly agree. The alpha reliability of the Modern Sexism scale originally found is .70 which shows satisfactory internal consistency and proves the scale is a reliable instrument. A feminist scale was used. It is comprised of 28 items. Its items are rated on a 4-point Likert scale ranging from 1-strongly disagree to 4-strongly agree. The alpha reliability of the consumer independence scale originally

found is .62 which shows satisfactory internal consistency and proves the scale is a reliable instrument.

Furthermore, the mean, range, the standard deviation were also computed for the present research under the heading of psychometric properties (See Table 2) The data of 500 individuals which were from sub-cultures of Pakistan were further evaluated with the help of advanced statistics for the testing of the hypothesis. The first finding of the present research is that Modern Sexism is negatively correlated with feminism among participants of different cultures.

The feminist movement fought for the abolishment of sexism and the establishment of women's rights as equal under the law. By the remediation of sexism in institutions and culture, women would gain equality in political representation, employment, education, domestic disputes, and reproductive rights. (Swim & Cohen 1995). The second finding of the present study is that Modern Sexism is positively correlated with dogmatism among participants of different cultures, which is also supported by the result of research results (Marchlewska et al., 2022).

People who are rigid regarding their beliefs and thoughts also tend sexism. As Sexism consists of attitudes, beliefs, behaviors, and practices at the individual, institutional, and societal levels that involve negative evaluations of people or promote unequal treatment based on gender, this tendency is high in dogmatic people because they have very rigid beliefs about social norms. Dogmatic people stick to an idea they don't allow any flexibility in it they are also not open to others' views and opinions. Taking it further when somebody is high on dogmatism they contain beliefs and behaviors based on societal norms and are treated unequally based on gender.

The third finding of the present research is that Feminism is negatively correlated with Dogmatism among participants of different cultures (Blogowska & Saroglou 2011). According to feminist schools, all genders have equal rights and opportunities. It's about respecting diverse women's experiences, identities, knowledge, and strengths, and striving to empower all women to realize their full rights. It's all about the openness of mind which allows equal behavior with all genders but we know dogmatic people are narrow-minded, they believe in their old existing beliefs and also set strict boundaries of work related to gender.

So as a result, we can say that dogmatic people don't support feminism. The fourth finding of the present study is that there are significant age group differences in feminism, dogmatism, and sexism among participants of different cultures. According to the results, only dogmatism has non-significant results but feminism and modern sexism (Bettencourt et al., 2011). Results show that feminism is high in adolescents as compared to adults (Leaper & Brown, 2018) and Modern sexism is high in adults as compared to adolescence. Adolescence think more specifically about gender roles but due to social media's effect, more adults support feminism.

The fifth finding of the present study shows that there are no significant mean differences in sub-cultures among these variables (Drüeke & Zobl, 2015). The world has become a global village and Pakistani sub-cultures are influenced by its effect. There are some other factors like religion, Common Language, and Dress that play key roles in making common cultures. Therefore we found no major differences in Sub-cultures regarding Sexism, Dogmatism, and Feminism.

6 Conclusion.

The present study emphasized the influence of Modern sexism, Dogmatism, and Feminism on Sub-cultures of Pakistan among different age groups. Modern Sexism and Dogmatism negatively correlate with feminism which means that by increasing feminism Modern Sexism and dogmatic thought will decrease. Sexism positively correlates to dogmatism among participants of different sub-cultures. However there are significant age group differences on feminism, dogmatism, and sexism among participants of different sub-cultures, feminism is high in

adolescents as compared to adults and Modern sexism is high in adults as compared to adolescents.

There are no mean differences in cultural groups on feminism, dogmatism, and sexism among participants of different cultures.

7 Limitations of Study

The quantitative method of data collection was used. Data was collected by using questionnaires and self-report measures which can increase social desirability bias and it can be a personal threat to the internal validity of findings. The sample of the study was vast in geographical area that was difficult to collect. Constricted sample with minute chances of generalization to population. In the end, no feedback was taken from the participants which should have the part of the study.

8 Implications of the Study

The findings of this research can be instrumental in shaping policies related to gender equality and women's empowerment in Pakistan. Understanding the generational differences in attitudes towards gender can inform educational reforms. Schools and universities can incorporate gender-sensitive curricula and promote critical thinking to challenge dogmatism. Educational institutions can also be spaces to promote feminist values and awareness, fostering more equitable attitudes in younger generations.

The research can serve as a foundation for advocacy campaigns and awareness initiatives. It can help feminist and gender equality organizations design targeted campaigns that address the concerns and preferences of specific age groups. By understanding the unique challenges and perspectives of each generation, advocacy efforts can be more effective. Media outlets can use this study and encourage them to promote positive portrayals of gender and challenge stereotypes. Private and public sector organizations can use the research to inform diversity and inclusion programs. Understanding how different age groups perceive gender issues can help tailor workplace initiatives that promote inclusivity and address any biases or stereotypes that may exist. The study's findings can be compared with similar research conducted in other countries.

This international perspective can highlight unique aspects of Pakistan's gender dynamics and provide insights into how global trends in feminism, sexism, and dogmatism manifest within the Pakistani context. The research can contribute to the academic discourse on gender studies, cultural studies, and sociology.

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Primary Paper Section: A

Secondary Paper Section: AL, AO

NICOTINE DEPENDENCE AS A PREDICTOR OF ANGER, PSYCHOLOGICAL DISTRESS, AND QUALITY OF LIFE AMONG ADULT SMOKERS

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This work is supported by Project "Theoretical Construction and Practical Exploration
of Chinese Education Modernization" (Grant No. VAA230006) and "The Historical
Logic and Contemporary Value of the Spread of Chinese Sericulture as "Belt and
Road" (Grant No. SWU2403008).

Abstract: The present research explored the influence of nicotine dependence on
anger, psychological distress, and quality of life among adult smokers aged >20 years.
A cross-sectional research design was used in the present study, and the total sample
included N=300 adult smokers. The data were collected using the purposive sampling
technique. Pearson correlation analysis and linear regression analysis were performed
to test the hypotheses. The correlation analysis revealed that nicotine dependence was
positively related to anger and psychological distress and regression results revealed
that nicotine dependence is a significant positive predictor of anger and psychological
distress. The present study is useful in explaining the negative effects of nicotine
dependence on mental health and raising awareness of nicotine-related problems on
quality of life.

Keywords: Nicotine dependence, Anger, Psychological distress, Quality of life.

1 Introduction

The reliance on nicotine is still a serious global public health
issue that has a severe influence on people's physical and mental
health (Kutlu, 2015). Even though most adults are aware of the
adverse impact smoking has on their health, a substantial section
of the population still smokes and finds it difficult to stop
because of their nicotine addiction. It is necessary to appreciate
the complicated impacts of nicotine dependency that extend
beyond its physiological consequences to produce intervention
strategies that operate and increase the general health of
smokers.

This study attempts to assess the association between nicotine
dependence and several psychosocial traits, including anger,
psychological distress, and quality of life, among adult smokers.
Nicotine dependency, characterized by a voracious desire to
consume nicotine-containing items, has been associated with
multiple unpleasant emotional states and low quality of life. By
examining these relationships, we seek to contribute to a fuller
understanding of the delicate interplay between nicotine
addiction and psychological well-being. Anger is a typical
emotional response among smokers, possibly amplified by
nicotine withdrawal symptoms and the stress associated with
addiction (Bruijnzeel, 2012).

Chronic exposure to nicotine can change neurotransmitter
systems involved in regulating mood and impulse control, hence
raising susceptibility to anger and irritability among persons
dependent on nicotine (Wills 2021). Understanding the extent to
which nicotine dependency connects to anger proneness is
crucial for controlling anger-related disorders and strengthening
emotional control skills among smokers (Zvolensky, 2014).
Moreover, the nicotine habit is intimately related to
psychological distress, covering feelings of anxiety, despair, and
overall emotional instability.

The cyclical pattern of nicotine addiction, characterized by
alternating periods of consumption and abstinence, can
dramatically impair a person's mental health, leading to
heightened levels of discomfort and exacerbating previous
psychological disorders (Besson, 2016). Identifying the link
between nicotine dependency and psychological pain can
motivate focused interventions aimed at lowering emotional
distress and promoting mental well-being in the smoking
community. Furthermore, quality of life is a complete measure
of individuals' total health and well-being, spanning several
domains such as physical health, social interactions, and
psychological functioning.

Understanding the routes via which nicotine dependency affects
quality of life can inform holistic approaches to smoking
cessation and boost individuals' overall health outcomes. Given
the complicated interrelationships between nicotine dependency
and psychological factors, investigating these dynamics is
crucial for guiding personalized therapies and promoting
smoking cessation attempts. By understanding the links between
nicotine dependence, anger, psychological discomfort, and
quality of life, this study hopes to provide crucial insights into
the greater ramifications of nicotine addiction on individuals'
emotional well-being and overall quality of life.

Through a thorough understanding of these relationships, public
health activities may be targeted to address the complex hurdles
experienced by smokers and facilitate real benefits in health
outcomes and quality of life. Nicotine habit is a serious public
health hazard with significant repercussions for both physical
and mental health. Smoking is a primary cause of premature
death globally, contributing to several health concerns such as
cardiovascular ailments, respiratory disorders, and cancer (Ware,
2014).

Understanding the psychological elements related to nicotine
habit can inspire tailored therapy aiming at reducing smoking
prevalence and improving health outcomes. Exploring the
relationship between nicotine dependency, anger, and
psychological discomfort can provide insights into the
underlying mechanisms driving smoking behavior and enable
the construction of more successful quitting programs.
Understanding the variables that influence the quality of life
among smokers, particularly the significance of nicotine
dependency and related psychological symptoms, is crucial for
creating interventions that fulfill the holistic requirements of
persons facing tobacco addiction. Existing studies have provided
important insights into the individual components of this
complex interplay. Still, there is a need for more detailed and
region-specific research that assesses these variables
simultaneously within a coherent framework.

Furthermore, much of the existing study has focused on clinical
patients or certain demographic categories in populations of
smokers. Additionally, there is a shortage of longitudinal studies
that track changes in nicotine dependency, psychological
symptoms, and quality of life over time, which could provide
substantial information regarding the trajectory of smoking
behavior and its impact on general well-being. Moreover, the
processes behind the relationship between nicotine dependency,
anger, psychological distress, and quality of life are not known.
It is unknown if nicotine dependence exacerbates psychological
anguish and anger or if these features contribute to the
maintenance of smoking behavior through complicated
biopsychosocial networks. Further work is needed to elucidate
these mechanisms and uncover acceptable targets for
intervention.

1.1 Background

As a major and pervasive public health problem, nicotine
dependency hurts an individual's quality of life as well as their

emotional and mental health (Benowitz et al., 2010). According to previous studies, individuals who are nicotine dependent are likely to experience psychological distress, which includes signs of anxiety and despair as well as anger and impatience. Furthermore, nicotine dependency is a significant predictor of decreased quality of life, with people reporting lower levels of physical and psychological functioning. Successful prevention and intervention programs aimed at enhancing the health and well-being of people affected by this addiction depend on an awareness of the connections between nicotine dependence, quality of life, rage, and psychological anguish (Morissette et al., 2007).

Nicotine dependency is a major health issue that is associated with several unfavorable effects, such as reduced quality of life, increased rage, and psychological discomfort. According to related research, individuals who depend on nicotine are more likely to experience these adverse effects, which can have a serious influence on their general well-being. Numerous studies have evaluated the connection between nicotine addiction and these unfavorable consequences, and many have shown that nicotine addiction is a strong predictor of poor quality of life, increased rage, and psychological discomfort. For example, nicotine dependence was significantly associated with decreased quality of life in adolescents (DeFrantz et al., 2004).

A study by Mc Chague et al. (2004) revealed that nicotine dependence was associated with increased psychological distress in adult smokers. These findings underscore the importance of addressing nicotine dependence as a means of improving overall health and well-being. Nicotine Dependence The (DSM-5) issued by the American Psychological Association states that nicotine dependence is characterized by "a collection of cognitive, behavioral, and physiological indicators that show the user is still abusing the substance despite serious issues with substance use" (American Psychiatric Association, 2013).

Dependencies on nicotine are described as "a state of neuroadaptation resulting in withdrawal symptoms upon cessation of nicotine intake, and a continued desire to use nicotine to prevent or alleviate these symptoms" (Benowitz, 2008). Nicotine dependency is defined by Benowitz (2010) as "a complex behavioral, cognitive, and neurobiological disorder that involves the continued use of nicotine in the face of its negative effects." Nicotine dependence is described by Difranza (2005) as "a chronic condition in which an individual develops a tolerance to nicotine, experiences withdrawal symptoms when nicotine is absent, and experiences a compulsion to continue using nicotine."

The complexity of nicotine dependency and its physical, psychological, and behavioral components are highlighted by these definitions and descriptions. To improve general health and well-being, it is crucial to seek support and assistance in quitting smoking or other tobacco products. The symptoms of nicotine dependence tolerance, cravings, the need to smoke, withdrawal symptoms after abstinence, and a loss of control over the frequency or length of usage, are the hallmarks of nicotine dependence (Marks, 1997).

Cravings, low mood, impatience, irritation, wrath, anxiety, difficulty concentrating, and restlessness are some of the signs of nicotine withdrawal. According to a widely used theory, young people who start smoking progress from occasional use to everyday use of cigarettes, which is sustained and becomes more common with time, leading to dependence. However, it has not been proven, that nicotine dependency must start with everyday use. The concept that dependence must be used heavily (one-half pack per day) for it to develop is based on observations of "chippers," adult smokers who have smoked up to five cigarettes per day for many years without becoming dependent.

Researchers have hypothesized that because chippers do not differ from other smokers in terms of nicotine absorption and metabolism, their consumption may be too low to result in nicotine dependence. The causes of nicotine dependence and

genetic, environmental, and behavioral elements factors all have the potential to influence the emergence of nicotine dependency. In one article, Li (2006), examined the genetics of nicotine dependency, emphasizing several genetic variations that have been linked to increased susceptibility to nicotine dependence. She noted that the development of nicotine dependency is likely influenced by complex interactions among genetic, environmental, and behavioral factors. The combination of reward deficits and excess stress in the brain is what leads to nicotine dependence, similar to other types of addiction. He contends that these shortfalls and surpluses can be influenced by genetic and environmental variables, which might result in the emergence of addiction (Koob et al., 2013).

1.2 Risk factors for nicotine dependence

Anyone who smokes or uses other forms of tobacco is at risk of becoming dependent. Factors that influence who will use tobacco include the following:

Genetic Factors. Certain genetic variations and a family history of nicotine dependence can increase the risk of NAFLD. For example, a study by Chen et al. (2016) revealed that specific genetic markers were associated with an increased risk of nicotine dependence.

Environmental Factors. Exposure to smoking at an early age, living in a household where smoking is prevalent, or having friends who smoke can increase the likelihood of nicotine dependence (Cummings, 2009; Pomerleau, 1993).

Mental Health Disorders. Individuals with certain mental health conditions, such as depression, anxiety disorders, or attention-deficit/hyperactivity disorder (ADHD), may be at a greater risk of nicotine dependence (Kutlu, 2015).

Peer Influence. Peer pressure and social norms related to smoking can play a role in the development of nicotine dependence, particularly during adolescence (Roosmalen (1989); Aloise-Young (1994).

Anger: Anger is an emotion that individuals experience in response to a perceived threat or injustice. Kassino (2013) defines anger disorders as "a group of conditions characterized by chronic, maladaptive anger and aggression that results in significant impairment in social, occupational, and other areas of functioning". He reviews the research on the causes and consequences of anger disorders, as well as treatment approaches such as cognitive-behavioral and anger management. In an article, Lerner and Keltner (2001) explore the relationship between emotions (particularly fear and anger) and risk-taking behavior.

They suggested that anger can increase risk-taking behavior by reducing perceived risk and increasing confidence and that understanding the role of anger in decision-making can have important implications for public policy. Research has identified several key components of anger, including physiological arousal, cognitive appraisal, and behavioral expression. Physiological arousal refers to the bodily changes that occur during an anger episode, such as increased heart rate and blood pressure. Cognitive appraisal involves the interpretation of the triggering event and the evaluation of its significance. Behavioral expression refers to the outward expression of anger, which can range from verbal aggression to physical violence (Sears, 2014).

1.3 Implications for mental health

Even though anger is a common and healthy emotion, it can be harmful to one's mental health and general well-being if it persists or is unchecked. For instance, rage has been connected to a higher risk of substance abuse, sadness, and anxiety (Kassino, 2013). According to Arslan (2010) and Kuppens (2005), persistent anger can also contribute to interpersonal problems such as relationship conflict and social isolation. In

addition, anger can support assertiveness, self-advocacy, and constructive social change when it is articulated healthily and adaptively. There are both positive and negative effects of anger on one's mental health and general well-being. Understanding the causes of anger will help us create interventions and management plans for this potent emotion healthily and adaptively (Robins, 1999).

Psychological Distress: Psychological distress is a complex and multifaceted concept that is often used interchangeably with terms like strain, stress, and distress, leading to confusion in its understanding and management (Ridner, 2004). It is associated with dissatisfaction with health care services, particularly among those who deny their psychological distress (Greenley, 1982). In patients with borderline personality disorder, psychological distress is linked to affective dysregulation, particularly the inability to label emotions and conflictive emotions (Ebner-Priemer, 2008).

The role of distress as a symptom of mental disorders or a marker of impairment is debated, with the need for a clear operational definition and method for rating its severity (Phillips, 2009). Today, psychological anguish is a serious problem, particularly for young people. Some kind of distress is reliable for the progress of development and science to push people and make them reach the peak of flourishing and live progressively to fight around the clock. An irregular state can have a dangerous effect on social, emotional, subjective, and physical health.

Future goal setting will lessen the weight of several factors, including academic, financial, social, and parental factors, to reach their objectives. Along these lines, mental inconvenience in a person's life may be portrayed as his undertaking to adjust to demonstrate difficulties using past youth obstruction frameworks, which may seem, by all accounts, to be maladaptive and socially inappropriate for the present condition (Kelly, 1977). The logical literature has discussed how controversial the status of psychological discomfort is in the field of mental nosology. From one perspective, psychological distress is perceived as a passionately unpleasant force that may have an impact on people's daily lives and social interactions (Arvidsdotter, 2016).

The concept of quality of life has been discussed and defined by various authors from different disciplines. The term quality of life (QOL) refers to a person's sense of personal well-being and comfort. QOL is an evaluation of one's current situation about various ultimate ideals and the things they regard to be fundamental in their lives (Carr & Higginson, 2001). Health-related quality of life refers to the biological, spiritual, expressive, and joint aspects of well-being, each of which has its specific scope and is influenced by the beliefs, perspectives, chances, and understandings of individuals (Testa and Simonson 1996).

QOL is a complex multidimensional impression that reflects somebody's particular, communicative, shared, and sacred safety (Ferrell, 1997). World Health Organization (WHO) - The WHO defines the quality of life as "an individual's perception of their position in life in the context of the culture and value systems in which they live and about their goals, expectations, standards and concerns". Felce and Perry (1995) describe the quality of life as "the extent to which individuals can achieve and maintain their own goals, fulfill their own needs and aspirations, and enjoy the opportunities that society offers".

Hutchinson (2022) in their study of patients with chronic disease, defines the quality of life as "an individual's perception of their position in life in the context of the culture and value systems in which they live and about their goals, standards, and concerns". Lee, Chiu, and Tsai (2019) in their study of older adults in Taiwan, Lee, Chiu, and Tsai define the quality of life as "a broad, multidimensional construct encompassing an individual's subjective perception of various aspects of their life, including physical, psychological, social, and environmental

domains" Mokkink et al. (2018) in their systematic review of instruments for measuring health-related quality of life, Mokkink et al. define the quality of life as "an individual's perception of their position in life in the context of the culture and value systems in which they live and about their goals, expectations, standards, and concern".

In one study of cancer patients, quality of life was described by Penedo and Dahn (2005) as "a multifactorial construct that includes physical, emotional, social, and spiritual well-being". QOL is described as "a subjective concept that encompasses a range of factors, including satisfaction with material and social conditions, perceived control on one's life, and the extent to which a person's life is fulfilling and enjoyable" by Cummins (1997).

2 Research Objectives:

1. To examine the relationship between nicotine dependence and levels of anger among adult smokers.
2. To assess the association between nicotine dependence and psychological distress among adult smokers, including factors such as anxiety, depression, and stress.
3. To investigate the impact of nicotine dependence on the quality of life of adult smokers, considering physical health, mental health, social relationships, and overall well-being.
4. To provide insights into the implications of the findings for clinical practice, public health policies, and smoking cessation interventions aimed at improving the well-being of adult smokers.
5. To contribute to the existing literature on nicotine dependence and its impact on psychological and emotional functioning, with a focus on anger, distress, and quality of life outcomes among adult smokers.

3 Research Questions:

1. What is the relationship between nicotine dependence and levels of anger among adult smokers?
2. To what extent does nicotine dependence predict psychological distress in adult smokers?
3. How does nicotine dependence influence the quality of life among adult smokers?
4. Are there differences in the levels of anger, psychological distress, and quality of life between highly nicotine-dependent smokers and less nicotine-dependent smokers?

4 Methods

4.1 Research Design

The present study employed a cross-sectional survey research design to conduct the study through a survey method. The participants included in this study were all adult smokers from different areas.

4.2 Study Sample

The data were obtained from 300 adult smokers via the purposive sampling technique. Informed consent was also obtained from all participants before the administration of the questionnaires. Demographic information, such as age, family status, socioeconomic status, residential area, marital status, and monthly income, was obtained. Nicotine dependence was measured through the Cigarette Dependence Scale (Etter et al., 2003), anger was measured through the Novaco Anger Scale (Mills, 1998), and psychological distress was measured by the Kessler Psychological Distress Scale (Kessler et al., 2002) and the WHO Quality of Life Scale (Burckhardt, 2003).

4.3 Procedure

A questionnaire was administered after formal informed consent was obtained from the participants. The cigarette dependence scale, Novaco Anger Scale, Psychological Distress Scale, and

WHO Quality of Life Scale were used to assess nicotine dependence, anger, psychological distress, and quality of life, respectively.

5 Results

Table 1 *Psychometric properties of the scales*

Scale	M	SD	Range	Cronbach's α
Cigarette Dependence	31.75	9.31	12-54	.82
Quality of Life	50.85	15.95	0-100	.83
Novaco Anger	30.45	3.06	19-40	.88
Kessler Psychological Distress	80.85	13.61	54-122	.80

Note: 1=cigarette dependence, 2= quality of life, 3=novaco anger, 4=Kessler psychological distress

Table 1 shows the psychometric properties of the scales used in the present study. The Cronbach's α for the Cigarette Dependence Scale was .82 (>.80), which indicates high internal consistency. The Cronbach's α for the WHO Quality of Life Scale was .83 (>.80), which indicates high internal consistency. The Cronbach's α for the Novaco Anger Scale was .88 (>.80), which indicates high internal consistency. The Cronbach's α for the Kessler Psychological Distress Scale was .80 which indicates high internal consistency.

Table 2 *Pearson correlation for present study variables*

Variables	1	2	3	4	5	6	7	8	9
1. Nicotine Dependence	—								
2. Anger	.51*	—							
3. Psychological Distress	.41*	.55*	—						
4. General Health	-.05	.07	-.05	—					
5. Physical Health	-.07	.20*	.15*	.32*	—				
6. Psychological Health	-.02	.09	-.07	.38*	.48*	—			
7. Social Relationships	.08	.07	-.05	.25*	.47*	.45*	—		
8. Environment	.03	.15*	.09	.42*	.53*	.49*	.47*	—	
9. Quality of Life	.04	.17*	.06	.56*	.80*	.74*	.69*	.84*	—

** $p < .01$

Note: 1=nicotine dependence, 2=anger, 3=psychological distress, 4=general health, 5=physical health, 6=psychological health, 7=social relationship, 8=environment, 9=quality of life

Table 2 shows the Pearson correlations among the study variables. The findings indicate that nicotine dependence has a significant positive correlation with anger ($r = .51, p < .01$). Moreover, psychological distress ($r = .41, p < .01$) and nicotine dependence were not significantly correlated with quality of life ($r = .04, p > .01$), the general health ($r = -.05, p > .01$), physical health ($r = -.07, p > .01$), psychological health ($r = -.02, p > .01$), social relationships ($r = .08, p > .01$) or the environment ($r = .03, p > .01$).

Table 3 *The regression coefficient of nicotine dependence on anger*

Variable	B	β	SE
Constant	23.51***		2.84
Nicotine Dependence	.81***	.50	.09

Variable	B	β	SE
R^2	.25		

Note. $N = 300$

*** $p < .001$.

Table 3 shows the impact of nicotine dependence on anger in adult smokers. The R^2 value of .25 revealed that the predictor variable explained 21% of the variance in the outcome variable, with $F(1, 298) = 100.69, p < .001$. The findings revealed that nicotine dependence positively predicts anger ($\beta = .50, p < .001$).

Table 4 *The regression coefficient of nicotine dependence on psychological distress*

Variable	B	β	SE
Constant	21.91***		.92
Nicotine Dependence	.22***	.41	.03
R^2	.17		

Note. $N = 300$

*** $p < .001$.

Table 4 shows the impact of nicotine dependence on psychological distress in adult smokers. The R^2 value of .17 revealed that the predictor variable explained 17% of the variance in the outcome variable, with $F(1, 298) = 59.52, p < .001$. The findings revealed that nicotine dependence positively predicts psychological distress ($\beta = .41, p < .001$).

Table 5 *Regression coefficient of nicotine dependence on quality of life*

Variable	B	β	SE
Constant	82.27***		2.85
Nicotine Dependence	.06	.04	.03
R^2	.002		

Note. $N = 300$

*** $p < .001$.

Table 5 shows the impact of nicotine dependence on quality of life in adult smokers. The R^2 value of .002 revealed that the predictor variable explained 0.2% of the variance in the outcome variable, with $F(1, 298) = .490, p > .001$. The findings revealed that nicotine dependence did not significantly predict quality of life ($\beta = .04, p > .001$).

6 Discussion

This study aimed to examine the consequences of nicotine dependence on anger, psychological distress, and quality of life in adult smokers. Moreover, the study aimed to investigate demographic differences in the study variables. First, the reliability, normality, and construct validity of the scales were ensured (See Table 1). For unstandardized items, alpha reliability is based on covariance among the items, Falk (2011). The alpha coefficients for all scales were $\geq .70$, which pointed out that the scales used in the study are reliable (Kline, 2005). The construct validity included discriminant and convergent validity (Sari, 2023).

The variable zero-order correlations were in the theoretically desired directions, which supported the scale's convergent validity (See Table 2). The first finding is that "nicotine dependence" positively predicts anger among adult smokers (See Table 3). These results are consistent with the corpus of theoretical and empirical research showing that smoking increases rage levels due to nicotine dependence. A study conducted by Kassel, Stroud, and Paronis (2003) revealed that daily smokers who reported higher levels of nicotine dependence also reported greater levels of anger than those with lower levels of dependence.

These findings are consistent with the idea that nicotine dependence can contribute to negative mood states such as

anger. Moreover, other studies have also shown a link between nicotine dependence and anger, suggesting that nicotine may increase the likelihood of anger in individuals (Cherek, Moeller, Schnapp, & Dougherty, 1997). affect the regulation model, which suggests that individuals may use nicotine to regulate negative affective states such as anger (Baker et al., 2004). According to this model, nicotine has a calming effect that can help reduce feelings of anger. A study revealed that a smoking cessation program that included anger management training was more effective at helping smokers quit than a standard smoking cessation program.

Healthcare providers may need to be aware of the potential for increased anger and irritability among smokers who are trying to quit. This approach can help them provide appropriate support and resources to help individuals manage these symptoms during the quitting process. The second finding is that "nicotine dependence positively predicts psychological distress among adult smokers" (See Table 4). These findings are in line with the existing body of theoretical and empirical knowledge, as a high level of nicotine dependence is associated with a greater level of anger among smokers. A meta-analysis published in the journal *Nicotine & Tobacco Research* examined 76 studies that investigated the relationship between nicotine dependence and psychological distress.

The analysis revealed that individuals who are dependent on nicotine are more likely to experience symptoms of anxiety and depression, as well as other forms of psychological distress than nonsmokers or occasional smokers are. The meta-analysis also revealed that the relationship between nicotine dependence and psychological distress is stronger in individuals with a history of mental health problems. The concept of self-medication, suggests that individuals may use substances such as nicotine to alleviate symptoms of psychological distress. A study by Lejuez, et al. (2008) revealed that individuals with higher levels of anxiety sensitivity were more likely to smoke cigarettes as a way of coping with their anxiety symptoms.

A study published in the *Journal of Consulting and Clinical Psychology* showed that smokers who received a cognitive-behavioral smoking cessation intervention had greater reductions in symptoms of anxiety and depression than those who received only standard smoking cessation treatment (Brown et al., 2001). Studies have consistently shown that nicotine dependence is associated with a range of negative psychological outcomes, including anxiety, depression, and stress (e.g., Prochaska et al., 2004; Morissette et al., 2006). This finding suggested that interventions aimed solely at reducing nicotine intake may not be sufficient to address the underlying emotional and psychological factors that contribute to smoking behavior.

Therefore, smoking cessation programs should take a more holistic approach, incorporating strategies that address the psychological and emotional aspects of addiction, such as cognitive behavioral therapy, mindfulness-based interventions, and stress management techniques (e.g., Flentje et al., 2018; Vidrine et al., 2016). The third finding is that "nicotine dependence does not predict the quality of life among adult smokers" (See Table 5). Based on the results of various studies examining this relationship, nicotine dependency is not related to quality of life. One such study, published in the journal *Addictive Behaviors*, found no significant correlation between nicotine dependence and quality of life among a sample of adult smokers (Davila et al., 2011).

Nicotine dependence may have negative health consequences; it may not necessarily have a direct impact on an individual's overall quality of life. Other factors, such as comorbid mental health conditions or social support, may have a stronger influence on an individual's quality of life than nicotine dependence alone. Overall, the relationship between nicotine dependence and QOL is complex and may be influenced by a variety of factors (Antic et al., 2011). QOL is a complex construct that is influenced by a variety of factors beyond

nicotine dependence, such as social support, economic status, and access to healthcare.

Therefore, while nicotine dependence may be a contributing factor to a lower quality of life, it may not be the only primary factor. Furthermore, the correlation between nicotine dependence and quality of life may be influenced by individual differences and subjective factors. For example, some individuals may prioritize the immediate benefits of smoking, such as stress relief or socializing, over the potential long-term health consequences. As a result, they may report a higher quality of life despite being nicotine dependent. Smoking and nicotine dependence have been shown to have numerous negative health effects, that can negatively impact quality of life.

These health effects include an increased risk of lung cancer, heart disease, and other chronic conditions. Therefore, it is logical to assume that nicotine dependence is related to health-related quality of life rather than only quality of life. Thus, in light of these findings, it can be inferred that public health efforts should focus on addressing the complex factors that contribute to overall well-being rather than simply focusing on reducing smoking rates (Priscilla, et al., 2011).

7 Conclusion of the Present Research

In conclusion, the research findings suggest that nicotine dependence is significantly related to both anger and psychological distress. Individuals who are dependent on nicotine are more likely to experience higher levels of anger and psychological distress. These findings highlight the impact of nicotine dependence on emotional well-being and psychological functioning. However, importantly, the research did not find a significant relationship between nicotine dependence and quality of life.

This finding suggested that while nicotine dependence may have detrimental effects on emotional and psychological aspects, it may not directly influence overall quality of life. Other factors, such as social support, physical health, and personal circumstances, may play a more significant role in determining quality-of-life outcomes. These findings underscore the importance of addressing anger and psychological distress in individuals with nicotine dependence. Interventions aimed at managing these emotional and psychological symptoms should be considered comprehensive treatment approaches for nicotine dependence. Healthcare providers and addiction specialists must provide tailored support and interventions to address these specific needs in individuals struggling with nicotine dependence.

Further research is warranted to explore the complex relationships among nicotine dependence, anger, psychological distress, and quality of life. Longitudinal studies and comprehensive assessments incorporating various factors can provide a deeper understanding of the dynamics involved. This knowledge can contribute to the development of more effective interventions and treatment strategies for individuals dealing with nicotine dependence and its associated emotional and psychological consequences.

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Primary Paper Section: A

Secondary Paper Section: AN, BB

SOVIET LIFE IN I. KABAKOV'S "COMMUNAL KITCHEN" AND V. SOROKIN'S "QUEUE"

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The study was supported by a grant from the Russian Science Foundation № 23-18-01007, <https://rscf.ru/en/project/23-18-01007/>; F. M. Dostoevsky Russian Christian Humanitarian Academy

Abstract: The purpose of the study is to analyze the comparability of the leading tactics and strategies of a group of Moscow conceptualists in the field of painting and literature. The attention of researchers is directed to the consideration of the artistic moves of the leader and ideologist of the Moscow conceptual circle Ilya Kabakov in his installation "Communal Kitchen" and the ways of their reception in the literary work of Vladimir Sorokin, in particular in his first conceptual novel "Queue". It is shown that the object of application of conceptualist strategies — pictorial in Kabakov and verbal in Sorokin — is the Soviet communal reality, the Soviet world and the Soviet man.

Keywords: Ilya Kabakov; Vladimir Sorokin; Moscow conceptualism; tactics and strategies; installation "Communal kitchen"; novel "Queue".

1 Introduction

The most important strategy of Moscow conceptualist artists, which played a key role in the formation of conceptual writers, is the combination of word and image, bringing verbal text into the visual field of the painting. V. Pivovarov, one of the founders of the Moscow conceptual circle, very precisely formulated the new status of a conceptual painting: "The painting became not only visible, but also audible, it found a voice, it began to speak, first individual words, then phrases, then large texts" (Bobrinskaya 1994, 87). That is why, when considering the novels of conceptual writers, it seems extremely important to trace the artistic strategies of the Moscow conceptualists, which were transferred to poetic or prose soil and received a new embodiment in the works of conceptual writers. In this study, the focus of the research is aimed at examining the artistic strategies of Ilya Kabakov, the leader and ideologist of the Moscow conceptual circle, and the ways in which they are received by the literary work of Vladimir Sorokin.

2 Literature Review

Many researchers have written about the techniques of conceptual art (Dobrenko 1990, Eisenberg 1991, Arkhangelsky 1991, Groys 1993, Lipovetsky 1997, Gunther 2000, Epstein 2000, Kuritsyn 2001, Leiderman 2003). There are works in critical literature on both pictorial conceptualism and literary conceptualism (Bobrinskaya 1994, Bogdanova 2005, Andreeva 2010, Bibergan 2011, Uffelmann 2022). In this article, we will try to compare the strategies and tactics of pictorial and literary conceptualism, what some researchers have already written about (Skoropanova 2002, Bogdanova 2004, Those who overcame socialist realism 2023 and others).

3 Communal space in the aesthetics of conceptualism

Considering the works of I. Kabakov as literary examples of Sorokin's conceptual novel, it is necessary first of all to turn to the installation "Communal Kitchen". In its final form, the installation dates back to 1991, but the idea itself was born much earlier — in our opinion, in the late 1960s, simultaneously with

the appearance of Kabakov's painting "Whose fly is this?". It is obvious that Vladimir Sorokin, who got into the environment of Moscow conceptualism in the mid-1970s, was a participant in theoretical discussions that were regularly held by conceptual artists and where they often touched on the topic of communal life, its understanding, and ways of its embodiment in art.

Kabakov chooses a communal space, the space of a Soviet communal apartment, for the installation "Communal Kitchen": "One of the main images that combines everything when I think about our lives is a communal kitchen" (Kabakov 2010, 62). In this regard, we can talk about the metaphorical nature of Kabakov's installation of the same name, because, according to Kabakov, the entire Soviet world is a large communal kitchen.

Ilya Kabakov: "A communal apartment combines a lot of content, a lot of different plots. A communal apartment is a good metaphor for Soviet life, because you can't live in it, but you can't live any other way either, because it's almost impossible to leave a communal apartment. This is the combination: you can't live like this, but you can't live any other way either — it describes the Soviet situation as a whole well. Other forms of Soviet life, including, for example, the camp, are only different versions of communal living" (Kabakov 2010, 62).

With regard to "communal situations" — Kabakov's kitchen — the parallel cited by B. Groys in his reflections on the peculiarities of communal society turns out to be fair (Groys 1993). For example, Boris Groys addresses the theory of dialogism and polyphony of M. Bakhtin and the point of forced collision of the hero(s) with other characters (Bakhtin 1978). Groys sees the similarity of situations and points out the polyphony of communal space: "Dostoevsky's departure is impossible, a real break is impossible. His characters are, as it were, forever registered in the space of his novel. In this sense, the communal apartment really forms a certain type of aesthetic space, which has a purely literary background in Russian literature" (Kabakov 2010, 62).

Vladimir Sorokin, who has been immersed in the life of Moscow artistic conceptualism since the late 1970s, witnessed and participated in discussions of the Soviet communal space, attempts to theorize various aspects of its manifestations and their impact on Soviet man and Soviet society as a whole. And, of course, such a model of society's existence, ways of manifesting the principles of communal dialogism could not but manifest themselves in literature. Sorokin managed to perceive them and transfer them to a new literary ground and reflect them in the novel "Queue" (1983).

Reflecting on the phenomenon of communal life, Kabakov points out an important feature: "The apartment, in addition to junk and litter, is exhausted by another thing: the incessant noise of voices, whether it's screams, scuffling children or quiet conversations that do not subside day or night, coming from all sides, from the kitchen, from the corridor, from behind thin partitions rooms" (Kabakov 2010, 60–61). That is why the artist complements the space of the total installation with a sound row — the voices of its inhabitants are heard in the communal kitchen (audio recording), which means that the person who got into the space of the total installation, turning out to be both a spectator and a listener at the same time, he is maximally immersed in the atmosphere of communal life. It is obvious that this particular feature was noticed by V. Sorokin in another phenomenon of Soviet life, no less communal — in the Soviet queue.

Filling the novel "Queue" with an incredible number of characters (there are about two thousand people in the queue), V. Sorokin allows you to see (or rather imagine) residents of communal apartments during their one more habitual occupation — standing in line. The novelist gives the reader the opportunity to hear a variety of conversations, discussions, arguments, quarrels, jokes, complaints and more.

Describing the details of the communal kitchen as a special space, I. Kabakov notes its very special atmosphere: “No one can and dare stay away, being a passive or active participant in everything, and anything can happen here at any moment: from a quiet, thoughtful conversation to frenzied screaming and howling, from quiet stirring with a spoon in the compote before the typhoon fight, tearing shelves off the walls and turning everything around — plates, pots, dinners, cans — into a shapeless mess on the tiled floor...” (Kabakov 2010, 241).

This is also the principle of V. Sorokin’s queue image. For a period of almost two days standing in line, his characters experience a rapid change of states, moods, behavior — from mutual help, mutual assistance, joint crossword puzzle solving to unexpected irritation and undisguised anger, turning into swearing (“Well, why did you get up? It stands like a *pillar*. <...> The *goat* <...> a *damn* *bully*!”) (Sorokin 2002, 143–144).

4 Kabakov’s communal pretexts

Kabakov, in order for the viewer to fully immerse himself in the atmosphere of the communal kitchen, when creating the installation, writes a text called “Olga Georgievna, you are boiling!” and places it within the boundaries of the installation. Text: “Surrounding the entire room, there was a long screen behind barriers at the level of human height, where each sheet was pasted a lot of lines spoken by the inhabitants of the communal kitchen. Taken all together, these remarks formed a kind of encyclopedia of the problems of residents of a communal apartment” (Kabakov 2010, 242).

Kabakov’s text is a list of quotes from residents of a communal apartment — such as they could be in every communal kitchen — as realistic, rude, and by no means romanticized as possible. Quotes are given in a list — the author’s words, his remarks are omitted. Not immediately, but gradually the reader (viewer) begins to guess what is happening in the kitchen and what the balance of power is.

Kabakov imitates the speech of residents of a communal apartment using language stamps, stylizing the speech of characters of different genders, different ages and professions. At first glance, it may seem that Kabakov simply cites various statements that could sound in a communal kitchen — from cooking recipes to swearing with obscene vocabulary (V. Sorokin’s characters are just as colorful in their statements). However, upon closer examination, it turns out that this is not the case. It is important that all the quotes given are as they should be in a communal kitchen (see Kabakov’s series of paintings on the theme of communal life “Whose grater is this?”, “Whose ladle is this?”, “Whose saucepan is this?” etc.), have their own character owners. Kabakov gives the characters names, but they are as impersonal as possible — as if they did not exist at all (and in Sorokin’s “Queue” all the characters are nameless except for four — Lena, Vadim, Luda, and the boy Volodya). For example, Kabakov takes the name Maria and combines it with various patronymics, getting several characters at once — Maria Gavrilovna, Maria Nikolaevna, Maria Akimovna, Maria Vasilyevna, Maria Zosimovna, then does the same with the names Olga and Anna, thereby getting a whole crowd of actors in the kitchen (among them, however, there are also rarer names — Eva Pavlovna, Zoya Ignatievna, Zoya Yakovlevna, Lidia Nikolaevna).

It is noteworthy that with all the variety of combinations of the heroine’s names there is no heroine with the name Olga Georgievna in the text. But the speech formula “You are boiling!” or “You are burning!” sounds repeatedly — “Anna Lvovna, your kettle has completely boiled away!”, “Anna Borisovna, something is burning here-should I screw it up a little?” (Kabakov 2010, 378–380).

Kabakov probably puts the name of a non-existent character in the title of the work “Olga Georgievna” in order to scale. That is, there are so many neighbors in a communal apartment that you can’t even mention them all, and maybe it doesn’t matter whose name to

name — anyway, someone will go and check if a certain Olga Georgievna turned off the fire on the stove.

Kabakov’s voices belong mainly to female characters, because, as the artist notes, in the communal kitchen “all contacts are made by women, and the atmosphere depends primarily on them. Sometimes it’s a wonderful world of mutual assistance — favors, treats, confidential conversations and advice. Sometimes it is a sinister world of incessant quarrels, insults, long-term enmity and revenge, where men are also attracted as heavy weapons” (Kabakov 2010, 238).

Upon closer reading, it turns out that Kabakov is playing out a drama in front of the viewer, in which the classic unity of place (a separate communal kitchen), unity of time (the action fits into one day) and unity of action (some kind of domestic conflict) are sustained. Sorokin’s “Queue” has a similar construction. Sorokin’s action revolves around one conflict node (to buy some desired product), lasts one day (to be precise, a little more than a day), tramples on the same place (streets of Moscow). That is, both texts conditionally show *one day in the life...* — I. Kabakov’s communal kitchen and V. Sorokin’s Soviet queue.

Kabakov and Sorokin’s texts turn out to be so artistically likened that it feels as if they involve almost the same characters who finished their business in the kitchen and now went outside, where they stood in an interminably long queue.

5 The voice of the Soviet people

Both texts represent the voice of the Soviet people, its sound, sometimes turning into noise. Formally, the ways of organizing the text are also close. Kabakov’s text is presented in the form of a list of phrases that overlap thematically and plot-wise, that is, they form a polylogue that took place (could have taken place) in a communal kitchen. In Sorokin’s text, all the replicas are designed as parts of a single polylogue.

At first, it seems difficult to find a common thread, but Sorokin’s thematic proximity and cause-and-effect relationships are easily detected. In one case and in another, the reader turns out to be a casual witness of what is happening, he is completely immersed in artistic reality (in one case, an installation about a communal kitchen, in the other, a novel about a queue). The recipient can hear snatches of phrases and conversations, as if he were present in a crowded communal kitchen or standing in line on a noisy street.

It is noteworthy that the texts of Kabakov and Sorokin reveal similarities at the level of microthemes, images and plot moves. Thus, one of the most striking and readable lines in Kabakov’s text turns out to be a discussion of recipes. Indeed, the shortage of goods forced Soviet housewives to go to culinary delights and improve their skills in an attempt to diversify all the boring products and the way they are cooked. In Kabakov’s installation, the motif of new recipes flashes throughout, which is quite natural, since the action takes place in a communal kitchen during the cooking process.

It is surprising that every time the reader hears a fragment of a new conversation about a new recipe, the speakers switch very quickly from one dish to another. Culinary frenzy reaches its climax when it comes to the recipe for cooking (dyeing) jeans, as if it were a recipe for another edible dish (Kabakov 2010, 338–339).

The prescription variety in Kabakov’s text is similar to the commodity variety in Sorokin’s text. As Kabakov asks the reader a culinary riddle (what is being prepared in the communal kitchen?), so Sorokin asks the reader a riddle, what kind of product are his characters behind. The introductory data changes all the time — the writer confuses the reader, each time pointing to a new product (the queue is either for fruits, shoes, jeans, coats, or polished furniture). However, the object of the conceptual game is easily represented in both texts, it is logically predetermined: the recipe is relevant in the kitchen, the name of the product is in the queue.

6 Motives of personal and communal freedom

An important common place in the texts of I. Kabakov and V. Sorokin is the presence of a child (children) in the artistic space of the work. On the one hand, this is the motif of the “tears of a child”, coming from F. Dostoevsky, on the other hand, is the perspective of a child’s view, perceiving what is happening in a special way.

So in Kabakov’s text, in the midst of an expletive using obscene vocabulary, a child turns out to be among the quarreling. “Nothing, nothing, let the child hear what they are doing here...” (Kabakov 2010, 316). The child does not leave the space of Kabakov’s kitchen, and in the spirit of the heroes of F. Dostoevsky’s novels motive arises for the heavy share of the child.

In Sorokin’s novel “Queue”, the children’s character is the only one, besides the participants in the love triangle (Lena — Vadim — Luda), who is endowed with the name (Volodya). It is obvious that Sorokin does not accidentally give the child his own name, thus he seems to trust him with the author’s view — able to see the true, and not ideologically introduced. The consciousness of the young character Volodya is not clouded by Soviet propaganda.

Special attention should be paid to the episode in which the boy, watching the pigeons, says: “I would fly away, mom, right away” (Sorokin 2002, 80), but on the rational argument of the mother that the birds have a feeder here (“I pecked and flew. He pecked again and flew again...”), the boy replies: “Boring...” (Sorokin 2002, 80).

Sorokin actually implements in this dialogue the idea of classical Russian literature that freedom is the only natural state of man, and man will always strive for it. Sorokin shows that the desire for freedom relentlessly accompanies a person throughout his life, revealing himself with all evidence at moments when a person does not even think yet, but already feels any restrictions on his freedom. The boy Volodya, who for a moment imagined himself as a pigeon living in captivity, immediately decides to fly away.

In this episode, the motive of the child’s plight clearly emerges, when the boy, instead of children’s fun, is forced to stand in line with his mother under the midday sun, to witness a drunken quarrel of men standing in line, women’s squabbles, unable to escape from this space, return to his usual childhood world.

It is quite natural that next to the theme of childhood in Sorokin’s novel is the theme of cats, the relationship to our younger brothers. In both texts, this topic is given a significant place, it appears in various episodes. The texts have similar perspectives of perception: some characters feel tenderness for cats, a desire to caress them and feed them, while others perceive cats as carriers of infection. It is also natural that the child (child consciousness) treats the cat with sympathy, seeing in it exclusively positive qualities, and adults see cats as carriers of infection (walking on the street, catching mice). So Kabakov and Sorokin show the difference between a natural consciousness (in this case, childish, free) and a consciousness overshadowed by civilization (in this case, communal life, which distorts the kind attitude towards animals).

In the artistic reality of Sorokin’s novel, the consciousness of adults (i.e., those who grew up in communal life, brought up by Soviet ideology) turns out to be wary, apprehensive, deprived of the opportunity to see beauty in everyday things, to show warmth towards an animal.

7 Results and prospects

Thus, completing the comparison of I. Kabakov’s installation “Communal Kitchen” and V. Sorokin’s novel “Queue”, we can conclude that the artist and the writer, depicting the most representative phenomena of the Soviet era — communal kitchen and queue — create collective symbolic images, which allows them to achieve the effect of artistic universalization. It turns out that I. Kabakov’s communal kitchen is capable of accommodating the whole of Moscow and the entire Soviet

Union, and V. Sorokin’s countless queue, the beginning and end of which none of those present in the novel saw, permeates the entire Soviet world.

In conclusion, it can be added that the writer Sorokin (one of the youngest conceptualists in the early 1980s) consistently copied and repeated the tactics of older conceptualists, in particular the artist I. Kabakov. Sorokin consciously — conceptually — transferred the visual strategies of artists into the field of literature, combined verbal and visual. Sorokin was (and remains) consistently a secondary writer, who both before and now imitates other people’s techniques, brilliantly transferring them from one sphere of art to another.

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Primary Paper Section: A

Secondary Paper Section: AJ



C CHEMISTRY

CA	INORGANIC CHEMISTRY
CB	ANALYTICAL CHEMISTRY, SEPARATION
CC	ORGANIC CHEMISTRY
CD	MACROMOLECULAR CHEMISTRY
CE	BIOCHEMISTRY
CF	PHYSICAL CHEMISTRY AND THEORETICAL CHEMISTRY
CG	ELECTROCHEMISTRY
CH	NUCLEAR AND QUANTUM CHEMISTRY, PHOTO CHEMISTRY
CI	INDUSTRIAL CHEMISTRY AND CHEMICAL ENGINEERING

SAND SIZE ANALYSIS OF POTENTIAL SALT BEDS IN BORONGAN CITY, PHILIPPINES USING MICROSCOPIC AND SEDIMENTATION TECHNIQUE

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Abstract: Sand samples from four (4) identified areas of Borongan City were analyzed to create baseline data on the sand profile for the proposed production of salt in Eastern Samar. Physical profile of the sand was determined following different standard procedures for sand analysis. Results show that the sands are fairly different in terms of their color, but all has similar structure, consistence, density and texture. Grain size and uniformity coefficient (fineness) were also determined and computed which indicated no significant difference in terms of fineness of the grains in the four (4) different areas of Borongan City. Since all are fine sands, then it can be utilized for salt production.

Keywords: grain size analysis, fineness modulus, physical profile, sand beds, uniformity coefficient

1 Background of the Study

Where does beach sand come from, anyway? The sand found on a specific beach is created by its surroundings. It's unique to that beach—like a fingerprint. Most beaches get their sand from rocks on land. Over time, rain, ice, wind, heat, cold and even plants and animals break rock into smaller pieces. This weathering may begin with large boulders that break into smaller rocks. Water running through cracks erodes the rock. In areas where it's cold enough to freeze, water expands as it turns to ice. This forces the cracks open wider. The freeze-thaw cycle happens over and over again. Each time, gaps widen. Pieces break off. Over thousands of years they break down into smaller and smaller rocks, pebbles, and grains of sand (Castro, J., 2013). Sand is a granular material composed of finely divided mineral particles. Sand has various compositions but is defined by its grain size. Sand grains are smaller than gravel and coarser than silt. Sand can also refer to a textural class of soil or soil type; i.e., a soil containing more than 85 percent sand-sized particles by mass (Ottawa Agriculture Canada, 2019).

The nature of Sea salt production is a reaction that separates NaCl and other impurities in seawater. Sand is used as an intermediate substance for salt crystallization. The process of making clean salt on sand includes 3 main stages: sea water supply, production of salty sand and lastly, filtration and crystallization of salt. Several experts and studies reported that this process has considerably improved salt's quality to have higher purity. Furthermore, it is also environment-friendly because no unnecessary wastes are emitted in the whole process (Thuan, N., n.d.).

A recent report by the CNN (2023) articulated that the Philippines relies heavily on the importation of salt as local production has "deteriorated" despite having one of the longest shorelines in the world, senators said Wednesday. During a hearing on the industry, Sen. Joel Villanueva said that the country's imports reached 93% of total salt requirements, while exports only amounted to more than \$200,000 in 2021. Senator Cynthia Villar also pointed out that salt production in the Philippines has dropped to about 40,000 metric tons from 240,000 metric tons recorded in the 1960s and 1970s. Moreover, Villar slammed agriculture authorities present during the hearing, saying they should have provided training to farmers to learn iodization.

In Eastern Samar alone there is are no salt producers wherein there are numerous numbers of good sand bed sites wherein one can produce salt via sand intermediate, hence, this research was conducted to assess the physical profile of the sand beds around Borongan city which can be utilized for salt production and help in increasing the amount of salt produced in the country and as well as provide an iodized salt to Estehanons which follow RA 8172 or the ASIN Law of the Philippine Republic.

1.1 Objectives of the Study

1. Identify and quantify the physical properties of the sands in sand beds around Borongan City, in terms of:
 - a. Color
 - b. Density
 - c. Texture
 - d. Sand structure
 - e. Sand consistence
2. Analyze the washed Grain Size and Uniformity Coefficient;
3. Determine if there is a significant difference in terms of the washed grain size analyzed from different sand beds in Borongan City.

2 Methodology

2.1 Research Design

This study utilizes the Experimental Research Design utilizing quantitative analyses in determining the physical properties of the sands collected from sand bars and beds in Borongan City as well as the sieve analysis and fineness modulus.

2.2 Locale of the Study

This study was conducted at the Chemistry Laboratory of the College of Nursing and Allied Sciences. Sand samples were collected from identified sand bars, sand beds as well as beaches in the area of Borongan City. In this study, 4 sampling locations were identified namely, Baybay, Cabong, Lalawigan and Punta Maria.

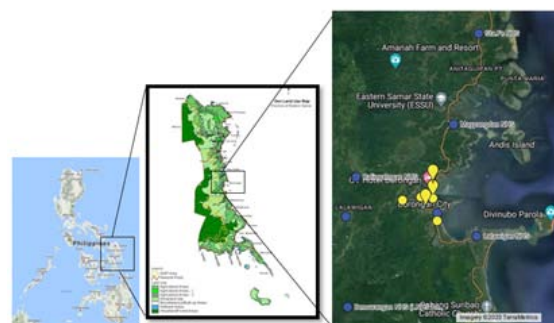


Figure 1. Location Map of Borongan City

Identified sandy beach areas as well as sand bars and beds located within the city proper of the City of Borongan served as sampling sites, all other similar areas outside the city did not form part of this study.

2.3 Data Gathering Procedures

The following step-by-step processes were utilized by this study to come up with homogenous results of data:

2.3.1 Gathering of Sand Samples

Sand samples were gathered from identified sampling sites around the city of Borongan. These samples were kept in a dry plastic container, labeled and was brought into the laboratory for sieve analysis, fineness modulus.

Representative sample from each site were gathered using Quartering Method.

2.3.1.1 Sample Inclusion

Samples included are clean sand beds around Borongan City only.

2.3.1.2 Sample Exclusion

Sand beds outside of Borongan City was not considered part of this research. Also, sand beds with high number of different types of organic and inorganic debris from the sea were not considered as sampling site.

2.3.2 Physical Properties

2.3.2.1 Color

Sand color was determined by determining the color name, utilizing the Munsell Notation, the water state and the physical state. To determine the color, the following procedure was done: Place a dry sample in the palm of your hand (this may be a finely ground sample, or a soil aggregate). With your light source behind you (light shining over your shoulder), choose a page from the Munsell color book that is close to the color of your sample. Holding the color page over the sample, move the page around to view your sample through the holes in the page. Find the closest match. When you have found a close match, determine if your sample may be redder or yellower than the color chip you have chosen; if you think it may be, go one page to the front of the book (for red) or to the back of the book (for yellow) and look at the chip with the same value and chroma. The better match color was recorded as the sands color.

2.3.2.2 Density

Density was determined by weighing 1 g of sand sample and recording its weight for density determination. Volume was determined by using the displacement of 1 g of sand. Test was conducted three (3) times using the following equation (Eq. 2). Average density was calculated.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Equation 1. Density Equation

2.3.2.3 Texture

To determine the texture of the sand, the analysis was done using the Flow diagram for teaching texture by feel analysis. Journal of Agronomic Education. 8:54-55 modified from S.J. Thien. (1979). Also, Texture class was determined fairly well in the field by feeling the sand particles and estimating silt and clay content by flexibility and stickiness.

2.3.2.4 Sand Structure

Sand structure is the shape that the soil takes based on its physical and chemical properties. Each individual unit of sand structure is called a ped. Take a sample of undisturbed sand in your hand (either from the pit or from the shovel or auger). Look closely at the soil in your hand and examine its structure. Possible choices of soil structure are: granular, blocky, prismatic, columnar, platy, massive and single grained.

2.3.2.5 Sand Consistence

Take a ped from the top sand horizon. If the soil is very dry, moisten the face of the profile using a water bottle with a squirt top and then remove a ped to determine consistence. (Repeat this procedure for each horizon in your profile.) Holding it between your thumb and forefinger, gently squeeze the ped until it pops or falls apart. Record one of the following categories of soil consistence on the data sheet. Sand consistence was recorded either as loose, friable, firm and extremely firm.

2.3.3 Sieve Analysis

Dry sieve analysis and washed sieve analysis are two methods of determining proportions of various particle sizes in a mineral aggregate. Standard procedures for running the sieve analysis are given in AASHTO T 27 and AASHTO T 11.

Regardless of the size of the aggregate, the procedure for running a sieve analysis is basically the same. The steps for this procedure are outlined as follows.

Obtain a representative sample of the material from the original sample by either a sample splitter or the quartering method (in this research, quartering method was used to obtain representative sample). Reduce to a size that can be handled on the balance and sieves, also, according to maximum stone size. Reference AASHTO T 27.

Quartering Method - The following method for size reduction by quartering is outlined for use when a conventional sample splitter is not available.

1. Distribute a shovel full of the aggregate as uniformly as possible over a wide, " at area on a tight weave canvas or other smooth surface. Continue to distribute shovels full of material in layers until all the sample is used to make a wide, " at pile that is reasonably uniform in thickness and diameter. Do not permit coning of the aggregate.
2. Divide the pile cleanly into equal quarters with a square-ended shovel or straight piece of sheet metal. When a canvas is used, the division may be conveniently made by inserting a thin stick (or rod) under the canvas and raising it to divide the sample equally, first into halves, then into quarters.
3. Remove two opposite quarters, including all fine materials, and set aside.
4. Repeat the foregoing procedure with the remaining portion of the aggregate until a test sample of desired size is obtained.
5. If desired, store the portion that has been set aside for possible check testing.

Dry aggregate sample thoroughly. The samples are dried to constant weight on a hot plate or in an oven at a temperature of 230°F (110°C).

Accurately weigh the dried sample. When weighing and handling the sample, extreme care must be taken to avoid any loss of the material, as this will affect the accuracy of the results. Also, do not adjust the weight of the split sample to an even figure, such as 500 grams, 1000 grams, etc. Use the entire reduced and dried sample.

Record the total dry weight on the worksheet. For example, assume the total dry weight of the sample is 506.4 grams.

Wash the sample over a nest of two sieves, the upper or top sieve being the No.16 (1.18 mm) mesh sieve and the lower or the bottom sieve being the No. 200 (75 µm) mesh sieve. Doing this, you would take your sample, add water, to cover the material completely, add a drop of soap and wash it thoroughly being careful not to lose any of the material. Pour the water and material over the nest of sieves, the No. 16 (1.18 mm) and No. 200 (75 µm), being careful not to lose any of the material, then repeat the procedure until the water is clear.

2.3.4 Fineness Modulus

To determine the uniformity coefficient, the Fineness Modulus was calculated. Fineness Modulus is defined as an index to the particle size not to the gradation. Fineness Modulus is calculated from the sieve analysis. It is defined mathematically as the sum of the cumulative percentages retained on the standard sieves divided by 100. The standard size sieves are 6 (150 mm), 3 (75 mm), 1 1/2 (37.5 mm), 3/4 (19.0 mm), 3/8 (9.5 mm), No. 4 (4.75 mm), No. 8 (2.36 mm), No. 16 (1.18 mm), No. 30 (600 µm), No. 50 (300µm), and No. 100 (150 µm). Always report the fineness modulus to the nearest 0.01. In fineness modulus, the finer the material the more the water demand is. The F.M. of fine aggregates should not be less than 2.3 or more than 3.1, or vary by more than 0.20 from batch to batch. In terms of intermediate salt crystallization, the resulting uniformity coefficient (UC) value provides an indication of the uniformity of the sand

particle sizes. A lower UC value indicates a more uniform particle size distribution, while a higher UC value indicates a wider range of particle sizes.

Fineness Modulus tells us what type of sand can be utilized for salt production, the choice between coarse or fine sand depends on the specific requirements of the process since, both coarse and fine sand can be used in different stages of salt production, and their suitability depends on factors such as filtration efficiency, water flow rate, and salt quality.

Coarse sand typically consists of larger particles and has a higher porosity. It is commonly used in the initial stages of salt production, such as in pre-filtration or as a support layer for finer sands. Coarse sand allows for faster water flow rates and efficient removal of larger impurities. It can help prevent clogging of filtration systems by providing adequate space for water movement.

On the other hand, fine sand consists of smaller particles and has a higher surface area per unit volume. It is often used in the later stages of salt production, such as in fine filtration or as a final layer to achieve higher purification levels. Fine sand can effectively capture smaller impurities and fine particles, resulting in a higher quality of salt.

It provides a larger surface area for adsorption and filtration processes, improving the overall purification efficiency. Ultimately, the selection of coarse or fine sand depends on the desired level of filtration, the specific impurities present, and the required salt quality. It is important to consider the specific requirements of the salt production process and consult industry guidelines or experts to determine the most suitable sand size for optimal performance.

Therefore, it is important that a salt bed be finer so as to yield a high purification of the salt product.

2.4 Statistical Analysis of Data

1 – Way Analysis of Variance (ANOVA) was used to determine significant difference in terms of the washed grain size analyzed from different sand beds in Borongan City. Also, mean/average computation was used.

3 Results and Discussion

Four (4) sand samples were taken from four (4) sampling location around Borongan City which were considered for its sand beds, namely, Baybay, Lalawigan, Punta Maria and in Cabong area. The sands collected from these locations were subjected to physical characterization in terms of its color, density, texture, sand structure, the following results were obtained.

3.1 Physical Properties

Table 1. Physical Properties of Sand Samples

Sand Samples	Color	Density (g/cc)	Texture
Baybay	Dark Gray	1.52	Sandy
Cabong	Dark Gray	1.50	Sandy
Lalawigan	Very Dark Gray	1.52	Sandy
Punta Maria	Reddish Yellow	1.53	Sandy

It can be observed based on the table above that only the sand coming from Punta Maria has a lighter coloration than those sands coming from Cabong, Lalawigan and Baybay areas. This is because the three previously observed areas are the once stretching the coastlines of Borongan City, whereas Punta Maria is situated outside the urban proper and that, it is separated from the coast due to its rocky location. This implies that the sand in Punta Maria area is lighter in color than those other 3 locales.

In terms of the samples' density, it can be seen that all the sand samples have almost identical density, only separated by a ± 0.01 differential. However, this data is similar to what a density of sand would be like, because the density of sand is around 1.52 g/cm^3 (Vitz, et al., n.d.). Therefore, this data coincides with the data given by Vitz et al. (n.d.).

Based on the standard identification of soil texture, all soil samples were identified as SAND. As the description, supports, when the balls of soil sample were squeezed when added with dropwise of water, it was neither too wet nor too dry indicating sandiness of the samples.

3.2 Sand structure

In terms of structure, it was generally observed that the samples coming from all the sites were SINGLE GRAINED, indicating its sandiness. This observation was further evidenced by the observation of dry samples where the individual particles that do not stick together and always have a loose consistence.

Table 2. Sand Structure and Consistence

Sand Samples	Structure	Consistence
Baybay	Single-grained	Loose
Cabong	Single-grained	Loose
Lalawigan	Single-grained	Loose
Punta Maria	Single-grained	Loose

3.3 Sand consistence

When the soil samples were observed for its consistency, the sand samples coming from all the areas were considered to be LOOSE, in terms of sand consistence. Loose consistence is generally observed for samples with single grained structure including sand.

3.4 Washed Grain Size and Fineness

Using a set of sieves of various pore size, the grain size of the sand coming from all sampling areas were determined via sieve analysis and calculations, the result of the computation which was taken from <https://www.geoengineer.org/education/lab-oratory-testing/step-by-step-guide-for-grain-size-analysis#selected-topics> (n.d.) was then interpreted to determine what type of sand is present for every area sampled.

Table 3. Average Grain Size of the Sand Samples

Sand Samples	Average Particle Size	Sand Type	Fineness Grade	Interpretation
Baybay	0.293	Fine	3	Poor/ Uniformly Grade
Cabong	0.283	Fine	3	Poor/ Uniformly Grade
Lalawigan	0.320	Fine	3	Poor/ Uniformly Grade
Punta Maria	0.440	Medium	4	Poor/ Uniformly Grade

Looking into the table above, it can be observed that the sand sample coming from Punta Maria does not only have a distinguishable color to the other but also in terms of particle size, the Punta Maria sand has a larger particle size than those coming from the other three (3) locations. With this, it can be seen that the three locations, Cabong, Lalawigan and Baybay are good areas for producing salt, although it may have a disagreeable color due to its sand color.

This data can be used as further evidence with the addition of the statements that fine sand consists of smaller particles and has a higher surface area per unit volume. It is often used in the later stages of salt production, such as in fine filtration or as a final layer to achieve higher purification levels. Fine sand can

effectively capture smaller impurities and fine particles, resulting in a higher quality of salt.

It provides a larger surface area for adsorption and filtration processes, improving the overall purification efficiency. Ultimately, the selection of coarse or fine sand depends on the desired level of filtration, the specific impurities present, and the required salt quality.

Therefore, it is important that a salt bed be finer so as to yield a high purification of the salt product.

From the data on Sieved Grain Size Analysis, uniformity coefficient or fineness modulus was calculated; additional information from <https://www.geoengineer.org/education/laboratory-testing/step-by-step-guide-for-grain-size-analysis#selected-topics> (n.d.) was used to effectively measure uniformity of sand from various locations in Borongan City. It was calculated that the fineness modulus or uniformity coefficient from all the sand samples were 4 which is interpreted as uniformly graded or consist of uniform grain diameter. In the uniformity assessment, it is stated that when the fineness number or uniformity coefficient is greater than 4, the soil is classified as well graded, whereas when fineness number or uniformity coefficient is less than 4, the soil is classified as poorly graded or uniformly graded.

With the given data, it can then be advised that having a uniform sand bed is crucial for salt production. As stipulated, it is important that a salt bed be finer so as to yield a high purification of the salt product. Therefore, all sand beds sampled can be a good area for salt production, but if we recur to the color, which may affect the salt products, it is suggested that salt production be conducted on all the sand area regardless of their color because of the uniformity in other sand properties of all the sand beds sampled.

3.5 Significant Difference Testing

Significant difference testing was also calculated to determine if there is a significant difference on the sieve size analysis of the sands taken from the four (4) different sand beds in Borongan City. 1 – way ANOVA was used, the ANOVA table can be seen below.

Table 4. ANOVA Table

Sources of Variation	df	Sum of Squares	Mean Squares	F – value	
				Computed	Tabular
Between groups (K-1)	3	0.0457	0.0152	0.217	4.07
Within groups (N-1) – (K-1)	8	0.5613	0.0701		
Total (N-1)	11	0.607			

$\alpha = .05$

Since the F-computed value of 0.217 is lower than the F-tabular value of 4.07 with 3 and 8 degrees of freedom (df) at .05 level of significance, we accept the null hypothesis, indicating that there is no significant difference in the grain size of the sands coming from the four (4) different sand areas in Borongan City, namely, Baybay, Cabong, Lalawigan and Punta Maria. This means that all 4 sites have similar grain size which is also graded as uniformly in relation to the fineness modulus which indicates that the sands in these areas are fine to medium.

4 Conclusions

Based on the results of the sand analysis of the four (4) representative sand samples, the following are concluded:

1. The sands coming from Baybay, Cabong and Lalawigan are grayish in color, while the sand from Punta Maria is yellowish. All sand samples are sandy in terms of structure, single-grained and are loosely consistent.
2. In terms of sand type, Baybay, Cabong and Lalawigan are fine sand, while the sand from Punta Maria is medium sand. Fineness modulus indicates that all sand samples are uniformly graded. This means that they have uniform consistency all throughout.
3. There is no significant difference in the grain size of the sands coming from the four (4) different sand areas in Borongan City, namely, Baybay, Cabong, Lalawigan and Punta Maria. This means that all 4 sites have similar grain size which is also graded as uniformly.

5 Recommendations

In relation to the data generated and analyzed, as well as the conclusions, the following are recommended by the researchers:

1. Assess other sandy areas on Borongan City with potential of having fine grain consistency which is needed to have a high-grade salt product.
2. Conduct similar study to further support or compete the current results.
3. Conduct additional study on other sandy areas in Eastern Samar which can be possible for salt production using sand beds.
4. All sand beds sampled are ideal for salt production regardless of their color, but because of their uniform grain consistency and structure as well as its fine-medium particle size which are ideal properties to produce high quality salt.

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DM	SOLID WASTE AND ITS CONTROL, RECYCLING
DN	ENVIRONMENTAL IMPACT ON HEALTH
DO	PROTECTION OF LANDSCAPE

THE ROLE OF LOCAL CULTURE AND AUTHENTIC TOURS IN THE SARAJEVO TOURISM IMAGE

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This paper has never been published before.

Abstract: Sarajevo, the capital of Bosnia and Herzegovina, stands out for its distinctive European cultural blend of eastern and western influences, providing unique experiences through its architecture, local products, and cultural diversity. The study examines the top tourism products in Sarajevo based on tourists' impressions. The results highlight city walks, gastronomy, craft tours, and night tours as the most popular tourist activities. Tourists are particularly drawn to the city's vibrant atmosphere and the seamless integration of cultural and historical elements. The study identifies key local dishes and handicrafts, as well as authentic tours, that enhance the tourist experience and contribute to the unique Sarajevo tourism destination image.

Keywords: tourism products, tours, souvenirs, gastronomy, handicrafts, tourism image

1 Introduction

Tourism is a strategic economic sector in Bosnia and Herzegovina, with a total contribution of travel and tourism to the national GDP of 11.4% and to employment of 12.2% in 2023^a (WTTC, 2024), as well as in Sarajevo (its capital city), which is "the most visited destination in Bosnia and Herzegovina, accounting for more than one-third of the overall tourist traffic" (Žunić et al., 2023). Sarajevo attracts visitors worldwide, offering a unique blend of cultural eastern and western elements. Tourism not only fosters economic growth but also plays a crucial role in preserving traditional crafts, customs, and gastronomy. Through direct interaction with the local community, tourists experience authenticity, which significantly shapes their perception of the destination. This perception forms what is known as the destination image. Beerli & Martín (2004) stated that image presents tourists' perceptions of the brand and its associations stored in their memory. Rayesh (2013) defined it as tourists' impressions of a destination with respect to the consumption value. According to Tasci et al. (2007), image is an interactive system of thoughts, opinions, feelings, visualisations, and intentions toward a destination. Huete-Alcocer & Lopez-Rui (2019) identified four types of destination image: organic (opinions of friends or magazines), induced (image proffered by commercial information and marketing sources), affective (visitor's feelings or emotional responses toward the subject), and cognitive (knowledge of a place). Žunić (2022) stated that various attractions influencing factors of destination image, including culture, art and env. atmosphere, while satisfaction, loyalty and Word-of-Mouth promotion are strongly connected as relevant parameters of destination image.

Factors significantly influencing Sarajevo's image discussed in this paper include local culture, authentic tours that provide profound experiences, and interactions with traditional products and communities. Various products of local traditional manufacturing and arts, as well as creative tours, including promotion of culture and art, history, and nature, contribute to the Sarajevo destination image. The quality of tourism products and meaningful stays in a destination that provide unforgettable, pleasant, and distinctive experiences significantly impacts tourist satisfaction. "Quality has a positive influence on satisfaction and intention to return, and that satisfaction determines the willingness to recommend the destination" (Bigne et al., 2001). Tourist satisfaction (as a "feeling of pleasure regarding a product related to expectation" as interpreted by Kotler & Kotler, 2012) is a key determinant of whether visitors will recommend the destination to others or plan future visits, directly impacting its reputation and economic sustainability.

Local products, such as handmade souvenirs, traditional crafts, and gastronomy, are integral to the cultural identity of Sarajevo. Items like copperware and carpets represent centuries-old traditions, while dishes such as ćevapi, burek, and Bosnian coffee offer a sensory connection to the local heritage. These products not only enhance the destination's economic potential but also serve as a medium for storytelling, allowing tourists to engage deeply with the city's history and culture.

Guided tours and travel agencies further enrich tourist experiences by emphasizing authenticity. By providing detailed narratives and personalized insights, guides shape tourists' perceptions, fostering emotional connections with the destination. Memorable experiences are a key factor driving tourists to participate in guided services, as they seek meaningful and personalized interactions that enhance their overall travel satisfaction (Liu et al., 2021). This emotional engagement boosts satisfaction and encourages visitors to share their experiences, thereby strengthening the destination's image (Urry & Larsen, 2011).

Sarajevo's rich traditions and unique cultural identity make it an exemplary case for exploring the interplay between local culture, authentic tours, and the creation of a lasting destination image. By heritage utilization and offering unforgettable experiences, Sarajevo continues to position itself as a must-visit destination for global travelers. Together, these components contribute to a multidimensional visualization of a destination, which plays a critical role in shaping tourist satisfaction, loyalty, and word-of-mouth promotion, enhancing the Sarajevo destination image.

2 Methodology

The research goal is to identify and evaluate local culture and authentic tours as the top tourism products of Sarajevo destination based on the perceptions and impressions of visitors. The local specialties, handicrafts and authentic tours as popular products were rated on the multiple-choice scales. The two forms of survey (e-survey and "face to face") were conducted with 92 tourists, of which 57.6% were foreign tourists and 42.4% domestic tourists (residents of Bosnia and Herzegovina). The online survey was created in Google Forms and implemented on the social media network Facebook, more precisely in groups and pages related to travel operators ("Nomadik travel—Tips for travel," "Travel tips and tricks," "Travel to Bosnia and Herzegovina," "Holiday in Bosnia—Tips and Experiences," and others). The field survey of tourists was implemented in the top three tourist locations: Bašaršija (Old Town), the area in front of the SCC shopping center (Centre), and the terminal on Ilidža. The questions in the surveys refer to the nature of products offered by travel agencies dealing with inbound tourism and knowledge of local specialties, handcraft products, souvenirs, and authentic tours. Additionally, interviews with locals, visitors, and tourism personnel were used to broaden the conclusions. The paper highlights the crucial role of local culture and authentic experiences in tourism promotion and enhancing the destination image.

3 Results & Discussion

Tourists come to the destination to visit the attractions, but there are specific components that enhance the overall tourist experience (local souvenirs, gastronomic offers, tours offered by travel agencies, etc.). Local products can be termed "cultural ambassadors." Local gourmet delicacies, such as Sarajevo ćevapi and Bosnian coffee, provide guests with real experiences and flavors. Žunić & Nežirović (2022) stated that some of the world's most popular chefs rated Bosnian cuisine with the highest score, declaring it as "flavors for everyone's taste". Some tourists (e.g. transit visitors) declared "ćevapi" (top traditional meal and protected gastro-brand of Sarajevo) as the main motive for visiting Sarajevo. Sarajevo has a centuries long

tradition of authentic dishes and beverage preparation. "Different cultures have shaped Bosnian gastronomy: Turkish-Islamic-Oriental, Austro-Hungarian (Central Europe), Old Balkan (Illyrian), Mediterranean and even Celtic culture, as well as modern processes of globalization (McDonaldization and others)" (Žunić & Nezirović, 2022). "For Bosnian cuisine is specific the preparation of roasted dishes under the baking bell ("sač") in the wood & coal-burning oven and embers. Bosnian coffee is served in a copper coffee pot ("džezva") and drink from a small handleless cup („fildžan“), with candy made of sugar syrup („rahatlokum“)" (Žunić & Nezirović, 2022). Taking again the example of Sarajevo kebabs/ Sarajevski ćevapi, as they were ranked 10th on the list of the world's 100 most identifiable national and regional traditional foods by the World Travel Food Atlas, "The TasteAtlas," and were in the top 5 dishes with great potential for preservation; it resulted with their formal conservation as an autochthonous domestic product, following a two-year protection procedure (2022-2024). This is why those products can be considered ambassadors of local culture and tradition, allowing tourists to physically "taste" Sarajevo. When tourists visit markets or traditional restaurants, they gain a deeper understanding of local lifestyles and values.

Aside from the foregoing, organized arrangements, tours, and activities in destinations play an important part in the whole visitor experience. For example, tours that include visits to historical sites are often combined with tastings of local specialties. This tour provides guests with a complete experience—they can explore the attractions, learn stories and historical facts, and then eat local food. In this way, tours serve as the bulk of the visual and sensory experiences, resulting in a comprehensive experience of the destination.

The combination of attractions, products, and tours allows tourists to experience the destination on multiple levels. This comprehensive approach increases their satisfaction and is likely to recommend Sarajevo to others as a desirable destination to visit. Also, the inextricable link between attractions, products, and tours is reflected in economic benefits. Selling local products and organizing tours directly contributes to the local economy (restaurants, artisans, and guides make a profit).

The most popular tours that make Sarajevo an appealing destination for visitors from other cities in Bosnia and Herzegovina and around the world will be discussed below.

Authentic tours creatively entitled by symbolic or metaphoric names mostly due to the sellers competition (Fig. 1) are created on key elements that define the image of the Sarajevo destination regarding the most remarkable cultural and natural attractions and events: the Olympic city (host of the world sports event - the 1984 Winter Olympics); bridge of natural and urban environment (a city with a "green ring" or mountainous environment in which there are numerous protected natural areas not far from the center); the fusion of East and West - multiculturalism (Christianity, Islam, Judaism); a city of world history (assassination of Prince Ferdinand - reason for World War I); gourmet city (dishes for everyone's taste); a city with a famous dark history (the longest siege in Europe); craft town (local culture, creativity, and craftsmanship); the city of the former Yugoslavia (formerly a mighty Balkan republic); a city with contrasting atmospheres (various cultural zones and day-night), among others.

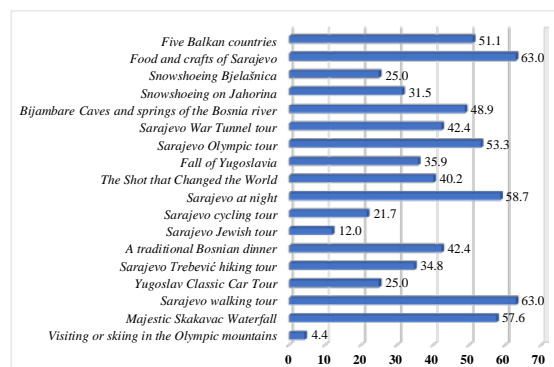


Fig. 1 Tourist preferences for Sarajevo tours offered by travel agencies (%)

Before analyzing the tourists' responses to the question of which tours they like in Sarajevo, it is important to note that the respondents had the opportunity to research tours on the Internet before providing their answers, allowing them to obtain detailed information about the available options, compare various offers, and make decisions based on their interests and preferences. Such an approach makes sure that the responses are representative of tourists' true interests and preferences, as they are the result of a conscious and educated decision. This was done to ensure that the survey findings provide a credible insight into the popularity of the different tours and can help travel agencies to better adapt their offers to the wishes of visitors in the future. It is also important to point out that tours appear under different names in Bosnia and Herzegovina and in other countries. This should be kept in mind when searching and planning, as different names can affect the visibility and attractiveness of tours for potential tourists. Understanding and adapting the terminology used in tour promotion can help travel agencies to better reach an international audience and ensure that their offer is easily recognizable and attractive to tourists from different parts of the world.

The Fig. 1 shows that the majority of tourists prefer walking around Sarajevo (63%), learning about gastronomic specialties and crafts (63%), and exploring the city at night (58.7%). The high percentage of tourists who prefer walking around the city suggests that they are interested in the immediate experience of the city. Walks allow tourists to explore historical and cultural sights, get to know local customs, and feel the atmosphere of Sarajevo in a relaxed way. The popularity of tours that incorporate learning about local crafts and cuisine demonstrates that tourists seek to immerse themselves in the destination's real experience. Gastronomy and traditional crafts represent an important part of heritage, and cultural tours like this offer tourists the chance to try local food and learn about traditional ways of preparing food and making handicrafts. Such experiences often include visits to local markets, workshops, and catering establishments where tourists can interact directly with the hosts. Night tours, which are also highly ranked, suggest that travelers want to experience Sarajevo in the evening. The city has a new feel at night, with lit landmarks, bustling streets, and exciting nightlife, and night tours can include trips to iconic places with panoramic views of the city.

A large number of votes were also received by the tours related to the visit to the Skakavac waterfall (57.6%), followed by the Olympic tour (53.3%), as well as the tour of spring of the Bosna River and the Bijambare caves (48.9%). This shows that tourists appreciate the natural beauty surrounding Sarajevo. The Skakavac waterfall, located in the immediate vicinity of the city, offers a beautiful natural environment, ideal for hiking and escaping from the hustle and bustle of the city. Visits to spring of the Bosna river and Bijambare caves are also popular among tourists, which highlights the interest in natural attractions around Sarajevo. Bijambare "is a popular Bosnian green site with rising tourist appeal" (Žunić, 2022). "Bijambare is getting more tourist interest lately because of its positive image that is highly influenced with the recent structure of visitors, mostly

Arabs who longing for "green motives" (Nezirović et al., 2017). Spring of the Bosna river, known for its springs and idyllic landscapes, and Bijambere caves, with impressive geological formations, offer tourists a unique experience. "The Bijambare Caves are rare and representative karst and speleological phenomenon" (Nezirović et al., 2017) in the Sarajevo surroundings on the northeast area of Black River plateau. "PL Biambare is attractive to visitors who are interested in speleology, walking in nature, bicycling, riding, hiking, alpinism, fishing, hunting, skiing, collecting medicinal herbs and mushrooms. The protected area is recognized by the rare and unique natural resources with its high scientific and tourism value. The greatest attraction is Bijambare Cave, which is full of striking cave formations (stalactites, stalagmites, curtains, basins, pillars...) and about 400 meters of the cave are open to the public." (Nezirović et al., 2017). According to Žunić (2022), satisfaction with pleasant environment of Bijambare and positive experience, loyalty and WOM recommendations are the highest among visitors from the Middle East region (Kuwait, Bahrain, and UAE). Furthermore, a significant percentage of tourists are interested in the Olympic Tour, which includes visits to the sites used for the 1984 Winter Olympics. These tours offer tourists a unique opportunity to get to know the rich sports history of the city, as well as to visit the mountains Bjelašnica, Igman and Jahorina, as well as the Olympic Museum.

Gastronomy features on numerous different tours, and each garnered a relatively high number of votes from travelers, indicating the strong attraction and popularity of culinary experiences among Sarajevo visitors. This finding underscores the importance of including local cuisine in tourist packages because authentic dishes and gastronomy excursions assist visitors to gain a deeper understanding of the destination's culture and traditions. The study of Žunić and Nezirović (2022) also found positive results toward the overall satisfaction with gastronomy attributes and gastronomy as a travel motive, with an excellent rating of the gastronomic supply, accounting traditional Bosnian dishes as an important brand and vital part of tourism supply. Gastronomy and tours of cultural and historical monuments are often connected through thematic tours that provide a comprehensive experience of the destination.



Fig. 2 Authentic and preserved gastro-brand "Sarajevski ćevapi" – the most popular traditional meal in Sarajevo (Authors. Photo by The World Travel Food Atlas, 2024)

"The shot that changed the world", also known as "Gavrilo Princip Tour", received less than half of the votes from the total number of surveyed tourists (40.2%); however, it should be taken into account that foreign tourists are more interested in this tour, as domestic tourists are mostly familiar with the events and have already visited the Latin Bridge, the monument to Gavrilo Princip, and the Sarajevo 1878-1918 Museum. "Gavrilo Princip assassinated Archduke Franz Ferdinand, heir to the Austro-Hungarian throne, and his consort, Sophie, Duchess von Hohenberg (née Chotek), at Sarajevo, Bosnia and Herzegovina, on June 28, 1914" (Britannica, 2024); the incident "*Sarajevo Assassination*" led to the beginning of the First World War (1914-1918). Foreign tourists, on the other hand, often come to Sarajevo precisely because of the historical importance of this event. For them, the "Gavrilo Princip tour" is an opportunity to see firsthand the places where world historical events took place and to learn more about the context and consequences of the assassination. Different degrees of interest between domestic and

foreign tourists emphasize the importance of adapting tourist offers to different target groups. While domestic tourists may prefer tours that involve nature excursions or explore lesser-known locations, foreign tourists are often more interested in globally known historical events and landmarks. Understanding these differences can help travel agencies better structure their offers and marketing strategies to attract a wide range of tourists and satisfy their specific interests.



Fig. 3 The Latin or Principov Most (bridge) in Sarajevo, the symbol of the "*Sarajevo Assassination*" (1914)—the trigger of the First World War (Authors. Photo by CA Author)

"The War Tunnel Tour" is also known as the "Tunnel of Hope" and the "Sarajevo Siege Tour—War Tunnel Museum." This tour, with 42.4% of votes, as well as the tours "Fall of Yugoslavia," "Siege of Sarajevo," and "Times of Disaster—War Tour" with 35.9% of tourist votes, are likewise more appealing to foreign than local tourists. "The Sarajevo War Tunnel of Hope" (beneath the International Sarajevo Airport) represents "the unique dark memorial site with international tourism representativeness" (Žunić, In Press), and the reminder of the local creativity and hard struggle during the last War in Bosnia and Herzegovina (1992-1995), specific for the longest siege of the city (Sarajevo) in European contemporary history. A tour of the War Tunnel allows visitors to learn about one of the most difficult and crucial chapters in Sarajevo's recent history. This tour is especially appealing to foreign tourists who are unfamiliar with the details of the siege, whereas domestic tourists, who have often personally experienced the events of the war or learned about them through education and the media, may not feel comfortable visiting the tunnel or some sites and museums related to the siege war events in Bosnia and Herzegovina. Foreign tourists often come with a desire to learn more about the complex history of the Balkans and the breakup of Yugoslavia, which had global implications and attracted international attention. These tours offer an understanding of the conflicts, political instability, and human stories that have shaped the region.

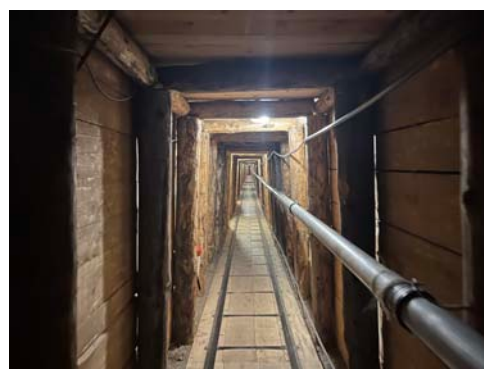


Fig. 4 Sarajevo War Tunnel of Hope—the symbol of the longest urban siege in contemporary history of Europe (Authors. Photo by CA Author)

The majority of 51.1% of tourists voted for the tour called "Five Balkan Countries," which the travel agency "2M Travel" emphasizes as their best-selling tour. This tour includes stops in Macedonia, Serbia, Montenegro, Bosnia and Herzegovina, and Croatia. It begins in Skopje and ends in Zagreb, with two nights in Sarajevo. Tourists are drawn to each of these countries because of their distinct cultural and natural heritage, as well as their rich history. The five countries described above have distinct gastronomic delicacies that entice gourmets; the locals are famed for their hospitality, which enhances the vacation experience. These are the exact reasons that foreign travelers choose this tour.

Tourists' awareness of local products and souvenirs in Sarajevo depends on their interests and the information they received before their arrival. For most tourists, authentic souvenirs such as handmade copperware, traditional textiles, or unique filigree jewelry can be very attractive. It is important that tourists have access to information about local products in order to better understand their value and authenticity.

Figures 5 and 6 show tourist knowledge of local gastronomic, craft, and artistic products, some of which can be bought as souvenirs. Respondents from Bosnia and Herzegovina and nearby countries differ significantly from those from faraway countries. Locals and tourists from the region are much more familiar with local products, which include Bosnian coffee, kebabs (ćevapi) and other meat dishes from the spit and grill, dolma and sarma, pies, traditional sweet dishes, and Bosnian rugs. Other foreign tourists are less familiar with the listed items, but Bosnian coffee and kebabs (ćevapi) are the most well-known.



Fig. 5 Knowledge of local specialties, craft products and souvenirs by foreign tourists in Sarajevo (%)

According to Fig. 5, Bosnian coffee (19.6%) and Sarajevo's ćevapi (17.4%), as well as Bosnian carpets (11.6%), are the most popular local specialties and handcrafts among foreign tourists. The popularity of Bosnian coffee and Sarajevo kebabs (ćevapi) highlights the preserved traditions of Bosnian cuisine and hospitality, as well as the potential for gastronomic tourism based on local offers. When famous American actor Kirk Douglas (Michael Douglas's father) visited Sarajevo in 1984 for the Winter Olympics, he stated that he was also particularly motivated to experience popular traditional dishes, Sarajevo's ćevapi and Bosnian coffee, in an authentic Bosnian environment. Sarajevo's traditional gastronomy has a global commendable reputation and is one of the tourism supply's most compelling draws.

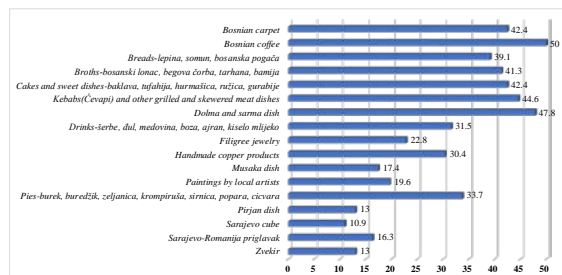


Fig. 6 Knowledge of local specialties, craft products and souvenirs by locals and resident tourists in Sarajevo (%)

The Bosnian carpet, with its rich artistic ornamentation and color, combines the influences of the Orient/Far East and indigenous Balkan elements, with "akrep" for the central motif. Various sources interpret "akrep" differently: some associate it with the turtle from ancient religions and the influence of Kazakhstan and Azerbaijan, while others associate it with the scorpion from Zoroastrianism and Persian influence, which shared elements with Balkan Illyrian beliefs and folk practices. The National Museum of Bosnia and Herzegovina is home to the rare collection of more than 100 samples of Bosnian carpets.



Fig. 7 Bosnian carpet with its ancient symbolic motif of "akrep" (marked with green circle), the National Museum exhibition

It is concerning that some of the responses provided in this survey question, such as Sarajevo cube, zvekir, filigree jewelry, and Sarajevo-Romanija priglavlak, are less familiar to tourists. For example, "zvekir" is a traditional iron ring bell that may still be found on the gates of old Bosnian houses in the old town of Sarajevo. It symbolizes the city, craftsmanship, and power, as well as welcoming well-meaning visitors and hospitality. In the field of Bosnian diplomacy, it serves as an appropriate commemorative gift for foreign delegates and guests. However, it is concluded that these products are not adequately promoted on online platforms, brochures, and other locations where travelers look for information on gifts or even destinations in general. Also, if these products are poorly represented in local souvenir shops frequented by foreign tourists, there is less chance that tourists will be familiar with them. The display of magnets imported from other countries or cheap imported jewelry should not be the first and main thing that tourists notice. Tourist workers should make an effort to promote and present as many local and authentic products as possible. Furthermore, foreign tourists may be unfamiliar with the cultural importance or tradition associated with these things, so a lack of context may diminish their motivation to explore or acquire these souvenirs. As a result, it is conceivable that travel firms, guides, and local organizations do not devote adequate attention to educating tourists about various local items. Tourist tours should incorporate these products, increasing their visibility among tourists. For example, when visiting Umoljani, the guide's story about wool spinning, knitting, and the creation of woolen socks may pique tourists' interest, including creative craft workshops as well, prompting them to see and purchase wool products.



Fig. 8 Zvekir, a traditional iron ring bell—the urban symbol of craftsmanship, power, and hospitality
(Authors. Photo by Tourism Association of Canton Sarajevo)

4 Conclusion

The research underscores the significant role that local products, tours, and authentic experiences play in shaping the overall tourism image of Sarajevo. Local products, especially gastronomic delicacies like Sarajevo ćevapi and Bosnian coffee, serve as cultural ambassadors, offering tourists a tangible connection to the local culture and traditions. Tours that combine visits to historical sites with tastings of local specialties provide a comprehensive sensory experience, helping tourists engage more deeply with the destination.

This study also highlights the importance of walking tours, gastronomy-focused experiences, and night tours as top preferences among tourists, suggesting that visitors seek a direct and immersive experience of Sarajevo. Additionally, natural attractions such as the Skakavac waterfall, the spring of the Bosna River, and the Bijambare caves attract tourists who appreciate Sarajevo's natural beauty, while the Olympic tour reflects interest in the city's sports history. Detailed research on the differences in preferences for visiting certain sights, as well as the differences in preferences for buying arrangements and souvenirs, among domestic and foreign tourists, can help travel agencies adapt their offer to different markets.

The study concludes that there is a need for more marketing of real domestic products and souvenirs, such as filigree jewelry, traditional fabrics, and unique handicrafts, which are frequently underrepresented in local souvenir shops and on digital platforms. Many tourists, especially those from other countries, are unfamiliar with these products because of a lack of visibility and understanding of their cultural and historical importance. Instead, shops often display mass-produced or imported items, overshadowing authentic local crafts. Future research should be directed towards revealing the percentage of information about the products that the destination Sarajevo offers. In addition, it is necessary to find out how much interest tourists have in such products. To solve this, it is crucial that tour guides, travel agencies, and local businesses actively educate tourists about the value and meaning of these traditional products. Integrating these items into tourist tours, where guides provide context about their manufacture and cultural significance, can pique tourists' interest and increase their likelihood of purchasing these authentic souvenirs.

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Primary Paper Section: D

Secondary Paper Section: AC, AK, AL

G AGRICULTURE

GA	AGRICULTURAL ECONOMICS
GB	AGRICULTURAL MACHINES AND CONSTRUCTION
GC	PLANT GROWING, CROP ROTATION
GD	FERTILIZATION, IRRIGATION, SOIL TREATMENT
GE	PLANT CULTIVATION
GF	DISEASES, PESTS, WEEDS AND PLANT PROTECTION
GG	ZOOTECHNICS
GH	NUTRITION OF FARM ANIMALS
GI	FARM ANIMAL BREEDING AND FARM ANIMAL PEDIGREE
GJ	BDISEDAISES AND ANIMAL VERMIN, VETERINARY MEDICINE
GK	FORESTRY
GL	FISHERY
GM	FOOD INDUSTRY

ANALYSIS OF THE RESULTS OF MANAGEMENT OF PRODUCTIVE AND ECONOMIC RESOURCES ON ORGANIC FARMS SPECIALIZING IN BEEF CATTLE PRODUCTION

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Abstract: Competitiveness drives innovation, including in agriculture and the food economy. Organic farming, aligned with EU sustainability goals, responds to rising consumer demand for healthy food and environmental protection. It offers a viable option for small and medium-sized farms in the EU. This article examines resource management in organic beef cattle farms in Podkarpackie, Poland, from 2015 to 2021. Farms with over 20 cows had the highest beef production and income, while smaller herds earned less. Larger farms also faced significantly higher costs. However, profitability was not directly linked to herd size.

Keywords: Poland, organic farms, meat cattle production, economic resources management

1 Introduction

Competitiveness largely determines innovation in the modern economy, and this relationship also applies to agriculture and the food economy. In the agricultural sector, especially in the context of the implementation of the concept of sustainable development, production methods that effectively implement the assumptions of this approach are becoming increasingly competitive. Organic methods of agricultural production, which are based on management in accordance with the natural requirements of the soil, plants and animals, fit perfectly into the concept of sustainable development (Komorowska, 2009). Organic farming, in addition to producing high-quality foodstuffs, performs many important functions. It promotes the protection of groundwater and the preservation of the natural landscape, and supports the protection of biodiversity in both production areas and neighboring areas. In addition, organic farming effectively manages natural resources, contributing to the preservation of biological balance in the natural environment, and also supports the maintenance of soil fertility and the protection of the environment from pollution and contamination of agricultural origin (Oerly et al. 2022).

According to Feledyn-Szewczyk and Kopinski (2024), increased public awareness of the negative effects of modern economic and agricultural development is leading to increased consumer expectations for healthy food quality and environmental protection. In response to these needs, the European Union's Common Agricultural Policy focuses on improving the quality of food products, taking into account environmental protection. As a result, stringent requirements have been placed on farmers in recent years in areas related to environmental protection, animal welfare and food safety. One of the key elements of this policy is the promotion of organic agricultural production, which is justified both by the positive impact of organic farming on the environment and the growing demand for organic products (Başer, Bozoğlu 2023).

Today, organic production is becoming an important alternative for small and medium-sized farms in European Union countries. However, it is not an easy activity. The multiplicity of legal regulations, the need for record-keeping and control mechanisms require not only a high degree of consumer awareness, but also considerable expertise (Tyburski, Żakowska- Biemans 2007).

One of the specific activities within the organic farming system is raising beef cattle. Organic rearing of beef cattle is determined by a number of factors, which should be considered individually depending on what conditions a farm has. Large organic farms with a large acreage of meadows, especially pastures, where

animals can graze from spring to autumn, are predisposed to raising beef cattle, while it seems less effective to use this type of production on smaller farms with limited land resources (Kućević et al. 2023). In order to eliminate the use of mineral fertilization on permanent grasslands, it makes sense to raise ruminants on them in order to keep them in a high culture and obtain adequate yields. Raising beef cattle can help maintain the ecological function of grasslands, while also contributing to high-quality beef livestock. In recent years, permanent grasslands have been used for agricultural production only 60% of the time, which is a limiting factor for the source of the cheapest roughage (Szumiec et al. 2018).

A producer, engaged in raising meat cattle, should have knowledge of the trends currently occurring in the market. Raising beef cattle is a direction of production advisable for farmers who do not have a lot of capital, have little opportunity to receive cheap loans and have adequate agricultural land, while lacking cheap labor. Organic beef production based on pasture can be supported by EU subsidies for permanent grassland, as well as loans, which gives the opportunity to start the business with relatively low financial outlays (Szarek and Konopka, 2013).

By reducing the cost of feeding (maximum use of pasture), maintenance, as well as labor inputs, the chances of profitability of raising beef cattle are significantly increased. Winter feeding should be based on fodder produced on the farm (e.g. green fodder, hay, straw, root crops, cereals).

The development of the beef market at the national level should be supported by increasing its consumption, as well as providing better conditions for farmers engaged in this line of production, making it more efficient. The most important of the factors that have a significant impact on the growth, development, healthiness and productivity of beef cattle kept on organic farms is the diet. Of greatest importance is pasture feeding, which should be supplemented with hay and straw. At the end of the grazing period, it is recommended that calves be fed concentrate feed. In winter, on the other hand, feeding should be based mainly on roughage, with small amounts of concentrates and mineral supplements. In order to be able to talk about the profitability of raising beef cattle, it is necessary to reduce not only the cost of feeding, but also the labor input. This is only possible in breeding where pasture is maximally utilized and winter feeding is based on farm feed (Pomykała, 2011; Kilar et al. 2023).

Beef farms are characterized by a fairly large capital requirement, a sizable contribution of own funds, a small optimization of production, which is associated with the purchase of a fairly large number of animals and the simultaneous provision of an adequate feed base for them (Li and Wang 2023). Factors determining success in beef production can depend on or be independent of the farmer. The first group of factors includes the rate of fattening, the genetic value of the animals and the size of the herd, while the second group of factors includes the prosperity of the market, i.e. the purchase price of the raw material, which should cover the cost of producing livestock. The level of purchase prices is influenced by the situation on the EU market and the relationship of the zloty to the euro, as more than 80% of domestic production is exported (Balcerak, 2014).

Currently, Poland has a small number of beef cows and heifers, which contributes to its insignificant impact on the scale of beef production and quality. Calves for fattening, both in our country and in other European countries, are obtained primarily from herds of dairy cows (Neja, 2014). The efficiency of beef cattle breeding and production is determined approximately 60-65% by calf rearing and reproduction, 30-35% by rearing technology, and 5% by breed (Adamski and Greis, 2012; Terry et al. 2021).

2 Purpose and methods of the study

The purpose of the study was to analyze the results of the management of productive and economic resources on organic farms keeping beef cattle and specializing in the production of slaughter livestock in the Podkarpackie Province in 2015-2021. Production indicators of farms focused on raising beef cattle were analyzed. These were: production potential, assessment of production profitability and assessment of efficiency of the use of production factors.

The analysis of production performance was based on the compilation of data on labor inputs, agricultural land and capital resources. Assessment of production profitability was used to check the amount of income and costs earned by each farm group in relation to the average annual cow herd size. Evaluation of the use of factor efficiency consisted of comparing the amount of hours earned and land owned in a given cow herd size group with the amount of profit earned and beef livestock produced.

The empirical material for the study consisted of self-reported survey data from 42 individual certified organic farms keeping beef cattle and specializing in the production of slaughter livestock located in the Subcarpathian province. The size of the cow herd on the surveyed farms ranged from 3 to 35 head. The most numerous group were farms with a cow herd of 6 to 10 head. The smallest number of farms was in the group with more than 30 head of cows. The research was conducted in 2015 - 2021, and analyzed the parameters of the average annual number of beef cows, labor inputs, the amount of agricultural land, the amount of capital held, the amount of beef livestock produced, the income achieved and the costs. Farms for the purpose of the study were divided into groups, according to the criterion of the average annual number of meat cows. This division was considered appropriate, since the number of cows kept on the farm is the main factor for reproducing herd size. This is especially important on organic farms, where the ability to purchase animals from outside certified farms is fraught with procedures and a period of adjustment to the requirements for organic farms. The region covered in the study is southeastern Poland - the Podkarpackie Voivodeship.

The research used the technique of face-to-face interviewing, and questionnaires specially designed for the research in electronic form were used as a tool. Production intensity was measured by the amount of direct and total costs (PLN) incurred per hectare of farmland, and cost efficiency by the value of production obtained per 1 thousand PLN of costs incurred. With the help of indicators of land productivity (value of production in PLN/1 ha of agricultural land) and productivity of labor inputs (value of production in PLN/1AWU), as well as profitability (i.e. value of farm income in PLN/1 ha of agricultural land), the efficiency of farm production factors was determined. The share of subsidies in farm income (%) was analyzed. Basic measures of economic efficiency were calculated in accordance with the methodology adopted by the Institute of Agricultural and Food Economics - National Research Institute in Warsaw (Szumiec et al. 2018).

3 Test results

Traditional measures of farm size, include those based on measuring the three primary factors of production: land, labor and capital. Land is the primary factor of production, and is often a measure of farm size. When operating a business focused on raising beef cattle, land is the necessary feed area. Labor, on the other hand, is the intellectual and physical force that is the organizer and creative element of the production process.

Capital characterizes the objectified labor involved in the production process in the form of tools, machines, buildings and labor objects. Between the elements of the production process there are interactions often based on the principle of feedback. The appropriate arrangement of all the elements that make up the production process allows to achieve favorable economic results. Different proportions of the factors of production influence the

choice of the appropriate technology. The designated manufacturing techniques can be more earth-, labor- or capital-intensive or economical (Szarek J., 2023).

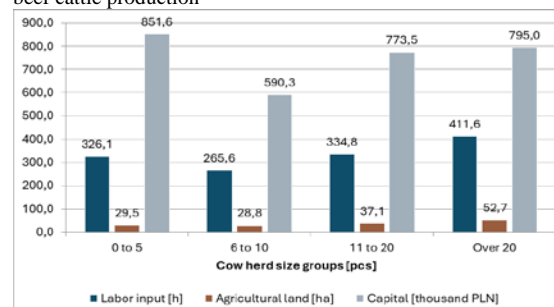
Production potential determines the amount of resources (productive forces) available to the farm that can be used for production. In addition, it determines production, income and development opportunities. An important element that co-determines the production potential of the agricultural sector is the number of people employed in it. This is because the level of employment affects labor productivity and efficiency.

The farms evaluated were characterized by labor inputs similar to their size. Slightly higher values were obtained by farms with the smallest number of cows. This was probably due to the low level of mechanization of work.

In terms of value potential, fixed assets come to the fore. They are a component of the technical equipment of farms. They are the material and technical base that makes production possible. On the degree of their use largely depends the volume of production achieved. The average level of equipment in fixed assets (capital) was in the range of 590.3 - 851.6 thousand zlotys. The amount of capital owned was shaped independently of the size of farms, the highest value was obtained by farms in the group with least number of cows. Similar results were obtained by (Szmidt 2016), who found that small organic farms had the highest level of fixed assets.

Figure 1 shows the average values of the production potential indicators of the surveyed organic farms specializing in beef cattle production.

Fig. 1: Characteristics of the average values of production potential indicators of the studied organic farms specializing in beef cattle production



Source: own elaboration

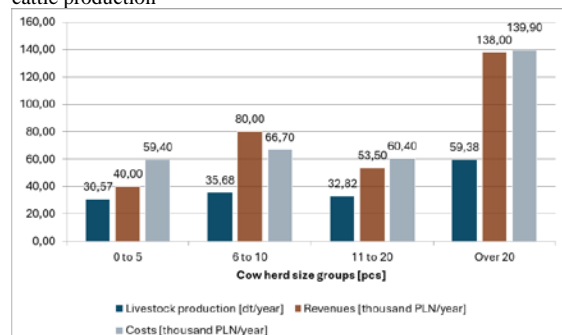
On the evaluated farms in the groups keeping more than 5 cows, the values of individual indicators increased with increasing herd size. The group of the smallest farms differed significantly from the other farms studied. The high involvement of labor inputs and the capital held may indicate the investments made to develop these farms. Analyzing the data in Figure 1, it should be noted the disproportionate ratio of the area of agricultural land of the smallest group of farms to the equipment in fixed assets. Statistical analysis, on the other hand, showed a high correlation between the size of agricultural land and the size of capital. In this case, agricultural land resources do not make a large contribution to capital. The interdependence between labor input and agricultural land size is moderate. It indicates a proportional degree of technical equipment of farms with productive means in relation to the scale of production. Due the larger scale of production on the other farms, the burden of 1 hectare of agricultural land on the cost of fixed assets compared to the small scale of production is significantly smaller.

The volume of beef livestock production, costs and income of organic farms were also evaluated. The results obtained were compared with those obtained from the entire pool of farms participating in the Polish FADN. (https://fadn.pl/wp-content/uploads/2023/04/Wyniki_2021_eko_czesc1.pdf as of 23.05.2024 pp. 58-64). According to the European System of

Accounting Data, in the 2021 fiscal year Polish organic farms obtained similar results to those obtained in this study.

Figure 2 shows the average values of production profitability indicators of organic farms specializing in beef cattle production.

Fig. 2: Characteristics of average values of production profitability indicators of organic farms specializing in beef cattle production



Source: own elaboration

Indicators of production profitability, profitability and the relative amount of costs were also evaluated. Table 1 shows the characteristics of the indicators of production profitability and the relative amount of costs on the surveyed organic farms specializing in beef cattle production in 2015-2021.

Tab. 1: Characteristics of the indicators of production profitability and the relative amount of costs on the studied organic farms specializing in the production of beef cattle

Cow herd size groups [pcs].	Livestock production [dt/year].	Revenues [thousand PLN/year].	Costs [thousand PLN/year].	Production profitability	Relative Cost Index
0-5	30,57	40,00	59,40	67%	149%
6-10	35,68	80,00	66,70	120%	83%
11-20	32,82	53,50	60,40	89%	113%
>20	59,38	138,00	139,90	99%	101%

Source: own elaboration

The profitability index provides information on the extent to which production revenues cover costs. This indicator was calculated based on the formula:

$$\text{Production profitability index} = \text{production/cost} \times 100.$$

On the surveyed farms specializing in beef cattle production under the organic farming system, for each herd size group, the production profitability rate was 67% (0-5 cows), 120% (6-10 cows), 89% (11-20 cows), 99% (over 20 cows), respectively.

The relative cost index indicates what percentage of total production is direct costs. This indicator was calculated based on the formula:

$$\text{Relative cost ratio} = \text{cost/production} \times 100.$$

On the surveyed farms specializing in beef cattle production under the organic farming system, the relative cost ratio for each herd size group was 149% (0-5 cows), 83% (6-10 cows), 113% (11-20 cows), 101% (over 20 cows), respectively.

The profitability index in only one of the groups of evaluated farms indicated that production costs were covered by income. This indicates the negative financial result of organic farms with both small and larger cow herds. Statistical elaboration of the data indicates moderate correlations between the volume of beef livestock production and the volume of income and costs. In contrast, the interdependence between the volume of income and the volume of costs is high. The group of farms with 6-10 cows shows an improvement in the economic result. The index of the relative amount of costs is also low for them. Farms in this group involving low financial outlays obtained a more favorable economic result in relation to the other groups, both those with

smaller and larger herds. The results obtained from larger farms are similar to those presented by Skarzyska et al (2008). It was indicated that increasing the scale of production brings positive financial results only if it is associated with adequate progress in production economics. This may indicate that the evaluated farms with larger cow herds have some limitations in this regard. These may be related either to the sources of inputs for production or to the sale and timing of beef livestock, the prices of which are prone to seasonal fluctuations. The farms with the smallest average annual cattle population achieved the lowest production profitability. The profitability index was relatively low, while the index of the relative amount of costs directly related to production was quite high.

The presented assessment of profitability, the magnitude of costs and revenues made it possible to assess the profitability, or as a result the unprofitability, of the production of the organic farms analyzed. During the research period, the results were certainly influenced by both the production potential of the farms, which includes the resources of land, human labor and capital, the way they are used, and dependence on external market and environmental operating conditions. In summary, these interactions resulted in varying degrees of change in the level of production, direct costs and earned income. Three of the four groups of farms (with a head of 1 to 5, 6 to 10 and more than 20 cows) achieved a negative financial result. One of the groups (with a head of 11 to 20 cows), represented by the largest number of farms (17), achieved a positive economic result. The results presented by Komorowska (2019) also indicate that farms oriented to raising slaughter cattle achieved a negative economic result. Only subsidies for the activity made it possible to offset the negative financial balance and increase economic efficiency.

The operation of a farm is possible due to the efficient use of the means of production, allowing, as a result, a source of income as well as the possibility of investment. The efficiency of the use of the farm's production factors: land, labor and capital can be determined by the productivity of land (which is determined by the value of production per unit area of agricultural land) and the potential of capital resources (fixed and current means of production, the value of which is represented by total assets).

The following economic efficiency indicators were used to determine the efficiency of factor use:

^ Land productivity (value of production/hectare of agricultural land),

^ Productivity of capital (value of output *100/total assets),

^ Asset yield (family farm income *100/total assets).

Tab. 2: The value of the land productivity index of the surveyed organic farms specializing in beef livestock production by farm group

Cow herd size groups [pcs].	Agricultural land [ha].	Revenues [thousand PLN/year].	Land productivity [PLN/year].
0-5	29,50	40,00	1355,93
6-10	28,80	80,00	2777,78
11-20	37,10	53,50	1442,05
>20	52,70	138,00	2618,60

Source: own elaboration

The above table shows the value of agricultural production per unit of agricultural land. The higher the value of the land productivity index, the more efficiently the agricultural land is used. There were no clear trends in individual groups adequate to the size of the farm. The difference between the weakest and best score was equal to PLN 1,421.85/ha of agricultural land (i.e. 51%). On farms with a weaker score, lower land productivity was due to the generation of low income, less intensive production was carried out there, and agricultural land resources were used less. A study of standard results by Juchniewicz and Zagaja (2023) on organic farms participating in the Polish FADN indicates that land productivity on farms oriented to livestock production was 1,464.84 PLN/ha and 30-50 hectare farms 1,432.15 PLN/ha, respectively. The company's own research indicates more favorable financial results obtained per hectare, that is, an average of PLN 2,066.86 in farms with an

acreage of up to 30 hectares and PLN 2,030.33 in the 37-52 hectare range.

Table 3 shows the value of the capital productivity index on the surveyed organic farms specializing in beef livestock production by farm group.

Tab. 3: Capital productivity (value of production x 100/total assets) on the surveyed farms specializing in organic beef livestock production

Cow herd size groups [pcs].	Revenues [thousand PLN/year].	Capital [thousand PLN].	Capital productivity [PLN/100 of total assets].
0-5	40,00	851,6	4,70
6-10	80,00	590,3	13,55
11-20	53,50	773,5	6,92
>20	138,00	795,0	17,36

Source: own elaboration

Productivity of capital determines the value of output per unit of capital used. To determine it, such measures of capital as the value of total assets, the value of fixed assets or the gross value of fixed assets are used in practice. The potential profitability of capital in agriculture, may differ from the actual profitability. The reason for this may be unused production resources. All fixed assets do not fully participate in the production process and for various reasons do not generate income. Current income is therefore realized only thanks to a certain portion of the used capital at the disposal of the farm. The data presented in Table 3. characterize the magnitudes of capital productivity of the studied organic farms. The discrepancies in the results indicate the varying investment resources spent on fixed assets and production technology. Low capital productivity was recorded in the group of farms keeping up to 5 head of meat cows and from 11-20 head of cows. Compared to farms in the other cow herd size groups, they generated significantly lower income in relation to the funds placed in equity. This could indicate the use of more capital-intensive production methods at the same time as low income.

Table 4 shows the profitability on the surveyed farms specializing in organic beef livestock production by farm group.

Tab. 4: Asset yield (income from family farm x 100/total assets) on surveyed farms specializing in organic

Cow herd size groups [pcs].	Revenues [thousand PLN/year].	Costs [thousand PLN/year].	Income [PLN].	Capital [thousand PLN].	Return on assets [%].
0-5	40,00	59,40	-19400,00	851,6	-228%
6-10	80,00	66,70	13300,00	590,3	225%
11-20	53,50	60,40	-6900,00	773,5	-89%
>20	138,00	139,90	-1900,00	795,0	-24%

Source: own elaboration

The data in Table 4 illustrate the effect of financial expenditures on fixed assets and the size of production-related costs on the total return in the form of income per asset yield. Most of the evaluated farm groups showed a negative financial result. Only one group with an average annual herd size of 6-10 cows per herd showed a positive economic result at an asset profitability level of 225%. Income on most of the organic farms surveyed did not allow them to exceed the profitability threshold. Many farms ended up with a negative financial result. These factors can be considered the main barriers to the development of this industry. In addition to the factors that directly affect the profitability of beef cattle production, the relationship of farms with the market, and the available forms of selling beef livestock, are important. The results of Kociszewski's (2014) study of sales channels for organic agricultural products indicate that among the most common forms of sales is farm direct trade accounting for 70%. (Rated as the most profitable). Just over

30% of farmers sell products through intermediaries to specialized buyers. The fewest farms supply wholesalers, producer groups and nearby stores. A barrier for beef cattle production is the low possibility of direct sales from the farm. What remains is trading with middlemen and receiving cattle through plants that specialize in slaughtering. Factors conducive to overcoming these constraints and at the same time a source of increased profitability for organic farms could be price increases, the development of processing systems and the development of more profitable distribution channels. These constraints are also related to consumer awareness and consumer confidence in products from organic farms.

Based on the results of the analysis of variance, Table 5 shows the dependence of production factors and production effects on farm size.

Tab 5: Dependence of production factors and production effects on farm size (results of analysis of variance) in the surveyed farms specializing in organic beef livestock production

Cow herd size groups [pcs].	Workload [h].		Agricultural land [ha].		Capital [thousands PLN].		Livestock production [kg/year]		Revenues [thousands PLN/year].		Costs [thousands of PLN/year].	
	x	SD	x	SD	x	SD	x	SD	x	SD	x	SD
0-5	326,1	66,9	29,5	15,2	851,6	420,2	3056,7a	990,3	40,0a	8,2	59,4a	21,7
6-10	265,6	131,0	28,8	15,8	590,3	583,3	3568,2a	1192,9	80,0b	30,19	66,7a	27,5
11-20	334,8	82,6	37,1	26,9	773,5	778,3	3282,4a	195,7	53,5a	45,0	60,4a	47,1
>20	411,6	94,4	52,7	7,9	795,0	67,9	5938,3b	1636,0	138,0c	28,8	139,9b	40,3
p												
	0,270		0,360		0,893		0,050*		0,010*		0,033*	

Source: own elaboration

The use of the one-way analysis of variance method, using the Fisher-Snedecor F test along with the assumption of a significance level of ≤ 0.05 , allowed us to reject the null hypothesis of no difference between the mean values. The same letter symbol next to the mean values indicates no significant difference between them in the NIR test (at $\alpha = 0.05$)

The results of the Fisher-Snedecor F-test (test probability values $p < 0.05$) indicate that the farm groups studied were significantly different from each other. The NIR test showed that livestock production is significantly higher on farms with more than 20 cows, compared to livestock production on the other farms. In contrast, earned income is highest on farms with more than 20 cows, significantly lower on farms with 6 to 10 cows, and lowest on farms with up to 5 cows and on farms with 11 to 20 cows. In addition, the study showed that annual costs are significantly higher on farms with more than 20 cows, compared to costs on other farms. The other analyzed variables (labor input, size of agricultural land, size of capital) were at similar levels in all the studied groups of farms.

Based on the value of Pearson's correlation coefficient, Table 6 presents an analysis of the interdependence between production factors and production effects on the studied organic farms specializing in beef livestock production.

Tab. 6: Interrelationships between production factors and production effects (Pearson's correlation coefficient values) in the surveyed farms specializing in organic beef livestock production

Specification	Workload	Agricultural land	Capital	Livestock production	Revenues	Costs
	<i>r</i>					
Workload	1,000	0,480* ¹⁾	0,175 ²⁾	0,406* ²⁾	-0,008 ¹⁾	0,118 ¹⁾
Agricultural land		1,000	0,776* ²⁾	0,433* ²⁾	0,410* ¹⁾	0,469* ¹⁾
Capital			1,000	-0,023 ²⁾	0,370 ²⁾	0,506* ²⁾
Livestock production				1,000	0,525* ²⁾	0,584* ²⁾

Revenues					1,000	0,850* ¹⁾
Costs						1,000

Symbol ¹⁾N = 19, ²⁾N = 15, symbol * indicates a significant correlation (at $\alpha = 0.05$)

Source: own elaboration

The results of the Student's t-test indicate that a significant correlation exists between labor input and agricultural land volume; labor input and beef livestock production volume; agricultural land volume and capital volume; agricultural land volume and beef livestock production volume; and beef livestock volume and revenue volume, among others.

Based on an analysis of the value of the correlation coefficient modulus "r", it should be concluded that the interdependence between the size of agricultural land and the size of capital, and the interdependence between the size of income and the size of costs is high. In addition, the interdependence between labor inputs and the size of agricultural land and the interdependence between labor inputs and the size of beef livestock production is moderate. The interdependence between the size of agricultural land and the size of beef livestock production is also moderate.

4 Summary

Organic farming, by its very foundation, focuses on the production of agricultural products of enhanced biological quality. When using conventional methods, this is not always fully paid attention to. It is common to strive to maximize productivity and profit putting residual effects on the environment in the background. Analysis of the productive and economic performance of farms is based on the need for rational use of all factors of production.

Beef livestock production was higher on farms with more than 20 head of cows. The volume of income was highest in the group of farms with an average annual number of cows above 20 head, and lowest in the groups of 0 to 5 and 11 to 20 head of cows in the herd. The size of costs was significantly higher in the group keeping more than 20 cows. No relationship was found between cow herd size and production profitability. Other variables (labor input, size of agricultural land, size of capital) were at a similar level in all groups of evaluated farms. Fluctuations in the level of the obtained production-economic results within each group of farms indicated the lack of influence of the scale of production on production-economic results. A comparison of factor productivity indicated that the productivity of land resources was relatively higher in medium-sized farms keeping an average of 6-10 cows per year. Production intensity was highest in the group of farms with 6-10 head of cows. Satisfactory profitability was obtained by relatively small farms (6-10 head of cows) compared to the other organic farms surveyed keeping beef cattle and specializing in slaughter cattle.

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Primary Paper Section: G

Secondary Paper Section: AH

I INFORMATICS

IN INFORMATICS

IMPROVING MACHINE LEARNING CLASSIFICATION MODELS FOR ANAEMIA TYPE PREDICTION BY OVERSAMPLING IMBALANCED COMPLETE BLOOD COUNT DATA WITH SMOTE-BASED ALGORITHMS

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The paper was supported by the national project KEGA 014TTU-4/2024 "Intelligent Animation-Simulation Models, Tools, and Environments for Deep Learning."

Abstract: Computer-assisted disease diagnosis is cost-effective and time-saving, increasing accuracy and reducing the need for an additional workforce in medical decision-making. In our prior research, we trained, tested, and compared the accuracies of nine optimizable classification models to diagnose and predict eight anaemia types from Complete Blood Count (CBC) data. This study aimed to improve these classification models by oversampling the original imbalanced dataset with four algorithms related to the Synthetic Minority Over-sampling Technique (SMOTE). The results showed that the validation accuracy increased from 99.22% (Ensemble model) to 99.57% (Tree model), and most importantly, the False Discovery Rate (FDR) for the anaemia type with the highest FDR decreased from 23.1% to 1.5%.

Keywords: Anaemia Types, Classification, Complete Blood Count (CBC), Healthcare Analytics, Imbalanced Dataset, Machine Learning, Oversampling, SMOTE

1 Introduction

Artificial intelligence, deep learning, and machine learning are nowadays used in various fields [1–4] to recognise patterns in data, classify data and predict some outputs. Using modern information technologies in healthcare, driven by artificial intelligence, can improve medical diagnostics, reduce human errors and enhance timely detection [5]. Artificial intelligence, machine learning and deep learning techniques can be used in healthcare, for example, to predict cardiovascular disease [6,7] or diabetes [8,9] or to diagnose cancer [10]. Our research focuses on diagnosing and predicting eight anaemia types from Complete Blood Count (CBC) data. In prior research, we trained and tested nine optimisable classification models to predict anaemia types. Even though our best classification model reached 99.22% overall validation accuracy, the False Discovery Rate (FDR) was very high, 23.1%, for the Leukaemia with the thrombocytopenia category [11]. In the research presented in this paper, our primary goal was not only to improve the overall validation accuracy but, most importantly, to decrease the FDR for all the categories and, with that, to develop a more reliable machine learning classification model for anaemia diagnosis. To reach our goal, first of all, we oversampled the original imbalanced dataset using Synthetic Minority Over-sampling Techniques (SMOTE) [12–15]. Next, we trained and tested the machine learning classification models with the new datasets and compared the obtained results. Finally, we examined the classification models with the highest accuracies more deeply and developed a MATLAB app for predicting anaemia type from CBC data.

2 Related Research

Anaemia is a condition marked by inadequate red blood cells or haemoglobin, which decreases oxygen delivery to the body's tissues. It is estimated that around 40% of children aged 6 to 59 months, 37% of pregnant women, and 30% of women between the ages of 15 and 49 worldwide are impacted by anaemia [16]. Proper diagnosis and classification of anaemia are crucial for effective treatment. Historically, this process relies on CBC tests and manual evaluations by healthcare professionals, which can be time-consuming and vary due to subjective interpretations. However, recent advancements in data science and machine learning open up new avenues for enhancing the accuracy and efficiency of anaemia diagnosis [17].

Bahadure et al. [5] focused on identifying anaemia and its subtypes using deep learning and YOLO object detection algorithms to analyse microscopic images of blood samples. They highlighted the significance of quality metrics and feature extraction for ensuring precise diagnosis. Their research achieved an accuracy of 97.60% in identifying anaemia and its subtypes on 448×448 resolution images. Similarly, microscopic images of blood samples were used in research conducted by Dalvi and Vernekar [18]. First, they assessed 13 geometric features of each red blood cell; afterwards, they compared five ensemble methods to diagnose anaemia. The results showed that the best performance (overall accuracy: 92.122%, specificity: 95.082%, recall: 79.88%, precision: 80.134%) was reached with the Stacking ensemble method, which combined K-Nearest Neighbours (KNN) and Decision Tree as base learners and Naïve Bayes as stacking learner.

In a study by Airlangga [17] the researchers used CBC data to diagnose anaemia and compare the performance of various machine learning classification models. The results showed that the Decision Tree classifier achieved the highest balanced accuracy score of 94.17%, outperforming more complex ensemble methods. Aditya et al. [19] used CBC results as well to detect anaemia. They compared the accuracies of four machine learning models. The highest accuracy, 99.22%, was achieved with the Random Forest using the Staking CatBoost algorithm. Similarly, CBC results were used in a research by Faraj [20], where six classification algorithms were used on a dataset containing records of 180 women to diagnose anaemia. The highest accuracy, 97.78%, was reached with the Logistic Model Tree algorithm. Also, CBC data was used in a study by Pullakhandam and McRoy [21]. They reached 97% accuracy with six classification models: Logistic Regression, Random Forest, K-Nearest Neighbours (KNN), Gradient Boosting, and XGBoost. The analysis also showed that among all predictors, the low blood level of haemoglobin, the higher age, and the higher red blood cell distribution width were the most critical. Rahman et al. [22] also used the attributes of CBC data to diagnose anaemia. They used gender, age, haemoglobin, count of red blood cells (RBC), packed cell volume (PCV), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), and mean corpuscular haemoglobin concentration (MCHC) as input parameters. They compared the results of 11 machine learning algorithms; the highest accuracy, 95%, was reached with the Logistic Regression classification model. Vohra et al. [23] also used CBC data to diagnose anaemia and classify it into mild, moderate, and severe categories. Except for the original dataset, they used a feature-selected dataset, an oversampled dataset, and a feature-selected and oversampled dataset to train and test six machine learning classification models. For all models, both the hold-out experiment method and the 10-fold cross-validation method were used, and finally, the obtained results were compared. The highest accuracy, 99.35%, was reached with Multilayer Perceptron, using the hold-out experimental method and the dataset oversampled with SMOTE. Yıldız et al. [24] used hemogram data together with general information (such as age, sex, chronic diseases, and symptoms) to diagnose twelve different types of anaemia. They analysed the results of four machine learning algorithms trained and tested on the given dataset. The highest accuracy, 85.6%, was achieved using the Bagged Decision Trees classification model. Kovačević et al. [25] used the KNN machine learning algorithm to predict anaemia. They used gender, age, presence of chronic disease, iron, mean corpuscular volume (MCV), folic acid, haemoglobin, ferritin, erythrocyte count, and vitamin B12 as input parameters to diagnose and classify three types of anaemia with 98.4% accuracy. The study's results also showed that the most relevant parameter was the MCV.

3 Materials and Methods

In this research, we used a publicly available dataset containing CBC data downloaded from Kaggle [26]; and MATLAB R2024b software [27] for data exploration, oversampling, training and testing several machine learning classification models, and calculating the final models' feature importance.

3.1 Dataset

The original dataset [26] contained 1281 observations, 14 predictors from CBC data, and the diagnosis as a categorical target variable. The predictors were the following: the amount of haemoglobin (HGB), the number of platelets (PLT), the count of white blood cells (WBC), the count of red blood cells (RBC), the haematocrit test (HCT), the mean corpuscular volume (MCV), the mean corpuscular haemoglobin (MCH), the mean corpuscular haemoglobin concentration (MCHC), the variability in platelet size distribution in the blood (PDW), the procalcitonin test (PCT), the percent of lymphocytes (LYMp), the percent of neutrophils (NEUTp), the number of lymphocytes (LYMn), and the number of neutrophils (NEUTn). The categorical target variable of the dataset contained nine categories: one for healthy patients and eight for different types of anaemia. The anaemia types were the following: iron deficiency anaemia, leukaemia, leukaemia with thrombocytopenia, macrocytic anaemia, normocytic hypochromic anaemia, normocytic normochromic anaemia, other microcytic anaemia, and thrombocytopenia.

We divided the original dataset into a training set (90% of observations) and a test set (10% of observations). The training set was used to train classification models and to develop four new training sets using SMOTE-related algorithms (Fig. 1). The test set was used to test all our trained models on previously unseen data.

3.2 Data Exploration

Exploring datasets visually with many predictors can be challenging. Nevertheless, Principal Component Analysis (PCA) helps to decrease dimensionality and enhances interpretability while minimising the loss of information. This multivariate method is used to analyse datasets with inter-correlated quantitative dependent variables. The main goal of PCA is to extract important information from the dataset, which is then represented as a set of new uncorrelated variables that sequentially maximise variance. Furthermore, PCA uncovers patterns of similarity among the observations and variables, enabling these relationships to be illustrated as points on maps [28,29]. We used PCA to generate two principal components from 14 predictors and visualise these components in a 2D graph. This method allowed us to visually observe which target categories are similar or different from others.

3.3 Oversampling

An imbalanced dataset, where the distribution of classes is not uniform, can pose significant challenges in machine learning, particularly when certain categories have very few samples. As a result, classification algorithms struggle to predict these underrepresented categories accurately. A straightforward solution to this issue is to increase the number of records in the minority classes [30]. Traditionally, oversampling techniques involve duplicating samples from minority classes, such as Random Over-sampling (ROS) [31]. A widely used method is the Synthetic Minority Over-sampling Technique (SMOTE), which creates new synthetic samples by interpolating between existing minority-class samples [12]. This method has influenced various sampling techniques, including Borderline SMOTE [14], Safe-level SMOTE [15], and Adaptive Synthetic Sampling (ADASYN) [13]. In the research presented in this paper, we used four SMOTE-related algorithms implemented in MATLAB [32] to oversample the original training set, expanding every minority class in the original dataset to 130 samples (Fig. 1). We then used the original and the new training sets to train several classification models and analyse the results.

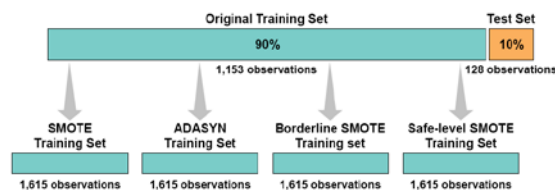


Figure 1: The training sets and the test set used in the research

3.4 Classification

Classification is a supervised machine learning technique that categorises data into predefined classes. In our research, we used several classification models to diagnose and predict eight types of anaemia. To accomplish this, we used the Classification Learner app [33] available in MATLAB R2004b software [27]. The models we employed include Ensemble, Tree, Support Vector Machine (SVM), Efficient Linear, Neural Network, Kernel, K-Nearest Neighbours (KNN), Naïve Bayes, and Discriminant analysis. We trained these models using the original and four oversampled training sets. To optimise the hyperparameters of each model, we applied Bayesian optimisation. Throughout the training process, we implemented 10-fold cross-validation to mitigate the risk of overfitting. Finally, we evaluated the performance of all models using an unseen test set.

3.5 Feature Importance

Although machine learning has significant potential to enhance products and services by quickly and accurately predicting outcomes from data, computers typically do not provide explanations for their predictions. To interpret these machine learning models, model-agnostic methods can be employed [34,35]. In this study, we calculated the permutation feature importance and Shapley importance for the two best classification models to understand how they operate.

4 Results

This section presents the study's findings, highlighting insights gained from data analysis and model evaluation. First, the data exploration results are summarised, including visual representations of the original and an oversampled training set projected onto two principal components. Next, the performance of various classification models is compared to evaluate their predictive accuracy. The analysis then identifies the most important features influencing predictions in the top two models. Finally, a MATLAB application is introduced as a practical tool for predicting different types of anaemia, demonstrating how the developed models can be applied in a user-friendly environment.

4.1 Data Exploration

First, we visualised the number of observations in the original training set for each target category. As we can see on the bar chart (Fig. 2), some target categories contain only a few observations. Using such an imbalanced dataset for training classification models might result in a high False Discovery Rate (FDR) for these categories, making the trained models unreliable for predicting them. To address this issue, we decided to generate oversampled training sets using SMOTE-based algorithms. We aimed to improve the classification models' accuracies and reduce the FDR for the most problematic categories.

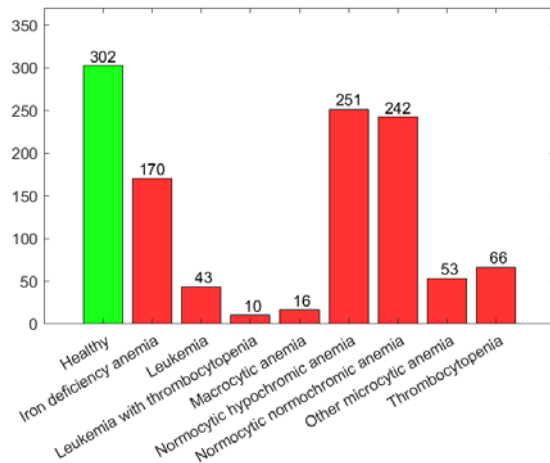


Figure 2: Number of observations by diagnostic categories in the original training set (N=1,153)

The dataset included 14 predictors, making visualisation only possible by using a technique to reduce its dimensions. Therefore, we opted for PCA to represent the target classes visually in a 2D graph. Fig. 3 displays the map of the two principal components for each category. Some classes are more distinguishable, while others, particularly the minority classes, are not visible in the graph.

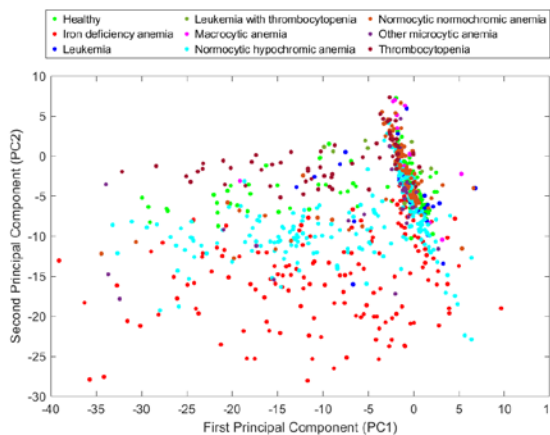


Figure 3: Original training set (N=1,153) projected onto two principal components

We oversampled the original training set by increasing the number of samples in the minority classes to 130 for five categories using four SMOTE-based algorithms [32]. The oversampled categories are Leukemia, Leukemia with thrombocytopenia, Macrocytic anaemia, Other microcytic anaemia, and Thrombocytopenia. While the original training set contained 1,153 observations, each of the oversampled training sets contained 1,615 samples. Fig. 4. shows the training set oversampled with SMOTE [12] projected onto two principal components. When comparing Fig. 3 to Fig. 4, we can observe the impact of SMOTE on the class distribution within the training set, emphasising its role in addressing class imbalance. As a result, more categories are distinguishable on the map; however, some observations from different categories remain close to one another.

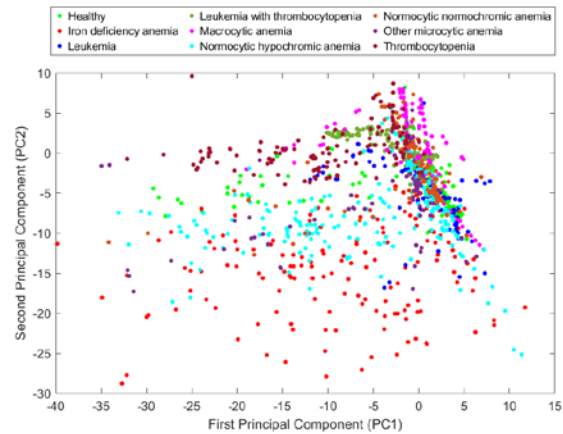


Figure 4: Oversampled (SMOTE) training set (N=1,615) projected onto two principal components

4.2 Comparison of Classification Models

After data exploration, we trained nine optimisable classification models first with the original training and then with the four oversampled training sets. During the training, 10-fold cross-validation was used. Tab. 1 summarises the validation accuracies of the trained models for each training set. As we can see in the table, the highest validation accuracies, 99.57% and 99.50%, were reached with Tree and Ensemble classification models that were trained on the training set oversampled with the standard SMOTE algorithm.

Tab. 1: Validation accuracies (%) of classification models on original (N=1,153) vs. four oversampled (N=1,615) training sets

Model	Training Set				
	Original	SMOTE	ADASYN	Border-line SMOTE	Safe-level SMOTE
Ensemble	99.22	99.50	99.44	99.44	99.38
Tree	99.05	99.57	99.20	99.26	99.32
SVM	91.76	94.61	94.67	94.06	94.67
Efficient Linear	89.51	92.38	92.69	92.57	92.63
Neural Network	88.03	94.55	93.37	94.67	82.54
Kernel	81.35	87.55	87.31	86.87	88.05
KNN	75.80	85.20	84.27	86.50	85.14
Naïve Bayes	67.30	71.02	72.76	73.13	73.19
Discriminant	54.38	59.94	60.50	60.06	58.02

After completing the training, we evaluated each classification model using an unseen test set. The test accuracies obtained are summarised in Tab. 2. For our best models, which achieved the highest validation accuracies, the test accuracy reached 100%, meaning they correctly classified every observation in the test set.

Tab. 2: Test accuracies (%) of trained classification models

Model	Training Set				
	Original	SMOTE	ADASYN	Border-line SMOTE	Safe-level SMOTE
Ensemble	100.00	100.00	100.00	100.00	98.44
Tree	100.00	100.00	100.00	100.00	100.00
SVM	91.41	92.97	92.19	95.31	94.53
Efficient Linear	94.53	93.75	92.97	93.75	92.97
Neural Network	89.06	93.75	91.41	96.09	84.38
Kernel	82.81	82.03	84.38	81.25	84.38
KNN	77.34	74.22	75.78	79.69	71.09
Naïve Bayes	67.19	69.53	67.19	58.59	70.31
Discriminant	52.34	53.12	54.69	53.91	53.91

In the following part of this paper, we will focus solely on our two best models: the Tree and Ensemble classification models. We will analyse their results in greater detail. Although these models achieved impressive overall validation and test accuracies, we still do not know how they classify observations within each category. Therefore, we should examine their confusion matrices. Fig. 5 displays the validation confusion matrices of the Ensemble and Tree models. The figure indicates that only one or two observations were misclassified in most categories.

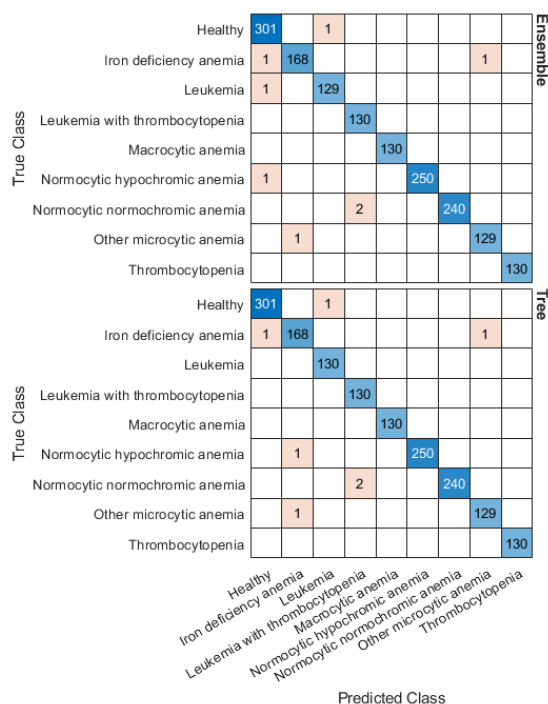


Figure 5: Validation confusion matrices of Ensemble and Tree classification models trained on the oversampled SMOTE training set

Fig. 6 shows the test confusion matrices for our best models. Both machine learning models correctly classified all observations in every category in the test set.

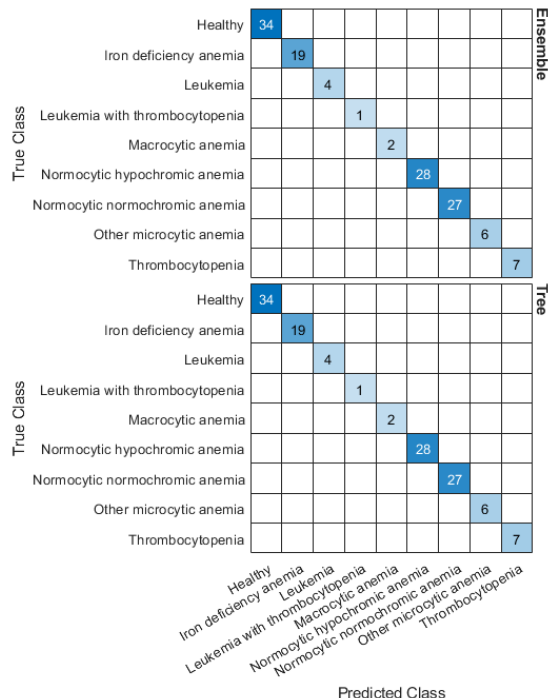


Figure 6: Test confusion matrices of Ensemble and Tree classification models trained on the oversampled SMOTE training set

The False Negative Rate (FNR) refers to the percentage of true positive cases a model mistakenly identifies as negative. It captures the rate of missed detections in the model's predictions. Tab. 3 summarises the FNR from the validation confusion matrices for our best models, which were trained on original and

oversampled training sets. The data in the table shows that when we used the original training set with the Ensemble model, the categories with higher FNR were Macrocytic anaemia (FNR: 6.2%) and Other microcytic anaemia (FNR: 5.7%). In the case of the Tree model trained on the original training set, the categories that posed problems included Leukemia with thrombocytopenia (FNR: 10.0%), Macrocytic anaemia (FNR: 6.2%), and Other microcytic anaemia (FNR: 7.5%). However, when we applied the oversampled SMOTE training set, the FNR for all problematic classes dropped below 1.0% for both classification models.

Tab. 3: False negative rates (%) in validation confusion matrices of Ensemble and Tree models trained on original vs. oversampled training sets

Training Set, Model	True Class							
	Healthy	Iron deficiency anaemia	Leukemia	Leukemia with thrombocytopenia	Macrocytic anaemia	Normocytic hypochromic anaemia	Normocytic normochromic anaemia	Other microcytic anaemia
Original, Ensemble	0.3	0.6	0.0	0.0	6.2	0.4	0.8	5.7
Original, Tree	0.3	0.6	0.0	10.0	6.2	0.4	0.8	7.5
SMOTE, Ensemble	0.3	1.2	0.8	0.0	0.0	0.4	0.8	0.8
SMOTE, Tree	0.3	1.2	0.0	0.0	0.0	0.4	0.8	0.8
ADASYN, Ensemble	0.3	0.6	0.0	0.0	0.0	0.4	0.8	3.1
ADASYN, Tree	0.7	1.2	0.0	0.0	0.0	0.4	0.8	3.1
Borderline SMOTE, Ensemble	0.3	1.8	0.0	0.0	0.8	0.8	0.8	0.0
Borderline SMOTE, Tree	0.3	1.2	0.0	0.0	0.0	0.4	0.8	3.1
Safe-level SMOTE, Ensemble	0.0	0.6	0.8	0.0	0.8	1.2	0.8	0.8
Safe-level SMOTE, Tree	0.3	1.8	0.0	0.0	0.0	0.4	0.8	2.3

The False Discovery Rate (FDR) refers to the proportion of positive predictions made by a model that turn out to be false positives. It measures the likelihood of a positive prediction being incorrect. Tab. 4 presents the FDR from the validation confusion matrices of our best models, which were trained on original versus oversampled training sets. For both classification models trained on the original dataset, the most challenging category was Leukemia with thrombocytopenia, with an FDR of 23.1% in the Ensemble model and 18.2% in the Tree model. However, after applying the oversampled SMOTE training set, the FDR of the problematic class significantly decreased to 1.5% in both models.

Tab. 4: False discovery rates (%) in validation confusion matrices of Ensemble and Tree models trained on original vs. oversampled training sets

Training Set, Model	Predicted Class							
	Healthy	Iron deficiency anaemia	Leukemia	Leukemia with thrombocytopenia	Macrocytic anaemia	Normocytic hypochromic anaemia	Normocytic normochromic anaemia	Other microcytic anaemia
Original, Ensemble	0.7	0.6	2.3	23.1	0.0	0.4	0.0	1.5
Original, Tree	0.3	1.2	2.3	18.2	0.0	0.4	1.2	1.5
SMOTE, Ensemble	1.0	0.6	0.8	1.5	0.0	0.0	0.0	0.8
SMOTE, Tree	0.3	1.2	0.8	1.5	0.0	0.0	0.0	0.8
ADASYN, Ensemble	1.0	0.0	0.8	2.3	0.0	0.0	0.0	1.5
ADASYN, Tree	1.0	0.6	0.8	3.0	0.0	0.0	0.0	1.6

Borderline SMOTE, Ensemble	0.7	0.0	0.8	1.5	0.0	0.4	0.4	1.5	0.0
Borderline SMOTE, Tree	0.3	1.2	0.8	1.5	0.0	0.0	0.4	3.1	0.8
Safe-level SMOTE, Ensemble	1.0	0.6	0.0	1.5	0.0	0.4	0.8	0.0	0.8
Safe-level SMOTE, Tree	0.3	1.8	0.8	0.8	0.0	0.0	0.8	1.6	0.8

Since all the machine learning models we used are optimisable, we aimed to determine the optimal hyperparameters for our best classification models, specifically the Ensemble and Tree models. Tab. 5 displays the bestpoint hyperparameters for the Ensemble model. With these parameters, we observed a minimum classification error of 0.0037086.

Tab. 5: Bestpoint hyperparameters of the Ensemble model trained on the oversampled SMOTE training set

Hyperparameter	Value
Ensemble method:	Bag
Number of learners:	27
Maximum number of splits:	350
Number of predictors to sample:	7

Tab. 6 presents the optimal hyperparameters for the Tree classification model. The minimum classification error observed with these hyperparameters was 0.0043136.

Tab. 6: Bestpoint hyperparameters of the Tree model trained on the oversampled SMOTE training set

Hyperparameter	Value
Maximum number of splits:	96
Split criterion:	Maximum deviance reduction

4.3 Identifying Key Features in Tree and Ensemble Models' Predictions

Although we achieved high accuracy, low False Negative Rates (FNR), and low False Discovery Rates (FDR) with the Ensemble and Tree classification models when trained on the oversampled SMOTE training set, we still do not fully understand how these models operate. To gain deeper insights into the selected machine learning models and identify which of the 14 predictors are most significant in their predictions, we calculated both permutation feature importance and Shapley importance for each feature.

As a result of calculating the permutation feature importance, Fig. 7 illustrates the mean importance of each predictor for the Ensemble classification model, while Fig. 8 illustrates the mean importance of each predictor for the Tree classification model. The charts indicate that the most significant predictors in both machine learning models were the following: the amount of haemoglobin (HGB), the mean corpuscular volume (MCV), the platelet count (PLT), the white blood cell count (WBC), the mean corpuscular haemoglobin concentration (MCHC), the mean corpuscular haemoglobin (MCH), and the haematocrit test (HCT).

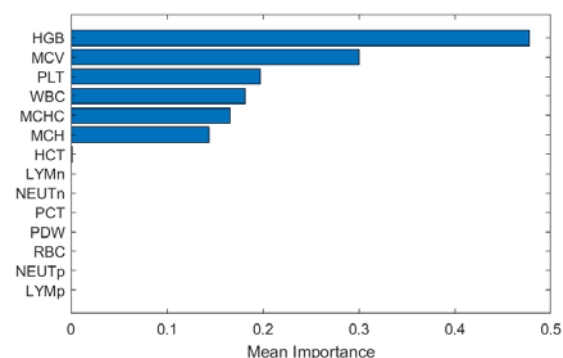


Figure 7: Mean importance per predictor of the Ensemble model trained on the oversampled SMOTE training set

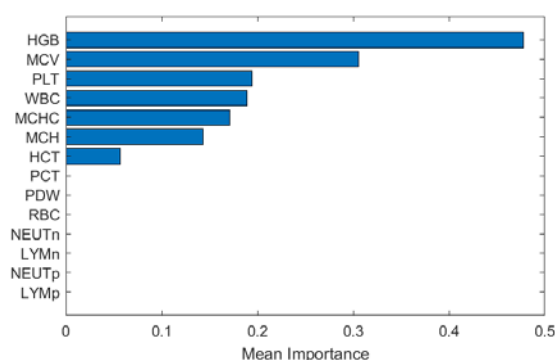


Figure 8: Mean importance per predictor of the Tree model trained on the oversampled SMOTE training set

Fig. 9 and Fig. 10 illustrate the Shapley importance values for each predictor variable in the chosen Ensemble and Tree classification models. While the significance of these predictors closely aligns with the results obtained through permutation feature importance, the Shapley graphs offer a more nuanced understanding of each predictor's contribution to the model's outputs.

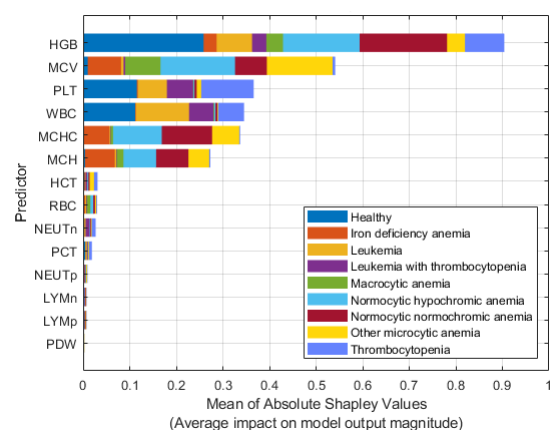


Figure 9: Shapley importance per predictor of the Ensemble model trained on the oversampled SMOTE training set

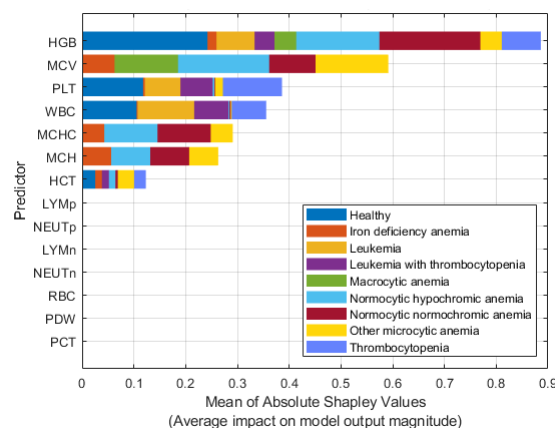


Figure 10: Shapley importance per predictor of the Tree model trained on the oversampled SMOTE training set

4.4 MATLAB App for Anaemia Types Prediction

As a practical outcome of our research, we developed a MATLAB app (Fig. 11) for diagnosing anaemia and predicting its subtype based on Complete Blood Count (CBC) data. Users can enter values for 14 predictors derived from the CBC data, and the app will calculate and visualise the likelihood of each type of anaemia using our Ensemble and Tree classification

models. The MATLAB app and the exported Ensemble and Tree classification models are available on GitHub [36].

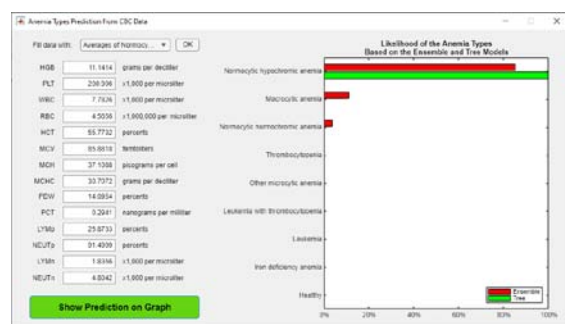


Figure 11: MATLAB App for Anaemia Types Prediction

5 Discussion

The results of this study highlight the potential of SMOTE-based oversampling techniques in addressing the challenges posed by imbalanced datasets in machine learning classification models. By applying these methods, we observed significant improvements in the performance metrics of the models used for anaemia type prediction. The validation and test accuracies of the models trained on the oversampled datasets outperformed those trained on the original dataset, with the Tree and Ensemble models achieving remarkable validation accuracies of 99.57% and 99.50% and test accuracies of 100%. Compared to previous studies [17,19–25], which achieved accuracies ranging from 85.6% to 99.35% using various machine learning algorithms; our approach consistently delivered higher accuracy. This is primarily attributed to the enhanced representation of minority classes through oversampling, reducing False Negative Rates (FNR) and False Discovery Rates (FDR) across all categories. For instance, the FDR for the previously problematic Leukemia with thrombocytopenia category decreased from 23.1% to 1.5% when using the oversampled SMOTE dataset. The findings also align with other research efforts, emphasising the importance of balancing datasets for improved classification outcomes [17,21,23,25]. However, our study extends this knowledge by evaluating the impact of multiple SMOTE variations, including ADASYN, Borderline SMOTE, and Safe-level SMOTE, on model performance. Among these, the standard SMOTE algorithm consistently yielded the best results regarding accuracy and reliability.

The feature importance analysis provided valuable insights into the predictors driving model decisions. Features such as haemoglobin levels (HGB), mean corpuscular volume (MCV), and platelet count (PLT) emerged as critical indicators for differentiating anaemia types. This aligns with clinical understandings, reinforcing the relevance of the developed models [37,38].

While the results are promising, this study has limitations. The dataset's reliance on CBC data alone may not capture the full clinical complexity of anaemia. Further validation on larger, more diverse datasets is necessary to generalise these findings to broader populations.

6 Conclusion

This research demonstrates the efficacy of applying SMOTE-based oversampling techniques to improve the performance of machine learning models for anaemia type prediction. By addressing class imbalances, the developed Tree and Ensemble machine learning models achieved high accuracy (99.57% and 99.50%), reduced error rates, and provided reliable predictions, even for minority classes. The findings underscore the importance of data preprocessing in healthcare analytics, particularly for imbalanced datasets. A MATLAB application, offering a user-friendly tool for real-world implementation, further showcased the practical utility of the developed models.

Future research should explore integrating additional clinical data and testing these methods on larger datasets to enhance their applicability and robustness. Nevertheless, the approach presented here sets a solid foundation for leveraging machine learning to advance medical diagnostics.

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