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TEACHERS' LEARNING EXPERIENCES: TYPOLOGY OF TRANSFORMATIVE LEARNING DURING THE COVID-19 PANDEMIC

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ABSTRACT

The destabilizing force of the COVID-19 pandemic served as a catalyst for intricate change processes at both societal and individual levels. This study investigates the experiences of Latvian schoolteachers, examining the substantial changes they have undergone in their professional roles. The study seeks to illuminate the diverse ways in which teachers have engaged in transformative learning processes during three years of pandemic and to identify the challenges they encountered in the process. By delving into the transformative nature of teachers' learning experiences, as a result a typology was developed to illustrate the trajectories of this change.

The aim of the study was to investigate how transformative learning manifests in teachers' experiences during the COVID-19 pandemic and to identify the orientation frames of the change teachers have undergone. Employing a qualitative design grounded in an ethnomethodology approach, the study utilized narrative interviews with 23 Latvian general education schoolteachers, adhering to the principles of maximum variation and theoretical saturation in sampling. The documentary method was employed for data analysis and interpretation. The reported outcome of this study is a two-dimensional typology of teachers' transformative learning experiences, reflecting five axes of transformation: Digital Methodological, Relational, Self-Efficacy, Personal Boundary, Organizational Transformations.

The study provides valuable insights into how educators adapt and evolve in response to the challenges posed by the pandemic, while also identifying valuable support mechanisms.

Keywords: *COVID-19 pandemic, teachers' learning experiences, teachers' professional development, transformative learning, typology.*

Introduction

The impact of the COVID-19 pandemic on Education sector, unavoidable and disrupting as it has been (Kim & Asbury, 2020; The World Bank, UNESCO and UNICEF, 2021; World Bank, 2020), may serve as a lens for researching more subtle, long-term, personal, and intrinsic change processes. School closures and the shift to remote teaching

forced schoolteachers to repeatedly reinvent their work, confronting dilemmatic learning situations and learning on the go (Goba-Medne & Rubene, 2023). This shift, though challenging, offered a unique opportunity to explore the transformative nature of learning by delving into teachers' learning experiences. This paper reports on the research developed as a part of doctoral thesis project (Goba-Medne, 2023), exploring teachers' learning experiences during the COVID-19 pandemic and the typology of transformative learning experiences developed. Theoretical framework for this research had been developed before the outset of the pandemic to investigate the potential of transformative learning theory for researching teacher change and education paradigm shift (Goba-Medne, 2019; Goba, 2019). The COVID-19 pandemic created circumstances conductive to transformative learning – a disorienting, pressing and challenging situation (Mezirow, 1991) that forced teachers to update their digital competence and accelerate digital transformation in schools (Rubene et al., 2021). Therefore, transformative learning experiences became researchable in the general population of teachers and not as extraordinary occurrences.

Transformative learning as a phenomenon is topical for researching the field of teacher professional learning and development through its potential to illuminate the change processes needed for larger shifts in teacher practice, paradigmatic shifts in pedagogy, as well as explanations why reforms in education systems are not working as intended (Goba-Medne, 2022). The exploration of individual teachers' experiences in the context of COVID-19 provides an opportunity to elucidate the processes through which pedagogical practices undergo significant changes. Simultaneously, it offers a chance to investigate the specific circumstances under which this learning occurs – encompassing support systems, contextual and cultural factors, internal and external resources, and subjective challenges.

Through a meticulous examination of their experiences, the study provides valuable insights into how educators adapt and evolve in response to the challenges posed by the pandemic, along with an exploration of the support mechanisms that have proven to be valuable.

Theoretical Background

The study's theoretical framework is based on Jack Mezirow's work (Mezirow, 1991), complemented with subsequent developments and critiques of the theory, such as those proposed by Hoggan (2016a), and supplemented by other learning theories for a comprehensive perspective, including activity theory advanced by Engeström (2009). In the context of comprehensive learning theories (Illeris, 2015; Jarvis, 2006), transformative learning experiences are positioned on a spectrum of learning complexity (see Figure 1). Considering its possible outcomes, transformative learning may be considered the most complex and challenging type of learning an adult can undertake.

Figure 1 Transformative learning represented on a spectrum of learning by complexity
Note. Figure first published in doctoral thesis (Goba-Medne, 2023)

Applying Hoggan's definition (Hoggan, 2016a), transformative learning within teachers' professional activity and its development may be described as "a process leading to significant and irreversible changes in how teachers perceive their professional activity, how they conceptualize (explain) it, and how they implement (do) it" (Goba-Medne, 2023, p. 63).

To help identify transformative learning experiences, five essential aspects or processes of transformative learning were aggregated through literature analysis (Goba-Medne, 2023):

1. Initial encounter with novelty or a disorienting dilemma accompanied by borderline emotions such as fear, guilt, anger, frustration.
2. Building the initial understanding of novelty through exploration.
3. Forming of a new perspective, thereby overcoming the initial uncertainty.
4. The understanding of the novelty undergoes social testing and revision.
5. The new perspective predominates in subjective interpretations and future actions.

The concept of learning experience, in turn, is a multidimensional and holistic phenomenon and encompasses intellectual, affective, embodied, and social dimensions, guiding future meaningmaking and actions (Goba-Medne, 2023). Therefore, the concept calls for a qualitative design study to adequately explore its multifaceted nature.

Methodology

A descriptive qualitative study was carried out employing an ethnomethodological research approach (Bohnsack, 2014; Eberle, 2014). The research aim was to investigate teachers' learning experiences that accompanied the transformations of their professional activity in the situation of the COVID-19 pandemic. Two research questions were set: 1) How is transformative learning reflected in teachers' learning experiences? 2) What are teachers' learning experiences directed at in the situation of the COVID-19 pandemic? Approval from the Humanities and Social Sciences Research Ethics Committee (Approval No. 71-46/8, issued on May 26, 2022) was obtained to ensure compliance with ethical and data protection principles as outlined in the Research Ethics Policy of the University of Latvia, and the study's data was handled accordingly.

Research participants comprised 23 Latvian general education schoolteachers (teacher experience ranging from 3 to 39 years) that were purposefully selected according to the principles of maximum variation (various subject areas, regions, types of schools, education levels) and theoretical saturation (Gerhartz-Reiter, 2017; Nohl, 2010; Strauss & Corbin, 2015) ensuring continuous monitoring of the congruence and extensiveness of

the collected data. Narrative oral interview (Jovchelovitch & Bauer, 2000) was selected for data acquisition due to its strengths in acquiring rich data and highlighting the interviewees' particular perspective and narrative structure. Interviews were carried out between May and September of 2022, lasting 47 minutes on average and encompassing three waves of pandemic experience. Interviews were transcribed in full, reviewed for data protection, and interviewees were identified using the code 'Sk' followed by a number.

Narrative interviews were analyzed using the documentary method of interpretation (Bohnsack, 2014; Nohl, 2010), constructing a typology of teachers' transformative learning experiences. This methodology facilitates both comparative analysis of the cases as well as typology development, with a particular focus on reconstructing implicit knowledge and orientation frames, along with their transformations. Thus, it enables identification of characteristic aspects of transformative learning. Key steps of the analysis process include: initial listening to interviews to identify the main topics of narrative; transcription of interviews; interpretation stage focusing on decoding meaning and formulating thematic structure; reflective interpretation stage involving the reconstruction of orientation frames through formal logic analysis, initially within interviews and then through comparative analysis; and type formation stage where sense-genetic types are derived from the orientation frames (or transformation dimensions), while sociogenetic types reveal common experiential grounds irrespective of sensegenetic type (ibid.). The process commenced with specific cases featuring significantly distinct scenarios, progressively integrating additional interviews.

Results

The data collected yielded rich insights into the experiences of teachers and how they overcame various challenges. By utilizing the documentary method and focusing on transformative dimensions inherent in teachers' narratives, a two-dimensional typology was developed that characterizes the learning experiences of teachers during the COVID-19 pandemic in Latvia (See Figure 2).

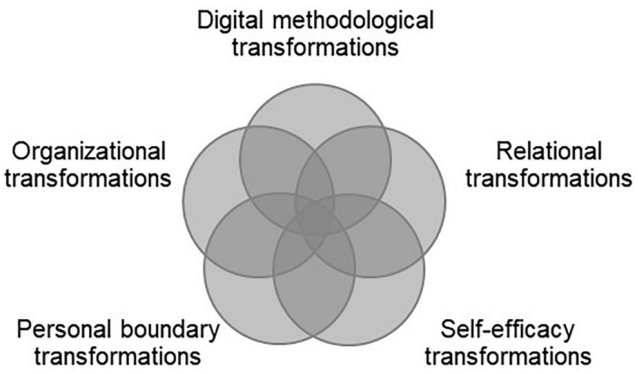

Figure 2 Typology of teachers' transformative learning experiences during COVID-19 pandemic

Note. Figure first published in doctoral thesis (Goba-Medne, 2023)

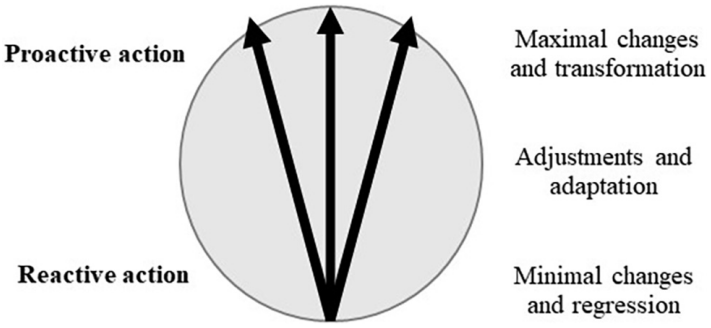

Figure 3 Logic of type construction with documentary method
Note. Figure adapted from doctoral thesis (Goba-Medne, 2023)

Within the sense-genetic dimension of the typology, five distinct types of transformation reveal the directions or axes in which teachers have changed through this experience and indicate how these learning experiences have integrated in their subsequent work – *Digital Methodological, Relational, Self-Efficacy, Personal Boundary, and Organizational Transformations*. Various degrees of transformation were identifiable within each type – from regression and non-learning up to evidence of deeply transformative learning. The five types are not mutually exclusive, nor isolated, namely, each interview (case) may include characteristics of several types to varying degree, which corresponds to general guidelines of documentary method (Nohl, 2010).

The second, socio-genetic, dimension of the typology (See Figure 3) complements each of the five types by characterizing the level of engagement exhibited by teachers in reshaping their work. This spectrum ranges from a reactive approach, where initiative is awaited from external sources (e.g., school leadership), to a proactive approach that exceeded the expectations placed on the teacher at that time. The level of engagement in transforming one's work shaped the way teachers sought solutions to pandemic crisis-induced challenges at work and it appeared to coincide with the degree of transformative learning they experienced. The most pronounced transformative learning was evident in the narratives of teachers' who exhibited initiative at the outset of the pandemic crisis, for instance, teacher Sk19 selftaught to implement synchronous online lessons and interactive tasks already at the time when her school community didn't urge doing so. Apparently, these teachers have pioneered new solutions and inspired others to succeed.

Digital Methodological Transformations

This type is directed towards acquiring and improving digital solutions and methods for their application in the teachinglearning process. This pervasive shift was the most evident due to its unavoidability as virtually all teachers were compelled to update their digital competencies for remote work. However, not all teachers showed the same extent of transformation. Significant changes were initiated through overcoming the threshold of online lesson delivery which happened in different moments for different teachers,

influenced by institutional demands and shaped by their own initiative. At the outset, teachers encountered the imperative to transition to remote teaching, marking the beginning of their digital journey.

The most significant transformations within this type are characterized by proactive engagement in self-directed learning and the implementation of engaging online lessons with a high degree of interactivity and diversity of methods used. Reported experiences include a variety of scenarios, such as realization that one could be teaching arts in a distance learning school with great success (teacher Sk4), updating mastery so that one could successfully develop high quality learning materials and lead professional development courses (Sk19), taking up mentorship role in IT for fellow teachers (Sk13) and even developing entrepreneurial ventures in online education, thus leaving school (Sk16). Primary school teacher Sk19 reported "*I probably had never learned so much in my life as during remote learning, because I was always looking for ways to improve. (..) I've mastered my skill to develop learning materials (..)*", however it likely brought harmful effects on overall health, wellbeing, and private life: *"time for the family, time for oneself was not actually left there*".

The middle of the spectrum of Digital Methodological Transformations locates cases where digital learning technologies are used to compensate for the lost face-to-face modality, teachers become more open to technology enhanced teaching and establish new working routines, however they don't exhibit initiative to be front runners in their pedagogical practices. A more grounded attitude and tendency to preserve energy leads them to letting others take the initiative to foster change, an excerpt from Sk8's interview displays such a cautious tactics: "*We hadn't been taught to disallow (online) participants take control thus far*".

Conversely, negative and regressive experiences within this type manifest in resistance to change and a reluctance to embrace digital technologies. Some educators may refuse to provide online lessons, exhibit avoidance by going on sick leave or even leave the job altogether. Teacher Sk19 reports her observations: "*Three colleagues told me: "I won't teach in Zoom!" They didn't even consider learning to do it.*"

Evidently, experiences within this spectrum vary significantly, shaped by educators' prior technological proficiency and familiarity with interactive tools. Consequently, what constitutes a significant transformation for one educator may represent fundamental shifts for another, highlighting the diverse starting points and potential outcomes within Digital Methodological Transformations.

Relational Transformations

The type delineates the changes in teachers' interactions with others, encompassing alterations in the perception and explanation of the encountered situations, and shifts in the behavioral responses in social context. This transformation type is characterized by an enhanced emphasis on fostering human connections and a reevaluation of the significance of interpersonal relationships amidst the challenges posed by the pandemic.

The most significant transformations within this type are marked by an emphasis on genuine appreciation for the value of human relations and building mutual understanding. Participants reported a heightened commitment to adopting a more student-centered approach, exhibited an increased awareness of the importance of nurturing positive teacher-student and collegial relationships characterized by empathy, care, and socioemotional wellbeing. This transformation is evident in teachers' renewed efforts to provide motivational feedback, empathize with students' perspectives, and proactively shape the course of lessons to cater to individual needs. Subject teacher Sk11 recounted of gradually becoming more accommodating towards students: "*I hadn't learned that much yet to look at the child from their own point of view (..) Initially I could be a drastic teacher (..) Now I have a calmer perception of it all.*"

Middle of the transformation spectrum entailed cases where teachers had attached higher value to human relations, mutual understanding, and empathy, however, their narratives weren't dominated by these experiences, nor they characterized these as important transformations within themselves. For instance, subject teacher Sk13 concluded that through assisting others she had learned to be more accepting of the limits of the ability of students and colleagues: "*Now when I have seen various situations, I realized that one needs to be patient, and you shouldn't demand much, expect less and also, thank God that they learned even that.*"

Conversely, negative and regressive experiences within Relational Transformations are characterized by challenges in communication and interpersonal dynamics with students, parents, or colleagues, leading to feelings of frustration, disillusionment, and professional burnout. Subject teacher Sk12 shared his observations on the mental state of fellow teachers: "*Many colleagues were on the verge of burnout (..), in fact they are still on the edge now.*" These adverse experiences may prompt contemplation of leaving the profession altogether as teachers grapple with feelings of unappreciation and resentment, which is evident in a prestigious school's teacher's Sk6 statements: "*And nobody thanks you either (..), there's resentment. (..) I'll give this profession one more year. If nothing changes, I'll leave.*"

There were notable variety of challenges in the interpersonal domain among teachers who were class teachers, among schools of different provision and community welfare, suggesting that the characteristics of community plays important role in encountering and tackling these issues. Challenges such as burnout and dissatisfaction with the lack of recognition underscore the need for continued support and recognition of the importance of relational dynamics in educational settings.

Organizational Transformations

Cases where teachers demonstrated growth in the field of systematic and efficient improvement of their professional activity formed the basis for this type. It involved commitment to reassessing priorities, rearranging work, refining time management skills, enhancing flexibility and actively engaging in orchestrating the school's digital

transformation. Growth in the organizational domain was closely linked to processes within the school community and its resource allocation.

The most significant transformations within this type exhibited proactive and efficient action in managing one's professional activity (Sk5) or even coordinating a schoolwide digital transformation (Sk1). Teacher Sk1 inferred the extent of efficiency of organizational change in her school that she served in her administrative position: "*If we now remove all the extra work that was there (due to pandemic), and stay at this same pace, yes, we will actually be able to do much, much more than before.*" Subject teacher Sk5 exhibited greater ownership of her work organization as well, involving initiating changes in her lesson schedule, which brought satisfaction: "*I liked the feeling of freedom when I was my own boss (..) Now I know the instruments to achieve something more*."

In the axis of Organizational Transformations, educators exhibited varying degrees of adaptability and proactivity. The middle of the transformation spectrum entails cases where teachers adjusted their organizational practices to the new situation, engaged in improvement initiatives initiated by others, however, didn't perform more as was formally required of them. Namely, while some teachers demonstrated proactive behaviors and took decisive action to improve professional practices or drive digital transformation efforts, others exhibited a more passive approach, adjusting to changes without demonstrating proactive engagement. For instance, primary school teacher Sk8 successfully mastered planning ahead weekly, however did it ondemand: "*The school directed us to plan for a week already, a week in advance (..).*"

While working remotely, practically all teachers had to reorganize their work, making it less likely for regressive experiences to be identified apart from cases where teachers left their jobs at the outset of the pandemic. However, negative experiences stemmed from issues of support and control within the organizational context. Instances of excessive control or lack of support from school leadership hindered educators' ability to enact meaningful change, leading to frustration and disillusionment. Additionally, teachers may resist change or opt to leave their jobs due to perceived barriers or lack of alignment with organizational objectives. Novice teacher's Sk17 statements illustrate this: "*I didn't feel any support (..) We throw you in, then swim! And we'll see if you can swim or not*."

Overall, Organizational Transformations reflect the dynamic interplay between individual agency and institutional contexts, highlighting the pivotal role of educators in driving organizational change and fostering a culture of continuous improvement within educational settings. Teachers expressed concerns about the workload and lack of support, reflecting on the need for a conducive environment that fosters autonomy, empowerment, and collaboration.

Self-Efficacy Transformations

This type of transformation captures the journey towards more effective management of internal resources and prioritization of personal well-being amidst escalating work demands, instability, and tension. In the face of mounting challenges, teachers endeavored to restore equilibrium between professional responsibilities and private life,

managing their time accordingly, and striving to preserve internal resources in response to crisis induced pressures, thus finding space for selfcare and resilience-building.

Teachers who underwent maximal transformations within this axis demonstrated remarkable resilience in effectively managing workloads while prioritizing self-care practices, these notable transformations are characterized by the attainment of a heightened awareness of personal limits and the establishment of boundaries to safeguard well-being. Teachers typically underwent profound transformations when they approached the brink of exhaustion and burnout, prompting a reevaluation of priorities, overcoming perfectionism, and implementing self-preservation strategies. Teacher Sk19 was forced to learn in this domain due to mounting personal issues, which resulted in a more balanced relationship with her professional role: "*I realized that these are my students, they have families, (..) there are those who love them, and there are no irreplaceable people. (..) somehow, I tried, learned to balance it all.*" In turn, teacher Sk5 was forced to learn setting firmer boundaries and become less forthcoming to avoid burn-out: "*I've always tried to be the nice person (..) but working (..) in a triple workload situation made me realize there are things you just can't carry out (..). Remote work helped me realize when it's enough*."

The middle part of Self-Efficacy Transformation spectrum includes cases where individuals learned various tactics to find balance between work and private life, although these narratives remain peripheral in the overall interviews. The scenarios involve setting limits for completing job tasks, establishing boundaries in communication with students and parents, restricting non-urgent communication to working hours, declining additional duties, delegating tasks, and accepting help. Most interviewees mentioned several tactics they used for boundary-setting, self-care, and restoration.

In contrast, minimal or regressive changes within this sense-genetic type are characterized by the adoption of self-preservation tactics, a diminished commitment to work, and contemplation of reducing workload or leaving the profession altogether. If teachers found themselves unable to rebalance their internal resources and receive suitable support, insufficient self-efficacy nearly inevitably brought undesirable outcomes. Teacher Sk19 recounts such cases: "*It all builds up. (..) colleagues really burned out and left work (..) they needed to rest, recover*". These experiences underscore the toll of prolonged stress and highlight the importance of fostering a supportive and cohesive community environment to mitigate the risk of burnout. Supportive and cohesive communities provide a vital source of strength and encouragement, facilitating resilience-building and collective problem-solving. Conversely, fragmented communities may exacerbate feelings of isolation and amplify the challenges associated with managing personal well-being in stressful conditions.

Personal Boundary Transformations

This transformation axis encompasses the dynamic process among teachers of challenging, expanding, and ultimately transcending personal limitations and boundaries. These transformations are reflected in shifts in teachers' perceptions of their potential, their ability to overcome mental barriers, and their critical examination of systemic

conditions within the educational landscape. As educators navigated this journey, they moved towards greater levels of professional autonomy, self-determination, and civic engagement.

In cases characterized by maximal transformation, teachers expanded their professional possibilities, demonstrated reliance on self-directed professionalism, and adopted a critical perspective towards systemic aspects of education. They exhibited an expanded outlook and a willingness to question established norms and practices. The most pronounced cases assigned a central position to experiences of bending and challenging boundaries to achieve the best results for their students and themselves. The extraordinary crisis presented an opportunity to experiment with new methods and circumvent the habitual systemic constraints, as illustrated by arts teacher Sk4: "*I was definitely looking for what fits (..) And then I thought about how to bypass the system! (..) I found arguments why I can work more freely.*" She voiced concerns about the inherent lack of trust in teachers' professionalism within the current curriculum reform, yet showing readiness to explore new pathways: "*I have to say that Skola2030 with its curriculum pretty much forces me to wade into fields that I have not wandered into before, really. (..) Well, since I like (doing) it, I don't mind (..).*" Similarly, increased expressions of personal autonomy were evident in the case of Sk16, as the teacher constructed her future professional career outside of the school environment, drawing on skills acquired during the pandemic. Her utterances reflect a growing sense of civic engagement and self-reliance: "*I share my opinion more now (..) I learned to work more independently (..) now I can provide help to more kids.*"

In the middle of the spectrum, teachers view boundaries as somewhat flexible guidelines open to interpretation. While they may hold critical views, they lack the drive to challenge these boundaries actively, opting instead for a more passive approach. Nevertheless, they maintain a critical stance and engage in reflective analysis, retaining their evaluative perspective. For instance, teacher Sk21 aimed to maintain a positive outlook, and adjusted openly to the forthcoming challenges: "*I will adapt to the situation as is (..) If one has chosen a life like that".* Many teachers reflected on how the pandemic crisis tested their boundaries within other narrative topics. Subject teacher Sk22 learned to seek for help and approach problems with more calm, overcoming mental barriers: "*My darkest moments were when I thought: "Well, this is a grim problem!" (..) But when I attempted to solve it, it all changed, it wasn't like someone would refuse help."*

Issues regarding boundaries became especially evident in cases when teachers' personal beliefs and values clashed with systemic requirements, such as mandatory vaccination, these experiences take an ambivalent position on the transformation spectrum. For instance, interviewees Sk7, Sk22 and Sk23 admitted resigning from their teaching positions due to profound disagreements over the management of crisis in the educational setting and at large. An experienced teacher Sk7 expressed frustration, stating: "*It's insane and terribly unfair. (..) the evil that is being done is simply insane*". This scenario represents a failure in communication and educational management, resulting in the loss of experienced educators. However, from the teachers' perspective, leaving their positions

allowed them to maintain their integrity and retain an inner locus of control over their professional lives. Teacher Sk23 admitted that the hardships made her find a new focus: "*I realized that it is no longer my place, where I'd like to work, (..) now I can focus on my creative potential again*." Nevertheless, this situation strained relationships and dampened morale within teacher communities.

Non-learning, negative and regressive experiences within the spectrum of Personal Boundary Transformations show in the conformity to predetermined limits without resistance or the rejection of previous initiatives aimed at personal and professional growth, or ultimately – personal boundary problems potentially contributed to taking a sick-leave, reducing workload, or leaving the job due to inability to cope. However, such cases didn't take part in voluntary interviews, rather, they were mentioned by colleagues.

Interestingly, neither the teachers who engaged in personal boundary transformations nor those who refused reported civic activities outside school to influence decisionmaking processes on topics they felt strongly about. Typically, initiatives would focus at the school level, indicating a lack of a strong lobby within the teacher community to coordinate the expression of teacher opinions. This aligns with societal trends in Latvian society, where civic and political activity is generally viewed as low.

Discussion and conclusions

Beyond doubt, the COVID-19 pandemic crisis and the resulting changes in teachers' working conditions have provoked transformative learning in teachers. This is evident both in the learning process, characterized by the five essential aspects of transformative learning, and the learning outcomes as suggested by the two-dimensional typology of transformative learning, which delineates the five axes of transformation: Digital Methodological, Relational, Self-Efficacy, Personal Boundary, and Organizational Transformations. An indepth exploration of transformative learning among teachers underscores the complexity of this process, extending beyond categorizations based on depth, breadth, and stability of change proposed by Hoggan (2016b). Instead, this study suggests that transformative learning manifests as a spectrum of responses to disorienting situations, with teachers undergoing varying degrees of transformation influenced by their individual capacities, subjectivity, past experiences, personal circumstances, interpersonal interactions, and contextual factors. The exact placement of each individual case on the transformative learning spectrum is subject to interpretation, while simultaneously providing insight into the trends and complex challenges faced by the group under study.

While a proactive disposition towards adapting professional practices in response to pandemic disruptions often led to significant transformations, it did not guarantee them. Some teachers reported encountering burnout, illness, and resistance to infection control measures, while others found agency in leaving their positions to pursue alternative career paths. This highlights the dual nature of transformation: while potentially beneficial, it is also a risky endeavor. It prompts us to consider the threshold for transformative change, define personal limits, and appreciate the role of contextual support

in facilitating or hindering transformational processes. The study emphasizes the importance of crisis support in nurturing resolve of existent issues, rather than relying on provocations to stimulate transformative learning.

Teachers' experiences illustrate transformative learning as a multifaceted journey embedded within an intersubjective web of influences, rather than a binary outcome of whether transformative learning occurred or not. Consequently, efforts to foster transformative learning should prioritize strengthening teacher autonomy and promoting collegial professionalism within the school community. Flexible support mechanisms for self directed, practice-based learning and professional development, as well as meaningful involvement of teachers in decision-making processes, are recommended to facilitate transformative learning experiences.

The COVID-19 pandemic has served as a catalyst for transformative learning among teachers, shaping their learning experiences and informing research on the dynamic interplay of individual, interpersonal, and contextual factors in fostering educational improvement. Teachers under study confirmed experiencing diverse challenges, growing demands and shortages of resources as evidenced in other studies (Daniela et al., 2021; Kim & Asbury, 2020; Murgatroyd & Sahlberg, 2016; World Bank, 2020). Addressing the diverse challenges and growing demands faced by teachers necessitates a comprehensive understanding of their personal journeys through crisis-induced challenges, recognizing that nonproactive teachers are not inherently inferior or less concerned for their students' welfare but may simply not be the primary agents of change.

Furthermore, addressing shortages of systematized data on teachers' professional development and learning experiences in Latvia is imperative for informing evidence-based policies and interventions aimed at supporting educators in navigating evolving educational landscapes. Researching how teachers managed their personal journeys through the crisisinduced challenges helps build a deeper understanding for providing tailored support.

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TEACHERS' FEEDBACK ON THE USE OF SUPPLEMENTARY MATERIALS FOR DEVELOPING STUDENTS' SELF-REGULATED LEARNING AND PROBLEM SOLVING SKILLS

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ABSTRACT

Transversal skills play an important role in the educational process worldwide and have been paid particular attention in the system of education in Latvia with the introduction of the new competence-based curriculum. Self-regulated learning (SRL), critical thinking and problem solving (PS) skills remain among the most crucial skills at all levels of formal and informal education, as well as in lifelong learning. This requires knowledgeable teachers, equipped with methodological support, guidelines and supplementary materials, that would enable them to professionally advance these skills in their students. The purpose of this study is to analyse teachers' feedback on the use of supplementary materials aimed at developing students' PS and SRL skills. The feedback was provided by 57 teachers of Grades 1–6 attending an online teacher professional development (TPD) course on developing students' SRL skills. The paper also presents a comparative analysis between the results of the current study and the results of an earlier piloting of the supplementary materials. The findings show that students frequently lack sufficient metacognitive skills and highlight that teachers consider supplementary materials to be a useful tool for developing these skills, particularly when accompanied by an appropriate TPD course that deepens teachers' knowledge of SRL and enhances their competence in developing students' SRL and PS skills.

Keywords: *teacher professional development, self-regulated learning skills, critical thinking and problem-solving skills, supplementary materials, teacher experience and feedback.*

Introduction

The development of transversal skills has been assigned an important role in the teaching and learning process, and since the introduction of the new competence-based curriculum in Latvia, the advancement of students' problem-solving (PS) and self-regulated learning (SRL) skills has been identified as an important educational goal (Skola2030, 2019a). SRL is defined as the process where individuals set both short-term and long-term objectives for personal growth, implement strategies to achieve these goals, reflecting on their

thoughts and actions, regulate their emotions and behaviour, and learn from their mistakes (Skola2030, 2019b).

SRL learning skills indicate students' ability to manage and self-regulate their cognitive, metacognitive, motivational and behavioural processes (Zimmerman, 1989; 2000) and numerous models of SRL have been developed, consisting of several phases and processes (Greene & Azevedo, 2007; Panadero, 2017). Zimmerman's (2000, 2002) cyclical loop model entails three main phases, such as (a) a forethought phase, encompassing task analysis and self-motivation beliefs, (b) a performance phase, representing the ability of self-control and self-observation, and (c) a self-reflection phase, encompassing self-judgement and self-reaction (Cleary & Zimmerman, 2012; Zimmerman & Moylan, 2009).

Research has confirmed that SRL skills make a significant contribution to students' academic achievement at different levels of education (Abd-El-Fattah, 2010; Gunzenhauser & Saalbach, 2020; Alessandri et al., 2020). Students who have developed SRL skills are able to motivate themselves, plan and evaluate their work (Veenman et al., 2014) and explicit mastery of skills can contribute to their transferability to life situations beyond the classroom. However, in order to successfully integrate the teaching and development of students' SRL skills into the classroom, teachers should be knowledgeable about what this concept entails and also well trained and equipped with the appropriate methods and materials.

This highlights the gap between educational policy objectives and teachers' competence, as educators often lack the necessary knowledge and competence to effectively develop students' SRL skills (Greene, 2021; Dignath & Veenman, 2021; Linde, Sarva, & Daniela, 2022, 2023). Currently, Latvia faces a challenge of ageing of the teaching workforce, with a considerable number of educators having received their formal training several decades ago. Additionally, the teacher shortage encourages requalification and obtaining teacher's qualification in a shorter period of time, leading to a significant presence of individuals with limited pedagogical expertise in schools. As the concept of SRL is relatively new, there is a necessity to bridge this gap and promote teachers' competence in developing students' SRL skills.

Another important transversal skill is problem-solving, which is identified as a process that includes goal-directed and complex cognitive, affective and behavioural operations (Heppner & Krauskopf, 1987; Nezu, 2004), and these operations are used in the PS process as a response to internal and external demands, to adapt and achieve one's goals. There are various theoretical approaches in the research of PS skills in both Education and Psychology fields (Fischer et al., 2012; OECD, 2013), which approach the assessment of PS skills differently. However, most researchers agree that the PS process can be divided into several specific operations, such as exploring the problem (inquiring and understanding it), developing solutions and stating goals, planning, executing the plan, and evaluating the results (reflecting on what was achieved). Various researchers have arrived at conclusions that PS skills are highly related to academic achievements and intelligence (Greiff et al., 2013; Kretzschmar, Hacatrjana, & Rascevska, 2017; Fitzpatrick et al., 2020; Ellis et al., 2021), indicating the crucial role of possessing these skills in the education process.

Based on the definitions of the two concepts, it is apparent that the phases of the PS process overlap with the three phases of SRL. Although the concepts of PS and SRL are frequently studied separately in science, SRL and PS skills are fundamentally linked within the learning process as effective self-regulation enables students to solve problems more efficiently (Van Gog, Hoogerheid, & Van Harsel, 2020). Consequently, it is logical that these skills should be taught concurrently.

The aim of the current study was to analyse teachers' (Grades 1–6) feedback on the use of supplementary materials aimed at developing students' PS and SRL skills, and also to compare the results with the previous study (Hačatrjana & Linde, 2023b) that focused on the use of supplementary materials in secondary (Grades 7–12) school. The main tasks were to (a) analyse teachers' experiences and observations on using supplementary materials in developing students' SRL and PS skills in Grades 1–6, (b) conduct a comparative analysis between the previously carried out research on using supplementary materials in secondary school, and (c) draw conclusions and provide recommendations.

Methodology

The study was conducted throughout the online TPD course that was tailored for in-service teachers of Grades 1–6 to enhance their competence in developing students' SRL skills. Quantitative and qualitative data were obtained by utilising semi-structured questionnaires administered via Google Forms. A mixed-methods research design was employed, as the integration of quantitative and qualitative data enhances the study by providing more comprehensive and detailed answers to the research questions (Creswell, 2021; Dawadi, Shrestha & Giri, 2021; Vebrianto et al., 2020). The quantitative data analysis involved the use of Excel mathematical calculations, whereas content analysis was used for analysing the qualitative data.

Procedure

In the framework of a larger PhD research in Phase 2 an online TPD course was conducted to class teachers of Grades 1–6. The aim of the TPD course was to expand teachers' knowledge on SRL and to advance teachers competence in developing student's SRL skills. The course was advertised through the Latvian Association of Teachers of English and the education authorities of local municipalities and any teacher who was committed to attending all the sessions and completing all the assignments could apply. Teachers could choose to participate in any of the groups depending on their availability (a) on Mondays from 3 pm to 6 pm, (b) on Thursdays from 3 pm to 6 pm or (c) on Saturdays from 9 am to 12 pm.

Structure of the TPD Course

The TPD course was conducted online via Zoom platform from February to June 2023 and the content related to the SRL, such as the phases and subprocesses of SRL, cognition, metacognition, motivation, social emotional learning and behaviour, was divided into

four modules. Therefore, each group met online at each module and at the final meeting at the end of the course. A Participatory Action Research (PAR) approach (Cornish et al., 2023; De Oliveira, 2023; Jacobs, 2016) was used in the design of the course as the 4h-long online sessions involved not only the overlook of the theory on SRL, but also active teachers' participation with constant self-evaluation of their professional activities, that provided a vast background for sharing good practice examples, identifying existing or probable problem situations and encouraged discussions providing suggestions for the probable solutions. At the end of each module teachers set their own goals for applying the acquired knowledge in practice and it was followed by a 3–4-week introduction phase and the results of which were analysed at the beginning of the next online session.

As this TPD course was the second of two consecutive studies conducted as part of a larger PhD research, the results of the previous study were taken into account and, although the participants in the previous study rated the TPD course highly, with an average rating of 8.41 on a 10-point Likert scale, teachers were also asked to submit suggestions for improving the TPD course, one of which was to provide teachers with materials that would help in the process of developing students' SRL skills (Linde, Sarva & Daniela, 2024). Therefore, the participants of the TPD course of Phase 2 were introduced to the set of supplementary materials that could be used for developing students SRL and PS skills and were asked to use them in their work and provide feedback.

Supplementary Materials

In the framework of the research supported by the European Regional Development Fund under the activity "Post-doctoral Research Aid" project No. 1.1.1.2/VIAA/4/20/697, a set of supplementary materials that consists of eight worksheets (WS) and two reminder sheets (RS) was worked out (Hačatrjana & Linde, 2023a) and piloted in 2023 (Hačatrjana & Linde, 2023b). Taking into consideration the results of the piloting, the worksheets were improved and published on the website of the University of Latvia.

The supplementary materials are versatile, allowing them to be used either as ready made materials or adapted to any specific learning contexts, such as the school subject, students' age group and cognitive ability, as well as learning needs and objectives. Although during each online session of the TPD course teachers' attention was drawn to the use of specific WSs or RSs relevant to the topic covered in the module, teachers' professionalism was highly valued as educators were more aware of the needs of their learners. As a result, participants were invited to use any of the WSs or RSs they considered useful for developing students' SRL skills and were asked to provide feedback on three of them.

Sample

74 in-service teachers who were mainly class teachers of Grades 1–6 or at least taught a subject in these grades applied for the TPD course on SRL, 67 started the course (n = 65 female, n = 2 male), 10 teachers quit the course and 57 (n = 57 female, n = 0 male) completed the course. This research will analyse the responses provided by 57 teachers

who completed the course. Participants represent 32 different types of schools from all the regions of Latvia, majority of whom work at a secondary (38.6% (n = 22)) and elementary school (36.8% (n = 21)), 21.1% of teachers (n = 12) work at a primary school and 3.5% (n = 2) at a state gymnasium. The average participants' age is 47 years and the average work experience is 22.7 years.

Code of Ethics

Teachers were informed that during the course they would be active participants of the research and would be asked to provided their observations, opinion and self-evaluation with the help of self-evaluation questionnaires and that the data would be used in an anonymised and summarised format, and teachers expressed their consent by completing the application form. The General Data Protection Regulation and ethical considerations were respected and the study was approved by the Research Ethics Committee of Social Sciences and Humanities of the University of Latvia (January 11, 2023; Nr. 71-46/12).

Data Collection and Analysis

While working on the topics of the four modules of the TPD course on SRL, teachers were provided a link to the set of supplementary materials on developing students' SRL and PS skills and advice was given on a number of ways to use them either as ready-made materials or teachers were encouraged to adapt them to the purpose of the lesson and the needs of the target group. Nevertheless, teachers did not have to follow strict regulations and their professionalism was trusted in choosing and using the most appropriate WSs and RSs in any order.

After using each WS, teachers were asked to complete a provided Google Form and assess the usefulness of the WS/RS used in developing students SRL and PS skills based on a 6-point Likert Scale: 1 (completely disagree), 2 (disagree), 3 (more disagree than agree), 4 (more agree than disagree), 5 (agree) and 6 (completely agree) and at the end of the TPD course were asked to evaluate the overall usefulness of the provided set of supplementary materials in developing students' SRL skills. In addition, teachers were also asked to provide answers to open ended questions analysing the use of the WS/RS and provide their opinion on (a) what was/was not useful in using the WS/RS; (b) their experience and observations about the students' skills in using it; (c) if they adapted the WS/RS and how; and (d) if they had any suggestions for improving it.

Content analysis was used to analyse the qualitative data using an inductive approach, as codes were developed from the data and categorised (Bingham, 2023), following several steps (a) initially, two researchers looked through the data and created the codes which after that were discussed and put into categories (b) after that both researchers started coding and met to refine as two additional categories were added, (c) then the results of the final coding were compared and consensus reached. The iterative process of code review and refinement, without significant disagreement between researchers, helped to ensure that the codes were reflected adequately.

Results

During the TPD course 57 teachers used several WSs and RSs each and provided their feedback. At the final session of the TPD course teachers were also asked to provide an overall assessment of the different aspects of the TPD course. This paper analyses the questions related to the use of the supplementary materials and other aspects of the overall assessment of the TPD course will be analysed in the future articles.

Teachers were asked to express their opinion assessing the statement "The provided WSs and RSs helped in developing students' SRL skills" and had an overall score of 5.16 on a 6-point Likert scale. Majority of the participants very positively evaluated the usefulness of the supplementary materials, as 42.11% of participants (n = 24) completely agree with the statement, 35.09% of participants (n = 20) largely agree, 19.30% of participants more agree than disagree.

However, there were two teachers (3.51%) who "more disagree than agree" on the usefulness of the supplementary materials. Nevertheless, when overlooking those respondents' detailed analysis of the used WSs/RSs, very positive reviews were provided stating that the worksheet was useful, hence, some explanations on the concepts or examples from real life were necessary for the students to help them understand how to complete the worksheet, finally admitting that the worksheet was beneficial as it helped students assess their strengths and weaknesses and helped them learn how to self-evaluate. This suggests that some teachers still need to improve their competence in developing students' SRL skills, as the degree of usefulness of supplementary materials may depend to a large extent not only on the worksheets themselves, but also on the teacher's professionalism in applying them, as some students have weaker metacognitive skills and may need a higher level of scaffolding.

Teachers' observations on the use of supplementary materials

In order to obtain more comprehensive data, teachers were also asked to provide answers to open-ended questions reflecting on the efficiency of the WS/RS, their experience and observations about the students' skills in using them and if they adapted the WS/RS and how. Table 1 represents the results of the qualitative analysis based on teachers' feedback.

Altogether 161 replies were received and most frequently 73.61% (n = 119 times) teachers acknowledged that the set of supplementary materials is a useful tool in organising and self-monitoring the learning process, and additionally some of them can be used as reminder sheets (see Table 1). The maths teacher of Grade 2 explained that WS6 was useful as the questions were organised in a way that it was easy for learners to understand, and the questions helped students start, continue, finish and also analyse the task or work.

Table 1 shows that the next conclusion that teachers mentioned most often (65.84%; n = 106 times) was that the use of WSs facilitated students' thinking and cognitive processes as well as developed the metacognitive skills through task analysis, looking for solutions and self-reflecting. The teacher of Grade 3 while working with WS5 observed that most of the students were really thinking, planning the work they were going to do and considering what the expected outcome would be.

Table 1 Teachers' feedback on the use of supplementary materials

Category	Description of the category	Frequency
A useful tool in the learning process	The supplementary materials are a useful resource for developing students' SRL and PS skills, as the WSs/RSs help students complete long-term/ large-scale projects, by dividing them into steps, or serve as a useful tool in organising the learning process (e.g. as a self-monitoring tool or reminder).	119
Impact on students' cognition and metacognitive skills	The supplementary materials encouraged students to apply thinking and engage in cognitive effort, to analyse the situation, to look for solutions and to self-reflect on ones' work.	106
Teachers' professionalism and role	Teachers' professionalism plays an important role in choosing the most appropriate materials and adapting them to specific needs, students' age group or cognitive level, as well as in guiding and facilitating the learning process.	74
Students' difficulties in using metacognition	Students lack metacognitive skills and the tasks involving metacognition require effort as students are not used to applying metacognition in the learning process	42
Impact on students' attitude towards the task completion	The use of supplementary materials impacted students' attitude towards the task completion as students experienced engagement, responsibility, autonomy, were interested in the task and enjoyed the activities and the learning process.	36
Impact on the learning outcomes and academic achievement	The use of supplementary materials impacted students' learning outcomes and academic achievement.	30
Impact on promoting students' collaboration	The use of supplementary materials fostered collaboration skills such as working in pairs/groups, working together with parents/ teacher or stimulated teacher-students' collaboration.	28
Future applications of the supplementary materials	Teachers plan to use the supplementary materials in the lessons in future and to recommend them to their colleagues.	24

Furthermore, the analysis of the data proves the importance of the teacher's role in the learning process as it was mentioned 74 times or in 45.96% of cases (see Table 1), explaining the significance of teacher's professionalism in choosing the most appropriate materials, adapting them if necessary, and preparing the soil for the development of a specific competence and scaffolding students in the learning process. The Grade 4 teacher used WS9 in a class lesson and concluded that "it was a great demonstration of a step-by-step learning strategy to figure out if a person was ready for the test and it was a great help for the teacher herself in the preparation for the class lesson and in teaching the children to prepare for any kind of work".

However, there were a couple of cases that were indicative of insufficient teachers' expertise, for example, a Grade 2 teacher mentioned that '...WS1 was too complicated for a 2nd grader and it was hard for him to understand what he was supposed to do on this WS', forgetting that it is a teacher's task to adapt the material to the specific audience and facilitate its introduction process, which highlights the necessity of TPD in developing teachers competence (Linde, Sarva & Daniela, 2022).

Furthermore, 26.09 % of teachers (n = 42) observed that students lack metacognitive skills, mentioning that they used the WS several times after every test and with each time it became easier for students to use it, concluding that such worksheets should be used systematically. Another observation was that students had poor organisational skills, as they were not used to planning their daily activities as they were usually organised by their parents, and this was mentioned not only by Grade 2, but also by Grade 4 and even Grade 6 teachers. Additionally, respondents acknowledged that the use of supplementary materials helped students improve these skills and a teacher wrote that RS6 'made students think and gave them the opportunity to slowly move on with problem-solving, rather than staying at the beginning and doing nothing'.

Another important aspect mentioned by the respondents was the impact of the use of the supplementary materials on students' attitude towards work which was pointed out by 22.36% of teachers (n = 36). Teachers observed the increase in motivation, positive attitude, interest and autonomy towards task completion, mentioning that 'students worked with interest, tried to analyse and answer the questions honestly' and concluded that 'they were learning from their mistakes'. A teacher of Latvian of Grade 1 observed that the RS6 was constantly on the wall in the classroom and students worked more autonomously and were less likely to ask the teacher to explain the task.

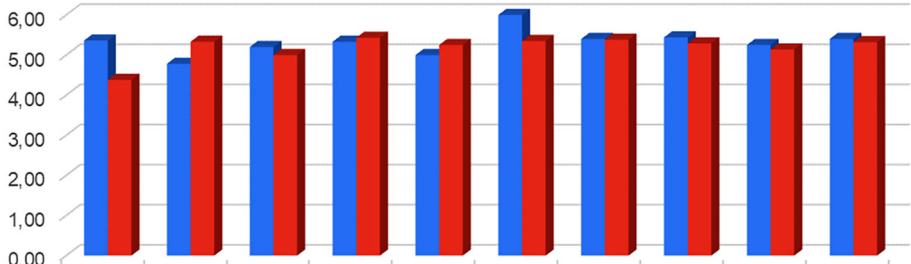
Similarly, 17.39% of teachers (n = 28) pointed out the impact on the promotion of students' collaboration skills through the use of the WSs as they served as a great source for discussions. The teacher of Grade 4 explained that students enjoyed working with WS10 and it gave them the opportunity to discuss and compare their answers with their classmates. The English teacher of Grade 5 highlighted that WS5 provided an opportunity to discuss the potential for seeking assistance from classmates, as initially, students identified only the teacher as a source of help. As a result, this conversation also served as an excellent platform to address social-emotional learning skills.

The last two categories were added after the first coding, as initially they were not envisaged but emerged during the coding process. 30 teachers (18.63%) had observed the impact of the use of WSs on students' learning outcomes and academic achievement and 24 teachers (14.91%) acknowledged that they would apply the WSs in their classrooms in future. These two categories imply that teachers see the importance and usefulness of applying these supplementary materials, as the participants indicated the benefit and necessity of using these materials in the long term.

Comparative analysis on the use of supplementary materials

The comparative analysis compares the results of the current study with those of the previous study conducted in 2023 where teachers were offered to pilot the worked out materials on developing students' PS and SRL skills and although 139 teachers applied to pilot the supplementary materials, only 36 teachers provided feedback (n = 120) on using the WSs and RSs. In a vast majority of cases (n = 110) the worksheets were used in Grades 7–12 and only 3 times in Grade 5 and 7 times in Grade 6, thus Study 1 will be more related to secondary school teachers (Hačatrjana & Linde, 2023b).

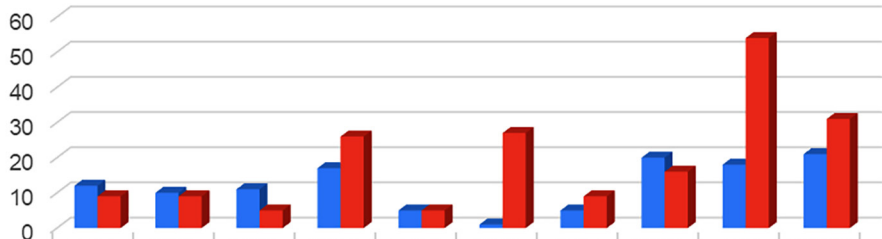
The comparison of the results of Study 1 (Grades 5–12) and Study 2 (Grades 1–6) on the overall usefulness of the WSs/RSs (see Figure 1) shows that in-service teachers highly evaluated the usefulness of supplementary materials in developing students' PS and SRL skills rating them from 4.38 to 6 on a 6-point Likert Scale. WS1 was slightly lower rated (4.38) by the primary school teachers and WS2 (4.78) by secondary school teachers which could be due to the task appropriateness to the student' age characteristics.



	WS1 Understand the task to solve it better	WS2 Plan how to do the task better	WS3 Analyse your work while doing the task	WS4 Reflect on and evaluate your work	WS5 Steps for solving a larger or more complex task	RS6 Control questions while doing the task	RS7 How to solve tasks and problems better	WS8 My knowledge and skills on what I have learnt	WS9 Planning time and duties of the school week	WS10 How I deal with challenges in studies and life
Grades 5-12	5,36	4,78	5,20	5,33	5,00	6,00	5,40	5,44	5,25	5,40
Grades 1-6	4,38	5,33	5,00	5,43	5,25	5,35	5,38	5,29	5,14	5,32

Figure 1 Average evaluations of the overall usefulness of each worksheet (WS)/reminder sheet (RS)

The comparative analysis on the frequency of the use of the supplementary materials (see Figure 2) shows that WS4 (n = 17), WS8 (n = 20), WS9 (n = 18) and WS10 (n = 21) have been used the most frequently by secondary school teachers, indicating that teachers intended to improve several aspects of SRL and PS, such as organisational skills, as well as self-judgement, self-observation and self-analysis which all involve metacognitive skills. RS6 was the least frequently used for the secondary school students (n = 1) as the steps might be too simple for the cognition level of the secondary school students. However, the only teacher who had chosen to use it stated that it was highly useful for the student with learning difficulties.



	WS1 Understand the task to solve it better	WS2 Plan how to do the task better	WS3 Analyse your work while doing the task	WS4 Reflect on and evaluate your work	WS5 Steps for solving a larger or more complex task	RS6 Control questions while doing the task	RS7 How to solve tasks and problems better	WS8 My knowledge and skills on what I have learnt	WS9 Planning time and duties of the school week	WS10 How I deal with challenges in studies and life
Grades 5-12	12	10	11	17	5	1	5	20	18	21
Grades 1-6	9	9	5	26	5	27	9	16	54	31

Figure 2 Frequency of using each worksheet (WS)/reminder sheet (RS)

Figure 2 demonstrates that the complete leader and the most frequently used WS for the primary school students (Grade 1–6) was WS9 (n = 54) which indicates that it is immensely important to develop students' planning and organisational skills at the primary school level. Similarly to Study 1, primary school teachers recognised the necessity to develop students' metacognitive skills with the help of WS4 (n = 26) and WS10 (n = 31). However, the frequency of using RS6 is controversially different as it was the least frequently used for the secondary school students (n = 1), whereas it was highly frequently used for primary school students (n = 27). Majority of teachers have used it as a poster in the classroom, one teacher mentioned putting it also in students' report books and another teacher made even two copies and laminated them as the students suggested that they would like to have one at home as well. This indicates that this RS is more appropriate for learners of younger school age as these skills should already be developed at the primary school level.

Discussion

The high overall evaluation regarding the usefulness of the supplementary materials proves that teachers consider these materials essential for developing students' SRL and PS skills. However, in Study 2 there were two out of 57 teachers who rather disagreed than agreed that the supplementary materials were useful in developing students' SRL and PS skills. This might indicate that teachers still need to advance their awareness of SRL and enhance their competence in developing SRL and PS skills in their students, as the supplementary materials are not a panacea themselves, they should be accompanied with appropriate pedagogical activities in line with the students' cognitive abilities, previous

exposure to the tasks that require metacognition and several other aspects. The findings of this research highlight the teachers' role in the learning process and the importance of teachers' professionalism which is in line with the previous studies (Linde, Sarva & Daniela, 2023).

Although metacognitive skills develop gradually and it might be assumed that older students find it easier to use their metacognitive skills, teachers in both studies were faced with the need to accustom students to in-depth thinking and analysis of their work. Similar to a previous study on the use of supplementary materials with secondary school students (Hačatrjana & Linde, 2023b), teachers in this study observed that students lacked metacognitive skills and were not used to analysing themselves, their thinking and their work processes, which is consistent with previous studies claiming that both primary and secondary school teachers spend insufficient time teaching metacognitive strategies (Dignath & Büttner, 2018), despite the fact that teacher's role in the development of students' metacognitive and SRL skills is considered crucial for success in contemporary education (Greene, 2021).

Teachers also observed that some students lack organisational skills and do not see the point in writing down homework assignments because they can see them in the 'e-class' (an electronic journal in Latvia) or their parents remind them of the assignments. This indicates that these students lack SRL skills and are not able to show their initiative, have not developed self-efficacy and the habit of planning and organising their time and instead rely on their parents or teachers (Zimmerman, 1989).

Another important aspect mentioned by the teachers was that the use of supplementary materials had a positive impact on students' learning outcomes. This observation aligns with prior research indicating that SRL interventions enhance academic achievement and learning outcomes (Cousins, Bol, & Luo, 2022; Dignath & Büttner, 2018). Teachers observed that although students lacked metacognitive skills, the use of supplementary materials encouraged them to develop these skills, to plan and think deeply, to analyse their strengths, weaknesses as well as their performance, and to use RSs as daily reminders of control questions while completing the tasks. Therefore, teachers' professionalism and role is vital and, according to Vosniadou and colleagues (2024), teachers can promote SRL skills in the classroom activities both directly and indirectly.

Finally, 'collaborative sense-making' is an important part of professional development (Ehrenfeld, 2022), which means that it is more efficient when teachers collaboratively discuss and understand new concepts and how to implement them in their lessons. The approach of introducing new supplementary materials as a part of the TPD course should therefore be encouraged, thus providing time and space for in-depth understanding of the materials and their use, as well as providing support and feedback in the use of the materials during the course.

Conclusions

Results of the current study, analysing teachers' feedback on the use of supplementary materials to develop students' SRL and PS skills, and a comparison of these results with the previous research, confirm that teachers consider supplementary materials highly valuable and beneficial for developing students' SRL and PS skills. Therefore, it would be useful to expand and add more additional materials to the set in the future, varying them according to the students' age range and having them in an easily modifiable form, so that teachers can easily adapt them to their needs.

Furthermore, the data indicate that, notwithstanding the highly appreciated usefulness of the materials from the teachers' point of view, the supplementary materials themselves cannot be considered a panacea for the development of students' SRL and PS skills, as these materials are strongly interrelated with the teachers' professionalism and competence in using them. The findings suggest that, it would be advisable to complement the use of the supplementary materials with an appropriate TPD course in order to increase teachers' knowledge of SRL and PS skills and competence in developing these skills in their students. This could be particularly important for in-service teachers who have completed their formal education a long time ago.

What is more, the data show that students lack metacognitive skills and experience difficulties in using them, suggesting that metacognitive skills are not being sufficiently developed in the learning process, which points to the need for appropriate TPD, emphasising two aspects: (a) enhancing teachers' understanding of the concept of SRL and the importance of systematic and long term development of these skills, and (b) improving teachers' competence in developing SRL and PS skills in their students, pointing out the benefits of the use of the supplementary materials.

Finally, further research analysing the development of students' SRL skills after teachers' systematic work on the enhancement of students' SRL skills with the use of additional materials would be useful.

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MODEL FOR PEDAGOGICAL-DIGITAL COMPETENCE DEVELOPMENT IN E-LEARNING

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ABSTRACT

In this study requirements and preferences of educators regarding the implementation of technology-enhanced learning approaches were determined. Learning materials were developed, and instructional formats were selected based on the gathered insights. Participants then took part in an online course and were required to participate in synchronous meetings, engage in self-directed learning tailored to their individualized learning objectives and utilizing provided support materials, collaborate within learning support groups, and apply acquired knowledge and skills in practical contexts with their students or colleagues over a span of up to two consecutive years. The developed online course underwent evaluation with 1347 educators across four distinct cohorts, each consisting of 173–501 educators, with minor adjustments made for subsequent cohorts. Data on participant learning experiences was collected through evaluation forms, learning reflection exercises, and participant contributions within a customized virtual learning environment. The effectiveness of the e-learning components was assessed based on participant feedback and the extent to which acquired knowledge and skills were implemented in practice. Leveraging the accumulated data a model for organizing e-learning to enhance educator pedagogical-digital competence in an online setting is proposed.

Keywords: *pedagogical-digital competence, model for e-learning, professional development online, competence development online, practice-based learning online, collaborative learning online, experiential learning online.*

Introduction

E-learning has surged in popularity worldwide, offering learners advantages, such as flexibility, affordability, and a wide range of learning content options (Hurley, 2023; OECD, 2020; Panigrahi et al., 2018). The flexibility of e-learning enables learners to study at their own time, pace and place, making it particularly appealing for adult learners with busy schedules (Aragon, 2010; Chen et al., 2020; Diep et al., 2021; Okojie et al., 2017). Various formats, including synchronous, asynchronous, and blended learning, cater to different learning preferences and needs. Synchronous learning fosters real-time interaction and collaboration, while asynchronous learning offers flexibility and self-paced

study options (Anastasiades, 2005; Hrastinski, 2008; Nor & Karim, 2013; Varkey et al., 2022). The blended learning approach integrates asynchronous online content delivery with face-to-face or virtual synchronous sessions, fostering active engagement and potentially enhancing the practical application of learned content (Diep et al., 2021; Lou et al., 2012; Nouby & Alkhazali, 2017). Furthermore e-learning activities allow participants to experience technology-enhanced learning (TEL) firsthand during their own learning process. This has beneficial implications for educators, as it has the potential to enhance the implementation of TEL in their work. And is especially important because educators recognize the shortage of practical examples as one of the main challenges in qualitative TEL implementation in their lessons (Falloon, 2020; Instefjord & Munthe, 2017; Røkenes & Krumsvik, 2014; Štemberger & Konrad, 2021). Furthermore a practice-based learning approach, coupled with the opportunity to engage with a supportive learning community, offers even more opportunities for developing, sharing and improving TEL practices across various educator groups. This is critically important, considering the rapid development of digital technologies that are continuously opening up new avenues for organizing e-learning and TEL in innovative ways (Maddix, 2010; Rubene, Daniela, Sarva, et al., 2021, Secore, 2017; Swan, 2002).

Despite its benefits, e-learning poses challenges, such as the need for self-motivation, limited social interaction, and potential digital literacy barriers. Strategies to address these challenges such as fostering supportive online communities, providing personalized support, and enhancing digital literacy skills can help mitigate some of these risks (Bonde et al., 2014; Dhawan, 2020; Reimers & Schleicher, 2020). These approaches were also integrated and tested in the e-learning course during this research.

In today's digital era, the development of digital competence is paramount for adults, with a particular focus on educators who play a crucial role in shaping the next generation's learning experiences. As technology continues to advance, educators must possess the necessary skills to effectively integrate digital tools and resources into their teaching practices. Additionally, educators should also facilitate the development of these skills in their students (From, 2017; Ghomi & Redecker, 2019; Krumsvik, 2014; Mishra & Koehler, 2007). The e-learning format can therefore be advantageous due to its integration with technology for learning purposes. This research aims to bridge the gap between theory and practice by developing an online course tailored for educators to improve their pedagogical digital competence (PDC). Through a participatory action research design, e-learning approaches will be refined to meet the specific needs of participants. The overarching goal is to conceptualize the experience of educators during this online course by exploring different e-learning approaches while simultaneously developing educators' PDC and creating a functional model for organizing educator PDC development online.

Methodology

The research was part of a up to two year online professional development course by the National Centre for Education, Republic of Latvia, within the "School 2030" project.

Educators of various experience, all subject fields and student age groups, who were willing to become technology mentors for other educators, took part in the course. Over 60% of course participants had more than 10 years of work experience in the field, while educators with 2 years or less comprised approximately 5% of the group. The majority of participants, about 20%, were from the technology field, followed closely by those from languages, mathematics, and natural sciences, each representing around 15% of participants. Social and civic education, along with culture and self-expression educators accounted for approximately 10% of participants, while health and physical education educators comprised about 5% of the group. Most educators came from primary and secondary schools, each representing about 25% of participants, followed by preschool at 20%. High school educators made up 15%, with the remaining participants working in vocational, higher, further, or special education, or leading after-school programs. Overall 1347 participants who were divided into four learning cohorts and 57 learning groups took part in the course. The course consisted of 22 modules, of which five are analyzed in this research. Throughout the course, both quantitative and qualitative data was collected to assess the quality, utility, and effectiveness of the offered course content and format. Participants provided feedback through surveys after each module, as well as regular surveys on collaboration in learning support groups and their learning progress. Additionally, participants submitted individual tasks reflecting on the use of DSs (digital solutions) in their practice. Summarized data was shared with participants, instructors, and organizers. Participants' professional needs were reassessed at the course's end, along with reflections on the course and a proposed model for online professional development. Continuous literature analysis informed course improvement, content creation, and data interpretation (Figure 1).

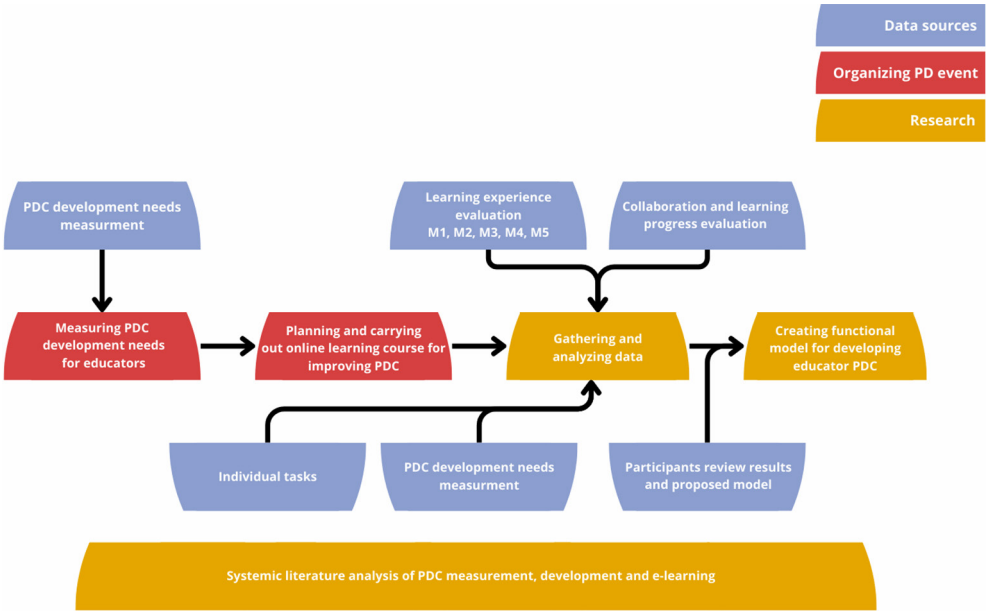

Figure 1 Research design

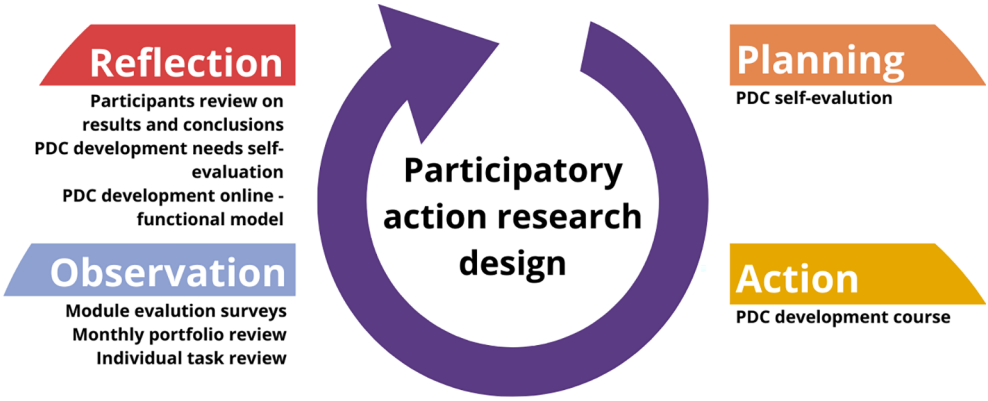

Figure 2 Elements of participatory action research design in this research

The research employed a Participatory Action Research (PAR) design, a flexible and adaptable approach suitable for various settings, including education, healthcare, community development, and organizational change (Arcaya et al., 2018; Berger & Peerson, 2009; Cahill et al., 2010; De Oliveira, 2023; McIntyre, 2007). This encompassed planning and executing an online course aligned with participant professional development priorities as well as evaluating participants' learning experiences, perceptions of course format, content, and organization during and after the course. This research incorporates all elements of the PAR cycle (Figure 2).

The same tool was used at the beginning and end of the course to measure PDC development needs (Sarva et al., 2022). Participants determined their Technology-Enhanced Learning (TEL) priorities at the start and selected learning goals accordingly. After each module, participants updated their portfolios, summarizing progress, adding practice examples, reflecting on collaboration in learning groups, tracking overall progress, and sharing their accomplishments and challenges. In the semi-structured survey, participants were required to disclose their name (used to track individual success), learning group, and evaluate the success of collaboration in their learning groups using a Likert scale from 1 to 5, where one represents "very bad" and five "very good". They also evaluated progress towards their learning goals on a Likert scale from 1 to 5, where one represents "very bad" and five "very good". Additionally, they shared their main successes and challenges during the learning period in an open-ended question. Another open-ended question was provided for any additional comments (Appendix A).

For the learning modules regular evaluations involved a semi-structured survey focusing on content, structure, and the quality of support during the learning experience. Participants were asked to express their opinions using a descriptive Likert scale with six levels ranging from "definitely no" to "definitely yes." Surveys also included optional open ended response fields to share any additional comments or explanations. This research analyzes five learning modules, referred to as M1, M2, M3, M4, and M5 in the sequence they occurred during the course. For M2 and M4 which were composed of

several submodules, surveys were branched to allow evaluation of the offered submodules separately (Appendix A).

The last module (M5) provided a summary of participants' reflections on their learning experiences, along with the proposed and explained functional model for online PDC development based on the course structure. It included a summary of participants' PDC development needs and a comparison of changes over time. The summary also detailed the course structure, including the number of participants in each cohort, topics of learning modules, number of learning content authors, group instructors, and the probable number of participants expected to successfully complete the course according to actual data. Additionally, the summary included participants' evaluations of collaboration in groups, self-assessment of reaching planned learning goals, main challenges, and successes. Summaries of four module evaluation surveys, the most popular DSs, and analysis for M2 submodule participants' reasoning for choosing DSs were provided, along with conclusions on each data set. Participants were asked to reflect on this information using a semi-structured survey, evaluating 13 statements about their experience during the online course using a Likert scale of seven levels (from "definitely yes" to "definitely no", including the option "can not evaluate"). They also compared learning formats – synchronous, asynchronous, and experience exchange events – ranking their preferences and noting their main challenges and successes during the course (Appendix A).

The course was created using principles and approaches drawn from scientific literature analysis, which have been shown to be effective for adult e-learning. These principles and approaches were applied and assessed through participant-shared experiences and work during the online course. To evaluate the e-learning course Kirkpatrick's Four-Level Model, developed by Donald Kirkpatrick, was used. This model is widely recognized for evaluating the effectiveness of learning programs (Kirkpatrick & Kirkpatrick, 2006; Rodriguez et al., 2009). Although originally designed for evaluating traditional face-to-face training, it can be applied to e-learning environments (Galloway, 2005; Hamtini, 2008; Kusumaningrum et al., 2018; Rodriguez et al., 2009). The four levels of Kirkpatrick's model are: (1) Reaction, (2) Learning, (3) Behavior, and (4) Results. To triangulate the results of the research each of these levels was evaluated through multiple data sets (Table 1).

Table 1 Data collection procedure relation to Kirkpatricks' model levels

Data collection procedure	**Level of Kirkpatricks' four stage model – (1) reaction, (2) learning, (3) behaviour, and (4) results**
PDC development needs self-assessment	2, 4
Module evaluation surveys (M1-M5)	1, 2, 3
Portfolio review, learning success and group collaboration evaluation	1, 2
Participant individual tasks for implementing DSs in their practice	2, 3, 4
Participant review on results and conclusions	1, 2, 4

Mainly quantitative methods were employed for data analysis. A self-assessment tool gathered participants' PDC development needs using closed questions and a Likert scale. Learning module evaluation surveys collected feedback through closed questions and a descriptive Likert scale. Surveys for participant portfolios included closed questions using a numeric Likert scale for collaboration and personal development goals. Qualitative data was collected through open-ended questions in surveys, portfolio evaluations, and analysis of practical work. A combination of qualitative and quantitative data was used to analyze 13 e-learning model components. Quantitative data was analyzed using Google Spreadsheets, SPSS, and R, while qualitative data was analyzed using NVivo and, in some cases, a double-blind approach with categorization.

The research adhered to GDPR regulations. Participants were informed that the data collected during the online course might be used for research purposes. Written permission was obtained from the e-learning course organizers. Additionally, the research methodology was approved by the Ethics Committee of the University of Latvia (Riga, 08.03.2023, No. 71-46/55).

Results

At the course's outset, PDC development priorities were set to tailor content to participant needs, and at its conclusion, to assess any shifts in these priorities. A total of 1202 participants completed a self-assessment before the course, with 610 doing so afterward. The PDC development priorities tool comprised 38 TEL statements, assessing their importance and implementation in participants' practice. The PDC Development Priority Index (PDCDPI) was calculated for each statement by subtracting the sum of high self-assessment instances (c = completely; e = enough) from the sum of high perceived importance instances (v = very important; i = important), using the formula: PDCDPI = $(v + i) - (c + e)$. Since sample sizes varied, all PDCDPI values were converted to percentages. To clarify, if all participants deemed a TEL statement important or very important but felt they didn't implement it in practice enough, the PDCDPI value would be 100%. Conversely, if all participants felt they implemented a TEL statement completely or enough, the value would be 0%. Negative values suggest no need for PDC development – participants' self-assessment of implementation exceeds perceived usefulness. The percentage calculation formula is: PDCDPI (%) = $(v + i) - (c + e)$ / respondent count × 100.

The results indicate a significant decrease in participant PDCDPI (%) for all TEL statements, confirmed by a Two-tailed T-test ($p < .01$). However, the perceived importance of TEL statements remained unchanged ($p > .05$), suggesting that the shifts are due to participants' increased self-assessment of TEL implementation in practice. Participants still recognize the importance of these TEL statements for organizing learning but have shown improved implementation. Consequently, the urgency for professional development in this area has diminished. Table 2 shows a notable decrease in the need for professional development in digital threat prevention systems, formative feedback

provision, and support for students with special needs by the course's end, indicating enhanced clarity among participants in these TEL elements. Additionally, participants have improved self-assessments regarding productivity enhancement, collaborative learning, digital reputation, and student-led learning. However, minimal changes were observed in areas such as peer-assessment facilitation, sharing student work, providing additional support for students who require it, getting to know students, and individual student communication. These TEL aspects align with the DIGCOMPEDU domain of empowering learners, highlighting the shift towards student-centered learning. Such changes necessitate adjustments not only in TEL implementation but also in teaching methodology and attitude, which were not the primary focus of this online course.

Table 2 PDCDPI (%) in the beginning of the course (n = 1202) and the end of the course (n = 610) in descending order according to PDCDPI (%) changes

	Beginning of the course	End of the course	PDCDPI (%) changes
System for digital threat prevention	51	30	–21
Digital solutions to provide feedback	36	16	–21
Students with special needs use digital technologies	45	25	–20
Digital solutions for formative assessment	36	16	–20
Digital solutions for increasing productivity	26	7	–19
Learning support pairs/groups	34	15	–19
A positive digital reputation	40	21	–19
Students plan, observe and evaluate their own learning	49	30	–19
Learning platform	30	11	–19
Data protection conditions	44	26	–18
Use online information resources and media for learning	36	18	–18
Receive support that helps using digital solutions	39	21	–18
Appropriate equipment	40	22	–17
Copyright	43	26	–17
Learning in groups using digital solutions	31	14	–17
Training to develop pedagogical-digital competence	25	7	–17
Creation of a variety of digital content	32	16	–17
Solve problem situations related to the use of technology	34	18	–16
Consider student technical abilities and resources	34	18	–16
Suitable environment	44	28	–16
Student interests	29	15	–15

Table 2 continued

	Beginning of the course	End of the course	PDCDPI (%) changes
Evaluation and improvement of the learning process	33	18	–14
Learning pace	31	17	–14
Healthy habits when working with digital solutions	30	15	–14
Experience exchange activities	30	16	–14
Digital solutions for summative assessment	30	16	–14
Virtual communication procedure	34	20	–14
Environmentally responsible use of digital technologies	32	19	–13
School management platform	16	4	–12
Independently master new digital solutions	27	15	–12
Communication platform	11	0	–12
Anticipate technological challenges and plan solutions	36	24	–12
In-depth learning for students who are ready for it	31	21	–11
Students conduct peer assessment	26	16	–10
Students share their work	25	15	–10
Additional support measures for students who require them	29	19	–10
Get to know students	26	17	–10
Individual communication	26	18	–8

To assess each of the selected 13 components (C1-C13) in the proposed model, various data sets collected through different methods during the online course were used. A threshold of 50% positive or very positive responses ("definitely yes" or "yes") was established to approve each of the 13 components (Table 3).

Data for implementing C1 was collected through PDC development needs self-assessment at the course's outset and utilized for course planning. A follow-up measurement at the course's end demonstrated statistically significant improvements in all tested statements. Module evaluation surveys (M1-M5) assessed the usefulness of the learning experience for professional development, with positive responses exceeding 50% for all modules and increasing over time (M2 > 75%, M3 > 85%, M4 > 70%, M5 > 70%). Participants' portfolios reflected on progress towards learning goals, with the top two positive responses exceeding 60%. Regular data collection throughout the course (n = 8636) ensured consistency. With over 50% positive responses and alignment with Kirkpatrick's model levels one to four, C1 is validated.

Similar to C1 in C2, portfolio reviews gauge participants' progress towards learning goals, with over 60% positive responses. Main successes include learning new DSs and organizing learning events, while challenges may arise in completing course tasks. Furthermore in the participants' review of course results and conclusions, over 75% expressed success in using DSs for learning and work. With over 60% positive portfolio review responses and alignment with Kirkpatrick's model levels one, two, and four, C2 is validated.

C3 involves determining participants' initial PDC development needs. The PDC Development Priorities Index (PDCDPI) was created to gauge the PDC development needs. Learning content and course structure were determined based on PDCDPI. Module evaluation surveys (M1-M5) assessed the adjustment of the learning experience to participant needs, with over 50% positive responses. Portfolio reviews reflected the course's capacity to meet individual needs, with over 60% positive responses. In the review of results and conclusions, over 60% positive responses signified the course's ability to address participant needs. With over 50% positive module survey responses, over 60% positive portfolio review responses, and alignment with Kirkpatrick's model levels one to four, C3 is validated.

Component four (C4) represents self-assessment, peer-evaluation and instructor feedback during learning. At this point participants have taken an active role in learning. And though analysis is still in process and the course design is adjusted, main components are already in place and functioning. For C4 portfolio reviews provide 60% or more positive responses for statements related to self-assessment and peer-evaluation and 95% or more positive responses for instructor feedback noting that it is especially highly valued. This is reinforced with 55% positive or very positive responses from participant review on results and conclusions. According to Kirkpatricks' model 1–4 level, C4 can be considered validated.

In C5 participants autonomously adjust their professional development goals throughout the course to meet their evolving needs, either setting new goals or modifying existing ones to maintain motivation and adaptability. Portfolio reviews indicate over 60% positive responses, reflecting participants' progress towards their chosen learning goals. Participant self-assessments demonstrate over 60% positive responses for statements related to goal-setting and progression. Additionally, participant reviews of results and conclusions show over 55% positive responses for statements concerning goal-setting and its impact on learning. C5 can be considered validated according to Kirkpatrick's model levels one, two, and four.

Components six through eight (C6, C7, C8) involve learning activities such as searching for and evaluating DSs, planning their use, and practising learned content. With support from instructors, learning groups, and course materials, participants explore, evaluate, and apply DSs in their educational settings, sharing experiences and seeking assistance as needed. Module surveys (M1-M5) evaluate these components, with statements like "I successfully used DSs for online collaboration" (M1) receiving over 60% positive responses. Similarly, statements like "Gained new ideas in the subject matter that

I want to apply in practice" (M2-M4) and "the course content was qualitative" and "the course format was appropriate" (M1-M5) garnered positive responses above 60% and 65–70% respectively. The usefulness of the learning experience for professional development, assessed through these components, received over 70% positive responses. Portfolio reviews and individual tasks provide additional insights into participant experiences and DSs usage. Participant responses on course review and conclusions further validate these components, with over 70% positive responses indicating practical application of DSs and future plans to implement similar approaches to those experienced during the online course in their practice. Overall, C6-C8 are validated according to Kirkpatrick's model levels one to four.

C9, C10 focus on compiling, evaluating, and sharing learning experiences. In M1, participants formed learning support groups, with over 70% reporting successful collaboration with chosen partners. Additionally, over 65% agreed on cooperation within the support groups. M2 included an evaluation survey item related to presenting good practice examples, receiving over 75% positive responses. Sharing experiences also occurs through individual tasks, with participants utilizing a variety of DSs in practice. Participant reflections in the review of results and conclusions revealed active involvement in support groups and collaborative learning, with over 55% noting the benefits of group collaboration. Furthermore over 70% participants reported using DSs with colleagues or students, and over 75% found practical DSs application beneficial for learning. Additionally, over 75% of participants shared their practice examples and more than 70% of them noted that colleague shared practice examples were beneficial for their professional development. According to Kirkpatrick's model levels one to four, C9 and C10 can be considered validated.

Components 11–13 delineate the course structure, encompassing multimedia tools (C11), the learning management system (C12), and learning analytics system (C13). Module surveys (M1-M5) included a statement on the appropriateness of the course format, with positive responses exceeding 70%, 75%, 85%, 75%, and 75%, respectively. In the review of results and conclusions, over 75% of participants credited practical DSs application for their learning. Moreover, over 75% appreciated the content and activity choices available, reflecting positively on C11. Additionally, over 65% expressed satisfaction with the course format, and 50% planned to employ a similar approach in their work, indicating validation of C11-C13 across Kirkpatrick's model levels one to four.

In the review of results and conclusions, participants provided feedback on their overall course experience. Over 75% expressed appreciation for the choice offered in both format and activities, while over 65% expressed overall satisfaction with this learning approach. Additionally, 50% indicated plans to adopt a similar approach for organizing learning with their students or colleagues. Based on the validation results of components C1-C13 and Kirkpatrick's models 1–4, the functional model (Figure 3) is deemed valid for online PDC development (Table 3).

Table 3 Information on the validation of the functional model during a participatory action research carried out in an online course, model component numbering is used in the table Figure 3

Model component	When it was approbated (B – before the course, D – during the course, A – after the course)	How it was approbated and the average proportion of very positive ("definitely yes") or positive ("yes") feedback in percent where applicable, not applicable (n/a) if not	Validated / Not validated
1	BDA	PDC development needs self evaluation (n/a) Module evaluation surveys (M1-M5) (50% or above) Portfolio review (60%)	Validated
2	BDA	PDC development needs self evaluation (n/a) Portfolio review (60%) Participant review on results and conclusions (70% or above)	Validated
3	BDA	PDC development needs self evaluation (n/a) Module evaluation surveys (M1-M5) (50% or above) Portfolio review (60%) Participant review on results and conclusions (60% or above)	Validated
4	BDA	Portfolio review (60% or above for self and peer-evaluation and 95% or above for instructor work) Individual tasks for implementing DSs in practice (n/a) Participant review on results and conclusions (55% or above)	Validated
5	D	Portfolio review (60% or above) Module evaluation surveys (M1, M2, M4) (60% or above) Participant review on results and conclusions (55% or above)	Validated
6	D	Module evaluation surveys (M1-M5) (50% or above) Portfolio review (60%) Individual tasks for implementing DSs in practice (n/a) Participant review on results and conclusions (50% or above)	Validated
7	D	Module evaluation surveys (M1-M5) (50% or above) Portfolio review (60%) Individual tasks for implementing DSs in practice (n/a) Participant review on results and conclusions (50% or above)	Validated
8	D	Module evaluation surveys (M2-M5) (60% or above) Portfolio review (60%) Individual tasks for implementing DSs in practice (n/a) Participant review on results and conclusions (50% or above)	Validated
9	D	Module evaluation surveys (M1, M3) (65% or above) Portfolio review (60%) Individual tasks for implementing DSs in practice (n/a) Participant review on results and conclusions (55% or above)	Validated

Table 3 continued

Model component	When it was approbated (B – before the course, D – during the course, A – after the course)	How it was approbated and the average proportion of very positive ("definitely yes") or positive ("yes") feedback in percent where applicable, not applicable (n/a) if not	Validated / Not validated
10	D	Module evaluation surveys (M1, M3) (65% or above) Portfolio review (60%) Individual tasks for implementing DSs in practice (n/a) Participant review on results and conclusions (55% or above)	Validated
11	D	Module evaluation surveys (M1-M5) (65% or above) Participant review on results and conclusions (50% or above)	Validated
12	D	Module evaluation surveys (M1-M5) (65% or above) Participant review on results and conclusions (50% or above)	Validated
13	BDA	Module evaluation surveys (M1-M5) (65% or above) Participant review on results and conclusions (50% or above)	Validated
Whole model	A	Participant review on results and conclusions (50% or above)	Validated

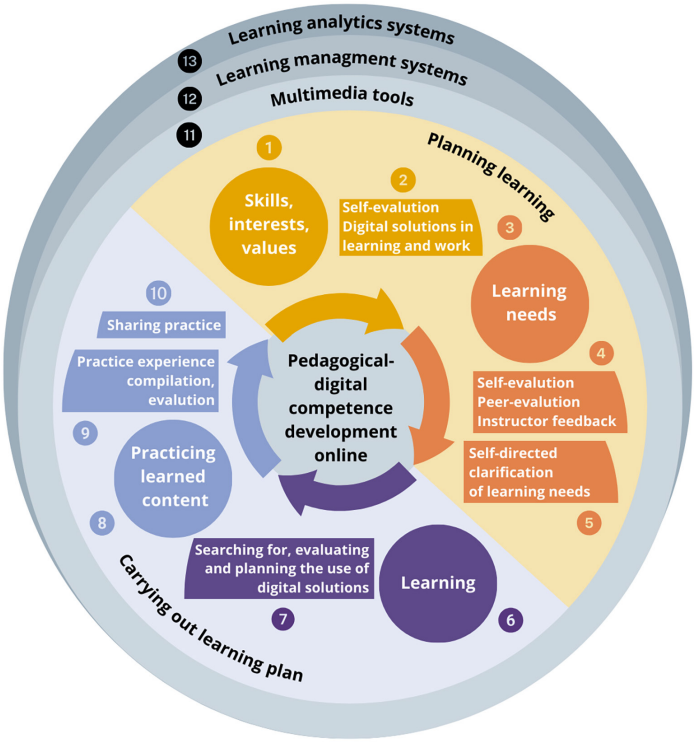

Figure 3 Functional model for organising PDC development online with 13 model elements referenced

Table 4 Course completion rate and average academical hours granted to participants compared between the four learning cohorts

Cohort	Participant count who took part in the course	Participant count who completed the course		Completion rate, %	Average academic hours granted, %
1.	501	431		86	50
2.	290	176		61	53
3.	383	206		54	51
4.	173	118		68	57
In total	**1347**	**931**	**Average**	**69**	**53**

The objective of this study was to translate the findings of the research into a practical model for structuring e-learning courses aimed at enhancing educator PDC. Over a two-year period, an e-learning course was conducted to achieve this objective. Elements of the proposed model were embedded into the course experience and continuously assessed to evaluate their effectiveness. Course activities were tailored and improved based on feedback from participants and group coordinators, as well as other gathered data. Any modifications or new elements introduced during the course were also incorporated into refining the functional model (Figure 3). In the final module of the course, the latest version of the model was presented to participants, and their feedback on its elements was collected to inform further enhancements.

Out of 1574 applicants for the course, 227 did not start or left it prematurely. Among those who left, 103 cited various reasons such as time constraints, job changes, or dissatisfaction with the course. This yields an overall retention rate of approximately 85%. Of the 1347 participants who completed the course, 931 received certificates, representing around 60% of the total applicants and 70% of the course participants. Completion rates varied across cohorts, with the highest (86%) in the first cohort and the second highest (68%) in the last cohort (Table 4). This discrepancy may be due to differing levels of motivation or support from instructors. Interestingly, while the completion rate was highest in the first cohort, participants from the last cohort contributed more hours on average to course assignments. This suggests a need for further investigation into the optimal course duration and intensity. However, qualitative research is necessary to fully understand the underlying factors behind these differences.

Conclusions

Educators' pedagogical-digital competence development needs were measured before and after taking part in an online course. Initial assessment highlighted pressing needs such as establishing digital threat prevention systems, fostering self-directed learning among students, and integrating digital technologies for students with special needs amongst others. This information was used to design an online professional development course that participants were enrolled in. Evaluation after taking the online course

demonstrated a notable decrease in professional development needs across all 38 measured aspects, indicating the course's positive impact on participants' competence. Particularly significant was the reduction in pedagogical-digital competence development requirements aligned with the participants' initial priorities, showcasing the course's targeted approach to addressing participant key needs.

Various data sets collected during the online course were used to evaluate each of the selected 13 components of the online course, with a threshold of 50% positive or very positive responses set for approval. Each of the 13 components were validated through two to four data sets collected through: (1) PDC development needs self evaluation; (2) Module evaluation surveys (M1-M5); (3) Portfolio review; (4) Individual tasks for implementing DSs in practice; (5) Participant review on results and conclusions. Taking in consideration the validation results a functional model was developed. Moreover, participants had the chance to provide feedback on the proposed model and its components during the course's conclusion. The high satisfaction levels reported by participants in all five data collection formats, coupled with evidence of applying learned content in practice, and high course retention and completion rate validate the effectiveness of the functional model employed. Given the broad scope of the research, which includes educators from diverse fields and with varying levels of experience as well as working with students of all age groups, it is reasonable to conclude that this learning model could be applied to the professional development needs of educators across all fields. However, further research focused on specific education fields, student age groups, and educator experiences could identify opportunities for customization, potentially enhancing participants' learning experiences and outcomes by tailoring the structure to their specific contexts.

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APPENDICES

Appendix A Digital tools used for evaluation during the course

Nr.	Name of the tool	Full version in PDF format (authors translation – English)	Full version in PDF format (original language – Latvian)	Interactive online version (original language – Latvian)
1.	PDC development needs self-assessment	https://drive.google.com/file/d/163C-8TYc44KubwP3R-2WZTP3sY7u6jB4XJ/view?usp=drive_link	https://drive.google.com/file/d/1YZZGHX-WOYLjmTKZ8ZSO-eV9KxuX5FOk4Z/view?usp=sharing	https://forms.gle/w3pukwzyFzhK6PMg9
2.	Module 1 evaluation survey	https://drive.google.com/file/d/1FJox-j5FAeb9GFC-qk86hz2qc4Hl3m5ZIu/view?usp=sharing	https://drive.google.com/file/d/1O_lFMT-dZZmZ8vrNRt-kTS_bqsQHP5EXXT/view?usp=sharing	https://forms.gle/oWEmgVAe7L36g5zJA
3.	Module 2 evaluation survey	https://drive.google.com/file/d/1FJox-j5FAeb9GFC-qk86hz2qc4Hl3m5ZIu/view?usp=drive_link	https://drive.google.com/file/d/1Bg-Ke3AZnt9ZMm8_TYWOPZTfvEV0Aavn9/view?usp=sharing	https://forms.gle/JAKeuk5CqChKp2ab8
4.	Module 3 evaluation survey	https://drive.google.com/file/d/1fB-8ju4R_Hyf-yIKdL-JDRnHxtWZVw5VOJ/view?usp=sharing	https://drive.google.com/file/d/1O_lFMT-dZZmZ8vrNRt-kTS_bqsQHP5EXXT/view?usp=drive_link	https://forms.gle/7fLYZkhEnEw6xesL9
5.	Module 4 evaluation survey	https://drive.google.com/file/d/1m-mUyLzIM_eks7i13M-WvdMQjpL_U2X4xX/view?usp=sharing	https://drive.google.com/file/d/12SrX-qaFPwoiWQgaR-8SUAXMTcY58rzNkh/view?usp=drive_link	https://forms.gle/xgAToT6Ns2fkX1ao7
6.	Module 5 evaluation survey	https://drive.google.com/file/d/161G2E-b0O4lScPT1aqyN-ZLYrT-VqFRn2X/view?usp=drive_link	https://drive.google.com/file/d/1wr1P-STzy1PxDTEB82W-bgIwDje1-pcxtr/view?usp=sharing	https://forms.gle/Z24wAxFBfTLDNBwP6
7.	Portfolio review, learning success and group collaboration evaluation survey	https://drive.google.com/file/d/1E0Hm-9kc3pKOGtwUkdYM-bQCDTBQMHTl_G/view?usp=sharing	https://drive.google.com/file/d/1Ld-30Fx21a9Tac90Wy-HIkZYhoM3ms-KI3/view?usp=sharing	https://forms.gle/UVaU6GvS11iGsDpn8
8.	Participant review on results and conclusions survey	https://drive.google.com/file/d/1hS-Myc271NeGjYfo-bYvUPnKJ70Ptm--O0/view?usp=sharing	https://drive.google.com/file/d/18x-Sw3M5YkCMsPMXwVw-cwQ7h4nkkvmu6b/view?usp=sharing	https://forms.gle/Xi3NKyMVtfr3viy1A

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IN-SERVICE TEACHERS' EDUCATION FIELD PREFERENCES IN THEIR FINAL PAPERS

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ABSTRACT

Education is essential to keep up with the constantly developing world. The quality of education systems relies heavily on teachers. Teachers need training, resources and support to do their jobs effectively. It is crucial to train and recruit qualified teachers to ensure the success of the education system. In Latvia, the necessities for the professional development of teachers are determined by the Education Development Guidelines 2021–2027. The article analyses theoretical materials concerning the essence of in-service teacher training. Within the framework of in-service teacher training implemented in the Faculty of Education Sciences and Psychology at the University of Latvia, one of the main priorities of which is to promote the professional development of pre-school and primary school teachers, it was possible to analyse empirical data on teachers' preferences in the context of in-service teacher training. The main findings reveal teachers' need to engage in professional development and their preferences when choosing an educational field, including teaching and research. Empirical research can inform in-service teacher training practices and help develop programmes that better meet the needs of teachers in the classroom. In-service teacher training is crucial to enhance the education workforce's professional development and to improve the quality and effectiveness of the education system.

Keywords: *in-service teacher training, primary school, pre-school, preferences, professional development.*

Introduction

Education is a condition for keeping pace with the developing world. One of the most important elements of the education system in today's society is the need to prepare teachers to meet the changing social processes in terms of quality and quantity (Kerimgil-Çelik, 2023). The quality of the education system depends on teachers, who need the education, resources and support to do their job well (UNESCO Institute for Statistics, 2016). The three major components of education – namely the teacher, the student and the education system – depend on each other and together account for academic achievement (Epstein, 2018; Prabowo, 2022).

Training and recruiting qualified teachers is essential for the success of the education system. Typically, the successful preparation and education of teachers and prospective teachers is one factor influencing the success of schools and ensuring the development of the education system (Cheng, 2016; Dreer et al., 2017; Livingston, 2016; Şahin & Akinci, 2020). Professional teachers use appropriate teaching materials and strategies; they have the ability to motivate students; they have high skills and a broad view of education; they have an understanding of human nature and society; and they have an inherent commitment to the profession (Dowden et al., 2013; Nyamai, 2021). In order to implement the teaching and learning process, teachers need to be able to create a classroom culture and education workplace that is creative, dynamic, enthusiastic, dialogue-oriented and fun in a meaningful way for students. In-service training is a key element of teachers' professional development (Essel et al., 2009; Prabowo, 2022; Şahin & Akinci, 2020; Saleem & Zamir, 2016).

Essence of In-Service Teacher Training Courses

The main purpose of in-service training is to enhance the professional development of educators in the field of education and the quality and effectiveness of the education system as a whole (Bulut, 2022), as well as to improve the quality of teaching and the strategies to make educational discoveries (Veenman et al., 1994). Thus, in-service teacher training courses aim to promote change and renewal. The goals of in-service training courses need to be effective in the long term (Nicolaidis & Matthe-oudakis, 2008) and the objectives to be achieved through in-service training should be clear. It should be stated whether the aim is to achieve a change in behaviour or knowledge (Prabowo, 2022).

Appropriate training can help promote the development of teachers' competence (Tennant et al., 2002). Training is a process of improving knowledge and competence and changing attitudes so that teachers can effectively carry out the tasks assigned to them (Prabowo, 2022; Torrington & Huat, 1994). In-service training courses enhances teachers' professional competencies, as well as their attitudes towards, belief in and perceptions of the profession (Borg, 2011; Şahin & Akinci, 2020; Weinstein, 1989). In-service training courses are a key component in improving teachers' teaching skills and updating their methodological knowledge. In this respect, in-service teacher training courses play a crucial role in ensuring quality classroom teaching by improving teachers' skills (Saiti & Saitis, 2006). In addition, through positive changes in teachers' behaviour, the courses have long-term benefits for education and institutions (Hayes, 1995, 2000; Richards & Farrell, 2005).

In-service training courses can help improve knowledge and understanding of the educational environment as a whole (Wood, 1999). In-service training courses help teachers to create qualitative learning environments in schools; they enable teachers to develop competences relevant to their career opportunities, as well as helping teachers and other staff involved in education to remain motivated and enthusiastic (Bulut, 2022).

The success of in-service training courses depends on a variety of variables inside and outside the classroom, such as theoretical knowledge, demonstration, practice, feedback and classroom application (Joyce & Showers, 1980). In-service training courses should be tailored to the specific subject, should address the needs of teachers, and should be continual. Effective in-service training courses provide teachers with real-life solutions with meaningful engagement through collaborative relationships in which teachers are given opportunities for reflection (Burns & Richards, 2009; Vukelich & Wrenn, 1999). Several factors contribute to the effectiveness of in-service training courses (Sokel, 2019):

- Coherence. This can be seen as a key factor not only in a general sense when the programme reflects national goals (Desimone, 2009; Desimone & Garet, 2015), but also as a more context-specific advantage when the content focuses on authentic and explicit challenges faced by teachers (Bayar, 2014; Posnanski, 2002).
- Active participation. In-service training classes lose their effectiveness if they are conducted using traditional methods where only theoretical knowledge is imparted in lectures (Elyas & Al Grigri, 2014; Ko, 2016).
- Collaboration. Working together during sessions encourages reflection and the discovery of new perspectives (Garet et al., 2001; Guskey, 2003; Guskey & Yoon, 2009).

Anyone who is not an education professional cannot be a successful teacher. The teaching profession requires a variety of specific and distinctive skills, such as starting and ending lessons, classroom management skills and the ability to explain the curriculum (Gendy et al., 2014). A professional teacher is expected to be knowledgeable about the subject and to have a mature and intelligent personality (Opfer & Pedder, 2011). A professional teacher must also be committed, master the subject, be responsible, be a systematic thinker and be professionally engaged in the learning process (Prabowo, 2022). One reason for teachers to participate in professional development is to ''increase awareness of strengths and weaknesses'' (Wong, 2021, 143). A teacher's awareness of their own decision-making processes and their strengths and weaknesses in the context of teaching is fundamental to their professional growth and development.

By exploring what teachers really need and want, creators and implementers of in-service training programmes can focus on teachers' real learning challenges (Genoğlu et al., 2016; Hayes, 2000; John & Gravani, 2005). Understanding teachers' needs and preferences within in-service teacher education programmes is an essential step that increases the programmes' relevance to teachers' real needs in the classroom (Roberts, 2008). On the other hand, if teachers' needs and expectations are not taken into account in their professional development, teachers tend to become overly critical, demotivated and unwilling to participate (Groves, 2015; Ho & Topal, 2013; Uztosun, 2018; Yan & He, 2015). It is therefore necessary to undertake the study to ascertain the preferred fields of education for teachers undergoing in-service training, with a particular focus on the content, methodology and practice associated with these fields.

Methodology

The research was carried out at the Adult Pedagogical Education Centre (APEC) of the Faculty of Education Sciences and Psychology at the University of Latvia, where various courses for the further development of teachers' professional competence are implemented. The research targeted in-service training courses for pre-school and primary school teachers at the APEC. All the teachers participating in the in-service training courses had a Bachelor's degree in Education and a teacher qualification. Teachers from different regions of Latvia took part in the courses. All teachers who participated in the in-service training programme consented to take part in the study. The study was conducted in the period from 2023 to 2024, when the in-service training programmes "Pre-school content and didactics for teachers" (n = 38) and "Primary education for teachers" (n = 80) were running, in which the professional competence of teachers is promoted and the opportunity for teachers to retrain in accordance with the regulations on education and professional qualification required for teachers and the procedure for the development of professional competence of teachers (Cabinet Regulation No. 569, 2018). The pre-school content and didactics in-service training programme is two credits (CP) or 80 contact hours, and the primary teacher education programme is four credits (CP) or 160 contact hours. All teachers are required to complete an independent study in order to meet the requirements of the continuing education programmes and to receive a certificate.

The aim of the study is to ascertain the preferred fields of education teachers undergoing in-service training in terms of content, methodology and practice.

The research questions were:

- RQ1: What fields of education do teachers prefer in pre-school and primary school?
- RQ2: What determines which subject area is studied and practised by teachers?

A survey was used as a data collection tool. This is a quantitative research method used to collect data from a set of respondents. The survey is probably one of the most widely used methodologies in the industry because of its many advantages and benefits in collecting and analysing data (Green et al., 2006). The aim of the survey was to find the views of teachers in in-service training courses on their preferred areas of education in terms of content and methodology and practice.

The teacher survey consists of eight questions, seven of which are semi-closed questions and one open. The content of the teachers' survey is based on the content of the "Pre-school content and didactics" and "Primary education teacher" programmes at the Centre for Adult Pedagogical Education, Faculty of Educational Sciences and Psychology, University of Latvia. The data collection was carried out in the framework of in-service training courses when teachers were asked to choose the topic of their final thesis. Course participants completed an online questionnaire on the Google Drive platform. Before completing the questionnaire, participants are informed that participation in the study is voluntary. The teachers were invited to complete the questionnaire anonymously, emphasizing that the identity of the respondent would remain undisclosed, and

that the data would be aggregated for the exclusive purpose of achieving the aims of the study. In the process of analysing the research data, a combination of descriptive and content analysis methods was applied. The descriptive analysis approach involved summarising and interpreting the data based on predetermined themes. For content analysis, codes were established through a thorough examination of the data. These codes were then grouped under appropriate concepts to develop themes. In this study, the researchers individually reviewed the responses provided by the participants. The data were then coded and themes were constructed from the codes identified. Finally, tables or figures were created to present the codes and themes systematically; these were then interpreted.

Results and Discussion

Teachers' professional effectiveness is determined by their continuous professional development, which is required by the demands of the twenty-first century to meet the inevitable challenges that teachers face (Ohlsson et al., 2022). One of the most important conditions for teachers' professional development and in-service training is the identification of teachers' needs (Soodmand et al., 2017). Implementation of the curriculum based on the learning outcomes depends largely on the professionalism of the teacher (Vojir & Rusek, 2021).

The main justification for attending in-service training courses (Table 1) in both teacher professional development programmes is to obtain a certificate. A certificate is a document that attests to the acquisition of a given methodology within a specific field of study. It is issued in accordance with the relevant normative documents set forth in Latvia (Cabinet of Ministers Regulation No 569, 2018). The justification for this need is found in the Regulations on the Education and Professional Qualifications Required of Teachers and the Procedure for the Professional Competence Development of Teachers, which stipulate that teachers working in an educational institution are required to have appropriate education and qualifications (Cabinet of Ministers Regulation No 569, 2018). However, teachers recognise that it is also important to improve their knowledge and skills. Thus, the expertise required for professional activity is determined by participation in in-service training courses based on political decisions and personal interest.

Table 1 Purpose of attending in-service training courses

Indicators	Pre-school in-service teachers		Primary school in-service teachers	
	%	*n*	%	*n*
Get certificate	60.5	23	61.3	49
Improve knowledge and skills	34.2	13	30	24
Understand how to teach and up bring their own children	–	–	1.2	1
Get certificate and improve knowledge and skills	5.3	2	7.5	6

Table 2 In-service training teachers' interests in a particular field and topic

Indicators	Pre-school in-service teachers		Primary school in-service teachers	
	%	*n*	%	*n*
Interested in an area of research, a topic	81.6	31	74.7	59
Not interested in a research area, topic	13.2	5	13.9	11
Specifies the precise direction of the research, the topic	5.2	2	11.4	10

Table 3 Choice of field of education for research in primary or pre-school education

Indicators	Pre-school in-service teachers		Primary school in-service teachers	
	%	*n*	%	*n*
Science	5.3	2	6.3	5
Social and citizenship	31.6	12	16.3	13
Cultural awareness and self-expression in art	23.7	9	11.3	9
Languages	28.9	11	47.5	38
Mathematics	2.6	1	12.5	10
Health and physical activity	2.6	1	3.7	3
Design and technology	5.3	2	1.2	1

Based on the professional development programme, teachers choose the topic for their final thesis according to their professional interests, needs and abilities. The majority of respondents acknowledge that there are research topics of particular interest. However, there are also teachers who do not have a particular topic that interests them (Table 2). Therefore, more thought needs to be given to how to foster teachers' professional interest in developing their professional competence so that in-service teacher training does not become a formal process that lacks motivation. As research suggests (Bulut, 2022), the role of in-service training is to foster teachers' professional interest and motivation.

It appears that in-service teacher's choice of subject areas differs (Table 3). Pre-school education teachers are more interested in social and citizenship education, languages, cultural awareness and self-expression in art, while primary school teachers are more interested in languages, social and civic learning, cultural awareness and self-expression in art, mathematics, and science. The responses confirm a national trend characterised by an insufficient number of STEM teachers (OECD, 2014; Birzina et al., 2023). Pre-school teachers' different interests in the subject areas can be explained in the context of the organisation of an integrated pedagogical process in pre-school education, which, unlike at the primary stage, requires each teacher to be familiar with the content and methodology of several subject areas. This probably also determines the in-service teachers' choice of education field in their research. As research on the holistic view of sustainability points out, it is defined by three dimensions: environmental, economic and social. The economic dimension is particularly highlighted, emphasising the readiness of human resources, more specifically teachers, to work in an integrated way in pre-school (Atkinson et al., 2007; Ohlsson et al., 2022).

Table 4 Factors determining teachers' choice of topic for their final paper

Indicators	Pre-school in-service teachers		Primary school in-service teachers	
	%	*n*	%	*n*
Available literature and resources	2.6	1	2.5	2
Lecturer as a consultant in the chosen field	2.6	1	3.8	3
Background knowledge	31.6	12	12.7	10
Previous research projects	5.3	2	–	–
The problem situation they would like to solve	39.5	15	53.2	42
Accident and coincidence	5.3	2	2.5	2
Interest in the field of education	13.2	5	20.3	16

Table 5 Choice of field of education for implementing the teaching/learning process

Indicators	Pre-school in-service teachers		Primary school in-service teachers	
	%	*n*	%	*n*
Science	7.9	3	10	8
Social and citizenship	18.4	7	10	8
Cultural awareness and self-expression in art	26.3	10	12.5	10
Languages	31.6	12	31.2	25
Mathematics	2.6	1	23.8	19
Health and physical activity	5.3	2	–	–
Design and technology	7.9	3	12.5	10

Typically, for the majority of in-service pre-school and primary school teachers, the choice of the topic for the final paper is related to a problem they want to solve. Pre-school teachers are more likely than primary teachers indicate that the choice of the topic for the final paper is related to their background knowledge. Pre-school teachers, unlike primary teachers, indicate that the choice of the topic for the final paper is related to their interest in the subject area. The majority of teachers (Table 4) choose the topic of their final paper based on the problem they want to solve, their background knowledge and their interest in the field. Pre-school teachers' choice is more influenced by background knowledge, while primary school teachers' choice is more influenced by interest in the subject area. It can be concluded that teachers analyse the pedagogical process, perceive problem situations, and engage in their solution when developing their final paper. This probably indicates the teachers' critical thinking skills and the need to look for solutions to problem situations.

In-service teachers' preferences for areas of learning to study in depth cover almost all areas. However, primary teachers do not associate their professional activity with the learning area of health and physical activity (Table 5). The proportional distribution differs between pre-school and primary school education. Pre-school teachers are more likely to indicate the language domain, the domain of cultural awareness and

self-expression arts, and the domain of social and citizenship education, while primary teachers are more likely to indicate languages, mathematics and, in equal proportions, social and citizenship education, science, and design and technology; they are less likely to indicate the field of cultural awareness and self-expression arts. It can be concluded that when comparing the areas chosen by pre-school teachers with those of primary teachers, teachers are willing to be involved in all areas of learning, but the proportions are different.

Table 6 Development of the final paper expanded teachers' professional knowledge and skills

Indicators	Pre-school in-service teachers		Primary school in-service teachers	
	%	*n*	%	*n*
Completely	47.4	18	39.2	31
Almost completely	28.9	11	39.2	31
Partially	23.7	9	20.3	16
Not at all	–	–	–	–

The majority of in-service pre-school and primary teachers felt that the final paper had fully extended their professional knowledge and skills (Table 6). Fewer pre-school teachers and primary teachers believed that it had almost completely broadened their professional knowledge and skills. On the other hand, there are pre-school teachers and primary teachers who considered that their professional knowledge and skills were only partially enhanced. In conclusion, there is a need for regular monitoring of in-service training programmes, reviewing and improving their content and organisation to meet teachers' professional interests and needs, and practice-based in-service studies (Şahin & Akinci, 2020; Uztosun, 2018). Teachers' professional development is seen as a long-term process that includes regular opportunities and experiences and that is systematically planned to promote growth and development in the teaching profession (Villegas-Reimers, 2003).

Teachers identify and describe challenges for further professional activity based on the final paper of the course. Teachers' need for and engagement in research activity indicates professional development and educational growth (Derakhshan et al., 2020). The development of the final paper of the in-service training course confirms that teachers have improved their research skills, as evidenced by the following statements:

> *I will continue research on the topic of the final work of the course because it is relevant to my interests.*
>
> *I will continue researching children's adaptation in practice; it was proved that theoretical knowledge does not always materialize.*
>
> *The study confirmed that integrating language into mathematics improved literacy.*
>
> *I will use what I have learned from the coursework in my daily teaching of mathematics.*

In-service teachers point to the need to plan future activities as a challenge, which shows the need to strengthen teachers' planning skills:

> *Time planning is a challenge, to plan time properly to be able to devote enough time to each linguistic skill to achieve the set goals.*
>
> *To plan group activities in nature, to identify and use methods in lessons that promote children's speech development…*
>
> *Time planning and systematic analysis of results...*

Overall, the results of the final paper motivate the teachers to undertake further independent research and action:

> *As a professional, I would like to continue to explore and try out more techniques to promote self-help skills in younger children.*
>
> *To be able to find ways and approaches to work simultaneously with gifted children, 'standard' children and those who have difficulties with reading, comprehension and performance in the classroom.*
>
> *To improve and develop the promotion of wellbeing in school, not only in the first grade, the school should improve and improve the development of a good sense of wellbeing at the classroom level, as each age comes with its own challenges and problems.*

According to the teachers' answers, they are motivated to acquire new knowledge and skills and to try them out in practice:

> *To continue looking for effective feedback methods, to find digital, effective solutions for their implementation, to use their time and the time of the students for effective data processing.*
>
> *I would like to continue exploring and trying out more techniques that will enhance the self-help skills of younger children.*
>
> *To implement the ideas discovered in the study, to continue developing students' literacy and foster their creative self-expression.*

Thus, teachers emphasize both growth and professional development opportunities in the planning, implementation and evaluation of the learning process, which is in line with the Latvian Standard of the Teaching Profession (Skolotāju profesijas standarts, 2020).

Conclusions

- Most teachers attend continuing professional development courses to obtain a certificate, which is required as a regulatory document for the right to work as a pre-primary and primary education teacher.
- Teachers are motivated to further their independent learning and action. Unfortunately, relatively few teachers are interested in science teaching. This confirms the national trend of insufficient numbers of teachers in STEM.

- Strengthening teachers' professional competence in in-service training programmes requires cooperation with employers, identifying the subject areas in which teachers work and/or intend to work, and offering in-depth training in the content of the subject area – i.e. through the development of a final coursework study in the chosen subject area.
- The development of teachers' professional competence should include a mechanism to monitor how teachers' professional interests and motivation are fostered, so that in-service training does not become a process of teacher professional development that does not reflect the essence of education.
- In-service training strengthens teachers' planning skills, research skills, systematic feedback and analysis. One way to enhance teachers' professionalism in Latvia is for teachers to participate in continuing professional development courses at the Faculty of Education and Science of the University of Latvia.

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PRIMARY SCHOOL TEACHERS' PROFESSIONAL WELL-BEING: VIEWS OF TEACHERS AND SCHOOL LEADERS

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ABSTRACT

The paper focuses on the need to promote the professional well-being of primary school teachers. The study aims to analyse and compare the views of primary school teachers and school leaders on the professional well-being of primary school teachers. The study involved 72 (n = 72) primary school teachers and 20 (n = 20) school leaders. The study addressed two research questions: RQ1: What is the professional well-being of primary school teachers from the point of view of school leaders and teachers themselves? RQ2: Is there a difference between the views of the primary school teachers and the school leaders regarding professional well-being? For data collection, two structured questionnaires were planned and designed to gather information about the following study scales: (1) teaching duties, (2) cooperation with colleagues, (3) professional development, and (4) methodical work. The SPSS 22 was used for processing and analysing the quantitative data. The study revealed that school leaders' views on the professional well-being of primary school teachers are generally more unfavourable than teachers' views. Primary teachers and school leaders agree that teachers' methodical work is well valued and feedback provided to primary school teachers is growth-oriented. The study found a statistically significant difference in the views of primary school teachers and school leaders on teaching duties and cooperation with colleagues. For these two scales, the primary school teachers are more optimistic than the school leaders. The study concluded that despite the statistically significant differences in the views on two out of the four scales, there was generally no statistically significant difference in the views of primary school teachers and school leaders on the professional well-being of primary school teachers. The study findings are essential in promoting the professional well-being of primary school teachers.

Keywords: *Primary education, primary school teachers, professional well-being, school leaders, teachers' support.*

Introduction

Primary school teachers have many responsibilities, such as carrying out educational activities in line with subject standards and the developmental needs of each student,

being classroom managers, engaging in the organization of extra-curricular activities and cooperating with parents, colleagues and school leaders. Moreover, every primary school teacher also carries out methodical work. It is essential for primary school teachers to feel good while performing their work duties, as this affects not only their work but also the students and their learning achievements. Studies have shown that teacher stress, fatigue, and depressed mood negatively affect students' satisfaction with school (Ramberg et al., 2019) and learning motivation (Madigan & Kim, 2021). Additionally, in schools where teachers had a higher level of emotional exhaustion, the student's performance regarding their literacy and numeracy skills was lower (Granziera et al., 2023).

Researchers believe that the teaching profession lacks respect in society (Pagiriene & Ramanauskiene, 2021), requires unique challenges (Kok, 2018), is stressful, and is associated with burnout and high turnover of qualified teachers (Gearhart et al., 2022; Ghamrawi et al., 2023). In particular, the social changes over the last 20 years have significantly affected teachers' well-being, making it more difficult for teachers to adapt to working conditions (Arbia et al., 2023). However, primary school teachers and other teachers have demonstrated resilience and flexibility during the global pandemic. In Switzerland, for example, primary school teachers' professional well-being was affected by many factors, such as high workload, social distancing, lack of competence and self-efficacy (Hascher et al., 2021). In the Philippines, less support for teacher autonomy by school leadership increases teachers' stress levels and harms their well-being (Mendoza & Dizon, 2024). In Greece, the well-being of primary school teachers was at an average level, as teachers' self-efficacy to promote student engagement decreased (Reppa et al., 2023). On the other hand, in Latvia, teachers' job satisfaction during the pandemic was negatively affected by the inability to control the activities taking place at school, the lack of positive emotions in everyday life, and the confidence's decrease in the ability to implement concrete ideas in the teaching/learning process to achieve the outcome required (Stramkale, 2023). Researchers believe teachers can develop and improve their ability to adapt to changing circumstances by engaging in reflective practices (Davis et al., 2024).

Studies have found that teachers' well-being is negatively affected by excessive demands at work (De Clercq et al., 2022), limited work resources (Collett, 2013), lack of autonomy (Skinner et al., 2021), students' behaviour in classrooms (Li et al., 2022), the desire to maintain control and the tendency of doing everything perfect (Glazzard & Rose, 2020). Moreover, primary school teachers with low emotional responses have a higher level of professional well-being (Li et al., 2023). Poor well-being reduces teachers' motivation, creativity and problem-solving abilities (Ghamrawi et al., 2023).

The professional well-being of primary school teachers can be influenced by factors related to the teachers themselves and school-level factors. Teachers can deal with factors that affect professional well-being if they depend on the teachers themselves. Researchers recommend school teachers to reduce workload and share responsibility (Glazzard & Rose, 2019), plan their work carefully (Falecki & Mann, 2021), be more engaged and build good relationships (Kern et al., 2014), be emotionally stable (Vorkapič & Peloza, 2017), have self-efficacy and teaching with fun (Manasia et al., 2020).

However, there are also aspects related to the educational work that teachers cannot directly influence. For example, Karegyeza and colleagues point out that school leadership attitudes can influence teachers' well-being (Karegyeza et al., 2021), and according to Li and colleagues, the student's behaviour in the classroom can cause teachers' positive or negative emotions, which also affect teachers' well-being (Li et al., 2022). In addition, an appropriate working environment reduces teachers' burnout, exhaustion and job replacement (Ortan et al., 2021) and increases professional well-being (Nwoko et al., 2023). Researchers consider that school leaders could directly affect teachers' professional well-being (Van der Vyver et al., 2020). Several studies have highlighted that teachers' professional well-being might enhanced if the school leaders provide sufficient support for teachers (De Clercq et al., 2022), use transformational and transactional leadership styles (Kok, 2018), create a caring, supportive and collegial work environment (Collett, 2013) and ensure teacher autonomy (Echon & Cabal, 2022). It is believed that there is a positive connection between teachers' professional well-being and the school's organisational health. (Samosa et al., 2023).

Professional well-being is also related to building relationships with colleagues. Well-being could be fostered and maintained by high-quality professional relationships with colleagues (Garbett & Thomas, 2020). Teachers should engage in meaningful collective action and decision-making (Woo et al., 2022). Moreover, healthy relationships are also essential to ensure high-quality teachers' work (Zakaria et al., 2021). If a school gives priority to teacher well-being (Tatum, 2023) and has an atmosphere that encourages conversations about teacher well-being (Allies, 2021), then teachers will show high levels of well-being (McCallum, 2021).

Researchers found that teachers need support to avoid feeling isolated and ineffective, which, in turn, can lead to a desire to leave the profession (Gibbs & Miller, 2014). A study conducted in Finland revealed that the support of school leadership and colleagues is significant for a teacher's professional well-being, and students' involvement in promoting teachers' positive well-being is also essential (Murphy et al., 2020). We should think more about fostering positive emotions in teachers because, as Dreer (2024) highlighted, emotions play a significant role in teachers' job satisfaction and ensure that teachers stay in the profession. It is essential to be able not only to recruit new teachers but also to retain existing and experienced teachers (Langford & Crawford, 2022). On the one hand, older teachers need more freedom in choosing how to arrange their work, and they need to receive acknowledgement of what they do to be satisfied with their work and to remain in the profession. On the other hand, experienced teachers should be able to have opportunities for career growth (Panagopoulos et al., 2024).

School leaders' perception of how primary school teachers feel while performing their duties is one of the ways to facilitate teachers' daily work and possibly help them feel much better. Despite there are many studies conducted on teachers' professional well-being, there is still a limited number of comparative studies on how teachers and school leaders understand the professional well-being of primary school teachers, which also defined **the aim of this study** – to analyse and compare the views of primary school teachers and school leaders on the professional well-being of primary school teachers.

Methodology

Participants

The empirical study was carried out from September 2023 to December 2023 and involved 72 (n = 72) primary school teachers from 17 comprehensive schools (one primary school, eight basic schools and eight secondary schools), as well as 20 (n = 20) school leaders from 20 schools. In total, 92 (n = 92) respondents participated in the study. Respondents were randomly selected. The data obtained was anonymous, which ensured that respondents could not be identified in the data.

Data Collection Instruments

The study addressed two research questions:

RQ1: What is the professional well-being of primary school teachers from the point of view of school leaders and teachers themselves?

RQ2: Is there a difference between the views of primary school teachers and school leaders regarding professional well-being?

Two questionnaires were planned and designed to answer the research questions – one for primary school teachers and one for school leaders. Both questionnaires included statements with the same meaning to compare the views of primary school teachers and school leaders. Each questionnaire consisted of four study scales: (1) teaching duties, (2) cooperation with colleagues, (3) professional development, and (4) methodical work. The first study scale identified the extent to which primary school teachers enjoy performing their teaching duties. The second study scale described the cooperation with colleagues, which is also the basis of emotional well-being. On the other hand, the third study scale determined the professional development of primary school teachers, and the fourth one figured out the methodical work, which is also a key factor of professional well-being. Several statements were included in each of the study scales (see Table 1).

The respondents rated each of the statements on a six-point Likert scale as follows: fully agree (6 points), agree (5 points), rather agree (4 points), rather disagree (3 points), disagree (2 points) and completely disagree (1 point). The statement was assumed to be at a low level if its arithmetic mean (M) ranged from 1.00 to 2.66, and at a medium level if the arithmetic mean (M) ranged from 2.67 to 4.33, and at a high level if the arithmetic mean (M) was between 4.34 and 6.00.

Table 1 Description of the study scales

Study scales	Statements (N)
Teaching duties	9
Cooperation with colleagues	4
Professional development	7
Methodical work	8

Data Collection Procedure

The questionnaires were distributed electronically via Google Drive, and the participation was voluntary. All survey responses collected from teachers and school leaders will remain anonymous to maintain privacy. That encouraged credible and honest answers about the situation. The respondents were informed about the purpose of the study and that the data obtained would be analysed and used only in a summary manner. All procedures performed in studies involving human participants were in line with the ethical standards of the institutional and or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Data analysis

SPSS 22 and Excel was used for processing and analysing quantitative data. The Cronbach's alpha coefficient determined the reliability of each study scale (see Table 2).

Table 2 Cronbach's alpha coefficient of the study scales

Study scales	Respondents	Cronbach's alpha coefficients	Reliability
Teaching duties	Primary teachers	.880	Good
	School leaders	.811	Good
Cooperation with colleagues	Primary teachers	.798	Good
	School leaders	.760	Good
Professional development	Primary teachers	.766	Good
	School leaders	.755	Good
Methodical work	Primary teachers	.837	Good
	School leaders	.876	Good

The study used descriptive statistics to measure the arithmetic mean, the standard deviation, and the standard deviation from the arithmetic mean, the median and mode, Skewness and Kurtosis of each statement. On the other hand, the study uses the Mann-Whitney *U* test to compare the views of primary school teachers and school leaders on the professional well-being of primary school teachers for each of the study scales.

Results

The study determined that it is essential for primary school teachers to experience joy in performing their teaching duties and cooperation with colleagues. That enables primary school teachers to feel emotionally well. All statements that make primary school teachers happy were rated at a high level, except one that describes the creation of tests. On the other hand, the school leaders rated four statements that describe the creation of tests and teaching materials, as well as the evaluation of their work and students' achievements at a medium level (see Figure 1).

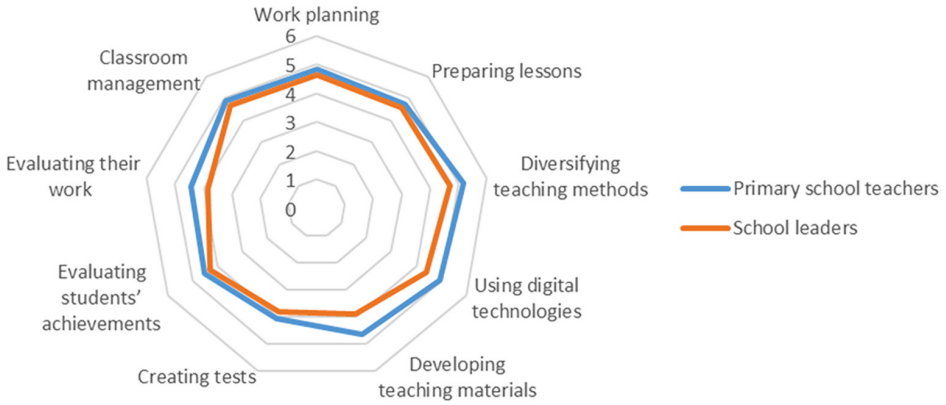

Figure 1 Teaching duties from the point of view of primary school teachers and school leaders

Primary school teachers believe that they are much happier when performing tasks such as diversifying teaching methods (M = 5.17, SD = .732), using digital technology (M = 4.97, SD = .822), classroom management (M = 4.89, SD = .897) and work planning (M = 4.85, SD = 850). School leaders also believe that primary school teachers enjoy diversifying teaching methods (M = 4.70, SD = .865), classroom management (M = 4.70, SD = .923) and work planning (M = 4.65, SD = .875).

The study found a statistically significant difference in the views of primary school teachers and school leaders regarding the statements that teachers are happy to use digital technologies (U = 460.00, z = –2.661, p = .008), develop teaching materials (U = 438.50, z = –2.791, p = .005), evaluate their work (U = 446.50, z = –2.768, p = .006). The teachers are more optimistic about diversifying teaching methods than school leaders (U = 497.00, z = –2.270, p = .023). The study revealed that the answers of school leaders on the scale describing the teaching duties of primary school teachers are, in several cases, more pessimistic than the teachers' answers themselves.

Primary school teachers (M = 5.31, SD = .597) and school leaders (M = 5.35, SD = .671) highly value positive relationships with colleagues, which is one of the keystones of teachers' professional well-being and consider as a basis for successful cooperation and willingness to share professional experiences with colleagues, which is also have been highly rated by both teachers (M = 5.07, SD = .718; M = 5.04, SD = .740) and school leaders (M = 4.50, SD = .761; M = 4.35, SD = .980) (see Figure 2).

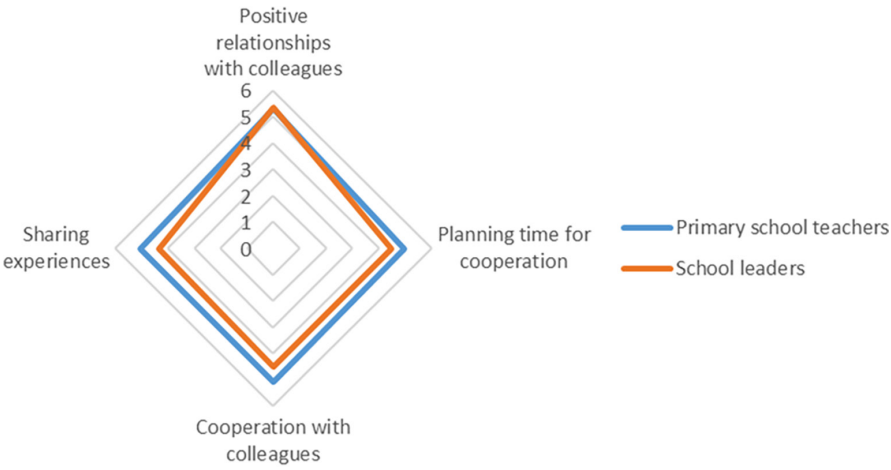

Figure 2 Cooperation with colleagues from the point of view of primary school teachers and school leaders

The study determined that there are statistically significant differences in the views of primary school teachers and school leaders regarding such aspects of cooperation as planning time for cooperation ($U = 472.50$, $z = -2.504$, $p = .012$), cooperation with colleagues ($U = 430.50$, $z = -2.966$, $p = .003$) and sharing experiences ($U = 431.00$, $z = -2.935$, $p = .003$). The data analysis shows that the responses of school leaders regarding three out of four statements describing the teachers' cooperation with colleagues are more pessimistic than the responses of teachers themselves.

Teachers should have opportunities for professional development, which includes learning from each other to feel good. The results indicate that all eight statements in this study scale have been rated high by primary school teachers and school leaders (see Figure 3).

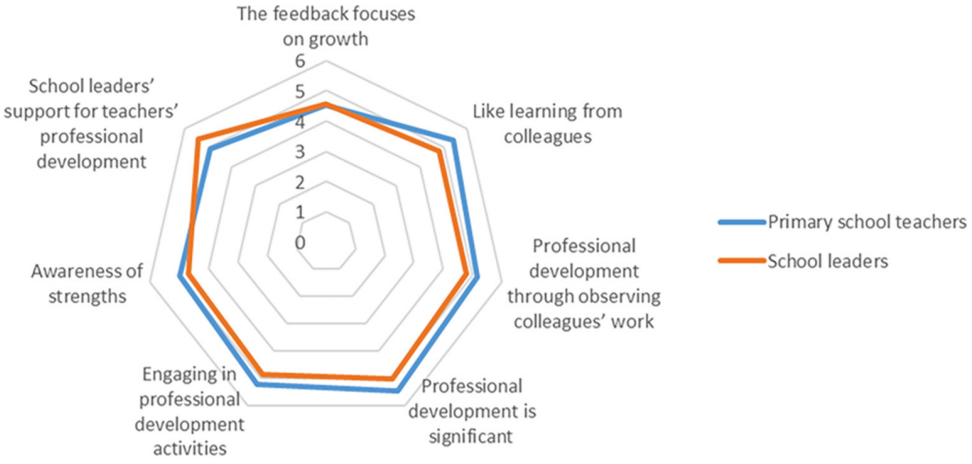

Figure 3 Professional development from the point of view of primary school teachers and school leaders

Primary school teachers (M = 4.54, SD = 1.047; Mean Rank = 46.63) and school leaders (M = 4.55, SD = 1.099; Mean Rank = 46.05) agree that the feedback provided to the primary school teacher focused on growth. Primary school teachers believe professional development is significant for them (M = 5.49, SD = .074), and school leaders agree with this (M = 5.05, SD = .198). However, a statistically significant difference was determined in the views of primary school teachers and school leaders on this issue (U = 522.00, z = –2.082, p = .037). Primary school teachers have valued the need for professional development more than school leaders. The study also found a statistically significant difference between primary school teachers' and school leaders' views on school leaders' support for the professional development of primary school teachers (U = 507.00, z = –2.137, p = .033). On this issue, the views of school leaders (M = 5.45, SD = .759) are more optimistic than primary school teachers (M = 4.91, SD = 1.044).

Primary school teachers are keen to engage in professional development activities (M = 5.24, SD = .096) and enjoy learning from colleagues (M = 5.42, SD = .071) by observing their colleagues' work (M = 5.17, SD = .105). However, school leaders moderately agree that primary school teachers like to engage in professional development activities (M = 4.85, SD = .209), and they want to learn from each other (M = 4.80, SD = .156) by observing their colleagues' work (M = 4.80, SD = .186). The study revealed that there is a statistically significant difference in the views of primary school teachers and school leaders that primary school teachers like to learn from their colleagues (U = 389.00, z = –3.452, p = .001) by observing their colleagues' work (U = 516.00, z = –2.077, p = .038). Primary school teachers believe they like learning from their colleagues by observing their work more than the school leaders can imagine and evaluate.

Methodical work is one of the most significant parts of every primary school teacher's daily work. It is impossible to ensure a high-quality teaching/learning process without methodical work, but it also creates the most problems for teachers because it is necessary to balance the load of methodical work and to receive the appropriate reward for the work done. Both primary school teachers and school leaders have rated the statements that describe the workload of methodical work (M = 3.57, SD = .152; M = 3.45, SD = .223) and the reward for methodical work (M = 3.21, SD = .162; M = 3.55, SD = .320) at a medium level.

The study results showed that primary school teachers (M = 4.38, SD = 1.094; Mean Rank = 46.35) and also school leaders (M = 4.35, SD = 1.308; Mean Rank = 47.05) agree that the methodical work of primary school teachers is well valued (see Figure 4).

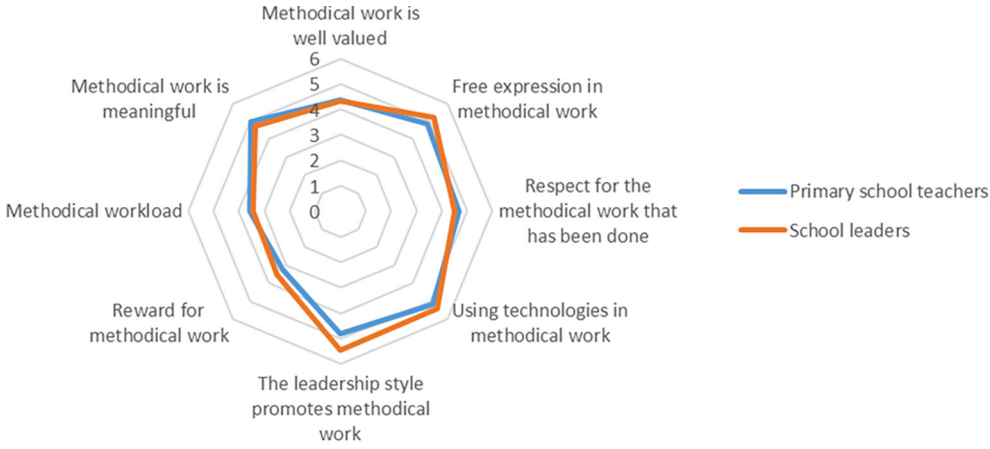

Figure 4 Methodical work from the point of view of primary school teachers and school leaders

School leaders rated their leadership style higher than teachers in terms of promoting the methodical work of primary school teachers (M = 5.45, SD = .170; M = 4.79, SD = .125), free expression in methodical work (M = 5.20, SD = .186; M = 4.82, SD = .107) and the use of technologies in methodical work (M = 5.40, SD = .210; M = 5.14, SD = .103). However, despite the different views of primary school teachers and school leaders, the study found a statistically significant difference only in the views on the leadership style that promotes methodical work (U = 933.00, z = 2.137, p = .033). School leaders believe that they support the methodical work of primary school teachers more than the teachers feel.

The study revealed that primary school teachers (M = 4.70, SD = .649) are more optimistic about performing their teaching duties with pleasure than school leaders (M = 4.32, SD = .546) think about this issue (see Figure 5).

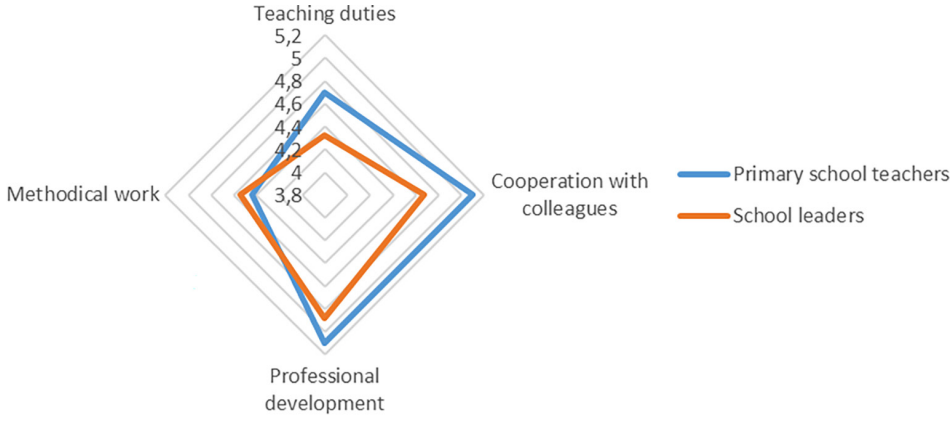

Figure 5 Study scales of primary school teachers' professional well-being

Primary school teachers also value their cooperation with colleagues and professional development more than (M = 5.10, SD = .573; M = 5.10, SD = .533) school leaders think (M = 4.67, SD = .612; M = 4.88, SD = .551). Only the fourth study scale, which describes the methodical work of primary school teachers, is rated slightly higher by school leaders (M = 4.54, SD = .760) than by teachers themselves (M = 4.44, SD = .723).

The study determined that there is a statistically significant difference in the views of primary school teachers and school leaders regarding the fact that primary school teachers perform their teaching duties with pleasure ($U = 457.50$, $z = -2.490$, $p = .013$) and on the teachers' cooperation with colleagues ($U = 431.00$, $z = –2.761$, $p = .006$). Overall, primary school teachers' views on these study scales are more optimistic than school leaders' beliefs. However, there is no statistically significant difference between teachers' and school leaders' views related to the study scales that characterized the professional development of primary school teachers ($U = 547.00$, $z = –1.644$, $p = .100$) and the methodical work ($U = 605.50$, $z = –1.087$, $p = .277$). The study results revealed that despite statistically significant differences in the views about two out of the four study scales, there is no statistically significant difference in the views of primary school teachers and school leaders ($U = 524.50$, $z = –1.851$, $p = .064$) regarding the professional well-being of primary school teachers.

Discussion

The study found that, in several cases, there are statistically significant differences between primary school teachers' and school leaders' views on the professional well-being of primary school teachers. In addition, the opinions of school leaders on the professional well-being of primary school teachers were often more pessimistic than the teachers themselves believed. These findings are consistent with a study conducted by Doran, which showed statistically significant differences in the views of primary school teachers and school leaders about well-being. The well-being of school leaders is higher than primary school teachers (Doran, 2021). Perhaps that is why, when assessing the professional well-being of primary school teachers, school leaders look at it through the prism of their professional well-being.

The study revealed that primary school teachers highly value relationships, cooperation and experience sharing with colleagues, as well as professional growth and engagement in professional development activities. The findings from the study are consistent with research conducted by Liang and colleagues, which found that a professional learning community has a positive relationship with teacher well-being (Liang et al., 2020). Moreover, Maseko has also highlighted that meaningful and positive relationships contribute to teachers' well-being and educational success (Maseko, 2023). On the other hand, Sohail and his colleagues, by summarizing the results of various previous studies, have concluded that the well-being of teachers is promoted by respect, inclusion and an atmosphere of mutual support among teachers, as negative emotions with the feeling

of being rejected or intimidated by colleagues are factors that cause teacher burnout. (Sohail et al., 2023).

The study identified the views of primary school teachers and school leaders about using digital technologies in performing their teaching duties and in methodical work. The study determined that primary school teachers are comfortable and happy to use digital technologies in their teaching duties and methodical work as they rated that at a high level, but on the contrary, the school leaders believe that primary school teachers still need support in using digital technologies. Passey's research also found that teachers' well-being is related to the use of digital technology (Passey, 2021). Therefore, it would be significant for primary school teachers and school leaders to have the same kind of understanding about this issue.

Conclusion

The study determined that primary school teachers highly value such components of professional well-being as diversification of teaching methods and use of technology in their methodical work, positive relationships and cooperation with colleagues, and engaging in professional development and learning from colleagues. On the other hand, school leaders believe that the key factors affecting primary school teachers' professional well-being are positive relationships with colleagues, the support for teachers' professional development, and a leadership style that promotes methodical work and using digital technologies. Furthermore, both primary school teachers and school leaders have rated the statements that describe the methodical workload of primary school teachers and the reward for methodical work at a low level.

The study found that both primary school teachers and school leaders agree that methodical work is well-valued and that the feedback provided to primary school teachers is aimed at their development and growth. However, in several cases, school leaders think that the professional well-being of primary school teachers is worse than the teachers themselves believe. The study results demonstrated a statistically significant difference in the views of primary school teachers and school leaders regarding the use of digital technologies, the development of teaching materials, the evaluation of teachers' work, the diversification of teaching methods, planning time for cooperation with colleagues, sharing experience with colleagues, the importance of professional development. The data analysis revealed that only two statements are statistically significantly higher rated by school leaders compared to primary school teachers: the school leaders' support for primary school teachers' professional development and a leadership style that promotes primary school teachers' methodical work.

In addition, the study found a statistically significant difference in the views of primary school teachers and school leaders about two study scales: teaching duties and cooperation with colleagues. Primary school teachers are more optimistic than school leaders regarding these two scales. However, it is possible to conclude that despite statistically significant differences in the views about two out of the four study scales, there was

no statistically significant difference in the views of primary school teachers and school leaders regarding the professional well-being of primary school teachers. Further research is needed to investigate, in-depth, the specifics of primary school teachers' methodical work and their satisfaction with the planning, process and result of the methodical work.

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EDUCATORS' INITIAL REACTIONS TO UNIVERSAL DESIGN PRINCIPLES AND IMPLEMENTATION PROSPECTS DURING ONLINE PROFESSIONAL DEVELOPMENT

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ABSTRACT

This study investigates the implementation of Universal Design for Learning (UDL) principles through an online professional development module designed for educators in Latvia. The research focuses on the emotions and perceptions of 264 educators as they experience UDL during a four-hour training session. Utilizing a comprehensive methodology that includes unstructured surveys, the study explores how educators feel about the flexibility and choices provided by UDL principles. The findings reveal that educators responded positively to the ability to choose between different task formats and ways of answering tasks. This flexibility heightened their satisfaction and interest during professional development. The study underscores the significance of offering choice and modeling UDL principles during professional development, which fosters a supportive and inclusive teaching environment. Moreover, the results highlight the role of experience exchange and knowledge sharing among educators as critical components in the professional development process. These elements contribute to a more engaging and effective learning experience for educators. This research adds insights to the existing literature on UDL, emphasizing the importance of practical application and emotional engagement in professional development. Overall, the study suggests that integrating UDL principles into professional development can positively influence educators' perceptions of inclusive teaching practices. The positive emotional responses to choice and flexibility underscore the need for adaptable instructional strategies that cater to diverse learner needs, ultimately promoting a more equitable and accessible educational landscape.

Keywords: *Universal Design for Learning; UDL; universal design; teacher professional development; online training; emotions.*

Introduction

In 2021/22, educational systems prioritized equity and inclusion in their policy agendas, leading to alterations in curriculum approaches and the customization of both

instructional and additional support services for students (Varsik, 2022). Universal Design for Learning (UDL) is a framework that aims to create inclusive and effective learning environments by accommodating diverse learner needs (Thoma et al., 2023; CAST, n.d.). This study explores the implementation and impact of UDL principles during a four-hour online professional development training module designed for educators. The module was a key element in a two-year professional development course focused on enhancing educators' digital competencies. The research delves into the experiences of 264 educators, spanning various educational levels, who participated in the digital module. Employing a methodology that includes three unstructured surveys, the study investigates educators' reflections on learning activities, including emotions, content, and progress toward individual learning goals, particularly emphasizing the practical application of UDL principles.

UDL is an innovative educational framework designed to provide inclusive and efficient learning environments that accommodate the different needs of learners (Novak, 2022). At its core, UDL recognizes the inherent variability in learners, acknowledging that individuals possess unique strengths, challenges, and preferences in their approaches to learning. According to Ribeiro et al. (2021), the framework strives to break away from the traditional one-size-fits-all educational model by providing a flexible and adaptable structure that accommodates this diversity. UDL aims to enable educators to create instructional strategies and materials that accommodate a diverse range of learning styles, skills, and backgrounds by providing multiple options for presenting information, engaging students, and expressing understanding.

In embracing UDL, educators are prompted to proactively consider how students comprehend information, engage with content, and express their understanding. This proactive approach not only addresses the needs of students with diverse abilities, including those with learning disabilities as well as gifted students (Connor & Wheat, 2023), but also benefits the entire student population, creating a more inclusive and enriching educational experience. Griful-Freixenet et al. (2021) determined that the overarching goals of UDL are to dismantle barriers to learning, promote equity and accessibility, and ultimately cultivate a learning environment where every student can thrive and reach their full potential.

As education continues to evolve, UDL stands as a cornerstone, advocating the belief that diversity is not a hindrance but a valuable asset that, when embraced, leads to more robust, engaging, and effective learning experiences for all. On this basis, the following research question was framed for the present study:

"What are the teachers' emotional reactions to tasks designed according to the Universal Design for Learning (UDL) principles in the professional development process?"

Understanding the answers to this research question is crucial as they provide insights into educators' emotional responses toward flexibility in actualization tasks (following Gagne's Nine Events of Instruction), which can significantly influence their engagement and effectiveness in the professional development. Finally, building on this knowledge

can lead to more tailored professional development training and contribute to the overall improvement of educational quality and accessibility.

Literature Review

The concept of UDL, as outlined on the website of the Center for Applied Special Technology (CAST), has gained prominence in recent decades in educational research and practice due to its emphasis on fostering inclusive learning environments. At its core, UDL advocates for providing multiple means of representation, engagement, and expression to accommodate the diverse needs and learning styles of all students (Shin, 2022). This pedagogical framework recognizes the inherent variability among learners and seeks to address this diversity through flexible and adaptable instructional strategies.

The literature on UDL emphasizes the importance of providing multiple means of representation, engagement, and expression in educational settings. According to Ribeiro et al. (2021), educators play a pivotal role in the successful implementation of UDL, requiring both understanding and commitment. The existing research underscores the need for professional development opportunities that enhance educators' capacity to integrate UDL into their teaching practices. Teacher training should include, in its curricula, practices and evidence that support teachers in developing skills for working in inclusive contexts (Rusconi & Squillaci, 2023). Additionally, Griful-Freixenet et al. (2021) noted that studies have shown that when educators experience positive emotions and satisfaction during UDL implementation, they are more likely to continue applying these principles in their teaching.

Educators are essential agents in the successful implementation of UDL, playing a pivotal role in shaping inclusive and effective learning environments. According to Saab et al. (2021), to apply UDL principles effectively, educators must possess a deep understanding of the framework's core tenets, which encompass providing multiple means of representation, engagement, and expression. This understanding involves recognizing and addressing the diverse learning needs of students and acknowledging that one-size-fits-all approaches may not be conducive to optimal learning outcomes. Educators must be well-versed in the principles of UDL to tailor their instructional strategies, materials, and assessments to meet the unique needs of all learners in their classrooms (Craig et al., 2022).

However, understanding alone is not sufficient; commitment is equally crucial for successful UDL implementation. Mansir and Karim (2020) identified that educators must be dedicated to embracing and consistently applying UDL principles in their teaching practices. This commitment extends beyond mere theoretical knowledge, requiring educators to actively integrate UDL strategies into their daily instruction, adapt lesson plans, and create an inclusive learning environment that accommodates various learning styles and abilities. According to Hayward et al. (2022), the commitment to UDL involves a willingness to invest time and effort in ongoing professional development, staying abreast of best practices, and continuously refining teaching methods to foster an inclusive educational

experience for all students. In essence, educators serve as catalysts for change, driving the transformation of traditional educational approaches into dynamic and inclusive learning environments through their understanding and unwavering commitment to UDL principles. Such commitment is forged through the practical application of UDL principles, shaping the professional advancement of individuals and their students.

Multiple Means of Representation

One key tenet of UDL is the provision of multiple means of representation, acknowledging that learners vary in their abilities to perceive and comprehend information. There is not one means of representation that will be optimal for all learners (Meyer et al., 2014). In the view of Saab et al. (2021), this principle advocates for presenting content in diverse ways, such as through visual, auditory, and kinesthetic modalities. By offering varied representations of information, educators can cater to different learning preferences, ensuring that each student has equitable access to the curriculum. This approach not only supports students with diverse learning needs but also enhances the overall learning experience for the entire classroom.

Multiple Means of Engagement

UDL also underscores the importance of providing multiple means of engagement to capture and maintain students' interest and motivation because learners differ in how they perceive and comprehend the information presented to them. Mansir and Karim (2020) identified that in view of students having different interests, preferences, and levels of engagement, educators are encouraged to offer a variety of instructional methods, materials, and activities. This approach ensures that students can connect with the content in ways that resonate with their individual interests and learning styles. According to Hayward et al. (2022), multiple means of engagement contribute to a more inclusive and dynamic classroom environment by fostering a sense of relevance and personal connection.

Multiple Means of Expression

The third pillar of UDL focuses on providing multiple means of expression, allowing students to demonstrate their understanding and knowledge in diverse ways. This principle recognizes that students have varying strengths and challenges in terms of communication and expression (Derakhshan et al., 2021). By offering options for how students can express themselves, such as through written, oral, or visual formats, educators empower learners to showcase their abilities and understanding in a manner that aligns with their strengths. This flexibility not only accommodates diverse learning styles but also promotes a more inclusive assessment approach (Rusconi & Squillaci, 2023).

The literature on UDL underscores the fundamental importance of providing multiple means of representation, engagement, and expression in educational settings. Embracing these principles supports the diverse needs of individual learners and contributes to the creation of inclusive learning environments (Lee, 2021). By recognizing and valuing

learner variability, educators can design instruction that is responsive, flexible, and accessible, ultimately enhancing the educational experience for all students. Through the implementation of multiple means, UDL seeks to promote equity, engagement, and academic success in the diverse landscape of today's classrooms. UNESCO's Global Education Monitoring Report (2020) suggests that in order to provide equitable learning opportunities to all students in a classroom, UDL should be embraced at the governmental level, integrating it into the inclusive education policies of nations worldwide.

Methodology

The present study employed a four-hour online professional development training module designed for educators focusing on UDL. This study employs a mixed-methods approach (qualitative analysis and quantitative analysis) to analyze the impact of a four-hour online UDL-focused professional development module on 264 educators. The module included an introductory video and various digital resources, such as Genially, Padlet, and Moodle, allowing educators to choose the tools most relevant to their needs. Data was collected through three unstructured electronic surveys, which prompted educators to reflect on their experiences with UDL principles, the learning content, and their progress towards individual learning goals.

The first survey contained two open-ended questions: "How did you feel when you were given a choice between different formats while completing the actualization task?" and "How did you feel when you could choose the way to answer the actualization task?" The second survey contained three open-ended questions: "Did the tasks proposed in the independent work and the lesson help you progress toward the planned lesson result, and if so, how?", "What did you find most valuable when doing independent work and participating in the lesson?" and "What would you have liked to have done differently?" The third survey contained two open-ended questions: "What was your biggest success while carrying out your learning goals?" and "What was your biggest challenge while carrying out your learning goals?" The survey also provided a free text field for participants to express any further opinions and comments.

The data was collated in a Google Spreadsheet before content analysis was performed. Initially, all texts were translated into English using Google Translate to avoid any potential bias from author translation while also making the most of the language model capabilities of wordcounter.net. Next, word count and weighted percentages were computed to identify the most frequently used words for each open-ended question in the first and second surveys, and filters to exclude irrelevant words were applied. For larger amounts of text, word combinations of two words were counted instead of singular words. All words or word combinations mentioned at least five times were included in the analysis; in some datasets, words and word combinations mentioned fewer than five times were also reviewed to determine if they aligned with broader categories of words already summarized. Afterward, similar words were grouped. For deeper analysis of the results, all participant responses were read, discussed, and interpreted by multiple researchers,

applying a double-blind approach. A similar approach was applied to analyze the surveys. Quotations from the comments provided by research participants, translated by the authors to convey their ideas accurately, were incorporated into this article to support the interpretations presented by the authors.

All procedures conducted in studies involving human participants adhered to the ethical standards set by the institutional and national research committee. The research followed the principles outlined in the 1964 Helsinki Declaration and its subsequent amendments, or comparable ethical standards, and complied with GDPR. Participants were duly informed that the data collected in the survey might be utilized for research purposes, and the organizers of the learning event gave explicit written permission to use the data in research. Additionally, the research methodology received approval from the Ethics Committee of the University of Latvia (Riga, 08.03.2023, Nr. 71-46/55).

Results and Discussion

Emotions amongst educators when experiencing and applying UDL principles

The results of the study reveal insights into educators' emotions and perceptions regarding UDL principles. The first survey (Table 1) indicates that educators felt positive emotions when given choices in task formats. The first survey revealed that educators experienced predominantly positive emotions when given choices in task formats and methods of response. Words like "choose," "like," and "options" were frequently mentioned, indicating that the flexibility offered by UDL principles resonated well with participants. This suggests that the integration of choice and autonomy in professional development modules can significantly enhance educators' engagement and satisfaction.

Table 1 Word count and frequency for the first survey question: "How did you feel when you were given a choice between different formats while completing the actualization task?"

Word	Count	Frequency, %
choose	18	4
like	17	4
options	16	4
task	15	3
choice	14	3
could	10	2
good	5	1

Table 2 highlights the positive sentiments offered when educators could choose how to give their answers in the task. This also underscores the positive emotional impact of having options in the learning process.

Table 2 Word count and frequency for the first survey question: "How did you feel when you could choose the way to answer the actualization task?"

Word	Count	Frequency, %
like	15	4
good	13	3
choose	11	3
could	10	2
interesting	9	2
more	8	2
very	8	2
most	5	1

The findings from the first survey (Table 1) underscore a significant connection between educators' emotional experiences and the provision of choices in task formats within the UDL framework. The data reveals a prevailing sense of positivity among educators, as evidenced by expressions of liking and satisfaction. Derakhshan et al. (2021) also mentioned that when educators are granted the autonomy to choose from various task formats, it engenders a favorable emotional response. This positive sentiment suggests that integrating flexibility and choice in instructional tasks resonates well with educators, potentially enhancing their engagement and satisfaction in the learning process. Fostering positive learning experiences for teachers in professional development programs is crucial for enhancing their effectiveness and efficiency in the educational environment (Seprudin, 2024). The correlation between positive emotions and the freedom to choose task formats underscores the importance of incorporating such adaptable approaches into educational methodologies, providing insights for educators and curriculum designers seeking to create more inclusive and engaging learning environments.

Table 2 sheds light on the positive sentiments experienced by educators when provided with the option to choose how to give answers during the actualization tasks. The findings reveal a prevailing sense of liking and goodness among participants, indicating a favorable response to the flexibility inherent in the learning experience. Educators expressed a sense of satisfaction and appreciation for the ability to choose their preferred methods of response. This positive emotional response is further echoed in the emergence of words like "interest" and "good" in their reflections. Following Lee (2021), the significance of these sentiments lies in the affirmation that educators value autonomy and choice in their teaching practices. The positive emotional impact of having options in the learning process contributes to a more engaging and enjoyable experience.

The analysis of the second survey (Table 3) suggests that educators' reflections include key UDL-related concepts, which may influence their perceptions of effective teaching practices.

Table 3 Word count and frequency for the second survey question: "Did the tasks proposed in the independent work and the lesson help you progress toward the planned lesson result, and if so, how?" (combinations of two words)

Word combination	Count	Frequency, %
universal design	20	4
learning disabilities	18	3
independent work	16	3
special needs	13	2
very helpful	10	2
better understand	10	2
inclusive education	9	2
think about	9	2
digital tools	9	2
helped understand	8	1
group work	7	1
design lesson	5	1
information about	5	1
made think	5	1

In previous research, participants have highlighted the critical significance of practical UDL training within professional development programs (McKenzie et al., 2023). The emphasis on concepts like "inclusive education" and "digital tools" in educators' reflections further highlights the broader impact of UDL principles on creating diverse and accessible learning environments. The combination "universal design" underscores the overarching framework that seeks to create inclusive and accessible learning experiences for all students (Craig et al., 2022). The prominence of "learning disabilities" suggests that educators recognize the importance of tailoring instructional approaches to address diverse learning needs and create an environment that supports every student, including those with specific challenges. The emphasis on "independent work" highlights the role of autonomy and self-directed learning in the UDL context, indicating that educators perceive independent work as a valuable component contributing to the achievement of planned lesson outcomes. According to Rusconi and Squillaci (2023), these identified word combinations reflect the nuanced interplay between the core principles of UDL and the practical considerations that educators prioritize in their pursuit of effective and inclusive teaching practices.

The recognition of specific word combinations, such as "experience exchange" and "knowledge sharing," highlights the importance of collaborative learning in fostering a supportive environment for UDL practices (Table 4). However, it is crucial to acknowledge that the study's reliance on surveys may capture perceived attitudes rather than actual behaviors. Therefore, future research could benefit from incorporating observational methods or interviews to provide an understanding of how educators apply UDL principles in their day-to-day teaching after experiencing UDL practice in their professional development.

Table 4 Word count and frequency for the second survey question: "What did you find most valuable when doing independent work and participating in the lesson?" (combinations of two words)

Word combination	Count	Frequency, %
experience exchange [with colleagues]	33	6
learning disabilities	24	5
universal design	18	4
information about	18	3
digital tools	17	4
special needs	17	4
group work	10	2
inclusive education	8	2
independent work	6	1

Tables 3 and 4 also demonstrate how educators positively perceive the use of digital tools in learning and applying UDL principles. Specifically, in the four-hour online professional development training module, all tasks were crafted using digital tools such as Genially, Padlet, and Moodle. These tools, particularly Padlet and Moodle, have been recognized by Latvian educators as among the most effective for implementing differentiation and UDL principles (Sarva & Rektina, 2024). Nowadays, the increasing emphasis on digital competence and the wide range of digital solutions available create opportunities to tailor learning experiences for students (UNESCO, 2023). The growing importance of digital competence in teacher education is evident in many countries (Sarva et al., 2023; Seprudin, 2024). Leveraging technology-enhanced learning can thus vitalize the core principles of UDL, a strategy designed to foster inclusive educational settings that cater to a variety of learners (Meyer et al., 2014; Novak, 2022).

Conclusions

This research offers insights into the emotional and cognitive reactions of educators to UDL concepts while engaging in online professional development. The results indicate that including adaptability, autonomy and cooperative learning into professional development programs can greatly increase educators' readiness to embrace UDL concepts. Nevertheless, the study also highlights certain domains that require additional investigation, such as the necessity to examine the lasting effects of UDL implementation, variations in reactions depending on the levels of expertise among educators, and the practical implementation of UDL concepts in classroom environments.

Future research should adopt a longitudinal methodology to evaluate the long-term sustainability of UDL adoption. Furthermore, using qualitative methodologies such as in-depth interviews or classroom observations might offer a deeper understanding of the practical implementation of UDL concepts. It would be beneficial to broaden the participant pool to include a more diverse variety of educators to improve the generalisability

of the results and foster a more nuanced knowledge of the factors influencing UDL adoption.

To enhance the effectiveness of professional development programs that promote broad adoption of UDL principles in education, future research should focus on addressing these gaps.

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A GAMIFIED LEARNING PROCESS MODEL

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ABSTRACT

The concept of gamification is relatively new, but studies have shown positive results for achieving the set gamification goal objectives, which usually are enhancement of learning motivation, change of attitudes or affecting a behavior of the students. Researchers still have many questions to answer through research, creating models that systematize and explain gamification. Gamification uses game elements implemented in the learning environment to engage students in learning activities and achieve the set gamification goal. To successfully use gamification in the learning process, it is necessary to understand not only the concept of gamification, its components, and elements of the game but also the logical course of the gamified learning process. To achieve better results and so the gamification of the learning process would be more efficient, educators would benefit from a theory-based and empirically tested model that helps to implement gamification into the learning process to enhance the learning motivation for students. This research aims to develop a theory- based model that would be a guide for those who wish to gamify their lessons. To develop the structure of the gamified learning process, a systematic analysis of publications was carried out, evaluating gamification process designs and models available in "Scopus" and "Web of Science" databases. Via this literature review, a gamified learning process model has been developed and evaluated with the Delphi method. Three field experts evaluated the model in two iterations in order to shape it. The Gamified Learning Process Model consists of six steps describing how to include gamification and game elements into the learning process and 10 pedagogical principles to help enhance learning motivation.

Keywords: *Delphi method; Game-based learning; Gamification; Learning motivation; Gamified learning process model.*

Introduction

In recent years an increasing popularity in various fields has gained gamification which describes a process when game design elements and game methodology are used in a non-game context (Deterding et al., 2011; Doherty et al., 2017; Woodcock & Johnson, 2017). Karl Kapp, author of the book "The Gamification of Learning and Instruction" describes gamification as use of game-based methodology, thinking and aesthetics to engage people, motivate action, promote learning and solve problems, however, it must

be a deliberate and thoughtful game methodology using game elements appropriate to the situation (Kapp, 2012).

Considering that the concept of gamification is still relatively new and has only gained recognition among researchers since 2012 (Doherty et al., 2017; Dreimane, 2019), researchers still have many uncertainties and questions about the concept that they are trying to find answers to through research. The results of the studies carried out so far show a positive trend for the impact of gamification on the development of motivation, behavior change and attitude modeling (Domínguez et al., 2013; Luarn et al., 2023; Hursen & Bas, 2019). A technology-enriched learning process can improve learners' involvement in the learning process, and the use of games and gamification makes the learning process more interesting and increases learning motivation, which can consequently increase learning achievements (Turan et al., 2016; Simões et al. al., 2013). Some authors believe that modern education has to face a whole series of complications and problems related to the development of technology (Liu et al., 2020), but on the other hand, it can also be seen as an opportunity to attract the attention of learners, motivate, involve them and make learning more interesting by using tools they may find engaging. However, the researchers agree that a more serious research base is needed, as well as rapid approbation and implementation of research, because everything develops very quickly in a technology-driven society, and playing games has the potential to positively influence learning motivation not only for children or young people, but also for adults in various fields.

Despite the potential of games described by many researchers, studies reveal that games as a learning tool are not sufficiently implemented and researched in formal education (Gros, 2006). In order to successfully use gamification in the learning environment, it is necessary to understand not only the concept of gamification, its components, and elements of the game but also the logical course of the gamification process in a learning environment and the practical implementation of gamification. Accordingly, this research aims to develop a gamified learning process model for the development of learning motivation and the pedagogical principles of gamification.

In order to understand the concept's essence, development, and potential impact on the learning process and motivation, an analysis of scientific publications was carried out to review the gamification models and systematization of elements proposed by various authors.

Methodology

To achieve the set goal, this research was conducted in three stages:

Stage 1 – Literature Review

A systematic analysis of publications was carried out to better understand the structure of the gamified learning process, evaluating gamification process designs and models available in research databases. Publications were obtained via the "Scopus" and "Web of Science" databases using the keywords ""gamification" and "model""; "gamification

model"; "model of gamification" focusing on process models. To select the required articles, the "open access" was used. Additionally, the articles to be reviewed were restricted to the English language and full-text accessibility. Altogether, four process models from the literature review were selected for the further analysis: 1) Five-step Model (Huang & Soman, 2013); 2) The Process of Gamification Design (Antonaci et al., 2018); 3) The Mechanics–Dynamics–Aesthetics framework (Hunicke et al., 2004) and 4) Goal–Access–Feedback–Challenge–Collaboration model (Huang & Hew, 2018).

Stage 2 – Development of the Model

Based on the results of the literature review, a gamified learning process model was developed, consisting of six steps describing how to include gamification and game elements into the learning environment. Additionally, pedagogical principles of gamification were created so that the implementation of gamification would be easier and more efficient.

Stage 3 – Delphi Method

Afterward, the model was evaluated using the Delphi method. The Delphi method can be used when the research objective can be achieved as a result of collective discussion, subjective judgments, and group dynamics (Grime & Wright, 2016). It provides for the involvement of experts in solving and discussing problems and issues in order to achieve an optimal result. This method is often used when it is necessary to study and connect several complex concepts, and expert opinion is essential to improve theory or practice (Hult Khazaie & Khan, 2020), which in the context of this research is the development of learning motivation through a gamified learning process. The Delphi method is an iterative process that envisages the synergy of different expert opinions obtained during several cycles (Hult Khazaie & Khan, 2020), but the researcher is responsible for the process via selecting appropriate tools and techniques, attracting experts and promoting their involvement in the evaluation process, and collecting, gathering, and evaluating the information obtained (Grime & Wright, 2016). Usually, Delphi experts remain anonymous during the research and do not know who the other experts are, and interviews are conducted with each expert separately so that opinions are not influenced. The researcher collects the obtained information and opinions, presents it to all experts, and in the next iteration they are discussed again with each expert separately. This is advantage if all involved participants cannot meet at the same time and place to engage in discussion, evaluation, and analysis of the topic, which may be the case due to time zone differences or distance (Grime & Wright, 2016).

Using a previously prepared questionnaire or criteria based on which expert opinions are obtained is recommended in the process of obtaining feedback (Grime & Wright, 2016). In the framework of this research, this was achieved by providing experts with an evaluation structure. The Delphi method was chosen so that the experts could evaluate the created model and give their opinions and feedback on its structure and content

remotely, and as a result of this synergy of experts' opinions, an optimal version of the model could be reached.

The Delphi method was conducted within two iterations in 2022. In order to evaluate the gamified learning process model developed, three experts in the field of psychology and education sciences were approached. A week before each iteration of the Delphi method, the experts were sent a description and visualization of the model's current version and a structure for evaluating it so that they could better prepare for the conversation. The interviews were conducted remotely via Zoom for each expert separately.

Results

Literature review

To understand the concept's essence, development, research, and potential impact on the learning process, an analysis of scientific publications was carried out to review the gamification models proposed by various authors.

One model that explains the gamification of the learning process is the **Five-step Model** designed by Wendy Hsin-Yuan Huang and Dilip Soman. This five-step model for the gamification of certain processes includes (1) identifying the target audience and context, (2) setting learning objectives, (3) planning the process step by step, and (4) allocating resources. In a sense, the fifth step creates a dissonance between a developed plan for the gamification of the learning process and the selection and adaptation of the gamification elements additionally described in the fifth step (Huang & Soman, 2013). The fifth step seems to be an approbation of the developed gamification strategy and thus incurs the need to add a sixth step, which would involve obtaining feedback and evaluation and understanding successes and failures so that the strategy can be adjusted and adapted in the next cycle of the process.

The Process of Gamification Design was created in 2018, offering a gamification methodology and design that could be used in various fields and situations. This model's authors, inspired by another process design model, adapted it and created six steps in the gamification design process: (1) Use scenario analysis; (2) Problem identification; (3) Theoretical framework; (4) Selection of game elements; (5) Development and realization; and (6) Evaluation. After step six, the model returns to the first step and restarts the cycle from the beginning (Antonaci et al., 2018). This model sets out important steps; however, in the context of a gamified learning process, one should start by identifying the problem before assessing the situation, environment, and audience in order to better find a solution to the problem at hand. Using the model of gamification practically in his everyday life, the teacher will not always have time to search for theoretical justification; therefore, the third step of this model could turn out to be impractical. However, this does not prevent us from looking for a theoretical basis in another step to find a more successful solution. It would be essential to introduce an additional step before selecting gamification elements, which would involve developing a gamification strategy first. Based on this step, as well as on the first and second steps, one can choose the most

appropriate gamification elements for the situation. Implementation and evaluation are also valid steps in this model and could be included in a gamified learning process model.

The Mechanics–Dynamics–Aesthetics framework was developed in 2004 by Robin Hunicke, Mark LeBlanc, and Robert Zubek to explain the relationship between game design and the player by dividing the gaming experience into three components: (1) mechanics, (2) dynamics, and (3) aesthetics. The Mechanics–Dynamics–Aesthetics framework supports a formal approach to explaining game design and helps to make judgments about game design and its goals and predict the impact of each component on the player, game process, and game outcome (Hunicke et al., 2004). Although the experience of the game is an essential aspect, when gamifying the learning process, it is necessary to understand that it is a complex process where, several steps before creating the game design or thinking about the dynamics and aesthetics of the game, it is necessary to evaluate the situation and the audience, define the purpose of the process and problem, and find a theoretical framework to solve the problem.

In 2018, based on five selected theories of motivation (Flow Theory, Goal-Setting Theory, Social Comparison Theory, Self-Determination Theory, and Behavior Reinforcement Theory), Biyun Huang and Khe Foon Hew proposed the **Goal–Access–Feedback–Challenge–Collaboration (GAFCC) model**. The authors tested the theory-based GAFCC model in two quasi-experimental studies involving university students in flipped learning classes (Huang & Hew, 2018). This theory-based gamification model offers five stages of game design strategy that focus on the use of technology and gamification elements; gamification strategy creation, which is one of these stages, involves awarding points and tokens to students for completing tasks. If a teacher creates a lesson and wants to gamify it, the various characteristics of the audience and environment, as well as motivational techniques, should be taken into account in order to ensure the greatest possible involvement of students and a higher-quality gamification process.

The second stage of the research was conducted based on the analysis of the models mentioned above, and the first version of the **Gamified Learning Process Model** was thus created by the author of this article. The final version was created after two iterations of the model by Delphi method (see Figure 1) and is described further below.

The Model of Gamified Learning Process

After evaluating all the available gamification process designs and models, a gamified learning process model was created that corresponds to the structuring of the gamified learning process on which to rely when creating a gamification strategy. Afterward, the model was evaluated and perfected within two iterations by the Delphi method, and the final version of the model was approved by the Delphi experts. The Gamified Learning Process Model is depicted in Figure 1 and includes six sequential steps:

1. The first step is to **identify the gamification problem**. It is necessary to understand what one wants to achieve with the help of gamification – to promote the development of motivation, to change attitudes, to encourage behavioral changes, to arouse interest, etc. It is necessary to clearly define what problem exists in the learning

environment in order to be able to develop an appropriate gamification strategy. At the same time, learning goals must also be defined, and one must not forget about high-quality and meaningful learning content and learning outcomes. Nevertheless, the goal of gamification will not be the same as the learning goals because gamification is oriented toward developing motivation, thus helping to achieve the set learning goals. If a problem is recognized but not fully defined and randomly selected gamification elements are used without considering further steps in the Gamified Learning Process Model, only shallow gamification may be achieved (Deterding et al., 2011; Lieberoth, 2015; Gurjanow et al., 2019).

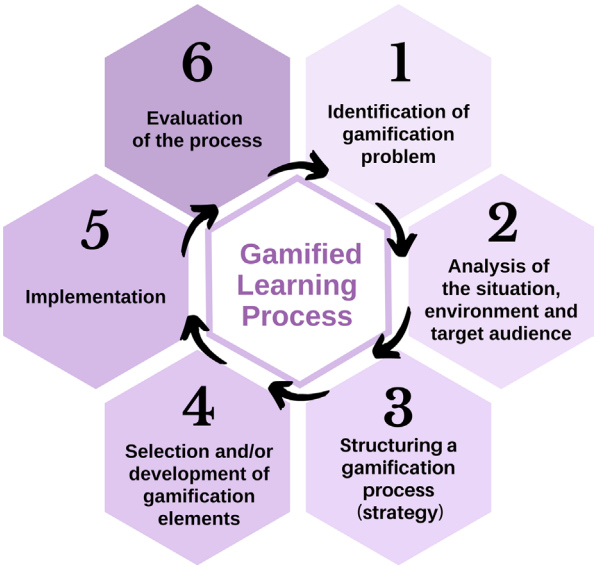

Figure 1 The Gamified Learning Process Model

2. Once the problem and the desired gamification goal have been defined, the next step is to **evaluate the situation, environment, and audience**, which is essential in order to select the appropriate gamification elements and create a strategy. First of all, the teacher needs to know the environment in which the learning will take place – will it be face-to-face or distance learning? What is the size and layout of the rooms? What possibilities does the remote site offer for organizing the learning process? What materials and technical support are available to the teacher and students face-to-face, and which are available in a remote learning environment? How much time is allocated for lessons within the academic semester? What is the lighting like? And other aspects that could be crucial when planning classes.
   It is equally important to identify the audience, i.e., the students, their level of knowledge, previous experience, interests, expectations about learning or the teacher, and personality traits, as this can help to choose appropriate gamification elements. The more familiar the teacher is with the audience, the easier it is to do this. However,

in situations where one must deal with students for the first time, the teacher must be flexible and make assumptions based on the information available. After the fifth step (implementation), it is possible to draw conclusions and make changes in the developed gamification strategy in order to adjust the elements to the characteristics of the audience.

3. The third step is planning and developing the **strategy of the gamified learning process**. This is a vital step because all the activities to be carried out are planned for the day, week, or semester based on the information collected in the first and second steps. In this step, techniques are chosen to achieve the set gamification goal. It should be noted that the goal of gamification is known to the developer of the process, but the participants are introduced to another goal: that of the chosen activities and the game.
4. The fourth step is the **selection of gamification elements**, which follows directly from the previous three steps and the selected motivational elements of the learning motivation dimension.
5. When the learning process and the gamification strategy is developed, the fifth step of the gamified learning process involves the **implementation of the planned activities and tasks**.
6. As the sixth and final step of the cycle, there is an **evaluation of the process** in order to understand whether the chosen gamification strategy and elements were appropriate for the audience. Ideally, an evaluation step should be carried out after each implementation of the gamified learning process so that elements and tasks can be adjusted if there is a negative reaction or the desired engagement is not achieved.

The Pedagogical Principles of Gamification

Nine pedagogical principles of the gamified learning process were also developed in discussions with the Delphi experts.

1. Attracting and holding attention

A vital factor not only in the context of gamification but also in the context of the learning process is attracting attention and keeping it so that learning can take place. Attention, by its very nature, is a cognitive link between a limited amount of information manipulated by the human psyche at a given moment and the entire amount of information contained in a person's feelings, memory, and other cognitive processes (Sternberg & Sternberg, 2012). It is an active focus on a particular stimulus to the exclusion of other stimuli (Slavin, 2009) and helps to provide access to information that is in one's memory and to perceive and process new information.

In the process of paying attention, it is important to arouse interest and curiosity in participants. The ARCS (Attention, Relevance, Confidence, Satisfaction) model explains perceptual as well as cognitive stimuli that can be used to attract attention (Keller, 2010). But gamification is another way that can help the educator attract and keep students'

attention, akin to a story, a challenge, or a reward. As also mentioned by Keller (2010), diversity in the use of these stimuli is essential to prevent habit formation because, in that case, the stimulus no longer fulfills its original function. However, the variety of such stimuli must be within the cognitive load because if there are too many new and interesting stimuli, the cognitive load is directed toward these stimuli, and the capacity of this load to learn something new lessens (Sweller, 1988). Diversifying game elements is also important so that they can arouse interest and achieve the set goal; however, they must not be too dominant or suppress the learning content.

2. Social aspect

Socialization is an essential aspect of the learning process, and social interaction between participants in the learning process must be taken into account when thinking about game-based learning. The teacher is responsible for providing a comfortable environment for all students as much as possible and finding the most appropriate social gamification elements for the relevant audience. For example, some might find competition fun, but for others, it is very stressful.

3. Feedback

Feedback is essential as it helps one to identify successes, failures, and mistakes and learn from them. This is not just the case for the teacher but for students' self-assessment as well. Feedback is a very important element in the gamification context and can be provided through many elements, such as the leaderboard, progress bar, narrative, or system avatar, as well as reward system elements, such as points, badges, or gifts.

However, points, tokens, badges, and other gamification elements representing task completion should not be the only form of feedback. They can indicate the completion of the task and provide an overview of the correct and incorrect answers, but this process must be supplemented with offering quality feedback on errors, providing an explanation for them, allowing the student to draw conclusions. As gamification elements that the educator can use to guide the learning process, the system avatar and narrative can be useful for this. If the tasks are done on a platform that offers, for example, points as feedback for correct and incorrect answers, the educator should also provide an explanation of the incorrect answers so that it is clear that the student has understood the mistake and will avoid making the same mistake again.

4. Making mistakes in a safe environment

One of the positive features of the game in the context of the learning process is the ability to repeat actions, try to achieve the goal of the game repeatedly. Making mistakes or losing is a normal part of the game. Doing so allows one to practice and improve knowledge and skills to help prepare for a test or build self-efficacy and avoid making similar mistakes in a real-life situation when performing a similar activity or task or in an exam.

5. Endangerment of internal motivation

Intrinsic motivation is highly desirable in a learning context because it predicts longer information retention and deeper knowledge (Ryan & Deci, 2000, 2017). However, not only is intrinsic motivation more difficult to achieve, but its persistence is also very fragile. If a student is interested in the activity to be carried out due to his/her own initiative or is guided by gamification elements, additional gamification elements can sometimes disturb the flow, and internal motivation may cease. Perhaps the developed gamification strategy includes specific tasks and gamification elements, but upon seeing an increase in the audience's internal motivation level, which also ensures a quality learning process, the educator may have to consider making some changes during the process to help maintain this internally motivated behavior for as long as possible. External stimuli and gamification elements can contribute to faster task completion and direct the student to internal motivation, but at some point, external stimuli can cause psychological load and stress, threatening the preservation of internal motivation.

6. Loss of efficiency over a long period of time

The use of gamification elements implies the integration of combinations and variations of different elements, tasks, and stimuli in the learning process. This is necessary to avoid forming a habit of certain stimuli, which may no longer provide the desired result over time. Both gamification elements and tasks should be varied and offer as much variety as possible to have an element of surprise. Within the framework of the ARCS model, Keller (2010) foresees diversity in the use of incentives to promote the development of motivation. The loss of the effectiveness of gamification over time is a big risk, so variety, new tasks, new elements, new combinations of them, and the effect of surprise are essential to avoid habits forming. However, the age and abilities of the participants must also be taken into account so that the diversity does not burden cognitive processes (Sweller, 1988), does not force the learning of new rules and new platforms, and does not cause the positive aspect of gamification and the learning content to disappear.

The external stimuli used within the framework of gamification can help enhance the development of internal motivation, thus changing the level of motivation, attitude, or behavior. With time, the use of gamification in the learning process is no longer so essential and can be reduced, offering fewer and fewer external stimuli to ensure the progress of the learning process.

7. Game-based learning in a gamified learning process

Game-based learning and gamification are often seen as similar concepts, but there are important differences between them. At the core of gamification are game elements that are integrated into a non-game context, which, in the present framework, is a learning process with the aim of motivating and engaging. Game-based learning, on the other hand, combines the entertainment function of the game and the game as a means to achieve learning goals (Gros, 2006). However, game-based elements can be easily integrated into the game-based learning process and can help to implement selected

tasks – provide immediate feedback, offer a time limit for completing the task, or create automatic scoreboards or progress bars. Game-based learning platforms can be used perfectly to achieve the goals of gamification. For example, interactive tests for knowledge evaluation, which provide immediate feedback with correct or incorrect answers, can be used for training purposes so that the student is sure of what they have learned and the teacher understands what still needs more attention. However, such game-based knowledge testing platforms are also diverse, and one should not be limited to using only one of them. They also offer different combinations and amounts of game elements. For example, Kahoot provides feedback, points, a time limit, and a scoreboard, but a platform like Nearpod also offers an additional story, avatars, a progress bar, rewards, and the ability to hide the names of participants so that participants with lower scores feels safer. Such additional elements make the game experience more diverse; however, in the context of the previous point, it is necessary to take care of the diversity of gamification elements, as well as the various possibilities of using game-based platforms. Breakout rooms and other alternatives to game-based learning platforms can be used to achieve the goal of gamification and ensure progress toward the achievement of the intended learning outcomes.

However, there are also pedagogical risks, as focusing on correct and incorrect answers simplifies the process of analyzing information, and learners can take tests randomly. For this reason, the knowledge testing process should also provide other forms of evaluation, which require in-depth analysis of information and processes, as well as the use of critical thinking. This means that in the learning process, forms of knowledge assessment should not be based only on the use of gamification elements and game-based learning, although their application can occasionally contribute to the development of learning motivation and knowledge acquisition.

8. Assessment

When providing feedback as part of the gamified learning process, we can also talk about evaluation as a confirmation of a completed task and its compliance with the fulfillment of the set criteria. However, it should be noted that it is better to use formative rather than summative assessment in the context of gamification. The purpose of formative assessment is to evaluate the student's performance on a daily basis in order to improve learning. The purpose of gamification and the use of gamified learning is to support the development of motivation by allowing multiple attempts and errors in a safe environment, providing immediate feedback in terms of points and tokens, accompanied by supplementary and explanatory comments from the educator to support learning. Summative assessment can appear at the end of the learning process as an assessment of knowledge after the gamified learning process has provided an opportunity to develop and improve knowledge and skills in a safe and supportive environment.

9. Previous experience

An important factor worth mentioning in relation to pedagogical principles is the participants' previous experience, which can have a strong influence on their learning

motivation and level of self-efficacy. Performing a task unsuccessfully (for whatever reason) in the past can lead to a low level of self-efficacy (Bandura, 1994; Schunk & Pajares, 2009), as well as a low level of motivation to try to perform similar actions again. Negative previous experiences can also be related to verbal influence from the teacher, classmates, or fellow students. Negative comments from parents can have an impact on the student's level of learning motivation and, in the future, may be related to a specific subject topic or teacher. Sometimes, a reluctance to engage in certain learning activities can be directly related to negative previous learning experiences and fear of experiencing similar situations, humiliation, feelings of shame, etc. The voluntary principle of gamification, the possibility to use gamification elements that could create a safe social environment and involve as many participants as possible in performing the tasks of the gamified learning process, and the possibility to maintain anonymity without making all the results public can all help participants with less positive previous learning experiences to loosen up and engage in the activities.

A gamified learning process and game environment also serve as tools to help build on previous experiences. The game environment allows students to acquire knowledge and skills in a safe environment, allowing them to repeat tasks and practice so that in a real-life situation or a test, their level of self-efficacy is higher, and the result is more successful.

10. Positive Behavior Support

Gamification emphasizes the use of positive stimuli in the achievement of goals set in the learning process, avoiding punishments and stimuli that can cause negative emotions. However, in the learning process, one may have to face situations when not all of its participants are interested in gamification activities and show socially unacceptable behavior, disturbing other participants. In such situations, it is recommended to replace punishments with Positive Behavior Support Strategies, which could correct unwanted or unacceptable behavior, which in the context of the learning process and gamification can be a negative attitude, problematic behavior, a low level of motivation or its absence, as well as deliberately disturbing others.

Conclusions

The use of game elements is fun and entertaining, but if not properly considered, it can do more harm than good and can easily lead to shallow gamification, that is, a learning process where the game elements and game-based tools are used without a specific purpose or defined goal.

This research has provided an essential model for implementing gamification in the learning environment that, step by step, helps to shape and adjust the gamification strategy. Accordingly, the learning process should be designed not only to achieve the set learning goal and achieve learning outcomes but also to make the learning process more efficient and enhance learning motivation, which could provide better learning results.

The pedagogical principles of gamification, on the other hand, can be useful as a guide for the enhancement of learning motivation, thereby making the implementation of gamification easier and more efficient.

The Gamified Learning Process Model should be approbated in the learning environment and tested with students. And, of course, the Gamified Learning Process Model would require an evaluation criterion so that the process could be assessed and adjusted based on the observations.

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APPROBATION OF THE GAMIFIED LEARNING PROCESS MODEL THROUGH PARTICIPATORY ACTION RESEARCH

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ABSTRACT

Gamification has shown the potential in developing motivation and changing behaviours. Still, research reveals that games as a learning tool are not sufficiently approbated in learning environments and longitudinal studies are rare. Theoretical objectives for gamification are essential to test in the learning environment. For this reason, The Gamified Learning Process Model developed by the author of this article was integrated into a higher education study course for future teachers with the aim of testing the model's effectiveness in the learning environment and evaluating the development of learning motivation among students. Students were divided into a control group (n = 20), where the gamification model was not present in their learning process, and a research group (n = 63), who were offered a gamification strategy to promote attendance, attention span, positive emotions, positive associations with the subject and lecturer, and motivation to master and better understand the course content. A points system was established in which points were awarded for attending lectures, completing a game-based task after each course topic (virtual breakout rooms or quizzes), and completing the course's final quiz (team competition). At the end of the semester, all the points were collated, and students with the highest score gained extra points in the final exam.

Participatory action research was conducted to collect feedback using a student survey based on the Motivation scale of the Motivated Strategies for Learning Questionnaire by Pintrich et al., adapting it and supplementing it with questions about the use of gamification elements and their impact on the development of motivation. The data collected were analyzed using the SPSS program and are presented in the article.

Keywords: *Action research; Gamification; Gamified Learning Process Model; Game-Based Learning; Learning Motivation.*

Introduction

Considering that gamification is a relatively new concept and serious research of this phenomenon has only started a few years ago, it is not yet possible to fully understand

the impact of this concept on pedagogical processes in the long term (Marklund, 2015). Since the 2002, when the term "gamification" was introduced by programmer Nick Pelling (Pelling, 2011), the research of this concept that describes a usage of game elements in non-game concept to motivate, engage and change attitude (Deterding et al., 2011; Kapp, 2012; Doherty et al., 2017; Woodcock & Johnson, 2017), has emerged and researchers are looking for answers not only to the question – "does it works?" but also how to use it more efficient. From the research, that defines and describes the concept (Deterding et al., 2011; Landers, 2014; Doherty et al., 2017; Domínguez et al., 2013; Karagiorgas & Niemann, 2017), the research have gone to the analysis of the influence of the gamification on specific audiences, environment and selected game elements on the motivation (Ibrahim et al., 2021; Hursen & Bas, 2019). However, there are still many unanswered questions about gamification and too little research that provides a comprehensive insight into the principles and effects of gamification on various processes, especially empirical longitudinal studies (Domínguez et al., 2013; Hanus & Fox, 2015; Landers & Callan, 2011).

One of the essential elements of the learning process is learning motivation, and in the context of gamification, it is often mentioned as the goal of gamification of the process. Already in the early 1980s, even before N. Pelling had proposed the concept of gamification, Thomas W. Malone published the first scientific studies explaining the addictive nature of computer games and how to transfer their positive aspects to other fields, focusing on how to motivate people to engage in certain activities (Malone, 1980; 1981; 1982). Even with the development of gamification research, many scientific articles on gamification of the learning process focus directly on the analysis of motivational development, but research on the effects of gamification on motivation has shown mixed results. There are articles that find that student performance and learning motivation improved after the use of gamification elements in the study course (Domínguez et al., 2013). The use of gamification in the study process has shown a positive effect on the development of internal motivation, indicating that both students and educators benefit from the use of gamification in the learning process (Luarn et al., 2023). Studies of gamification and learning motivation have also been carried out at the primary school stage, analyzing the impact of gaming on students' motivation to learn natural sciences. The results of the study showed that the indicators of learning motivation of the students involved in the study in learning natural sciences increased significantly (Hursen & Bas, 2019). It should be mentioned that there are also cases when gamification did not affect the motivation and attitudes of learners as expected (Monterrat et al., 2017). A study conducted in 2015 found that gamification of the learning process even reduced students' intrinsic motivation, indicating that gamification transforms intrinsic motivation into extrinsic motivation (Hanus & Fox, 2015).

Despite the potential of games described by many researchers, studies reveal that games as a learning tool are not sufficiently implemented in formal education (Gros, 2006), and the the approbation of theoretical objectives are wery important. For this reason, The Gamified Learning Process Model developed by the author of this article and

evaluated using the Delphi method described in "The Gamified Learning Process Model" (Dreimane, 2024) was approbated in the learning environment to test its effectiveness in the learning process. The approbation of the Gamified Learning Process Model was carried out using participatory action research at the same time as the model was evaluated. Participatory action research was selected as the research method to achieve the goal of testing the Gamified Learning Process Model in a learning process, involving students in the process, and checking the model's effectiveness in the learning environment. The model and its pedagogical principles are described in detail by Dreimane (2024); this article provides data collected via participatory action research and conclusions that helped to shape the final version of the Gamified Learning Process Model.

Methodology

To achieve the set goal of this paper, this research was conducted in three stages.

Stage 1 – Participatory Action Research

Action research was formulated for the first time in 1946 by Kurt Lewin (Lewin, 1946). Lewin explained action research as a research-based series of action experiments consisting of planning, acting, observing, and reflecting before repeating all these actions until the desired result is achieved, and he also believed that research should take place in a natural environment with the involvement of all its participants (Lewin, 1946; Carr & Kemmis, 1986). Lewin's insights were further explored and developed by Wilfred Carr and Stephen Kemmis, who defined three types of action research: (1) technical action research, (2) practical action research, and (3) participatory action research (Carr & Kemmis, 1986; Thawinwong & Sanrattana, 2022). By applying action research, researchers can study theoretical principles in a practical framework, review their own or others' actions with the aim of improving them and making them more effective, and promote change at the group, organizational, and even societal levels (Dickens & Watkins, 1999). Action research is more effective when its participants engage in self-reflection and problem-solving (Brown et al., 1982), which is also at the heart of participatory action research. For this reason, this work adopted a participatory action research design to approbate the Gamified Learning Process Model when working with students and asking them to reflect on the model's effectiveness and the development of their learning motivation at the end of the study course.

Stage 2 – Motivated Strategies for Learning Questionnaire

In order to evaluate the model's influence on the development of students' learning motivation, students involved in the study conducted a survey based on the Motivated Strategies for Learning Questionnaire (MSLQ) as part of the participatory action research.

The MSLQ is designed to assess and measure the development of motivation in various aspects. It consists of 81 questions divided into two scales: the Motivation scale and

the Learning Strategies scale. The Motivation scale includes 31 questions about intrinsic and extrinsic motivation, the value of the learning task, control over learning, self-efficacy, and performance and anxiety in the learning process. The Learning Strategies scale includes 50 questions about cognitive and metacognitive strategies, critical thinking, self-regulated learning, the influence of the learning environment and resources, seeking support, and learning in pairs or groups (Pintrich et al., 1991; Garcia & Pintrich, 1996). The survey assumes that the answers to the questions are given on a Likert scale and that the survey questions may be modified and adjusted according to the specifics of the study.

The MSLQ Motivation scale was used when creating the survey used for this study. The questions were adapted and supplemented to offer answers as to whether the integration of gamification elements and game-based learning strategies in the learning process contributes to the development of learning motivation, looking at aspects of intrinsic, extrinsic, and external motivation, such as self-efficacy and the learning task, the value of the methods, and tools used (see Table 1).

Stage 3 – Statistical Package for the Social Sciences

Statistical data processing was performed using the Statistical Package for the Social Sciences (SPSS) and Microsoft Excel software, analyzing:

1) Cronbach's alpha test results;
2) Kolmogorov-Smirnov test results;
3) Mann-Whitney U test results; and
4) descriptive statistics.

The author of this article was the one who created the gamification strategy and implemented it in the study process with university students throughout the semester and was an active participant, not just an observer. At the beginning of the course, all students were informed verbally about the gamification strategy applied and an option was given not to engage if one did not wish to. At the end of the course, students were asked to fill out a questionnaire if they wanted to participate in a further study, where the obtained data would be analyzed. The questionnaire was anonymous and the results were used in aggregate form.

Results

The research results are described according to the research stages described earlier. The first stage of the research – the participatory action research – was carried out during the 2022/2023 academic year, gamifying two study courses at the University of Latvia. In total, 83 students were involved, divided into a research group (n = 63) and a control group (n = 20). More students attended the lectures, but these 83 students were the ones who filled in the questionnaire afterward (not an mandatory action) and were involved in the evaluation process.

The action research was carried out after the first iteration by the Delphi method, based on the second version of the Gamified Learning Process Model, and tested in

the learning environment. This research was a step that helped to shape the final version of the Gamified Learning Process Model (Dreimane, 2024). The second version of the model consisted of the following six steps:

1. Identifying the problem and setting learning goals
2. Evaluation of the situation, environment, and target audience
3. Structuring the gamification process (strategy)
4. Selection of gamification elements
5. Implementation
6. Evaluation of the process

Step 1: Identifying the problem and setting learning goals

In step 1, the study course was evaluated by the author of this article, and problems related to the course and its attendance were identified. Lectures lasted between 4.5 and 6 hours in one day, not including breaks, depending on the course. Although the course is extensive in terms of content, attendance is not mandatory, but it is nevertheless desirable so that students can fully learn the entire course content and successfully achieve learning results. Accordingly, several gamification goals were determined for the students:

1) to promote maximum attendance of the study course;
2) to attract and keep students' attention throughout the day; and
3) to make the theoretical course engaging and interesting by developing learning motivation.

Step 2: Evaluation of the situation, environment, and target audience

Audience: students in the first year of the bachelor's study program "Primary Education Teacher" and the second year of the bachelor's study program "Teacher" were involved in the process of approving the pedagogical model of playing games, without or with minimal prior knowledge of the theoretical positions to be learned in the course. Most students had no difficulty using technology and had a good knowledge of English. The possibility for students to use mobile devices in face-to-face lessons and computers as part of remote lessons was clarified during the first lecture.

Environment: A semi-distance learning process was implemented. In remote classes was used the MS Teams platform, which offers the opportunity to present, demonstrate audio-visual materials, complete tasks on digital platforms, and devide in groups using the affordance offered by MS Teams to create separate rooms within the event. Users can connect to remote classes from a computer, as well as from a phone or tablet; however, users will not always be able to see the audience's faces and emotions for feedback because not all participants turn on their cameras.

Face-to-face lessons were held on the University of Latvia premises. The teacher had access to a computer, projector, blackboard, and other equipment if needed. It is impossible to predict how many students will bring their own laptops or tablets to the lecture to complete assignments; however, it is possible to provide students with university tablets for group work or searching for information.

Step 3: Structuring the gamification process (strategy)

In order to solve the problems identified and achieve the gamification goals, a gamification strategy was developed for the duration of one academic semester. The gamification strategy consisted of several small gamification goals and one big gamification goal at the end of the semester.

The small gamification goals included a scoring system for different types of tasks that students had to complete within the semester, with each completed task receiving a certain number of points that were added together to form a score for the main goal. The main goal was the opportunity to get one extra point at the end of the course in addition to the number of exam points, which could help students to improve their grade. This privilege went to the student with the highest score at the end of the semester. Points were awarded for:

1) Attendance.
2) Tasks: Each day of the course, students were offered game-based learning tasks and tests, and at the end of each major topic, students were offered digital breakout rooms. For completing each such task, the student received 1 point.
3) Grand final quiz: To help repeat what they had learned in the course throughout the semester, in the last lesson, students divided into teams and competed with each other in a quiz that included questions about all the topics learned during the course. This gave them the opportunity to have a good time and to repeat the topics learned. All participants received points according to their place on the leaderboard.

Step 4: Selection of gamification elements

This step involved the selection of gamification elements according to the gamification strategy created. Game-based learning platforms, like escape rooms and quizzes, were also selected and created.

Step 5: Implementation

At the beginning of the study course (in the first lesson), students were introduced to the rules and tasks to follow in order to receive a prize at the end of the course. The gamification strategy was carried out throughout the semester.

Step 6: Evaluation of the process

Lessons were evaluated at the end of each day to understand whether the chosen platform and game elements were appropriate for the audience. Students' opinions were also collected.

The second stage of the research involved the MSLQ to evaluate the influence of the model on the development of students' learning motivation.

In order to get a more complete picture of the development of the learning motivation of students whose learning process was gamified (n = 63), the research also included a control group (n = 20) whose learning process was not integrated with a gamification

strategy. The questions asked to both groups of respondents were divided into categories pertaining to intrinsic and extrinsic motivation, the value of tasks, learning methods, cognitive load, self-efficacy, and the role of the teacher. A summary of the survey is depicted in Table 1.

Table 1 Survey summary

	Research group	Control group
Participants	63	20
Questions	35	27
Type of question	34 – Likert scale 1 – open-ended	26 – Likert scale 1 – open-ended
Intrinsic motivation	4	4
Extrinsic motivation	4	4
Value of the task	5	5
Learning methods	16	8
Cognitive load	2	2
Self-efficacy	2	2
Role of the teacher	1	1
Comments	1	1

Students from both groups were asked to fill in the MSLQ after the final exam at the end of the course. As such, the answers reveal the situation after the application of the gamification strategy ended.

The third stage of the research involved data analysis with SPSS. When starting the data analysis, the issue of whether the questions included in the survey and the answers given to them were sufficiently homogeneous was assessed. The Cronbach's alpha test was used for this purpose, evaluating the internal consistency of the Likert scale and setting the critical value at 0.6. The results (see Table 2) show that the Cronbach's alpha test result for all 34 study group questions is 0.888, which is considered a high internal consistency. The highest value of Cronbach's alpha can be observed in the "Teaching methods" group of questions (0.879), which can be considered a very high coherence indicator. The "Cognitive load" group of questions shows a negative value (–0.603). However, it is based on an inverted question; thus, a negative value shows that the respondents answered the question with the answer "I do not agree," which, taking into account the formulation of the question, allows us to conclude that students did not feel cognitive overload and fatigue at the end of the lessons. Indeed, the second question from this group confirms that the students felt a sense of satisfaction at the end of the lessons. In general, all other groups of questions also exceed the set critical value of 0.6, which shows that the internal consistency of the questions is acceptable.

Table 2 Cronbach's alpha test results

Question group	Cronbach's alpha value
Intrinsic motivation	0.535
Extrinsic motivation	0.726
Value of the task	0.769
Learning methods	0.879
Cognitive load	–0.603
Self-efficacy	0.690
Together	**0.888**

The Kolmogorov-Smirnov test was used to test the fit of the data to a parametric or non-parametric distribution. Since the p-value for all questions was below the value of 0.05, a non-parametric method of data analysis needed to be used, which is the Mann-Whitney U test within the scope of this work.

The Mann-Whitney U test is a non-parametric test for testing hypotheses and comparing two samples (Nachar, 2008) and is appropriate for comparing and analyzing the responses of the study group and the control group to the MSLQ survey questions. This test also has the advantage of analyzing data obtained from a small number of respondents (Nachar, 2008), who, in this case, comprised 63 students in the research group and 20 in the control group.

If $p < 0.05$, then the medians have statistically significant differences. Accordingly, a statistically significant difference in the medians of the study group and the control group was found for 11 questions (see Table 3) and four groups of questions (see Table 4).

The most significant difference between the answers of the study group and those of the control group can be observed in questions related to the value of the performances: $p = 0.000$ for both question 10 ("I am very interested in the content of this course") and question 12 ("I like this course"). The other two questions about the value of the exercises also show a statistically significant difference: $p = 0.041$ for question 13 ("It is very important for me to understand the topics of this course") and $p = 0.038$ for question 11 ("I think that what I learned in this course will be useful to me").

It is possible to compare the questions about the teaching methods and techniques used only partially because game-based learning was only used for the research group; therefore, these questions cannot be compared. However, question 17 ("The learning methods used within the course helped to keep my attention throughout the day") showed a statistically significant difference between the two groups of respondents ($p = 0.002$), as did question 21 ("The methods used helped to form positive associations with the study course: group work"), where $p = 0.012$.

Another statistically significant difference in the respondents' answers can be observed in the question whether students have a cognitive load during the study course. The plan was to reduce it with the implementation of the gamification strategy.

Accordingly, for question 20 ("At the end of each lesson (day), I felt satisfied with what I had done and learned"), $p = 0.003$.

There was considerable variation in the group of questions to evaluate self-efficacy. The indicator of question 29 ("I am sure that I have understood even the most difficult topics taught by the teacher in this course") was $p = 0.002$, while in question 30 ("I believe that the teacher facilitated the learning of the course content"), $p = 0.001$.

Table 3 Mann-Whitney U test results (individual questions)

Question	Group	N	Mean rank	Sum of ranks	U	Z	P
1. I was most satisfied with this course's opportunity to understand the learning content as fully as possible	Control group	20	30.55	611.00	401	−2.716	0.007
	Research group	63	45.63	2875.00			
2. I prefer course assignments, methods, and apps that stimulate curiosity and interest, even when the topic is difficult	Control group	20	40.13	802.50	592.5	−0.463	0.643
	Research group	63	42.60	2683.50			
3. I prefer this course's assignments that really challenge me so that I can acquire new knowledge	Control group	20	35.13	702.50	492.5	−1.54	0.124
	Research group	63	44.18	2783.50			
4. I choose to do assignments that I enjoy or learn from, even if I don't get a grade	Control group	20	34.23	684.50	474.5	−1.908	0.056
	Research group	63	44.47	2801.50			
5. Getting a good grade in this course gives me a satisfaction	Control group	20	42.38	847.50	622.5	−0.084	0.933
	Research group	63	41.88	2638.50			
6. My priority right now is to improve my overall grade of the semester, so getting good grades in this course is important to me	Control group	20	47.38	947.50	522.5	−1.169	0.243
	Research group	63	40.29	2538.50			
7. I want to get better grades in this course than my fellow students	Control group	20	42.25	845.00	625	−0.055	0.956
	Research group	63	41.92	2641.00			
8. I want to be successful in this course so I can show my success to my family, friends, employer etc.	Control group	20	35.75	715.00	505	−1.367	0.172
	Research group	63	43.98	2771.00			
9. I think that I will be able to use what I learned in this course in other courses as well	Control group	20	40.08	801.50	591.5	−0.583	0.560
	Research group	63	42.61	2684.50			
10. I am very interested in the content of this course	Control group	20	25.35	507.00	297	−4.12	0.000
	Research group	63	47.29	2979.00			
11. I think that what I learned in this course will be useful to me	Control group	20	35.95	719.00	509	−2.04	0.041
	Research group	63	43.92	2767.00			
12. I like this course	Control group	20	25.38	507.50	297.5	−4.592	0.000
	Research group	63	47.28	2978.50			
13. It is very important for me to understand the topics of this course	Control group	20	34.38	687.50	477.5	−2.073	0.038
	Research group	63	44.42	2798.50			
17. The teaching methods used within the course helped to keep my attention throughout the day	Control group	20	28.30	566.00	356	−3.077	0.002
	Research group	63	46.35	2920.00			
18. The teaching methods used within the course helped to acquire theoretical knowledge	Control group	20	35.30	706.00	496	−1.603	0.109
	Research group	63	44.13	2780.00			
19. At the end of each lesson (day), I felt tired and overloaded with information	Control group	20	45.98	919.50	550.5	−0.875	0.381
	Research group	63	40.74	2566.50			
20. At the end of each lesson (day), I felt satisfied with what I had done and learned	Control group	20	29.00	580.00	370	−2.995	0.003
	Research group	63	46.13	2906.00			
21. The methods used helped to form positive associations with the study course: quizz	Control group	20	40.88	817.50	607.5	−0.263	0.792
	Research group	63	42.36	2668.50			
21. The methods used helped to form positive associations with the study course: clouds	Control group	20	33.90	678.00	468	−1.844	0.065
	Research group	63	44.57	2808.00			
21. The methods used helped to form positive associations with the study course: group work	Control group	20	31.40	628.00	418	−2.499	0.012
	Research group	63	45.37	2858.00			
22. The methods used within the course helped to form positive associations with the teacher	Control group	20	36.00	720.00	510	−1.818	0.069
	Research group	63	43.90	2766.00			
28. I am confident that I have mastered the basic concepts of this course and will be able to recognize them	Control group	20	33.93	678.50	468.5	−1.863	0.062
	Research group	63	44.56	2807.50			
29. I am confident that I have understood even the most difficult topics of this course	Control group	20	28.08	561.50	351.5	−3.143	0.002
	Research group	63	46.42	2924.50			
30. I believe that the teacher facilitated the learning of the course content	Control group	20	30.43	608.50	398.5	−3.365	0.001
	Research group	63	45.67	2877.50			

Table 4 Mann-Whitney U test results (groups of questions)

Question qroup	Group	N	Mean rank	Sum of ranks	U	Z	P
Intrinsic motivation	Control group	20	28.73	574.50	364.5	−2.862	0.004
	Research group	63	46.21	2911.50			
Extrinsic motivation	Control group	20	40.98	819.50	609.5	−0.219	0.826
	Research group	63	42.33	2666.50			
Value of the task	Control group	20	24.85	497.00	287	−3.889	0.000
	Research group	63	47.44	2989.00			
Learning methods	Control group	20	33.88	677.50	467.5	−1.732	0.083
	Research group	63	44.58	2808.50			
Cognitive load	Control group	20	37.55	751.00	541	−0.976	0.329
	Research group	63	43.41	2735.00			
Self-efficacy	Control group	20	29.15	583.00	373	−2.794	0.005
	Research group	63	46.08	2903.00			
Role of the teacher	Control group	20	30.43	608.50	398.5	−3.365	0.001
	Research group	63	45.67	2877.50			

Regarding intrinsic motivation, $p = 0.007$ for question 1 ("I was most satisfied with this course's opportunity to understand the learning content as fully as possible"). On the other hand, the questions about the level of external motivation did not show a significant statistical difference either in the groups of questions or when looking at the questions separately. However, it should be mentioned that the answers of both groups did not show that external stimuli, such as assessment, were important to them.

Taking a closer look at the results of the Mann-Whitney U test for question groups (see Table 4), statistically significant differences can be observed in the groups of questions about the value of tasks ($p = 0.000$), the role of the teacher ($p = 0.001$), intrinsic motivation ($p = 0.004$), and self-efficacy ($p = 0.005$). It should be mentioned that the group of questions about the teaching methods used did not show a statistically significant difference, but this could be explained by the fact that there were not many comparable questions.

Descriptive statistics showed that the most significant differences between the research and control groups were in questions about task value, learning methods, and cognitive load. Also, the research group scored higher for intrinsic motivation.

Data can also be viewed by the number of times a particular value appears in the data, which is called absolute frequency. On the other hand, relative frequency reflects the number of times a certain value appears in the data (absolute frequency) in relation to the total number of this variable's values, which can be expressed as a percentage (Vetter, 2017). The relative frequency distribution of the responses obtained from the research group shows that the Likert-scale response "5 – Agree" dominates most of the responses.

Central tendency is a value that describes the entire data set as a single measurement. The three main measures of central tendency are mean, median, and mode (Vetter, 2017). The present action research data analysis will take a closer look at the median and mode.

The median is the average value of the data when the data is ordered in ascending or descending order, while the mode is the most common value in the data set (Vetter, 2017).

The distribution of the research group's answers to the group of questions about the value of tasks shows that the mode is 5. Its frequency varies from 73% to 89% of all the answers. The task value group includes questions such as whether what was learned in the course will be useful (question 11 = 89%) and whether it will be possible to use it in other study courses (question 9 = 81%), if students are very interested in the course content (question 10 = 73%), and whether it is important to understand the topics to be learned (question 13 = 78%). Additionally, 86% of respondents gave a score of 5 in response to the question about whether they liked the course (question 12).

The highest frequency of mode 5 in the control group appears in two questions from the group about the value of tasks – question 9 ("I think that I will be able to use what I learned in this course in other courses as well") and question 11 ("I think that what I have learned in this course will be useful to me"). On the other hand, when answering statement question 10 ("I am very interested in the content of this course"), 50% of the respondents in the control group chose the rating 4, and only 25% chose 5. A similar distribution can also be observed in their responses to question 12's statement "I like this course," where mode 4 has a frequency of 45%.

Similarly, in the research group's question 30 ("I believe that the teacher facilitated the learning of the course content") and question 22 ("The methods used within the course helped to form positive associations with the teacher"), the mode is 5, which was indicated as an answer to these questions by 86% and 84% of respondents, respectively. The control group showed lower readings for the same questions: question 24 ("I believe that the instructor facilitated the learning of the course content") was rated 5 by 50% of respondents, while question 19 ("The methods used in the course helped to form positive associations with the teacher") was rated 5 by 65%. This allows us to conclude that the teacher plays a significant role in the formation and organization of the learning process, as well as in the choice of methods, and that the integration of the game-playing strategy in the study group's learning process had a positive effect on the formation of student associations not only with the study course but also with the teacher.

Differences can also be observed when analyzing the questions about teaching methods, which were the same for the study and control groups. There were no significant differences regarding the use of knowledge tests in the two groups – in the study group, 54% of respondents chose a rating of 5, while in the control group, 50% of students chose a rating of 5. On the other hand, the use of opinion walls and clouds had a more positive effect on the research group – 48% of students marked this with a rating of 5, while in the control group, 45% of students chose a rating of 4.

Group work in the study group was marked with a rating of 5 by 60% of the respondents, while 45% of the control group gave it a rating of 4. This could be explained by the fact that in the study group, these tasks were integrated within the framework of the game-playing strategy and were purposefully chosen as an external stimulus in order

to develop learning motivation, promote the learning of the course content, and keep students' attention.

The answers of the research group allow us to conclude that the respondents positively evaluated the integration of the pedagogical model of gamification in the learning process, i.e., the final quiz and breakout rooms. When asked whether the final quiz helped them to form positive associations with the study course, 73% of respondents answered "5 – Agree," and when asked whether the final quiz helped them to reinforce the topics learned within the course, 71% answered "5 – Agree." On the other hand, the breakout rooms used at the end of each big topic allowed them to look for clues and answer questions, and 70% of respondents agreed that they helped to reinforce knowledge about the given topic.

When looking at the distribution of answers from the internal motivation group, significant differences in the answers given can be seen. The mode of the answers provided by the research group is 5, and the frequency ranges from 41% to 67%. On the other hand, the control group answered the same questions with a rating of 5 for two questions and a rating of 4 for another two. If it is assumed that gaming primarily has the ability to influence external motivation but also has the ability to develop internal motivation through exciting activities and external stimuli, it can be concluded that the level of internal motivation of the study group is higher, the reason for which could be the use of games in the learning process.

Conclusions

A significant difference was found between the two groups in their responses to the question about the ability of the teaching methods used to keep students' attention throughout the day. The responses of the research group showed that the stated goal of gamification ("to attract and hold students' attention throughout the day") was achieved in whole or in part due to the developed and implemented gamification strategy. The entertaining nature of using game-based learning methods and the possibility of diversifying the learning process helped to keep students' attention throughout several lectures.

Statistically significant differences can also be observed in matters related to the research group's and control group's liking for the study course and interest in its content. The responses of the research group showed a greater liking for the course and interest in its content than the control group.

The survey also shows that the final quiz helped to reinforce the knowledge learned within the course, while the breakout rooms helped to reinforce the knowledge of the specific topic and were interesting. However, the open-ended questions show that students need additional quality feedback after using game-based knowledge tests and breakout rooms. Participatory research activities in breakout rooms were offered at the end of lessons, preventing immediate comments on unclear questions or mistakes. Accordingly, the teacher must evaluate how to deal with such a situation. It is possible to

discuss mistakes at the beginning of the next day of classes or add additional explanatory and informative materials to the content of the breakout room. After students complete the knowledge tests, it is necessary to provide immediate feedback and discuss the mistakes and questions that caused difficulties. This would provide additional added value to the use of game-based learning tools.

Overall, the participatory action research showed that using the gamification strategy and integrating the points system made the learning process more interesting. It was observed that attending the study course was important for the students to get maximum marks for all scoring disciplines. The analyzed answers lead to the conclusion that integrating the gamification strategy into the learning process positively influenced the attitude of students from the research group both toward the study process and the teacher. This, in turn, contributed to their motivation to attend the course and their desire to engage in all study activities in order to gain both more points and the opportunity to get an extra point in the exam. The answers also show that the study group's level of intrinsic motivation was higher than that of the control group, which could be correlated with the integration of the Gamified Learning Process Model in the learning process.

From the above, it can be concluded that all three goals of gamification were achieved: 1) encourage maximum attendance of the study course, 2) attract and keep the attention of students throughout the day, and 3) make the theoretical course engaging and interesting, developing learning motivation.

When evaluating the process with the MSLQ, it was found that it is necessary to develop evaluation criteria to be used by the educator when evaluating the entire gamification strategy as a whole, as well as the applied gamification strategy in intermediate stages, if the strategy can be implemented over a longer period. The educator will not always have the opportunity to take the MSLQ survey. Developing the evaluation criteria is a suggestion for future research, as this will help the teacher carry out such evaluations in more depth.

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SYSTEMATIZATION OF GAMIFICATION ELEMENTS

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ABSTRACT

Gamification is a relatively new concept that has gained recognition among researchers since 2012 and has shown potential in a variety of fields. Gamification uses game elements to develop motivation, change behavior and attitudes, and solve problems. The game elements are one of the main characteristics of gamification and distinguishes it from similar disciplines like game-based learning and serious games; accordingly, it is important to systemize them so that the implications in the learning environment are more efficient and easier for educators to use when creating a gamification strategy.

To achieve the aim of this research, the data mining was used as the research method to obtain the taxonomies, systematizations and models of gamification elements available on "ResearchGate" database. To mine the date, the keywords "gamification elements" and "taxonomy" or "systematizations" were used. Additionally, the data were restricted to the full-text accessibility. Altogether, 5 data units were detected within "ResearchGate" database that were suitable for the research and selected for the further analysis

Within the framework of the present research, collected gamification elements were analyzed, systemizing the gamification elements mentioned in the works of various authors, the taxonomy of game elements, and their explanations in the context of the gamified learning process. In total, 32 gamification elements are systematized into four dimensions (1) game design elements, 2) motivational elements, 3) social elements and 4) technical game elements), considering the meaning and impact of the elements on the gamification process and its participants. The systematization of gamification elements aims to help to better understand the role of each element in the gamified learning process and to choose the right combination of elements appropriate for a particular situation.

Keywords: *Gamification; gamification elements; game elements; systematization; systematization of gamification elements.*

Introduction

In 2002, N. Pelling named the way to apply game elements in the learning process gamification. In 2002, the academic environment showed no scientific interest in this concept. Only in 2012, the concept gained popularity and gamification research

began in various fields (Dreimane, 2019), with different authors giving their version of the definition of gamification (Karagiorgas & Niemann, 2017; Kapp, 2012; Landers, 2014). Considering the growing interest in gamification, the definition of gamification has been accepted in the scientific community as a concept that uses game design and game elements in a non-gaming context (Deterding et al., 2011; Doherty et al., 2017; Woodcock & Johnson, 2017, Seaborn & Fels, 2015; Werbach & Hunter, 2012). In the context of the learning process, gamification uses game elements, game-based methodology, thinking, and aesthetics to engage people, motivate actions, and solve problems, thus influencing learning outcomes (Deterding et al., 2011; Doherty et al., 2017; Kapp, 2012; Landers, 2014; Woodcock & Johnson, 2017).

As can be seen from definitions of gamification, one of its components is "game elements", which is an essential part of characterizing gamification, which distinguishes gamification from its similar concepts – game-based learning and serious games, which are associated with fully developed games with a specific goal (Sailer et al., 2017), which is usually the acquisition of knowledge without entertainment in case of serious games (Landers & Landers, 2014; Karagiorgas & Niemann, 2017; Sailer et al., 2017), and acquisition of knowledge in entertaining and fun setting in case of game-based learning (Prensky, 2001; Gros, 2006). Gamification aims to change attitudes and behaviour and motivate participants (Kapp, 2012; Landers, 2014). It can be achieved by using audience appropriate game elements in a considerate way, to achieve previously set goal objectives.

As mentioned, game elements are one of the most important characteristics of gamification. A well-designed taxonomy is useful for using structured knowledge to achieve a goal. Several taxonomies, systematizations, and lists of gamification elements that can help to create a more successful gamification process have been developed; however, many of them are still incomplete, cover a small number of game elements, or are not designed for the gamification of the learning process. For this reason, researchers are trying to build their taxonomies and systematizations, looking for better ways to structure knowledge of the elements of gamification. This research aims to collect and systemize the elements of gamification and taxonomies of game elements mentioned in the research of various authors and provide an explanation of these elements in the context of the gamified learning process so that the gamification of the learning process would be more efficient and easier for educators.

Methodology

The data mining technique was chosen as a research method to achieve the research goal. Data mining allows a researcher to gather unstructured data that comes in many formats – text, images, videos and documents and discover relations within those data (Rasid et al., 2017; Zengin et al., 2011). This research method allows the gathering of useful data from a massive amount of information on the internet or other sources (Hodhod & Fleenor, 2018). The source of data mining within this research was the "ResearchGate" which is a professional network providing a platform for collaboration and access to

a wide range of research. To mine the date, the keywords "gamification elements" and "taxonomy" or "systematizations" were used. Additionally, the data were restricted to the full-text accessibility. Altogether, 5 data units were detected within "ResearchGate" database that were suitable for the research and selected for the further analysis: two taxonomies, one concept map, one model, and one systematization of gamification elements.

Results

One of the best-known taxonomies of gamification elements was published by Armando M. Toda and colleagues in 2019 and is designed for use in education (Toda et al., 2019). The authors collected game elements in the context of the field of education by analyzing the literature. The taxonomy consists of a total of 21 elements divided into five categories (see Table 1).

Table 1 Taxonomy for Gamification Elements in Education by Toda et al. (2019)

Category	Game elements
Performance	Progression, Levels, Points, Stats, Acknowledgement
Ecological	Rarity, Economy, Imposed Choice, Chance, Time Pressure
Social	Social Pressure, Competition, Cooperation, Reputation
Personal	Novelty, Renovation, Puzzle, Objective, Sensation
Fictional	Storytelling, Narrative

Although the taxonomy offers elements that are essential and very useful in creating a gamification strategy, its structure and categories are not helpful in developing a gamification learning process. Reputation, feelings, recognition, novelty, and puzzle do not seem to be included in the systematization of gamification elements created in this paper because reputation, feelings, recognition, and novelty are elements characterizing motivation – they are not elements of gamification that the educator can include in the learning process. A puzzle, on the other hand, can be defined as the challenge of solving engaging and challenging tasks. Also, the element of forced choice does not seem appropriate when discussing the use of gamification in the learning process because it may not contribute to the development of learning motivation. Free choice and autonomy are two of the prerequisites for the formation of internal motivation based on the principles of Self-Determination Theory (Deci & Ryan, 1994).

In 2014, Yu-Kai Chou developed the Octalysis Framework, or the Eight Core Drives of Gamification, explaining the importance of each core and the relevance of game elements to each one. Four of them are intrinsic motivation cores, and four are extrinsic motivation cores. They are also divided into four positive and four negative cores (white and black hat gamification). Chou emphasizes that these eight cores focus on motivation, and the dimensions that promote and develop people's motivation are explained through them. The Octalysis Framework is designed as a universal model that can be

used in various fields to analyze a product, workplace, marketing strategy, or lifestyle and promote the motivation of customers or participants for development. Although Chou's model is not designed to gamify the learning process, there are things worth keeping in mind when creating a systematization of gamification elements because the Octalysis Framework offers a wide range of game elements.

Although Chou has done a lot of work describing and analyzing gamification, its elements, and the various dimensions related to motivation and audience differences that influence the process, the Octalysis Framework is designed to analyze the business environment of gamification, not the learning process. The learning process is significantly different from the business environment and the situations encountered in it. Learning goals differ from business goals, and the environments of these two areas are also different and require a different approaches to the gamification of the process, strategy, and element selection.

Black hat gamification, which Chou explains as negatively biased elements of the game, is intended to be used in situations where it is not necessary to build a long-term relationship with the customer but to promote the consumption of a product or service at any given moment (Chou, 2014). This does not correspond to the goals of education, which forms a long-term commitment with learners. A positive stimuli should be selected in the gamification of the learning process so that negative associations with the activity, subject, topic, teacher, etc. are not formed. However, it is important to understand that the elements themselves are neither inherently good nor bad; rather, the way they are used, i.e., with what purpose, intensity, and periodicity, determines how they will affect the game-based process and individuals' long-term results or involvement.

Sofia Schöbel and Andreas Janson created their own taxonomy with the aim of facilitating the gamification of information systems using design thinking (Schöbel & Janson, 2018). The authors brought up the question of the taxonomy's adaptability to different audiences, which is relevant in the context of this work. Manuel Schmidt-Kraepelin and colleagues also developed a taxonomy of gamification that explains and helps to evaluate gamification-related concepts contained in health apps (Schmidt-Kraepelin et al., 2018). It consists of 12 dimensions, each with two to three mutually exclusive characteristics. The dimensions proposed by the authors are too broad and do not provide a list of game elements that would be relevant and usable during the learning process; however, it is helpful when systematizing game-playing elements.

Martin Sillaots, Triinu Jesmin, and Andreas Rinde (2016) conducted a literature analysis within the framework of which they identified 103 game elements, which are summarized in a concept map. The map shows the central elements of the game, or the most frequently mentioned ones, and their mutual relations with other game elements. Although the list of elements is a valuable contribution to the research of gamification elements, this map is very complicated, and in the context of the learning process, it might be difficult to track and select situationally appropriate gamification elements from the available visualization. The systematization of gamification elements requires a different type of structure that explains the possibilities of using the elements, taking

into account the environment, the target audience, the purpose of gamification, and the promotion of motivation.

Another systematization of gamification elements was done at Tallinn University by David Upshall, who developed a taxonomy of gameplay elements. Upshall conducted a literature analysis, collecting the existing taxonomies of game elements and listing the mentioned game elements, as well as a network analysis, which serves as a basis for structuring game elements into four groups. The taxonomy consists of a total of 16 game elements divided into four groups, with a brief explanation for each element. The taxonomy is very simplified, but it is another collection of gameplay elements that can serve as a basis for creating a wider and more complicated systematization or taxonomy of gameplay elements.

Although all these taxonomies and lists of elements are important contributions to gamification research, none of the mentioned taxonomies are designed to be used in an educational context to create lessons. Further research reveals systematization of gamification elements so that their implementation into the learning environment would be more efficient.

Each game is based on a specific, pre-determined **goal** that must be achieved during the game. This element of the game differs from play. During the game, it is possible to set one big, long-term goal that the player must achieve, which is the goal of the game to be achieved. It is also possible to include several small goals that prepare the player for achieving the big goal and help maintain their attention and interest during the game (Kapp, 2012; Ibrahim et al., 2021; Toda et al., 2019).

The game sets out the **tasks** that the player must complete in order to achieve the set goal of the game (Schöbel et al., 2020). During the execution of tasks, restrictions are set that must be observed in order to achieve the goal. The game by design is a set of rules. The **rules** inform players about how many players can participate in the game, what tasks need to be completed, how many points can be earned for completing certain tasks, what actions are forbidden, and what the consequences of not following the rules are (Kapp, 2012).

Strategy assumes that the player will develop a plan of action to accomplish the task more successfully or to suffer the least possible losses (Butler, 2014). This implies greater involvement in the activities to be performed, thus the sense of autonomy can be higher, which, in turn, can also increase the possibility of internal motivation to develop.

The **story and narrative** are essential elements of the gamification. The story, as an element of the game, makes sense of the game experience and enhances it. It allows the player to feel more involved in the game, stimulates and engages the imagination, and allows a personal experience and perspective (Kapp, 2012). This element of the game can also be used in situations where it is necessary to enhance the player's experience and form associations to facilitate information processing and recollection. The story needs heroes, developments, little tension, and resolution (Panis et al., 2020; Toda et al., 2019).

The **narration** differs from the story, or the narrative, in that it accompanies the player during the game, providing feedback and telling them about the progress of the game

and further events using voice or text (Ibrahim et al., 2021; Toda et al., 2019). If the player encounters the narrative of the game at the beginning and understands what awaits them, the narration helps them to move and understand the game.

Games involve **challenges** provided by either game tasks or other players (Ibrahim et al., 2021). Kapp (2012) mentions that the game system can be one of the sources that make the game challenging for its participants, which means that if a player is playing not against other players but the game itself, different elements of the game are used to make it harder, more challenging, and more exciting. If there are several players, then the challenge is to beat the others and not lose the game.

Competition is an element of the game that explains how at least two players compete with each other to achieve the same goal (Schöbel et al., 2020; Toda et al., 2019). However, it is the rules that set the boundaries for actions that may interfere with the opponent, and during the competition, players focus on their performance and how to improve it in order to beat their opponent (Kapp, 2012). The player has the opportunity to show that they are faster, smarter, and more cunning than other players. However, it is important to understand the players' personalities and interests because not all people like the competition and the pressure it creates, while others do not seem to be motivated enough without it. This has been identified by Richard Bartle's types of players and theories put forward by other authors about the different interests of players in the game (Bartle, 1996; Oliveira & Bittencourt, 2019).

Collaboration is the joint action of two or more players to accomplish tasks and achieve a common goal (Kapp, 2012; Toda et al., 2019). This is a social aspect of the game that might seem appealing to people who are not motivated by competition as an element of the game. Collaboration can also provide players with an opportunity to unite the group (Schöbel et al., 2020).

There are two types of **avatars** as game elements – **player avatars** and **system avatars**. Player avatars are used as visual representations of players that personalize their look or character, or the player can choose an alternative embodiment of their personality. System avatars are personalized images of the game that provide guidance to the player or feedback on the outcome of the game (Ibrahim et al., 2021; Panis et al., 2020; Schöbel et al., 2020). Toda's avatars are not highlighted as a separate element of the game, but the element of 'forced choice' is explained by the game's setting to choose a visual representation to start the game (2019).

A **reward or penalty system** is a powerful motivator for any activity. However, in the gaming context, positive incentives are practiced, so a system of penalties is not desirable in order to maintain a positive association with the action to be taken.

Penalties involve penalizing a player for failing or misbehaving. Penalties usually mean taking away anything the player has gained or earned during the game. However, there is also a neutral type of penalty that informs the player of incorrect actions or answers but does not deprive the player of anything.

Rewards characterize the rewarding of the user for the successful performance of certain actions (Schöbel et al., 2020). Within the game, it is possible to offer players

different types of rewards for different tasks. Remuneration is awarded for the performance of certain tasks, which are usually related to the achievement of a small or large goal. Another way to gain engagement and retention is to reward players, for example, not only for completing complex and challenging tasks but also for simple activities (Kapp, 2012). However, limiting oneself to a remuneration system that is not directly related to the objective is not advisable. The reward system includes:

(1) **points** – an element that rewards certain behaviors or the successful completion of tasks with points, summing them during the game. It is possible to award points for actions found in the rules of the game or to award additional points or surprise points for particularly successful actions during the game (Kapp, 2012; Panis et al., 2020; Schöbel et al., 2020; Toda et al., 2019; Yamani, 2021; Yaşar et al., 2020);
(2) **badges/tokens** – a visual icon that indicates a player's achievement. The badge usually visually represents the skill that was needed to complete the task or the activity that was done;
(3) **bonuses** – an element that means that the player is awarded additional rewards or recognition for the success of their action, such as extra points;
(4) **prizes/gifts** – a reward that a player receives during the game with which they can pay for other things that will be useful for the game, for example, a stronger weapon or a clue to help solve the task (Kapp, 2012; Panis et al., 2020; Schöbel et al., 2020; Yamani, 2021; Yaşar et al., 2020); and
(5) **praise/recognition** – a verbal or written appreciation from the game system or other participants.

The rules usually determine what a player gains for completing certain tasks and the point at which the points earned can be converted into some other reward or the player can choose a bonus. The reward system is an external incentive that promotes the development of external motivation; therefore, it is desirable to combine it with other elements of the game in order to achieve greater player involvement.

Feedback is an element of the game that gives the player instructions that lead them to achieve the goal. Feedback is designed to facilitate the correct performance of actions by providing information that shows how correctly or incorrectly a player has completed a task but does not predict the correct answer (Kapp, 2012; Yamani, 2021). Feedback helps to increase motivation, as the player knows what to look for, learns what mistakes have been made, and helps them to move toward the goal. The scoreboard and progress bar are two elements that provide the player with feedback on the progress of the game and its results (Ibrahim et al., 2021; Schöbel et al., 2020).

The **leaderboard** is one of the elements of the game that helps to provide feedback. Points, tokens, or other rewards earned during the game that show the players' level of achievement or knowledge can be summarized in a leaderboard that is available to all players and shows each player's achievements. Such a display of achievements on the scoreboard might only be interesting for those with the highest scores (Kapp, 2012; Panis et al., 2020; Schöbel et al., 2020; Yamani, 2021). However, not wanting to be at

the bottom of the leaderboard or wanting to get the best score can be strong motivators that echo competition as an element of the game.

The **progress bar** is another way to give the player feedback. This element is used to provide the player with information about the progress of the game, the number of points accumulated, the badges gained, the end of the game approaching, or the number of remaining lives (Schöbel et al., 2020; Toda et al., 2019). Unlike the leaderboard, the progress bar only shows the performance of one particular player without comparing it to other players' results.

Time is a powerful motivator whereby players have to solve game tasks within a set time limit. There are also various types of time manipulation within the game to keep the player's attention and increase motivation, reduce the time spent on an incorrectly completed task, increase stress, or give the player more time to complete the next task as a reward for completing a previous task (Kapp, 2012; Schöbel et al., 2020; Toda et al., 2019). In the game, manipulating time also means manipulating real-world events, squeezing time and making the process faster than could be possible in reality (Kapp, 2012).

Levels within a game are divided into two types – **game levels** and **player levels**. Game levels are designed to increase the difficulty for the player with each new level during the game. These levels integrate small goals, and achieving these and completing levels help the player to move toward the game's big goal. In turn, player levels mean that at the beginning of the game, the player can choose the appropriate level of difficulty (Kapp, 2012; Panis et al., 2020; Toda et al., 2019). Performing an action that is too simple or difficult reduces motivation, so such levels help players find the most appropriate level for their abilities and knowledge so that skills and knowledge can be balanced with the challenge of achieving the goal of the game.

The game's **aesthetics** and visual design play an important role in enhancing the player's experience. A visually appealing game helps to attract and retain the player's attention (Schöbel et al., 2020). Karl Kapp mentions that educational games, as well as serious games, often focus mainly on content and ignore the importance of aesthetics, which can make the player's gaming experience less engaging. Attractive appearance and consistent graphics are more important than making the graphics look as close to reality as possible as it immerses the player in the process (Kapp, 2012). In the case of serious games, the simulations must be close to reality, but for many, the experience of the game seems very engaging. However, the details of the game must not only be visually appealing but also include a meaning that is related to the game's objectives and goals. Toda's aesthetics are not singled out as a separate element but are called "feelings" that create new experiences through audiovisual stimuli (2019).

Repeatability means being able to make mistakes with minimal consequences, encouraging the player to explore, experiment, arouse curiosity, and promote discovery-based learning. The game can become a platform for trial and error through mistakes (Vasalou et al., 2017). The positive aspect of the game lies in the fact that it allows the player to make mistakes, understand these mistakes, and repeat actions

(Doherty et al., 2017), which is more difficult to achieve in real life and can have negative consequences because the player expects minimal consequences in the game environment (Kapp, 2012). Toda calls this element "restoration" but also explains it as an opportunity for the player to repeat the actions taken (2019).

Economics is an element of the game that explains the economic activities that take place with the currency offered by the game (Toda et al., 2019). Currency can be in the form of money or points accumulated during the game, with which players can buy weapons, necessary items, extra lives, accessories, etc.

Social pressure implies that game participants may be influenced by other game participants with comments or actions that evoke fear, shame, or some other negative emotion (Harteveld & Sutherland, 2017; Al-Smadi, 2015). Although it is mentioned in several typologies of gamers, it can lead to negations that go against the essence of the concept of gaming.

Social status is an element of the game that allows the player to brag or brag about their success in the game, status gained, or rewards to other players (Butler, 2014; Al-Smadi, 2015).

Surprise is another important element of the game. The uniform and predictable course of the game, or the result, can reduce a person's interest in the process, so unexpected turns and moments of surprise are essential to keep the player's attention and interest (Kapp, 2012; Sillaots et al., 2016).

Exploration and discoveries provide an opportunity to explore and explore the game environment, to look for hidden things, to discover something interesting or useful (Al-Smadi, 2015; Butler, 2014; Tondello et al., 2016; Holmes, et al., 2015; Tondello et al., 2017). This is a very appropriate game element for explorers (according to R. Bartle's typology) or seekers (according to BrainHex's typology).

Choice offers players a sense of autonomy in choosing levels, development scenarios, tasks, etc. (Harteveld & Sutherland, 2017; Tondello et al., 2016; Holmes et al., 2015; Al-Smadi, 2015; Butler, 2014), and autonomy is an essential prerequisite for the formation of intrinsic motivation, based on the Self-Determination Theory (Ryan & Deci, 2017).

In cases where the publication of the results may cause negations to the participants and reduce the level of motivation, it is recommended to use **anonymity** as one of the elements of the game. It allows the participant to remain anonymous in the game environment when the results are made public (Tondello et al., 2016). This can be very useful in order not to demotivate those participants who are at the bottom of the scoreboard.

Lottery is an unpredictable and unexpected element of the game, which provides prizes, points, goodies that can be used in the game environment, etc. in the round of draws. (Tondello et al., 2017). The unpredictability of this element can be hidden not only in winning the lottery, but also in the frequency of drawing the lottery, since it does not always have to be systematic or according to a certain schedule. It can help maintain attention, increase the level of motivation, if the teacher observes a loss of motivation in the audience.

Systematization of Gamification Elements

Having considered the information gathered from the works of various authors on the use of gamification elements in the context of education, the author has systematized these gamification elements in Table 2.

All elements are systematized into four dimensions (Figure 1), taking into account the meaning and impact of the elements on the gamified process and its participants, helping to better understand the role of each element in the gamified learning process and choose the right combination of elements. It should be noted that game elements can be placed into more than one dimension at the same time.

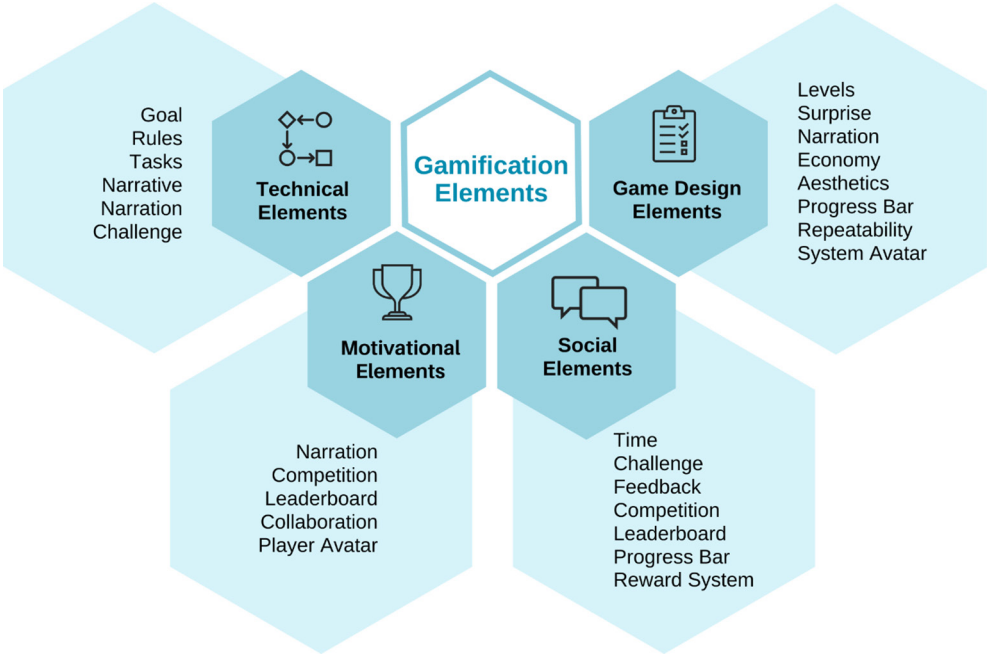

Figure 1 Systematization of Gamification Elements (author's concept)

The **game design** dimension describes the basic components on which any game is based, such as the goal, the rules, the challenges provided by the game, and the story or narrative that permeates the game and makes the experience more engaging and understandable.

Table 2 Systematization of Gamification Elements (author's concept)

	Gamification element	Description	Dimension			
			Game structure elements	Social elements	Motivational elements	Technical elements
1	**Anonymity**	Ability to remain anonymous in the game environment when results are published.		×		
2	**Aesthetics**	A visually appealing game helps to attract and retain the player's attention				×
3	**Badge**	A visual icon that indicates a player's achievement, a skill required to complete a task, or an action performed			×	
4	**Bonus**	Additional rewards or recognition for the success of an action			×	
5	**Challenge**	Can be provided by either the game's tasks or other players	×		×	
6	**Choice**	Offers a sense of autonomy in choosing levels, development scenarios, tasks, etc.	×			
7	**Collaboration**	The joint action of players to complete tasks and achieve a common goal		×		
8	**Competition**	At least two players competing against each other to reach the same goal		×	×	
9	**Discoveries**	Ability to expolore, search, discover something interesting or useful in the game environment			×	
10	**Economy**	Economic activities performed during the game with the currency offered by the game				×
11	**Feedback**	Indications of correct or incorrect actions that lead the player to achieve the goal of the game			×	
12	**Goal**	Predefined goal to be achieved during the game	×			
13	**Leaderboard**	Players' levels of achievement or knowledge are summarized and reflected on the leaderboard		×	×	×
14	**Levels**	At the beginning of the game, the player can choose the level of difficulty that suits them best; alternatively, the difficulty can increase with each new game level				×
15	**Lottery**	Unpredictable and unexpected element of the game that provides some prizes, points, goodies that can be used in the game environment, etc.				×
16	**Narration**	Gives the player feedback during the game, informs them about the progress of the game, and develops events using voice or text		×		×
17	**Narrative**	Makes sense of the game experience and enhances it	×			
18	**Player avatar**	Visual representation of the player		×		

	Gamification element	Description	Dimension			
			Game structure elements	Social elements	Motivational elements	Technical elements
19	**Points**	Rewards certain behaviors or successful tasks and are summed during the game			×	
20	**Praise**	Verbal or written praise from the game system or other participants			×	
21	**Prize, gift**	Rewards that a player receives during the game with which they can pay for or purchase other things useful for the game			×	
22	**Progress bar**	Provides information about the progress of the game, points earned, badges gained, the end of the game approaching, or lives left			×	×
23	**Repeatability**	The ability to make mistakes and try again in a safe environment				×
24	**Reward system**	Reward or penalty system as a motivator that includes points, badges, bonuses, prizes, virtual gifts, rewards, praise			×	
25	**Rules**	Restrictions imposed in order to achieve the goal	×			
26	**System avatar**	Visual representation of the system (game)				×
27	**Social pressure**	Participants of the game may be influenced by other participants with comments, causing a feeling of fear or shame		×		
28	**Social status**	Allows the player to be proud and brag about success, status or awards to others		×		
29	**Strategy**	It is expected for the player to develop a plan of action to more successfully complete a task or suffer as little damage as possible in the game environment			×	
30	**Surprise**	Unexpected twists and moments of surprise help to keep the player's attention and interest				×
31	**Tasks**	Steps to take to reach the set goal of the game	×			
32	**Time**	Time manipulation keeps the player focused and motivated			×	

Social elements are related to the participant's personal goal and level of involvement in the game experience, which is also determined by Bartle's typology of players. This means that the elements of the game that can be used to play the process are a form of competition or cooperation with other participants in the game or the game itself. Avatars can also be added to the social element dimension, allowing the player to create a personalized visual representation or choose an alternative embodiment of their personality if they want to distance or isolate themselves.

Motivational elements are used to achieve player involvement, task completion, and goal achievement in a short period of time. These include time manipulation, external incentives, the reward system, the scoreboard, and the progress bar. The elements of challenge and competition also fall into this dimension.

Technical elements in turn, complement the game experience and support motivation. These include levels, aesthetics, and the ability to make mistakes and repeat actions to improve knowledge and skills. The scoreboard, which shows the player's individual game score, the system avatar, and the narration that gives the player instructions and feedback are also included in the technical element dimension.

Conclusions

This research has analyzed gamification elements mentioned and gathered by various authors and systematized them so they can be used in the learning process when developing gamification strategies. Table 2 provides descriptions of each gamification element. It also gives information about which element belongs to which group, which helps to determine the purpose of each gamification element, better understand the role of each element in the gamified learning process, and choose the right combination of elements appropriate for a particular situation to fulfill the goals developed when creating a gamification strategy.

This systematization of gamification elements can be used when creating a gamification strategy and choosing appropriate game-based tools or developing one if there are none available that suit the situation or do not provide the desired gamification elements.

When creating a gamification strategy, one should first select game structure elements, as these form the core of the gamified learning process. Afterward, various social, motivational, and technical elements can be combined to enhance the learning experience.

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NEURAL NETWORKS IN IDENTIFYING TEACHERS' SELF-PERCEIVED COMPETENCIES IN DIGITAL GAMIFICATION

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ABSTRACT

In the last ten years, the integration of information and communication technology (ICT) into education has become more and more prevalent, as ICT has become an indispensable part of everyday educational life. With the development of ICT, the number of teaching strategies involving the use of ICT has also increased. One of the latest strategies for the use of ICT in education is digital gamification. ICT can serve as a technological basis for the creation and further development of gamification experiences. The development of new technologies and teaching strategies implies the development of teacher competencies for the application of teaching methods based on the use of ICT, including digital gamification. The application of gamification in education brings numerous benefits and is used for various purposes, from influencing student motivation and engagement, improving educational outcomes and creating interactive learning opportunities, to the application of gamification in student evaluation. With the aim of better understanding teachers' self-assessed competencies in the use of digital gamification, this paper focuses on the association between these assessments and their overall ICT use and gamification in student evaluation with other demographic variables. The aim was to develop a successful neural network model using these variables that is able to identify the teachers with a high level of competence. The best neural network model obtained had an overall classification accuracy of 75% and was able to identify all teachers with a high self-assessed level of competence in the use of digital gamification in the education of students.

Keywords: *digital gamification, information and communication technology, neural networks, self-assessments, teachers.*

Introduction

Accelerated development of information and communication technologies (ICT) is rapidly changing all spheres of life, including education, resulting in broader opportunities for the application of ICT in education. Numerous governments have made

significant investments in the process of providing educational institutions with ICT devices and resources which has led to a rapid development of ICT-related tools in educational practices (Fernández-Gutiérrez et al., 2020). Consequently, new educational practices were developed that included methods and strategies based on ICT tools. The global shift towards a digital economy and society necessitates modifications in the technology employed by educators in schools and educational institutions to train modern teachers (Desnenko et al., 2021). Ensuring equitable and high-quality learning requires teachers to possess the necessary competencies for effectively integrating ICT into their professional practice, enabling transformative pedagogy and empowering students to develop essential Knowledge Society skills such as critical thinking, innovation, problem-solving, collaboration, and socio-emotional abilities (UNESCO, 2018). Unlike traditional approaches, which put the teacher at the focus of the lesson, modern teaching strategies put the student at the centre. While the instructor serves as his guide and partner, the student actively participates in the learning process by gathering, considering, locating, and analysing information. Gamification, described as "the use of elements of play in a non-playing context" (Deterding et al., 2011, p. 10), emerges in the context of contemporary approaches to education. With more and more devices having digital technology installed, it is possible to implement the gamification method by using a variety of digital tools to improve student engagement and motivation. In addition to the fact that gamification in education increases student motivation and engagement (Rozhenko et al., 2021; Royas-López et al., 2019; Barna & Fodor, 2018), it can enhance interaction (Kepceoglu, 2019; Barna & Fodor, 2018) and achivement (Kepceoglu, 2019; Lopes et al., 2019) but also support student's social, emotional or cognitive dimensions (Domínguez, et al., 2013). As reported by Mårell-Olsson (2022) it takes a variety of skills to prepare teachers to design gamification activities that effectively encourage and engage students while improving their learning. It requires specialized knowledge in creating engaging activities that incorporate learning material from a variety of areas and the flexibility to adjust to organizational changes. This preparedness entails modifications to educational practices that facilitate collaborative design processes in addition to the development of personal competency. Teachers need to have a supportive environment that encourages innovation in teaching methods in addition to their own areas of expertise in order to execute digitalized gamification activities using contemporary technologies (Mårell-Olsson, 2022). Gamification can be applicable in a variety of educational situations, from learning, through monitoring student progress to its application in student evaluation. According Menezes & Bortoll (2016) there are three forms of evaluation: formative, summative, and diagnostic, while Sudakova et al. (2022) specifies four types of assessments: formative, summative, diagnostic and evaluative. It's important to recognize that formative and summative evaluations serve different assessment purposes, rather than simply being different evaluation types or formats, and in certain situations, the same type of data can be used both formatively and summatively (Dolin et al., 2018). It is widely accepted that feedback is a crucial component of a broader formative assessment framework (Wiliam, 2018, as cited in Morris, Perry, & Wardle, 2021). Both

feedback and formative assessment gathering and offering details regarding a student's present performance or understanding with the goal of improving their learning (Morris, Perry, & Wardle, 2021). The primary objective of summative assessment is often to provide a comprehensive evaluation of students' learning progress at a specific point in time, rather than to influence their continuing learning, as is the case with formative assessment (Dolin, et al., 2018). Given that the success of gamification may depend on context (Hamari, Koivisto, & Sarsa, 2014; Hamari, 2013; Thom, Millen, & DiMicco, 2012), the role of the teacher and his competences in the application of gamification is crucial.

Literature preview

According to the available literature, a smaller number of studies focused on the research of teacher competences for the application of gamification.

Nousiainen, et al. (2018) conducted an analysis on the specific competences required by teachers while employing game-based pedagogy, which encompasses the utilization of educational games or entertainment games, learning through game creation, and the implementation of gamification in the learning process. The results revealed four primary competence areas: pedagogical, technological, collaborative, and creative (Nousiainen et al., 2018).

Hanifah at al. (2021) investigated the application of the gamification strategy in the context of teacher education and training sessions. The study primarily cantered on three key variables: gamification knowledge, gamification skills, and the utilization of gamification among Geography trainee teachers. Based on the findings, it can be concluded that the degree of knowledge regarding the gamification approach is rather high. Additionally, the skill level and the level of use are also quite high. In conclusion, the findings indicate that trainee teachers frequently employ the gamification technique when imparting knowledge and facilitating learning.

The scientific community in the last few years is far more interested in studying the use of gamification in student assessments. The performed studies focused on traditional assessment model vs. game-based mode comparison (Areed et al., 2021; Sanchezm et al., 2020; Zainuddin et al., 2020; Sánchez-Rivas et al., 2019), how students with reading difficulties viewed and used a gamified assessment (Reed et al., 2019), importance of online gamification flip learning using gamified formative assessment (Zainuddin et al., 2021), using assessment tools such as Quizizz (Ccoa et al., 2023; Handoko et al., 2021; Prestiadi et al., 2021; Orhan Göksün & Gürsoy, 2019), Kahoot! (Jones et al., 2019; Orhan Göksün & Gürsoy, 2019) or others game-based assessment tools (Jo et al., 2021). Some authors focused on analysing negative impact of gamified assessment activities (Kwon & Özpolat, 2021).

Several studies have indicated that the implementation of gamification for assessment purposes has led to enhanced academic performance (Jones et al., 2019; Orhan Göksün & Gürsoy, 2019), increased student engagement (Orhan Göksün & Gürsoy, 2019), enhanced learning motivation (Ccoa et al., 2023; Zainuddin et al., 2020; Jo et al., 2021),

reduced levels of stress (Ccoa et al., 2023), alleviated the learning load (Jo et al., 2021). Also, gamification might yield positive outcomes in the short term, and demonstrated that interpersonal differences may have an impact on those benefits (Sanchez et al., 2020). The results demonstrated that taking the gamified online quiz was more successful than taking traditional paper quizzes (Areed et al., 2021; Sánchez-Rivas et al., 2019). They are more effective in formative assessment when it comes to evaluating the students' learning outcomes (Areed et al., 2021). Also, most students exhibit a preference for Quizizz as an assessment tool when compared to paper and Google Forms (Handoko et al., 2021). Learner engagement has been positively impacted by formative assessments that use online flipped learning strategies and gamified learning (Zainuddin et al., 2021). The findings of the study on the utilization of Quizizz gamification as an online assessment tool indicate that it can serve as an effective means of evaluating students (Prestiadi et al., 2021). Additionally, it offers a more enjoyable and visually appealing assessment experience (Prestiadi et al., 2021). Students preferred Kahoot and Quizizz apps in the classroom for their need for motivation and rapid feedback on test performance (Orhan Göksün & Gürsoy, 2019). Compared to Kahoot, Quizizz proved to be less successful for educational activities (Orhan Göksün & Gürsoy, 2019). Students with reading difficulties was fully engaged in the gamified reading assessment and were motivated by activities that provide a suitable level of challenge without being excessively frustrating (Reed et al., 2019). In contrast, Kwon and Özpolat (2021) discovered that the implementation of gamification in assessment activities led to a notable decline in content knowledge, contentment, and overall course experience.

Despite the contradictory results, most studies show that gamified quizzes can be successfully applied in student assessment and can serve as an alternative way of evaluating students. According to the available literature, there is no research that examines the association between teacher competencies and the application of gamification in student evaluation, this paper focuses on research into this topic. With the aim of better understanding teachers' self-assessed competencies in the use of digital gamification, this paper focuses on the association between these assessments and their overall ICT use and gamification in student evaluation with other demographic variables. The aim was to develop a successful neural network model using these variables that is able to identify the teachers with a high level of competence.

Methodology

The study was conducted online during the academic year 2022/2023. The social network Facebook was used as a research tool to collect data from teachers from different parts of Croatia. An online questionnaire was created, which consisted of three blocks of questions to collect general demographic data (4 variables), data on formative and summative assessment of students (48 variables), data on the frequency of use of ICT in teaching, its usefulness and self-assessed competences (12 variables). The first block of questions was used to collect data on gender, age, the county in which the participants

work at the school and the area (rural or urban) in which the school is located. The second block was designed to find out whether the participants use digital tools for formative or summative assessment of students and which digital tools they have used for these purposes so far. For these purposes, participants could indicate which of the 22 tools offered they use, indicate that they have not used any of the tools offered, or give the name of another tool they have used. The last block of questions dealt with the frequency with which the participants use information and communication technology in teaching, its use in the assessment of students (8 Likert scale were used for this), whether the participants consider it useful in the teaching process and how they themselves assess their competencies in the use of information and communication technology and digital gamification in teaching.

A total of 159 participants took part in this study. The majority of them were female (88.54%) with the mean age of 40.5 years (SD = 9.54). The participants came from all 21 Croatian counties (see Figure 1), with most of them coming from Vukovar – Srijem County (19.10%) and almost equal numbers of respondents came from rural (49.68%) and urban (50.32%) areas.

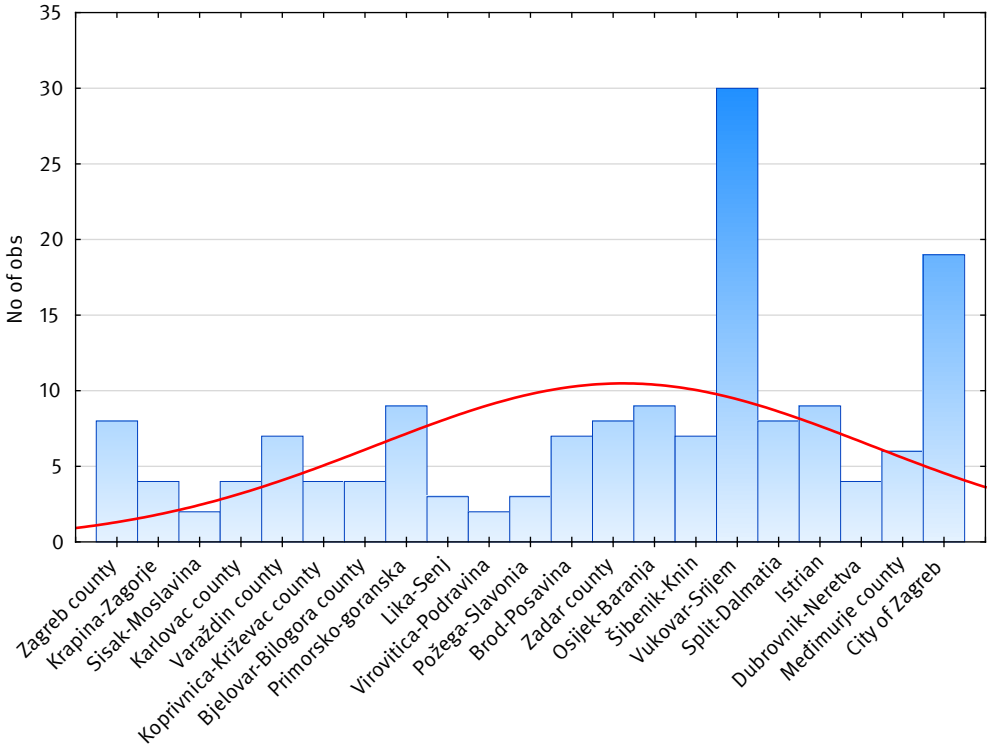

Figure 1 Number of participants according to the county in which the school in which the participants are employed is located

Results

The majority of participants indicated that they use digital tools for formative assessment of students (85.35%) and 64.97% of them indicated that they also use digital tools for summative assessment. When asked which digital tool participants use for formative assessment of students, most indicated they use Wordwall (75.80%), 71.97% indicated Kahoot, and more than two-thirds of participants (69.43%) indicated they use Microsoft Office tools for formative assessment. Although these tools were also most commonly used by participants for summative assessments, a lower percentage of them indicated that they used these tools for this purpose. Thus, 52.87% of participants stated that they use Microsoft Office tools for this type of assessment, 33.76% Wordwall and 31.85% Kahoot.

Most of the participants (42.67%) stated that they use ICT in class every day and only 2.55% stated that they do not use ICT in class at all. Furthermore, the majority of participants (91.08%) consider ICT in the classroom to be useful, most of them (48.41%) self-assessed their level of competence in using ICT in the classroom as advanced but most of the participants (43.31%) self-assessed their level of competence in using digital gamification in the classroom as basic.

In addition, most participants often use digital tools for formative assessment of students (45.86%) as well as summative assessment (33.76%), sometimes use elements of digital gamification for formative assessment (31.85%) and never use elements of digital gamification for summative assessment (25.48%). They often use feedback obtained through the use of ICT in assessment (33.76%), feedback obtained through the use of gamification in assessment (26.11%) and feedback obtained with ICT and gamification to analyze the achievement of educational outcomes (36.31%) and to adapt and plan lessons (34.40%).

The $\chi 2$-association test showed that there was a statistically significant association at the 0.05 level of significance between the self-reported level of competence in the use of digital gamification in teaching and: the use of digital tools for formative assessment ($\chi(3) = 21.78$, $p = .000$), summative assessment ($\chi(3) = 8.52$, $p = .036$), some tools previously used for formative assessment (MS Office tools ($\chi(3) = 23.35$, $p = .000$), BookWidgets ($\chi(3) = 17.80$, $p = .000$), Edmodo ($\chi(3) = 9.66$, $p = .022$), GoogleClassroom ($\chi(3) = 11.19$, $p = .011$), Google Forms ($\chi(3) = 35.25$, $p = .000$), Kahoot ($\chi(3) = 27.87$, $p = .000$), LearningApps ($\chi(3) = 12.25$, $p = .007$)), some tools previously used for summative assessment (MS Office tools ($\chi(3) = 14.30$, $p = . 003$), Edmodo ($\chi(3) = 10.12$, $p = .02$), Google Forms ($\chi(3) = 20.18$, $p = .000$), Kahoot ($\chi(3) = 11.57$, $p = .009$), Quizlet ($\chi(3) = 10.95$, $p = .012$)), no use of summative assessment tools ($\chi(3) = 8.11$, $p = .0.44$), self-assessment of how often they use ICT tools in the classroom ($\chi(12) = 24.41$, $p = .018$), self-assessed level of competence in using ICT in teaching ($\chi(9) = 103.59$, $p = .000$) and all 8 variables used to assess the frequency of use of information and communication technology and gamification in student assessment (use of digital tools for formative assessment of students ($\chi(12) = 68.15$, $p = .000$), use of digital tools for summative assessment ($\chi(12) = 46.89$,

p = .000), use of elements of digital gamification for formative assessment ($\chi(12) = 77.24$, p = .000), use of elements of digital gamification for summative assessment ($\chi(12) = 48.65$, p = .000), use of feedback obtained through the use of ICT in assessment ($\chi(12) = 32.16$, p = .000), use of feedback obtained through the use of gamification in assessment ($\chi(12) = 51.27$, p = .000), use of feedback obtained with ICT and gamification to analyze the achievement of educational outcomes ($\chi(12) = 39.59$, p = .000) and to adapt and plan lessons ($\chi(12) = 43.27$, p = .000).

Statistica 13 software was used to model the neural networks and the random sampling method was applied. In addition, the sample was split up into three subsamples: a test (20%), a validation (10%), and a training (70%). Binary variable was the output variable in which the teachers with high self-competence in the use of digital gamification were assigned to category 1 and the other participants to category 0. All variables that showed a statistically significant association with the selected output variable of the NN model were removed from the modelling and a total of 38 variables were used for this purpose.

The type of NN chosen was a multilayer perceptron, the minimum number of hidden units was set to 8 and the maximum to 25, the error functions used were the sum of squares and the cross entropy, the activation functions used were the logistic, the hyperbolic tangent, the exponential and the sine function. In addition, 200 neural networks were modelled. The best NN model was obtained with the exponential activation function. This model had an overall accuracy of 75% and was able to recognize 60% of teachers who did not have high competence in the use of digital gamification and all of those who did.

Conclusion

This paper examines the association between teachers' self-assessed digital gamification competencies and their overall use of ICT in student evaluation with other demographic variables to better understand them. Results showed statistically significant association between several variables, and we successfully developed a neural network model. Detecting teachers with a high or low level of self-assessment of competence in digital gamification is important for several reasons. Identifying teachers with a high degree of self-assessment enables the identification of best practices in the use of digital gamification in teaching. This may result in the development of a model for training other teachers to improve their skills in this area. Teachers with low self-esteem may need additional support and resources to improve their skills in using digital gamification. Using digital gamification can have a positive impact on student engagement and motivation, as well as on their learning outcomes. Identifying teachers with high levels of self-esteem allows the promotion of these practices that can improve learning outcomes.

Like most research, ours also has several limitations which are primarily related to the size of the sample, but also the greater representation of female respondents. Therefore, future research should include a larger number of respondents, but also a more

balanced gender ratio. Furthermore, it would be good to expand the research to more countries in the surrounding area.

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CURRENT PERSPECTIVES ON TEACHER PROFESSIONAL IDENTITY RESEARCH: A SYSTEMATIC REVIEW

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ABSTRACT

This systematic review explores recent trends in teacher professional identity (TPI) research and compares them with the findings from Beijaard et al.'s (2004) literature review on TPI studies. The conceptualization of TPI, as well as the purpose of studies done by different scholars is explored in the review. Taylor & Francis, Sage, and Emerald databases chosen to select relevant empirical work focusing on general education pre-service, in-service, and student teachers. Literature reviews and studies pertaining to higher education and early childhood education teachers were excluded. Thus, 66 articles were analyzed in this review.

The findings reveal that authors define and conceptualize TPI variously, some focusing on what TPI is, while others on the aspects that TPI includes, or the process of developing or constructing TPI. The definitions highlight different aspects of TPI depending on the focus of the respective study. There seems to be an agreement that TPI is fluid and constructed throughout one's career, it is contextual, it encompasses sub-identities, and it is connected with agency. In the review, the author proposes another lens for analyzing TPI – intersectionality.

From the analysis of the studies' aims, five themes emerged: (1) PI construction; (2) identity tensions; (3) influential factors; (4) PI development strategy; (5) theory development. Compared to the 2004 review, it was concluded that contextual factors are more widely studied in TPI research nowadays. This review highlights the definitions and themes in current TPI research. As a result, it serves as a reference point for future research, offering insights into the evolving landscape of teacher professional identity research.

Keywords: *general education teachers, professional tensions, student teachers, systematic review, teacher professional identity, teacher education.*

Introduction

Over the last 20 years, teacher professional identity (TPI) has established itself as a relevant area of research that is frequently addressed in studies about teachers. Both smaller-scale studies, which the author explores in this review, and large-scale papers published by the OECD (e.g. Suarez & McGrath, 2022) or UNESCO (e.g. UNESCO, 2024)

recognize TPI as an important factor in teacher role-orientation, job satisfaction and retention, and, consequently, the educational outcomes of students.

The Latvian professional standard for teachers (The State Education Content Centre (VISC), 2018) determines that teachers must evaluate their performance and professional mastery, and plan their professional development accordingly. This includes planning one's career and professional development by critically reflecting on one's pedagogical work, as well as recognizing the social role of teachers. The standard also outlines the need for teachers to be able to assess their health (including mental health) and proactively engage in health-promoting activities. Kerby (1991) wrote that the need to reflect on one's identity may not present itself until one is faced with a problem or a "possible or impending future" (p. 38). Likewise, some teachers may not be inclined to ponder about their professional identity – who they are as teachers and who they wish to become (Flores & Day, 2006) – unless they encounter identity tensions. Although tensions and crises are a natural part of any career and can lead to growth and increase resilience (Golzar et al., 2022; Russo-Netzer & Shoshani, 2019), they can also contribute to loss of confidence in self and one's teaching practices (Palacios et al., 2020), as well as burnout.

Focus of the review

Teachers' values and beliefs about teaching and education in general are part of their professional identities (Flores & Day, 2006). If professional identity is viewed as the lens or framework through which teachers make sense of their professional lives (Liu & Sammons, 2022; Szocik et al., 2021), agency is the force that allows teachers to enact their values and beliefs to "transform the context" (Beauchamp & Thomas, 2009, p. 183). TPI, therefore, enables teachers to become aware of their professional development needs and assess how those needs interact with their values, as well as the political and social context in education (Wray & Richmond, 2018).

Different scholars have attempted to make sense of the concept of TPI in existing studies (e.g. Beauchamp & Thomas, 2009; Beijaard et al., 2004) or offer new ways to look at identity in educational research (e.g. Sfard & Prusak, 2005; Gee, 2001). As a result of one of these attempts, in 2004, Beijaard et al. published a literature review of TPI studies. At that time, professional identity was a novel field of educational research and the authors sought to clarify how researchers defined TPI, what it entailed, as well as highlight the challenges in TPI research (Beijaard et al., 2004). As the conclusions of Beijaard et al.'s review have remained relevant and are referenced in studies about TPI to this day (e.g. McCaw, 2023; Nickel & Crosby, 2022; Hahl, 2021 etc.), this review revisits Beijaard et al.'s findings to determine if the field of TPI research has changed.

Purpose

There is a lack of reviews that capture the recent trends in TPI studies, therefore, this review aims to address this gap by exploring the current trends in TPI research, focusing on studies published since 2017 across three academic databases. The novelty of this review lies in its exploration of the latest trends and methodologies in the field of TPI.

In this systematic review, the author focuses on two research questions:

1. How is teacher professional identity defined in studies?
2. What are the current trends of TPI research?

The first question allows to see how TPI is conceptualized and how terminology is addressed by different researchers. The second question sheds light on the aspects of TPI that researchers have deemed important and their implications.

To guide the systematic review, the Critical Appraisal Skills Programme (CASP) checklist (2018) for systematic reviews was followed. Although the checklist was developed for systematic reviews in health care, the questions were equally relevant for an educational setting. In the next section, the literature selection and screening process is described, which is then followed by an analysis and discussion of the results. In the conclusion, the limitations are discussed and the answers to the research questions are proposed.

Methodology

The literature selection process (see Figure 1) for the review was done between July and August of 2023. Emerald, Sage Journals, and Taylor & Francis were selected for the review. These specific databases were chosen because the library of the University of Latvia offers free access to the content of the databases and due to the convenience of the search engines and filtering. Only studies published in English were included in this review.

On Emerald, the phrase *teacher professional identity* was searched. The initial hits were limited to full-access articles published since 2017. On Sage Journals and Taylor & Francis, keywords *teacher professional identity, professional identity*, and *teacher identity* were searched in the *abstract* field. The results were then narrowed down to only include full-access articles published since 2017. On Sage and Taylor & Francis, advanced search was used, whereas basic search was used on Emerald, which lead to a large number (n = 2047) of results, most of which were rejected.

After the keyword search, abstracts were reviewed to identify studies about pre-service and in-service general education teachers, as well as special education teachers working in general education settings. Studies about teacher educators, early childhood teachers, and school management were excluded from further review. One study was excluded, as it did not have a literature review and, therefore, did not have the information that the author was looking for. Following the abstract review, four sections of the relevant articles – introduction, literature review (if applicable), methodology, and results, were scanned to determine the relevance of each article. In the final review round, 29 articles from Emerald, 5 from Sage Journals, and 66 from Taylor & Francis were selected for full reads. 66 articles were determined relevant to the scope of this literature review.

In the papers selected for full reads, the author identified the definition of TPI and the aim or research question of the study. As suggested by the CASP (2018) checklist, the results of the studies, the research design (if mentioned) and data collection methods that were used were also noted.

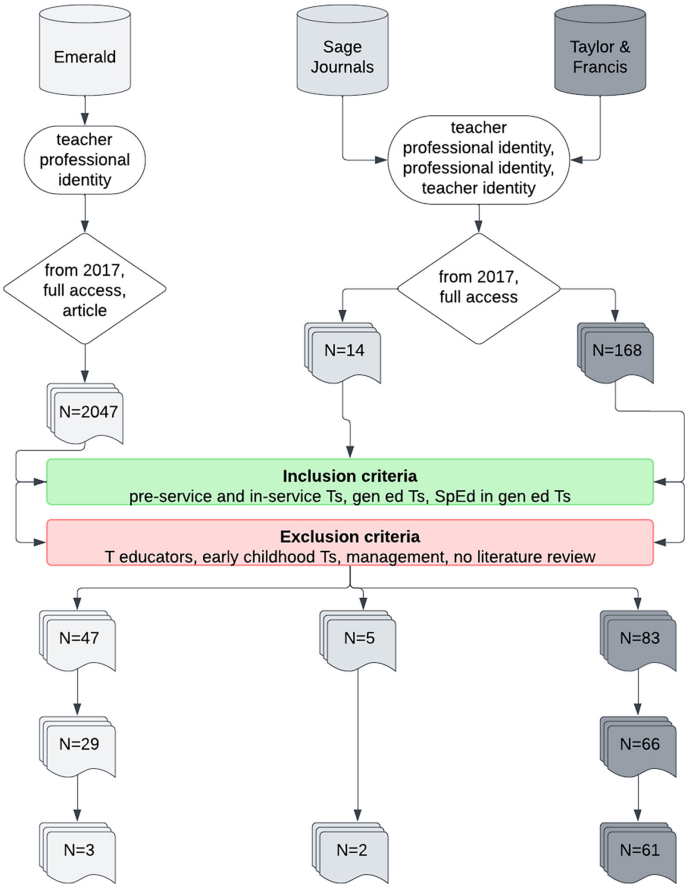

Figure 1 Literature Screening and Selection Flowchart

Within the introductions and literature review sections of the papers, definitions or descriptions of TPI were identified. To analyze them, the author looked for similarities in phrasing and key words. The purpose was analyzed and coded according to theme to determine what scholars' current focuses in TPI research are. The methodology of the studies allowed to better understand how researchers address their study questions.

Results

Figure 2 illustrates a summary of the definitions of TPI included in the list of papers that were analyzed. In three articles, there was no definition of TPI. The definitions of TPI could be roughly categorized in four ways: (1) explaining what TPI *is* (a reflection of professional self, the ideal self, analytic lens etc.); (2) exploring what TPI *is like* (fluid, socially legitimated etc.); (3) defining what TPI *is comprised of* (lived experiences, sub-identities, values etc.); (4) exploring how TPI *is developed* or *constructed* and what *impacts* TPI (interpretation and reinterpretation of self, social, political, cultural forces etc.).

Figure 2 Summary of descriptions or definitions of TPI in the articles

Author(s), year	What TPI is
Moghadam et al., 2019	dynamic, multi-dimensional, impacted by personal, social, cultural factors
Poole, 2019	includes personal, professional, cross-cultural experiences
El Masry & Alzaanin, 2021	dynamic, impacted by inter- and intrapersonal factors; includes one's values, beliefs, motivations, experiences; "seeing" oneself as a teacher
Virta, et al., 2023	includes one's values, beliefs, goals, competencies etc.; TPI is constructed by becoming a teacher
Poom-Valickis & Löfström, 2019	teacher as expert/professional (subject, pedagogical, socially interacting)
Tokoz Goktepe & Kunt, 2023	dynamic, multi-dimensional, developed by self(re)interpretation
Valdés-Sánchez & Espinet, 2020	professional self-image, includes perceived and enacted roles, personal histories, values, beliefs
Ayinselya, 2020	dynamic, interpretable, influenced by personal factors and practice
Shen et al., 2024	includes teachers' ways of knowing, doing, and being; impacted by social, cultural, educational contexts
Smetana & Kushki, 2023	a reflection of what a teacher is, who they are becoming and who they want to be
Hahl, 2021	ongoing, includes knowledge, beliefs, attitudes etc. Developed by self(re)interpretation, requires agency
Stenberg & Maaranen, 2020	ongoing, contextual, comprised of multiple identities
Clarke et al., 2023	comprised of multiple identities
Ruohotie-Lyhty & Pitkänen-Huhta, 2022	agentive
Nickel & Zimmer, 2019	shaped by contextual and personal factors, reflection on experiences
Cobb, et al., 2018	ongoing, socially legitimated, contextual; TPI is constructed within community of practice
Molander & Hamza, 2018	TPI is constructed within community of practice; participation in teacher education (TE) means constructing TPI
Magen-Nagar & Steinberger, 2022	dynamic structure of intra- and interpersonal factors; constructed before TE, during, and after (throughout career)
Schellings et al., 2023	a reflection of what a teacher is, who they are becoming and who they want to be
Dahl, 2020	identification with the idea of becoming a teacher
Wray & Richmond, 2018	values; positioning of oneself within communities
Sheybani et al., 2019	beliefs, attitudes, motives, experiences through which one identifies; future-orientation
Nickel & Crosby, 2022	dynamic, comprised of multiple identities, requires agency
Moore et al., 2020	ongoing, developed by self(re)interpretation; influenced by personal and social factors
Zhu et al., 2022	ideal, aspirational self

Author(s), year	What TPI is
Karousiou et al., 2019	evolving, dynamic, contextual
Liu & Li, 202	dynamic, relational; constructed in relation to others, including outside the classroom
Dvir & Schatz-Oppenheimer, 2020	beliefs, goals; perceived compatibility with profession; constructed through tensions
Gu, 2018	lived experiences, cultural background; influenced by cultural, social, political processes
Muchnik-Rozanov & Tsybulsky, 2021	basis of meaning and decision making; practice (learning) as construction of identity
Kudaibergenov & Lee, 2022	dynamic, ongoing, developed by self(re)interpretation, contextual
Huang & Wang, 2024	self-image regarding one's professional mastery; fluid, multifaceted, contextual, includes educational beliefs
Wang et al., 2022	self-image, identification as part of a group; a reflection of what a teacher is, who they are becoming and who they want to be
Ostad et al., 2019	social construct, fluid; includes personal and professional experiences, communal context, organizational culture
Shiyama, 2021	beliefs and meanings attributed to teachers, fluid; includes beliefs, practices, lived experiences, requires agency
Blackmore et al., 2018	TPI is constructed by sharing experiences, exposure to teaching
Garner & Kaplan, 2019	includes subject and pedagogical knowledge, competencies, values, view of self, interests, goals, beliefs etc.
Nguyen & Loughland, 2018	interrelated, continuous, social
Brunetti & Marston, 2018	ongoing, contextual, agentive
Mehdizadeh et al., 2024	analytic lens through which to evaluate self, solve problems
Fanshawe et al., 2023	values, beliefs; who one is and aspires to be
Li & Lai, 2022	meanings attached to self by self and others
Golzar et al., 2022	how one understands the world, constructs relationships across time and space, future-orientation
Lambert & Gray, 2020	complex, multifaceted; personal, social, structural aspects of being a teacher; behavior according to belief
Wang, 2021	multifaceted, complex, fluid; choice to be agentive or passive
Lo & To, 2023	constructed by self-efficacy
Romylos, 2021	interaction between self, social, political contexts
Chien, 2020	n/a
Sherman & Teemant, 2023	dynamic, socially situated, agentive; TPI is not a singular core identity, but comprised of multiple identities
Yilmaz, et al., 2017	group membership, role membership; construction of TPI means developing a personal framework of meaning
Russo-Netzer & Shoshani, 2019	impacted by personal experiences, schooling experiences, role and school culture
Han, 2021	perception of self as a teacher; includes beliefs, attitudes, enables interaction with others

Author(s), year	What TPI is
González-Calvo et al., 2021	impacted by personal experiences, social, cultural, institutional context
Iranzo-García et al., 2020	multifaceted, non-linear; impacted by self, social, professional environment
Szocik et al., 2021	the lens through which to engage with current issues
McCaw, 2023	ongoing, embodied, enacted; comprised of multiple identities that are impacted by power and agency
Nigar et al., 2024	process of becoming, dynamic, constantly (re)negotiated
Khalaf, 2021	perceptions of the profession and future role
Venegas-Weber, 2018	n/a
Liu & Sammons, 2022	how one sees oneself, the profession; lens for negotiating values and the social and cultural conditions
Aliakbari & Sadeghi, 2022	self-image; role perceptions; self-evaluation; self as part of occupational group; commitment to professional practices
Xiang, 2021	includes cognition, emotions, social practices, professional lives, roles, responsibilities, purpose, sense of confidence etc.; how teachers distinguish themselves from different groups of professionals
Parmigiani et al., 2023	complex, multidimensional, learning process
Chávez et al., 2023	knowledge, skills, abilities, understanding of role; requires agency
Palacios et al., 2020	reflexivity, self-inspection; exists within context of structural powers
Muchnik-Rozanov & Tsybulsky, 2019	n/a

Within the purposes of the studies, the author was able to identify five themes (see Figure 3), however, some of the studies covered more than one of the themes, as illustrated by the numbers above the lines.

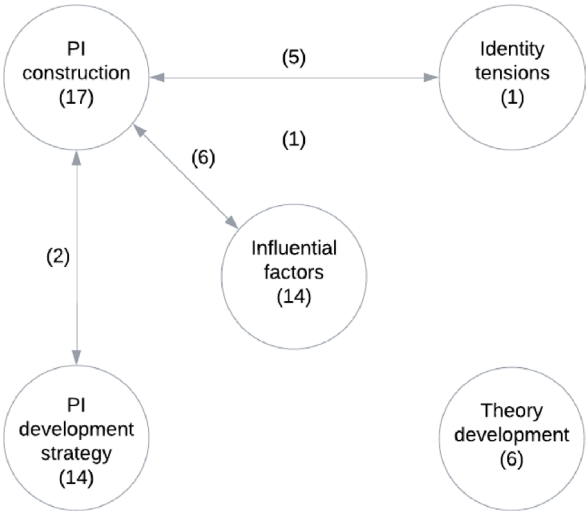

Figure 3 Themes in the Selected Teacher Professional Identity Studies

1) In the *PI construction* theme, the author included studies focusing on teachers' experiences constructing their professional identity. Authors of the studies included in this category sought to explore how TPI is constructed in specific contexts, for example, during teacher education (e.g. Poom-Valickis & Löfström, 2019; Stenberg & Maaranen, 2020, etc.) or in different geographic locations (e.g. rural Ghana in Ayinselya's (2020) work, rural China in Shen et al.'s (2024) work).
2) Studies related to *identity tensions* explicitly explore identity crises or constraints impacting the construction of TPI. The tensions varied in the studies – some were personal conflicts such as the challenge of negotiating different roles within a teaching career (Mehdizadeh et al., 2024), others were caused or reinforced by systemic problems such as bias against non-native English-speaking English teachers (Nigar et al., 2024) or new educational policies affecting special education teachers (Palacios et al., 2020).
3) The *influential factors* theme includes studies exploring the factors that impact the construction of TPI, as well as studies looking at the relation between TPI and one or more factors, such as agency (Cobb et al., 2018; Wray & Richmond, 2018; Venegas-Weber, 2018; Chávez et al., 2023) or critical thinking (Sheybani et al., 2019). Contrary to the studies included in the *PI construction* theme, the work included in the *influential factors* theme focus on the contextual factors more than individual experiences.
4) In the *PI development strategy* theme, studies looking at specific strategies that aid the development of TPI were included. Among these were co-teaching (Valdés-Sánchez, & Espinet, 2020; Nguyen & Loughland, 2018), reflection (Hahl, 2021; Muchnik-Rozanov & Tsybulsky, 2021; Szocik et al., 2021), simulations (Magen-Nagar & Steinberger, 2022) and others. The studies included in this theme were written by teacher educators working with student teachers at college or university level, which indicates that identity work is an aspect that is being intentionally included in teacher education to promote TPI.
5) The final theme, *theory development*, includes studies that were aimed at proposing new ways of thinking about TPI (positioning theory in Huang & Wang, 2024; complex dynamic systems perspective in Garner & Kaplan, 2019 etc.) or conceptualizing the way TPI is constructed throughout teachers' careers (Brunetti & Marston, 2018).

Discussion

In Beijaard et al.'s (2004) work, it was found that in the reviewed studies the definitions of TPI, where provided, were diverse. Based on the data, they were able to identify four features of TPI: (1) it is ongoing; (2) it encompasses the interplay of personal and contextual factors; (3) it includes sub-identities; (4) it is agentive. The author will compare Beijaard et al.'s (2004) findings to those of this review and then propose another characteristic of TPI.

In the definitions analyzed within this review, the author found that the dynamic and changing nature of TPI is emphasized by nearly all authors. There seems to be

a unanimous consensus that TPI is not a static concept, but rather an iterative process that begins as early as during teacher education and lasts throughout one's career.

1) For the interaction of "person and context" (Beijaard et al., 2004, p. 122), the author found that this feature of TPI is similar to the idea of *TPI as an analytical lens* for teachers. It was also echoed in Wray and Richmond's (2018) work where they wrote that teachers' actions are primarily driven by values rather than outside influence (e.g. policies, reform).
2) Sub-identities were a common theme in Beijaard et al.'s (2004) and this review as well. Here, the author also found that these sub-identities could refer to the different roles that teachers play within the professional setting (McCaw, 2023; Stenberg & Maaranen, 2020).
3) As mentioned in the analysis of the themes encountered in the work, the relationship between agency and TPI was looked at in several ways within the studies included in this review. Agency was also one of the factors that showed up in the definitions of TPI either as a facilitating factor of TPI development (Chávez et al., 2023; Cobb et el., 2018) or conversely – with TPI as the catalyst for a greater sense of agency (Wray & Richmond, 2018). Nevertheless, researchers believe that the concepts of TPI and agency are related and impact one another.

After having reviewed the features Beijaard et al. (2004) identified and exploring the ways they were present in the studies reviewed here, the author would like to propose a fifth feature of TPI to add to the four – intersectionality. Although the interrelation of different identities was to an extent addressed by the second and third feature of TPI, it could be useful to look at it separately, as it seems to be a recurring theme in some studies. Gee (2001) stated that those who hold the power in society are able to share it within affinity groups. Meanwhile, the oppressed are often limited by the identities imposed onto them by the authorities. Palacios et al. (2020) explored the treatment of special education teachers when they entered generalist classrooms after a reform in special needs education in Chile. Liu & Li (2023) wrote about the hierarchy of languages and cultures in the classroom, Venegas-Weber (2018) examined the role of bilingualism in teaching, and similar ideas were presented in Nigar et al.'s (2024) work about non-native English-speaking English teachers and the discrimination they face while seeking employment in Australia – the personal lives and careers of teachers and, therefore, the construction of their identities is impacted by what is deemed acceptable by the authorities. In other words, while some identities may be more welcome in the classroom than others, all identities contribute to teachers' lived experiences and shape their TPI.

After analyzing the themes of the studies, it could be seen that the majority of scholars were interested in the TPI construction experiences, the factors that impact TPI, and strategies for TPI development. This contrasts with Beijaard et al.'s (2004) findings, as most studies in their review focused on personal factors and teachers' stories of their professional experiences. The researchers also mentioned that the primary data collection tools in the studies they reviewed were interviews and portfolios, which limited the type of information that was available. In the current review, the author found that

the methodology of the studies has diversified along with the themes that scholars write about. The majority, 54 out of 66, of the studies were qualitative, 9 were mixed-method, and 3 were quantitative. Within the three main themes mentioned above, various types of interviews (e.g. life history, semi-structured, narrative interviews etc.) are the main type of data collection method used, but included among others are: observations (ethnographic, classroom behavior), document analysis (reflections, drawings, teaching philosophies, metaphors, lesson plans), and questionnaires (including self-report scales). Both the themes of the studies and the data collection methods used in them indicate that although researchers are still interested in the personal experiences of teachers and their professional identities, the impact of context on TPI is acknowledged and made explicit in current research.

Conclusion

TPI plays a critical role in shaping teachers' professional lives. As educational systems everywhere undergo changes triggered by reforms, technological developments, and the shifting societal expectations of teachers and schools, it is necessary to understand how teachers construct their professional identities in contemporary educational contexts. The findings of this review further the field of TPI studies by determining the current trends of the field, as well as revisiting the findings of Beijaard et al's (2004) review and assessing their applicability in studies published over the past five years.

Two research questions were posed to guide this review. The first one concerned the definition of TPI. The definitions of TPI are diverse and the focus of the definition depends on the purpose of the paper. Beijaard et al. (2004) had identified four features of TPI that they deemed essential. In this review, the author concluded that the features are still used to describe TPI in more recent studies, as well as proposed a fifth feature for describing TPI – intersectionality. This feature would allow to more clearly conceptualize the ways TPI is impacted by other identities that teachers choose to hold or those that are imposed onto them.

The second question explored the current trends in TPI research. It was concluded that stories in the forms of narratives of TPI construction experiences are the main theme in TPI research, however, scholars also focus on the factors that impact TPI, as well as identity tensions. There is a growing number of studies describing methods or approaches that can be used to promote the development of TPI in early-career teachers and teacher education students, proving that the value in promoting TPI is recognized by higher education institutions. A small number of studies also look at new approaches to studying or conceptualizing TPI.

In the future, it would be useful to further clarify the concept of TPI by creating a typology of seminal studies in the field that would allow researchers to differentiate among the various definitions of TPI and their theoretical underpinnings.

A notable limitation of this systematic review was that it was done by a single researcher. For more significant results, the review should include a more diverse set

of work, which could be achieved by screening a wider range of databases, expanding the search to all fields, instead of the abstract field, as well as including studies written in languages other than English.

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CONTEMPORARY APPROACHES TO CULTURAL LITERACY STUDIES IN EDUCATION

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ABSTRACT

Traditional approaches to cultural literacy have always emphasised the importance of a shared (national) imagined community, achieved through engagement with traditional media and the cultural canon. This approach has often been based on problematising the growing deficit of cultural knowledge and has stressed the importance of this deficit at both individual and societal levels. Transformations in contemporary society challenge us to rethink what can or should be considered relevant or valuable knowledge about culture and the arts. A systematic literature review of research articles published from 2016 to 2023 was conducted to analyse educational approaches aimed at developing cultural literacy. The purpose of this study was to explore trends, patterns, and individual differences related to the study of cultural literacy in the educational domain. After content analysis of 412 abstracts of articles containing the keywords "cultural literacy", "cultural competence" in the Web of Science database, 32 articles were identified that described an approach or a technique to improve the overall understanding of cultural literacy. The analysis highlighted key models of cultural literacy including dialogic practices, intercultural education, sociocultural theories, and critical analysis of cultural structures, as well as key skills such as critical thinking, cross-cultural awareness, self-criticism, and reflection necessary for successful interaction in today's multicultural world. These findings highlight the importance of revising and adapting educational strategies to take account of increasing globalisation and cultural diversity, and the need to develop cultural literacy as a key component of contemporary education.

Keywords: *cultural literacy, cultural competence, cultural awareness, tertiary education, cultural skills, cross-cultural learning, intercultural interaction.*

Introduction

Globalisation has given rise to a new discourse calling us to seek renewed educational solutions for 2024. Even the briefest analysis of global trends of increasing international interconnectedness, rapid urbanisation, technological progress, growing migration and depletion of natural resources makes it evident that labour markets are increasingly demanding individuals with a range of new skills. All this has led to changes not only

in the economic, social, and technological spheres, but also in people's mindsets and the way they interact with the world around them. In our increasingly interconnected world, one of the most important tasks of educators and institutions at all levels is to develop, promote and enhance cultural literacy. With the rise of a national populist movement, the relevance of cultural literacy may be questioned.

Because many of today's challenges are unique and do not quite have analogues in the past, educational institutions face complex problems of adapting their graduates to new life realities in a transdisciplinary and transcultural environment. It is crucial for an educational institution to provide their students with a set of skills that will provide them with mobility and flexibility to operate effectively in different cultural and professional environments.

The objective of this systematic literature review is to rethink the debate on cultural literacy and critically examine a number of interrelated perspectives of its development to summarise the general trends in the development of a new set of skills needed to foster cultural literacy in today's realities.

Literature analysis

In this systematic literature review, the author presents the current state of research on cultural literacy. The review addresses the definitions of the concept, its evolution, areas of application, indicators used to measure cultural competence, and methodologies used in the educational field.

Historically, literacy as an ontological phenomenon has been traced back hundreds of years and has been defined differently because of political and social changes in society. In the 18th and 19th centuries, industrialised European countries made some progress in reducing illiteracy and increasing the overall literacy rate, but in the middle of the 20th century the literacy rate increased dramatically (Shliakhovchuk, 2021). The term "cultural literacy" appeared in the 1940s and meant the ability to understand a particular society or culture, familiarity with the customs and characteristics of the culture (Oxford English Dictionary). In 1974, an attempt was made to broaden the term, which sounded already as the ability to work effectively with people who are culturally different and to demonstrate the skills required to do so (Wilson, 1974).

In 1987, E. D. Hirsch published his monograph "Cultural Literacy. What Every American Needs to Know" where he outlined the basic tenets of his theory (Hirsch, Kett, & Trefil, 1987). Hirsch's theory of cultural literacy was based on the idea of core knowledge that he believed was necessary for everyone to participate equally in society. Hirsch argued that national language and culture should be recorded in school textbooks and dictionaries, and should be used in millions of books, magazines, and newspapers (Hirsch, Kett, & Trefil, 1987). Thus, a unified cultural literacy would ensure social and economic equality, as opposed to multilingualism, which is extremely dangerous for civil society and increases cultural fragmentation, civic antagonism, illiteracy, and economic technological inefficiency.

Hirsch's work triggered a broad scholarly debate criticising the notion of core knowledge and the assumption that everyone has access to it (Johnson, 2014). For decades, scholars and educators have attempted to redefine the notion of cultural literacy giving it new meaning. Most agreed that there are too many different cultures for a person to be literate in all of them. In other words, people are fluent in their home culture because they learn it tacitly and often unrealised from childhood. However, when an individual enters a new culture or interacts with its members, they need to acquire a new set of cultural literacy skills (Geertz, 1973; Sule, 2021).

Subsequently, cultural literacy has been redefined and since 2000s, the perception has been articulated that culture is no longer an obstacle to be overcome, but rather a tool for competitive advantage (Rosen, 2000). Intercultural literacy was defined as "the understandings, competencies, attitudes, language abilities, participation, and identities that enable effective engagement with a second culture" (Heyward, 2000). The concept of transnational literacy was first elaborated by Gayatri Chakravorty Spivak in her article "Teaching for the Times" (Spivak, 1992). This notion is consistent with the ideas of decolonial thought, and according to Spivak, it is transnational literacy that allows us to recognise that we are hearing the voices of people previously deprived of rights or unable to make their voices heard.

All these issues reflect the complex and multifaceted nature of the concept of cultural literacy, which involves deep engagement with diverse perspectives, enabling individuals and societies to harness cultural diversity as a source of innovation, creativity and strategic advantage. This rethinking requires an educational paradigm that not only recognises cultural complexities, but actively incorporates them into curricula and social practices, contributing to a more inclusive and equitable society.

Methodology

In order to achieve the above-mentioned objective of the study, a systematic literature review was conducted. A primary keyword search was conducted to identify all scientific articles and research papers published between 2016 and 2023 in the Web of Science database. The keywords used for the search were: "cultural literacy", "cultural competence," which resulted in 412 articles. To further narrow down the most relevant material for analysis, a qualitative review of all annotations was conducted, and the inclusion and exclusion criteria described below were developed.

Exclusion criteria

- Articles describing other types of literacies (other than cultural literacy).
- Articles on early child literacy.
- Articles on elementary school education.

Inclusion criteria

- Open access articles.
- Articles written in English.

- All articles related to cultural literacy concepts.
- All articles related to teaching/learning strategies for cultural literacy, and approaches that can be summarised and/or reproduced.

Purpose of the search

- To define the concept of cultural literacy, identify its core components, and trace its evolution, highlighting key stages of its development.
- To study and evaluate pedagogical methods, educational strategies, and approaches for developing cultural literacy, including the influence of globalization on these practices.
- To analyze the role and impact of cultural literacy within the educational process, and compare approaches across different countries and cultures.
- To evaluate the tools and methods used to assess cultural literacy across various populations, and explore its relationship with other forms of literacy, such as media, information, and language literacy.

Results

After qualitative analysis of all articles containing the keywords "cultural literacy", "cultural competence" based on inclusion and exclusion criteria, 32 articles were identified corresponded to the inclusion criteria. As a result of the analysis of approaches to the study of cultural literacy, the following groups of ideas and concepts of cultural literacy were identified:

- Models of cultural literacy (articles on cultural literacy and clarification of some conceptual ideas related to this notion, such as changes in the interpretation of the concepts – literacy and cultural literacy, rethinking the idea of cultural literacy) – 4 articles.
- Skills necessary for cultural literacy and new approaches to the implementation of cultural literacy in education in the contemporary context – 28 articles (skills – 12 articles; new approaches – 16 articles).

Models of cultural literacy

In an era of globalisation and increasing intercultural interactions, cultural literacy is becoming a key component of modern educational systems. It encompasses not only awareness of cultural diversity, but also the ability to interact and co-operate effectively in different cultural contexts. Various models of cultural literacy have been developed, each offering a unique perspective on the development of this skill. These models help structure the necessary knowledge and skills for intercultural communication and offer methods to help build cultural competence. The study of these models highlights key principles and approaches that can be used to promote cultural diversity and inclusion in educational settings.

Maine, Cook, and Lähdesmäki (2019) discuss the concept of cultural literacy as a dialogic practice focusing on developing the knowledge, skills and attitudes needed to interact successfully with people from different cultural contexts. Key elements of this model include an understanding of cultural differences, intercultural communication skills and openness to new perspectives. In this context, cultural literacy is understood as a dialogical process that enhances intercultural dialogue and democratic interactions. Vygotsky's sociocultural theory emphasises the importance of social interactions and cultural contexts in the learning process (Marginson & Dang, 2017). This theory focuses on how social and cultural contexts influence learning and development, introducing concepts such as the zone of proximal development and cultural mediation. Despite the transformations brought about by globalisation, Vygotsky's ideas remain relevant to the study of educational processes in a global context.

The transdisciplinary model underlines the integration of knowledge from different disciplines to address complex cultural and social issues. According to Rupnik and Avsec (2020), this model highlights the importance of flexibility, adaptability, and collaboration – skills that are crucial in a technologically advanced society. Their research demonstrates that a transdisciplinary educational approach significantly enhances students' ability to apply technological concepts in real-world contexts, thereby equipping them with the necessary competencies to navigate and contribute to an increasingly complex and interconnected world (Rupnik & Avsec, 2020).

Other contemporary concepts such as *intercultural literacy*, *cultural intelligence* and *global agility* reflect the desire of educational systems to adapt to the challenges of globalisation and multiculturalism. These concepts stress the importance not only of knowledge about other cultures, but also of skills to interact effectively in multinational and multicultural contexts. *Intercultural literacy*, according to Rossiter and Bale (2023) is a set of knowledge, skills and attitudes necessary for successful interaction with people from other cultures. It includes understanding of cultural differences, awareness of one's own cultural biases, and the ability to empathise and communicate interculturally (Pazio Rossiter & Bale, 2023).

Cultural intelligence, in turn, is the ability to adapt to new cultural contexts and to interact effectively with people whose cultural values and norms differ from your own. This includes cognitive, emotional and behavioural aspects that help an individual to successfully integrate into cross-cultural contexts which becomes especially important for leaders working in international or multicultural teams (Caputo et al., 2019). Meanwhile *global agility* involves the ability to adapt flexibly to a variety of cultural and professional contexts, enabling successful functioning in different cultural contexts (Caligiuri, 2023). It includes not only the ability to adapt quickly, but also a proactive approach to learning and adopting new cultural models and approaches.

Skills necessary for cultural literacy and new approaches to its implementation in education

Classical approaches to building cultural literacy skills focused on the national component and were achieved by reading books or any other interaction with the traditional code, a phenomenon that later became known as the "literacy myth" (Rutten, 2020). Recently, there has been a growing body of research that critically examines the possibility and consequences of becoming 'literate', and more specifically, on whose terms and for what purposes this transition to cultural literacy takes place (Rutten, 2020). What counts as a legitimate argument when discussing the value of cultural and artistic knowledge is also inevitably linked to certain views of their societal functions. That is, we need to critically evaluate claims about the 'importance' and 'value' of culture and the arts to the individual and society, and therefore focus on the wider social context in which debates about this take place. Furthermore, we need to reconsider the institutionalised spaces in which this mediation of cultural knowledge takes place.

Culture is now seen as a driving force (along with science, technology, and innovation) for peace, security, and the creation of social, cultural, and economic inclusive environments. Some critical cultural-literacy skills can be articulated as follows:

- Cross-cultural awareness. "Paralleling" different cultural traditions, beliefs, and social systems; "parallels" rather than comparisons increase cultural literacy.
- Local cultural awareness. Accepting and respecting the knowledge within local cultures is the pre-requisite in the development of cultural literacy.
- Critical reflection and thinking. The need for self-critique, self-reflection, or reflection on the trajectory that society is taking.

Researchers are developing a new approach to cultural literacy with a broader range of *interdisciplinarity* that criticises so-called 'traditional' cultural literacy practices in the classroom that rely on a centre of disciplinary knowledge (Ochoa et al., 2016). These studies propose new principles for developing cultural skills, knowledge, and abilities through intercultural and interdisciplinary collaboration and emphasise the importance of experiential learning and reflection as meaningful practices of cultural literacy. Emphasis is placed on the importance of funds of knowledge and lived experience as a way of reimagining education, which help to provide a pedagogical foundation for culturally sustainable practices where students and faculty can create and critique co-created curricula.

New learning discursive practices for preparing culturally literate individuals are constructed through dialogue and argumentation where cultural identity is collaboratively constructed and inspired by texts or visual content about core civic cultural values such as tolerance, empathy, and inclusion. In this way, dialogic learning aimed at developing cultural literacy acts as an innovative and adaptive education curriculum in different contexts. Much attention is devoted to various strategies for dealing with potential conflicts arising from cultural differences. The discussion of their applicability raises questions related to current practices in the study of cultural differences and

current knowledge about the role of culture, cultural differences, potential conflicts, and strategies for mitigating these conflicts (Galvez-Lopez, 2023).

Recent research also considers the perspectives of the phenomenon of *culture shock* experienced by students studying in universities with a culture different from their own (Swallow & Tomalin, 2022). Students must navigate new social and educational environments, behaviors, and expectations, while also dealing with adaptation challenges common to all students. This is difficult enough when a newcomer is aware of the differences beforehand, but even more difficult when they are unaware and mistakenly believe that the new society works in the same way as in their home country. The quality of the psychological, socio-cultural and educational experiences of this large group of people is of great importance, not least for the development of global intercultural understanding.

A key consideration is also to critically rethink the internationalisation of curricula and incorporate critical reflection, which can enable educators and students not only to achieve understanding or competence in other cultures, but also to question their own normative cultural understandings (Vishwanath & Mummery, 2019). Learning and teaching in an increasingly culturally diverse environment require careful, sensitive, and proactive planning and a personalised learning approach. However, because cultural literacy studies occur within a particular period and are always specific, they are only a history of the present moment and anthropology of a current condition. We therefore need to continually explore what cultural literacies are and how they evolve in the context of a wide range of disciplinary, geographical, geopolitical, and institutional spaces.

Another essential element is *destabilisation*, a teaching strategy that stimulates a conceptual shift in students to change their views on culture, identity, and the world at large (Ochoa & McDonald, 2019). The goal of destabilisation is that students understand how they approach, both conceptually and empirically, what they do not know. How do they respond to the uncertainty and instability of new situations? The main objective of this teaching strategy is to destabilise students' perceptions of certain topics to encourage them to introspect at the most fundamental level. A significant objective of this approach is to provide students with a safe space where they can ask themselves questions to better understand themselves and their ever-changing personal and professional contexts. Not only the private conceptual shifts and reflections of a student or a group are investigated, but also the duration of study in an educational institution in relation to family characteristics of institutionalised cultural and economic capital. The theoretical basis for this analysis was Pierre Bourdieu's concept of cultural and economic capital, education as a field, social reproduction (Lehti & Kinnari, 2023). The authors of this study were primarily interested in whether individuals from families with high cultural capital (higher levels of parental education) could play the 'learning game' faster than individuals from families with low cultural capital (lower levels of parental education).

A number of studies mention the need for knowledge about race as an important part of cultural literacy. There is a question raised about to what extent race is visual and why it is important and how this relates to cultural literacy issues, even if it is not visualised. Thus, a study examining America as a color-blind society found that white students

are more likely to believe they live in a post-racial era, whereas students of color continue to see race as a significant and central part of their lives. (Mueller, 2017). Another more recent study on racism in education argues that colour-blind ideology amounts to a refusal to deal with the reality of racism (Gillborn, 2019).

The development of cultural literacy therefore requires a combination of multiple skills such as critical thinking, cross-cultural awareness, interdisciplinarity, self-criticism, adaptability and communication skills. These skills are becoming an integral part of preparing professionals and citizens who are able to interact effectively in the context of cultural diversity, promoting social and cultural understanding and supporting the creation of inclusive societies. It is important to understand that cultural literacy is developed not only through educational programmes, but also through constant interaction with the world around us, through experience and reflection, which makes it a vital component of education and professional training.

Discussion

After a thorough analysis of approaches to cultural literacy learning, it is evident that cultural literacy practices are not strictly defined, but are constantly mixing and integrating with each other, which makes it not always easy to identify and make clear distinctions between them. A growing number of researchers are critically examining the possibility and implications of the emergence of cultural literacy and the conditions under which reciprocal cultural exchange between individuals and groups occurs at different levels (Rutten, 2020). This raises important questions about what it means to 'become culturally literate' and how this concept affects different forms of cultural knowledge. We can now identify common traits and skills that may indicate key elements of successful cultural literacy learning, both in an individual and in a learning environment. These are primarily self-reflection on cultural identity and understanding cultural diversity; communicative skills; avoidance of stereotypes; adjustment of one's behaviour, flexible thinking and interpersonal skills, standing against prejudice and inequality.

Globalisation has changed not only economic and technological aspects, but also our perception of cultural knowledge. This calls for a rethinking of what can and should be considered relevant cultural knowledge. Cultural institutions are therefore faced with the challenge of choosing methods that will help them to cope with the diverse challenges of a rapidly changing environment while maintaining their role in disseminating cultural knowledge. Higher education institutions, in their turn, should prepare students to live and work in a discursive postmodern transcultural environment.

It is also necessary to recognise the limitations of this study. First, many of the findings are based on generalisations of existing theories and practices, which may not take into consideration the unique contexts of individual educational institutions or cultural groups. Second, there is a need to further explore how specific educational practices influence the development of cultural literacy in different settings. It is important for future research to focus on the practical integration of cultural literacy into educational

programs and the development of methods for assessing its effectiveness. Additionally, studies could explore the influence of cultural literacy on intercultural interactions across various professional and social settings, offering insights into its broader impact.

Conclusions

The following key conclusions can be drawn from analysing some of the debates on cultural literacy and critically examining a range of interrelated perspectives on its development. Cultural literacy is a multifaceted concept that includes the ability to understand and effectively interact with cultural differences. The main components of cultural literacy include knowledge of cultural norms, respect for diversity, and the ability to adapt to different cultural contexts. The methods and pedagogical strategies studied highlight the importance of integrating cultural literacy into the educational process. These approaches range from the introduction of specialised courses to the use of intercultural exchange and interactive educational programmes. Globalisation reinforces the need to develop cultural literacy as interactions between cultures become more frequent and significant. Analyses of different international approaches to cultural literacy show considerable variation in methods and strategies, highlighting the importance of adapting approaches according to cultural contexts.

The evolution of the concept of cultural literacy points to its dynamic development, which is linked to the transformation of educational practices and social change. The interrelationship between cultural literacy and other forms of literacy, such as media, information, and language literacy, underscores its significance in today's educational landscape. This connection highlights the necessity of integrating these skills to create a holistic approach to learning. Cultural literacy not only contributes to the reduction of cultural bias and inequalities, but also plays an important role in building sustainable, globally oriented societies. Even the smallest step towards cultural literacy in education can lead to significant gains and have a positive impact on diversity of opinion, creativity, sustainable development, a culture of peace and non-violence, critical thinking and effective contribution to society and the economy.

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THE SPECIFITY OF THE ADMINISTRATIVE CONTRACT IN GENERAL EDUCATION

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ABSTRACT

The paper explores the nature of the administrative contract, its unique features and application possibilities in general education. The aim of the study is to analyze how the administrative contract can be applied in the general education of Latvia, emphasizing it's importance in managing the responsibilities of pupils and institutions. The results show that these contracts provide a framework for clarifying the responsibilities and rights of educational institutions, pupils and parents. The content of the administrative contract can be characterized incategorized under two parts: mandatory and optional. The mandatory part provides an agreement on learning in the general education program. It's content derives from the specifics of the educational program and educational institution's daily practice, respectively determining the obligations in the learning and nuture processes, as well as informing and delegating responsibility in case of problematic situations. The optional part allows agreement onfor any additional services or support from the educational institution, for example accommodation in a service hotel etc. The contract is signed by the educational institution, one of the learner's parents and also by the learner (from the age of fourteen). This contract may be particularly effective in offering support measures to pupils and for those dealing with disciplinary issues. In addition, incorporating administrative contracts in education may significantly contribute to overall management within an educational institution. This approach offers a novel solution for improving pupils' outcomes and handling administrative challenges. The study's findings highlight the importance of rethinking traditional administrative practices in education, so as to include administrative contracts as an innovative tool for fostering both better educational experiences and cooperation between school and family.

Keywords: *administrative contract, education law, school governance, pupils support, teacher-pupils-parents relationship.*

Introduction

At the beginning of the article, we mention the following case study. In one of the general educational institutions, a fifth-grade student, X, systematically violates the internal rules of the educational institution. The student tends to harm weaker classmates, use

swear words, ignore teachers' reprimands, often arrives late to lessons, fails to prepare homework, and tends to disrupt the lessons. Although the pupil is academically successful, their behavior in the educational institution can be burdensome for both other students and for teachers. The student comes from a middle-income family. The student's mother mainly cooperates with the educational institution, while the father rarely visits the institution. The pupil's mother admits that she struggles to manage the student and is therefore looking for ways to resolve the situation. This description raises the question of whether the solution could involve not only the disciplinary, control, and work organization methods accepted in pedagogy but also, from the authors' perspective, whether the student's behavior in the educational institution should be assessed and addressed from a legal standpoint. In this context, the authors propose the thesis that the administrative contract could be one of the forms of cooperation between the educational institution and the student/parents (legal representatives), as a way to collaborate within the educational institution. The creation of such a contract does not exclude other forms of cooperation between the educational institution and the legal representatives, such as parent teacher meetings, email communication, the use of the educational institution's website and digital education system platforms (Mykoob, e-klase), participation in events organized by the educational institution, parent meetings ect. Accordingly, the administrative contract would be used to define the student's obligations, rights, responsibilities and additional support measures as well as addressing specific problem situations. Examples of the latter would be systematic violation of the internal regulations of the educational institution, such as being undisciplined, violent, missing lessons, etc.

The purpose of this article is to clarify the specifics of the administrative contract in general education and to evaluate its applicability in solving various problem situations.

Contractual obligation and administrative contract

In legal science, the term "contract" is understood as an agreement between several persons to establish, modify, or terminate a relationship (Dubure et al., 1998). Specifically, in the Roman-Germanic legal system, a contract is understood as an agreement between two or more persons resulting in the creation, alteration, or termination of rights and obligations for these persons (and sometimes for third parties). In Anglo-Saxon law, a contract is understood as an agreement that is sufficiently sets out what is to be done or not done. That is, a promise given by one party to another, who in turn accepts this promise. If it is in written form, it serves as evidence of the commitment. In common parlance, the term is used interchangeably with agreement, bargain, undertaking, or deal; but whatever the word, it embodies our notion of freedom to pursue our own lives together with others (Hosmanek, 2022).

Therefore, a contract is the harmonious expression of will by two or more persons, which establishes an obligation between them, and the subject of the obligation can only be something possible, as otherwise the transaction is not valid. (Civil Law, 1937).

In present day, the term "contract" carries at least three different meanings. Firstly, this term is used in the sense of "agreement". This article will elaborate on this, whilst analyzing the legal relationship between educational institutions and the parents of pupils Secondly, it is used to indicate the legal relationship that arises from a contract. For example, in situations where it is presumed that a contract can be terminated in a certain way, it is generally understood that the legal relationships resulting from the contract can be terminated within the framework of the contract. Thirdly, a contract is defined as a specific document outlining the terms of the agreement in the sense of an agreement. The aforementioned meaning of "agreement" is undoubtedly the dominant meaning in which this term is currently used (von Bar et al., 2009).

Meanwhile, the Latvian Education Law specifies the rights of parents (or persons exercising guardianship) to enter into a contract with an educational institution for the education and care of a child in the educational institution. As seen, the legislator has determined that: 1) parents have the right to enter into a contract with the educational institution; 2) the subject of the contract should be considered the education and care of a child in the educational institution; 3) it is a right, not an obligation. In the Republic of Latvia, only general requirements for the behavior and upbringing of pupils in educational institutions have been established to date, leaving to the autonomous competence of educational institutions the choice and respective regulation of several essential issues of upbringing, discipline, and behavior. That is, the legal regulation, determining the actions of the head of the educational institution if pupils endanger their own or others' safety, health or life, currently does not fully achieve its goal and is subject to revision, seeking new ways (including legal) to ensure the safety of pupils and prevent disciplinary violations in educational institutions. One of such solutions is the need to improve the regulation of the contract for the education of a child in educational institutions in the normative acts regulating education, as well as to promote the practice of applying this contract. In the authors' view, one of such means would be the so-called administrative contract.

It should be addedis important to note that an administrative contract cannot be entered into, if the form of the contract is not suitable for regulating the specific legal relations (State Administration Structure Law, 2003). An educational institution has the subjective right to enter into a contract with a child's parents because the legal regulation stipulates the possibility for the legal subject, the educational institution, and the child's parent to establish contractual obligations. For example, in one of its judgments, the Senate indicated that public legal relations can also be based on a contract, even if, at first glance (prima facie), it seems like a classic civil law contract (the Senate Decision in case no. SKA-78., 2007). There is no doubt that in the field of civil law, the contract is the most common form of legal subject action, but in the field of public law, the most frequently used legal instrument is an administrative act issued by the authority. For instance, an order for a child's admission to a general education institution is an administrative act (Balodis, 2007). That is, it establishes new legal relations – the child becomes a person subject to the educational institution. Although educational institutions are granted

the right to issue administrative acts by regulatory acts, the purpose is not the issuance of administrative acts per se, but rather to ensure education as effectively as possible, i.e., the fulfillment of state administration tasks. One of the means by which greater efficiency can often be achieved is the administrative contract (Briede, 2014). Meanwhile, the administrative contract is one of the public law contracts, i.e., to ensure the effective performance of state administrative functions, the institution has the right, in the manner prescribed by law, to conclude public law contracts (State Administration Structure Law, 2003).

In the administrative process, legal relations between a private individual and an institution are most often affected by an administrative act issued by the institution or factual actions taken by the institution. At the same time, in addition to the two mentioned instruments of the administrative process, there is also the possibility to regulate legal relations using an administrative contract. The authors believe that such contracts can also be used in the legal relations between general education institutions and parents, providing general education to the educatee (child). Especially in situations where a minor educatee in an educational institution or in events organized or supported by it endangers their own or others' safety, health, or life, and the education institution's manager needs to ensure the development of a support measure plan appropriate to the needs and situation of the educatee and the supervision of the implementation of included support measures.

Parents' rights to enter into contracts or agreements with educational institutions are legitimized in the legal regulation of the United Kingdom. Researchers Mike Coldwell, Kathy Stephenson, Ihsan Fathallah-Caillau and John Coldron have found that the mutual relationships between educational institutions and parents (families) provide evidence that parental involvement in the educational process offers many advantages – a better understanding of the teaching process, encouragement for teachers to improve the expectations of both pupils and parents, as well as increased self-esteem for pupils, enhanced social contacts, and a stimulated desire to achieve better academic results (Coldwell et. al., 2008). In Anglo-Saxon countries (United States, United Kingdom, Australia etc.), it is possible to prepare agreements or contracts for cooperation between parents and educational institutions (in English – parental agreements; parent-school contracts). Specifically, a written contract can be prepared between the parent and the school or local authority (in English – local authority; the governing body). For example, with its help, situations can be addressed when pupils attend the educational institution irregularly, has various kinds of behavioral issues, or there is a risk that the pupils may be expelled from school for serious violations of internal rules (The Key Support, 2024). A parent cannot be obliged to enter into such a contract or agreement, as it is considered a so-called support measure or supportive intervention (in English – supportive intervention) and is not considered a punitive measure against parents (Evans et al., 2008).

However, UK legislation specifies situations in which a contract or agreement can be entered into. This means the possibility of entering into a contract between the educational institution and the parent in situations where there is reason to believe that as

a result of the child's behavior: a) significant disruptions to the educational process of other pupils may have occurred or may occur; b) significant harm to the pupils themselves or the well-being, safety, health of other pupils or school staff may have occurred; c) there is a risk that the pupils could be expelled from the educational institution (Education and Inspections Act 2006). The behavior of the pupils is to be assessed both in school and in other circumstances where it would be reasonable for the educational institution to regulate the behavior or actions of those under its authority. Therefore, the educational institution or local authority can enter into a contract with the child's parents or the pupils themselves. In such a contract, it is specified that the parents agree to adhere to certain requirements for a specified period, and the school or local authority certifies that it commits to supporting the parent in situations that were previously indicated. The contract may include a requirement for parents to attend a so-called psychological and pedagogical counseling program (in English – a counselling or guidance programme). The inclusion of such a requirement in the contract is necessary to promote improvement in the pupils behavior, as well as to ensure the pupils regularly attend the educational institution. The contract must be mutually signed – by the parent and a representative of the local authority. At the same time, such a contract does not give rise to liability under contract law or liability arising from a tort or legal infringement (in English law – *tort*) (Anti-social Behaviour Act 2003). It should be mentionedis worthy of note that such a contract is not considered as a classical basis for the creation of obligations, i.e., from a legal transaction or an unauthorized act (Ibid, 2003). That is, in carrying out its contractual functions, the local authority must observe any instructions given from time to time by the legislator. At the same time, such a contract is a significant aid in improving mutual relationships, understanding, and cooperation between parents, pupils and the educational institution, as it promotes a productive and positive learning environment. Such a contract must not include provisions and conditions that could be unlawful or unjustified, for example, a financial demand or an obligation to wear a specific type of school uniform if the pupils not wear it due to religious beliefs. The fulfillment of such a contract cannot be submitted for judicial review, nor can the pupils be expelled from the educational institution or punished if parents fail to comply or only partially comply with it due to specificparticular circumstances (the Department for Education, UK, 2013).

As such a contract is defined in the specific regulation that determines the rights and obligations of educational institutions and parents, it is only understandable that this is not a civil law contract, but rather a contract determined by law in the field of education. Accordingly, the legal regulation in the United Kingdom provides for the possibility in situations where the pupils systematically violates the internal rules of the school, unjustifiably fails to attend the educational institution, or their behavior endangers other pupils etc. In this case the educational institution can propose to enter into an agreement or contract with the parent regarding what is to be done, observing the child's best interests. In Germany, for example, in Baden-Württemberg, in order to fulfill the educational and pastoral tasks of the educational institution, comply with the obligation to attend

the educational institution, adhere to the internal rules, as well as to protect people and property, so-called educational and order measures are implemented if pedagogical educational measures are insufficient. These include agreements on behavior change with the pupils and their parents/persons who have custody rights. These measures must consider fundamental human rights. The educational institution may cease the use of educational and disciplinary measures if the pupils improve the situation in cooperation with social service (Latvian Association of School psychologists, 2012).

In this context, it should be noted that in Latvia, the issue of whether norms, which usually regulate private law relationships, are applicable in the regulation of public law relationships, has not been resolved. At the same time, for example, in Germany, it has been recognized that the use of such norms is permissible, because the norms regulating public law relationships are not always complete (Danovskis, 2012). This means that a contract in education is a specific contract aimed at regulating both public law and private law relationships between the educational institution, pupils and parents.

Sometimes legislative acts may specifically stipulate that, before the conclusion of a private law contract, a public entity should issue an administrative act. However, in these cases, when a decision is made in the realm of private law, it means that the legislator evaluates considerations of expediency, determining that the legality of the respective decision is to be examined in the administrative process. E. Danovskis has identified typical cases where decisions, contracts, or actions of state administration create private law relationships: 1) decisions or actions related to the property of a public person and its management; 2) decisions or actions related to already concluded private law contracts; 3) decisions on the establishment, amendment, or termination of employment legal relations; 4) decisions on the management of a public person's capital companies. Accordingly, a public law decision is first made, followed by the conclusion of a private law contract (duration of applicability of public use conditionsasset can be used, etc.) (Briede et al., 2016).

In the authors' view, within the framework of the two-stage theory, public legal relationships arising from Section 57, Paragraph 3 of the Education Law, which stipulates that parents have the right to enter into a contract with an educational institution for the provision of their child's education, are also addressed. Such contracts can be concluded by preschool education institutions with the parents of a child. Judicial practice shows that the execution of such contracts is resolved within the framework of civil procedure (Valmiera District Court Judgment in case no. C-0141-18., 2018). For instance, municipalities or private law entities handle small claims against individuals for the recovery of money for children's education and care in an educational institution in a civil law manner. Moreover, private educational institutions enter into a contract for cooperation in the field of general secondary education, whereby one party undertakes to prepare the pupils within the framework of the general secondary education program, while the other party commits to pay the tuition fees. Furthermore, the head of a private educational institution has the right to issue an order for the expulsion of pupils from

the educational program, if the payment for preschool, basic general education or general secondary education is not made for more than three months within a calendar year.

In a judgment of the Riga City Latgale District Court dated May 20, 2014, it was claimed that a private educational institution had provided general secondary education to a student, whose legal representatives had incurred a debt for failing to pay the full amount arising from the contract. Consequently, the educational institution filed a lawsuit to recover the debt from the student's parents (The court of the Latgale suburb of the city of Riga. Judgment in case no. C29844213.2014).

As indicated, public law contracts are concluded in writing, adhering to the provisions of the Civil Law and the restrictions set forth in regulatory acts. Accordingly, public law contracts are prepared in writing based on: a) civil rights; b) restrictions defined in legal regulation. It should be added that there are so-called interdisciplinary public law contracts, namely contracts through which a public law entity delegates public authority to a private individual. Senator and legal scholar I. Višķere points out: "[T]his contract is not considered a classic administrative process instrument, as it does not affect the subjective public rights of private individuals in the sense of administrative process, but rather expands the circle of public authority holders. Simultaneously, it cannot be considered as a purely internal administrative contract (such as a delegation agreement between entities that are public law subjects), because one of the contracting parties, by its status, is a private individual." (Višķere, 2008). It is emphasized that the Republic of Latvia, as an original public law legal entity, has its own will. That is, it may choose to conclude or not to conclude a contract, or select the type, form, and participants of the contract (Ozoliņš, 2018). Such freedom of contract, based on private autonomy in civil law, is not possible in public law. This means that the public administration must strictly follow the public law norms that establish the legal order, and therefore, cannot deviate from them in principle (Paine, 2002).

Conversely, the essence of this regulation is to emphasize that in entering into a public law con-tract, an institution must consider the legal regulation that is binding upon it as an implementer of public power. Accordingly, the application of Civil Law provisions in the conclusion of a public law contract is permissible insofar as it is consistent with the legal norms regulating the insti-tution's activities in the realm of public administration and the specific nature of the particular public law contract (the Senate Judgment in case no. A420234817, SKA-149/2021, 2021). Professor J.Briede highlighted that, unlike a civil law contract, the concept of admissibility is applied to an administrative contract, and evaluated according to two criteria: 1. the admissibility of the public law contract as a form of action, and 2. the compliance of the content of the public law contract with regulatory acts (Briede, 2014). An institution can act in the domain of private law only if a specific authorization is included in a legal norm (Danovskis, 2009).

The limits and requirements for the content and form of a contract are specifically determined by the legislation of each particular state. This means that general education institutions, as subjects of public administration law, are bound by the principles of public administration. They must adhere not only to the specific regulations but also

to the legal acts regulating public administration. Moreover, in its activities, the public administration also respects legal principles that are explicit, derived, and developed in the practice of institutions or courts, as well as in legal scholarship (State Administration Structure Law, 2003). This aspect relates to situations where it is necessary to justify the use of not only legal science principles but also principles of pedagogical science in the acts and activities of educational institutions.

Public law contracts are concluded to ensure the effective execution of state administrative functions. They are concluded by the consenting authority in the manner prescribed by law. Although so-called classical administrative law did not recognize the admissibility of a public law contract as a form of action between the executor of state power and the citizen, i.e., such denial was based on the view that the state and citizens are in a relationship of subordination, where the possibility of concluding contracts was not admitted (theory of subordination), but the essential characteristic of contract conclusion is precisely the equality of the contracting parties, i.e., both sides (in bilateral contracts) equally influence the content of the contract. F. J. Paine points out that the previously existing understanding of the relationship between the state and the individual, or "superior and subordinate", has been overcome in legal doctrine. That is, nowadays, the state is the one that assumes the duties of service that individuals themselves do not want or cannot undertake, thereby no longer excluding public law contracts as a form of action, indicating their necessity. Accordingly, the contract is a means by which legal relations between partners are regulated (Paine, 2002).

E. Levits emphasizes that public contracts are "concluded by the administrative authority with a private individual. An administrative contract is fundamentally a civil law contract that is 'covered' by elements of public law. Therefore, it must comply with both civil law prerequisites (for example, the authenticity of will, etc.) and, additionally, public law regulations. The elements of public law are intended to prevent the state, when applying the contract as a form of action, from freeing itself from the restrictions imposed by public law. It has a mandatory written form." (Levits, 2002). The purpose of the enumeration of types of public law contracts specified in the State Administration Structure Law is to typify the types of public law contracts concluded by state administration and to determine specific, judicially reviewable prerequisites for admissibility and content for each of them, as well as to set known conditions for the types of public law contracts allowed by law, to which they are subject. The public law contract is considered a classic tool of the administrative process because it affects the subjective public rights of private individuals in the understanding of the administrative process (Krampuža, 2020). I. Višķere emphasizes that contracts in which a public law entity delegates public authority to a private individual are not exactly counted among these, even though one of the parties is a private individual (Višķere, 2008). The conclusion of an administrative contract does not occur often, especially in cases where the conclusion of an administrative contract is not specifically provided for in special regulatory acts (Smiltēna & Kukle, 2016).

On the other hand, the administrative contract is considered the most useful and flexible way of operating to regulate atypical cases (Briede, 2014).

Violation of the internal rules of general education institutions, especially in cases where the behavior of the pupils is violent, rude, and disciplinary breaches are systematic, is considered atypical behavior. Consequently, the authors suggest that it might be possible to offer to conclude an administrative agreement (consensus) with the parents and the general education institution regarding the necessary support measures for preventing behavioral disorders. This type of agreement would be useful in situations where the head of the educational institution must ensure the development and implementation of a support measures plan appropriate to the needs and situation of the pupils, as well as to inform the founder of the educational institution about the measures taken and planned support measures. Latvian legislation stipulates that the headteacher must send information to the parents in writing (in paper or electronic document form) about the pupils behavior and the necessary cooperation of the parents with the educational institution (Cabinet of Ministers of the Republic of Latvia. Regulations No. 474, 2023). At the same time, it is not specified what type of written document should be sent to the parents. Therefore, it can be presumed that the legislator is leaving to the discretion of the head of the educational institution, which type of document they will use to define the cooperation between the educational institution and the parents, as well as how to involve (observing the obligation set out in Article 58(1)2 of the Education Law, to cooperate with the educational institution where the child is studying, including with teachers and other persons involved in the implementation of the educational process, as well as in matters of ensuring the child's education – with the municipality) parents in the implementation of support measures.

Methodology

The study employed the following fundamental methods: analysis and synthesis, comparison, historical analysis. The authors used a comparative law method to examine the specific characteristics of laws in Latvia and other countries (the US, UK, Australia, and Canada), focusing on those aspects of the laws that are important for the research. By employing a historical research method, we have determined how the administrative contract has evolved over time. This enables us to understand the significance of these contracts today and the laws that govern them. A grammatical analysis is necessary to determine the precise legal provision defining the term "administrative contract." This analysis should consider the meanings of the individual words comprising the term and their interrelationships. "A systematic approach is employed to determine the significance of administrative contracts within the framework of educational law. As a specific norm of educational law (an institution of educational law), the administrative contract is a component of administrative law and is analyzed within the context of the broader legal framework. A teleological method of law interpretation shows, the specific educational and administrative legal norms that define the concept and purpose of an 'administrative

contract,' align with the purpose of these legal norms, both from a historical and contemporary perspective.

Conclusion

The authors of the article believe that in addressing unconventional situations in the provision of general education and in implementing support measures for pupils, it would be prudent to utilize administrative agreements (akin to the approaches of the United Kingdom or Germany). Essentially, through administrative agreements, a more precise scope of rights, duties, and responsibilities is established, as everyone involved in a child's education, on actions to support a child in difficulty, defining the content of cooperation with educational institutions and parents.

Within the legal framework of Latvia governing general education, there is no direct reference to the types of contracts educational institutions are authorized to use. This raises a question regarding the admissibility of administrative contracts within the legal relations between the parents and the educational institution. From the authors' perspective, the administrative contract would be particularly suited for the legal relationships between general education institutions and parents when there is a need to agree upon a collective action plan to provide support for pupils who violates the internal regulations of the educational institution, or potentially endangers their own or others' safety, health, or life, or has behavioral disorders that cannot be adequately addressed with the resources of the educational institution alone. This approach is predicated on the notion of equitable relationships between parents and the educational institution, not one of subjugation and submission, but rather one of equal collaboration partners.

The general contractual content of the administrative agreement established within the Education Law, there are two main components: mandatory and optional. The mandatory section entails agreements on education and support within the general education program. The content of this section is derived from the specifics of the education program and the daily practice of the educational institution, accordingly determining the obligations in the teaching and pastoral ca process, as well as information sharing and responsibility in case of problematic situations. The optional section allows for agreements on additional services provided by the educational institution, including supplementary support measures, extracurricular education, accommodation in a service hotel (if applicable), among others.

This contract would be particularly effective in resolving disciplinary issues and ensuring support measures for pupils, while also fostering cooperation with the parents. Furthermore, the administrative contract promotes a more efficient implementation of the respective support measures for the pupils, as the individual (the student or their legal representative) has agreed to them, and ensures the execution of the state administration's (the general education institution's) tasks in a manner acceptable to both the educational institution and legal representatives, whilst respecting the best interests of the child (children).

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DIGITAL TRANSFORMATION IN ACADEMIA: THE UNIVERSITY OF LATVIA, 1990–2004

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ABSTRACT

The 21st century has seen a profound transformation in education driven by the integration of advanced technologies such as computers, smart devices, artificial intelligence, and immersive tools. These innovations have had a substantial impact on teaching methodologies, research practices, communication, and information retrieval processes. This study aims to assess the impact of Internet and computer technologies introduced at the University of Latvia (UL) between 1990 and 2004 – a period of significant socio-political change following Latvia's independence. By conducting a qualitative analysis of archival materials, including issues of the 'Universitātes Avīze' (University Newspaper), academic conference proceedings, and graduation books, this research traces the adoption and effects of these technologies on UL's academic environment. The study identifies key factors influencing successful technological integration, such as continuous skill development, a balanced use of digital and traditional resources, and adherence to ethical and legal standards. The findings provide valuable insights for contemporary educational institutions navigating similar digital transitions, highlighting strategies for effective adaptation to ongoing technological advancements. These lessons are not only relevant to the specific historical context but also offer guidance for modern educational institutions facing similar transitions in the digital age, helping them to better prepare for and adapt to ongoing technological changes.

Keywords: *Internet in Education, Internet Adoption, University of Latvia, Technology Acceptance, Technology in Education.*

Introduction

The chosen period marks a significant event in Latvia – the collapse of the Soviet Union and Latvia's re-declaration of independence in 1991. Shortly after this historic event, the new Constitution of the University of Latvia (UL) was approved, officially recognizing the name of the University. The Constitution confirmed the academic autonomy and rights of the UL (University of Latvia, 2023). The collapse of the Soviet Union and the regaining of independence in Latvia in 1991 necessitated radical changes

in the education system (Abens, 2020). Looking back on this transitional period, the Vice-Rector of the UL, Janis Krumins (Jānis Krūmiņš), explains that "The occupation of Latvia has had a great impact on the attitude of university staff and students towards their studies. The degree of centralization in the USSR made the academic staff of the University mere taskmasters, as decisions on curricula and their content were made in Moscow, but now the student is the center of the academic activity of the UL" (Siksna, 1994). Following the collapse of Soviet rule, Latvia implemented a democratic education system that encouraged greater student and pupil participation in the learning process. However, the majority of teachers and lecturers in the 1990s had received their education during the Soviet era, where the system was based on authoritarian principles emphasizing obedience and submission to authority. As a result, many Latvian educators and policymakers required time to transition and adapt to a democratic educational model (Abens, 2020).

The advent of computers and the Internet in the early 1990s marked another significant milestone, leading to a profound transformation in pedagogical practices. The integration of technology into education has been a global phenomenon, with varying impacts depending on the context. The growing integration of technology and the widespread availability of online resources forced educators to rethink their approaches and adapt to the evolving educational landscape (Frick, 2020). Studies on technological integration in education generally highlight both opportunities and challenges. For example, Selwyn (2012) discusses the potential of digital technologies to transform educational practices, particularly in improving access to information and enabling new forms of learning. However, he also points out that these benefits are often unevenly distributed, with disparities in access to technology and digital literacy exacerbating existing inequalities. Research by Kangro (1997) and Kuzmins (2002) emphasizes the rapid pace of technological change during the 1990s and the resulting challenges for educators who were unprepared for this shift. Studies on similar transitions in other post-Soviet countries, such as Estonia, reveal similar trends, where the legacy of Soviet-era educational practices posed significant barriers to the adoption of new technologies (Plakans, 2011).

Despite these challenges, there is evidence that digital technologies have had a positive impact on education in post-Soviet contexts. For instance, Kocere (1995) notes the transformative effect of online catalogs and databases on academic research in Latvia, which allowed for unprecedented access to global information. Similarly, Lase (2001) highlights the growing popularity of online learning programs in Latvia, which provided new opportunities for students who were previously excluded from higher education due to geographical or financial constraints.

However, the literature also reveals several gaps in our understanding of technological integration in post-Soviet educational contexts. Much of the existing research focuses on the early stages of technology adoption, with less attention given to the long-term outcomes of these changes on academic practices. Additionally, there is limited discussion on the specific experiences of institutions like the University of Latvia, where the transition to digital technologies was shaped by a unique set of historical and socio-political factors.

This study aims to fill these gaps by providing an in-depth analysis of the University of Latvia's experience with integrating Internet and computer technologies during a critical period of transition. The central research question guiding this study is: How did the adoption of Internet and computer technologies between 1990 and 2004 influence the academic environment at the University of Latvia? By addressing this question, the study contributes to the broader discourse on technological integration in education.

Methodology

This research aims to analyze the impact of the development and integration of Internet and computer technologies on the academic environment of the University of Latvia (UL) from 1990 to 2004. The methodology involved a systematic examination of several key sources to gather relevant data and insights. The methodology involved a systematic examination of multiple primary and secondary sources, including archival publications, conference proceedings, and related literature. These sources were meticulously selected to ensure comprehensive coverage of the development and integration of Internet and computer technologies at the University of Latvia between 1990 and 2004.

A total of 232 issues of the 'Universitātes Avīze' (University Newspaper) from 1989 to 2000 were systematically reviewed. This period was chosen to capture the early discourse on technology as it emerged and evolved within the academic community. The review process involved both manual and automated keyword searches. The manual review ensured context-specific accuracy, while the automated search allowed for a broader analysis of keyword frequency and distribution over time. Given the language of the publications, the keyword search was conducted using the relevant Latvian terms. Specifically, the terms 'dator'(computer) and 'internet' were selected based on their relevance to the research focus. The keyword 'dator' was found in 199 documents and mentioned 1282 times, while 'internet' was found in 88 documents and mentioned 360 times. The keyword search was performed using a combination of digital text search tools and manual verification to ensure that variations in spelling or context did not affect the results. This approach allowed for an accurate capture of all relevant mentions of computer and Internet and computer technologies in the newspaper issues reviewed. For the qualitative analysis, the context in which these keywords appeared was examined in detail to interpret the narrative and significance attributed to these technologies. This included categorizing the discourse into themes such as challenges, benefits, and perceptions of technological change. This approach provided a deeper insight into how the academic community at the University of Latvia perceived and adapted to the integration of these technologies.

The conference proceedings of the University of Latvia included four major conferences that summarized research on technology integration in Latvian schools, higher education institutions, and libraries. These proceedings were analysed to understand the broader context and specific instances of technological integration and its impact on academic practices. Qualitative analysis of the conference proceedings involved

a thorough review of the papers presented at these conferences. This included identifying key topics discussed, methodologies used in the research, and the findings reported by various researchers. By analysing the content, themes such as the effectiveness of technology in education, the barriers to implementation, and the innovative practices adopted by different institutions were identified. This helped in understanding the broader impact of technology on the academic environment and the specific strategies employed to integrate these technologies effectively.

Three graduation books commemorating university anniversaries were reviewed. These books summarized various significant achievements and events. The qualitative analysis of the graduation books involved identifying and categorizing significant technological milestones mentioned in these books. This included advancements in digital infrastructure, the introduction of new educational technologies, and key events that marked the integration of these technologies into the university's operations. By examining the narratives around these milestones, insights into the university's strategic approach to technology adoption and the resulting impact on academic practices were gained.

Results

The integration of Internet and computer technologies at the University of Latvia during the 1990s and early 2000s represents a significant case study in the transformative power of digital tools in educational settings. This period of rapid technological advancement coincided with major shifts in pedagogical approaches, access to information, and the skill sets required by both educators and students. The results outlined below detail the specific impacts of these changes, highlighting the challenges and opportunities that arose from the convergence of technology with traditional educational methods. From enhancing global information access to reshaping learning processes and addressing resource disparities, the influence of technology at the University of Latvia illustrates broader trends in the digital evolution of higher education.

Rapid Technological Change and Information Gap

In the early 1990s, the rapid evolution of the internet and computer technology created significant challenges in education. The speed of these changes made it difficult for educators and policymakers to stay informed and updated (Kangro, 1997; Grīnfelds, 2000). The *IEA COMPED* study in 1992 highlighted the need to bridge this information gap and understand the role of computers in enhancing educational outcomes (Grīnfelds, 2000). The fast pace of technological advancement required continuous learning and adaptation from educators. Policymakers were especially concerned with how these technologies could improve educational effectiveness, a concern that persisted throughout the 1990s.

Access to Global Information and Traditional Resources

The advent of online catalogs and databases significantly broadened the scope of academic research, allowing students and researchers to access information from global sources (Kocere, 1995). This global access facilitated deeper research and the possibility of interdisciplinary studies. Despite the surge in digital resources, traditional printed materials retained their value. Baiba Sporāne's 1997 study emphasized that while computers could provide quick access to information, the depth and completeness often remained reliant on traditional texts (Sporāne, 1997). This dual reliance on both digital and traditional resources shaped the academic environment. The rise of digital resources also brought challenges related to copyright and the ethical use of information. A 1997 study by the Institute of Educational Research revealed that a significant portion of users were unclear about legal boundaries concerning software and information theft (Kangro, 1997). This highlighted a growing need for digital literacy and ethical guidelines.

Transformation of the Learning Process

The integration of technology into education transformed traditional learning models. With the internet, students could choose and follow curricula online, engaging in a more flexible and self-directed learning process (Kuzmins, 2002). Universities began offering online learning programs, which became popular due to their convenience and accessibility (Lase, 2001). The concept of a "virtual tutor" became possible with technology, providing students with uninterrupted and objective learning support (Kuzmins, 2002). This shift marked the beginning of a move from a fixed, location-based education system to a more dynamic, personalized, and inclusive learning experience.

Skills, Training, and Knowledge Development

The integration of IT in education required teachers to develop new skills. In the late 1990s, there were limited IT specialists, so many teachers, particularly in subjects like physics and mathematics, had to incorporate IT into their teaching, often without adequate training (Grīnfelds, 1997). Workshops and additional training were initiated to help bridge this gap. Students entered universities with varying levels of IT knowledge, making it difficult for educators to teach subjects like informatics effectively. The disparity in students' IT skills often led to challenges in teaching and required instructors to adjust their methods to accommodate lower skill levels (Kangro, 1997).

Financial and Technical Resources

The uneven distribution of computers and technology across different schools and universities created disparities in students' and teachers' ability to engage with new technologies (Silva, 1995). Financial constraints delayed the introduction of necessary technology, further exacerbating these disparities. Efforts to improve technological access included international collaborations and the establishment of specialized training centers. For instance, cooperation with the University of Iceland provided much-needed computers and training resources to the University of Latvia (Riekstina, 1995; Brikmane,

1995). By the late 1990s, the University of Latvia had significantly improved its technical infrastructure, becoming a leader in the Baltic States (Sadovska, 2001).

Conclusions

The study highlights that the introduction of the Internet and computer technologies at the University of Latvia between the early 1990s and 2004 had a transformative impact on the academic environment. These changes are evident across several dimensions:

1. **Adaptation to Rapid Change.** The fast-paced development of technology required continuous adaptation from both students and educators. This need for ongoing learning and skill development was essential for integrating new technologies into the academic environment.
2. **Duality of Information Sources.** While digital resources expanded access to information, traditional printed texts continued to play a crucial role in academic research and education. The coexistence of these resources underscored the importance of a balanced approach to knowledge acquisition.
3. **Transformation in Learning Models.** The shift towards online learning and flexible education models marked a significant departure from traditional fixed curricula. This transition empowered students to take greater control of their education and highlighted the importance of adaptability in educational institutions.
4. **Skill Development and Resource Disparities.** The successful integration of technology in education was heavily dependent on the availability of resources and the ability of educators and students to develop necessary skills. Disparities in resource distribution and varying levels of digital literacy among students and teachers posed significant challenges.
5. **Ethical and Legal Considerations.** The rise of digital resources also brought ethical and legal challenges, particularly concerning copyright and the proper use of information. These issues emphasized the need for clear guidelines and education on digital ethics.

In conclusion, the integration of the Internet and computer technologies into the academic environment at the University of Latvia led to profound changes. These changes, driven by the need for adaptability and continuous skill development, reshaped traditional academic practices and paved the way for future innovations in education. These findings serve as a foundation for understanding the factors critical to successfully integrating technology into modern educational environments. In summary, the University of Latvia's experience with integrating Internet and computer technologies offers valuable insights into the broader challenges and opportunities that accompany technological advancement in education. The shift required not only adaptability and continuous skill development but also a rethinking of traditional academic practices. These findings highlight the critical factors necessary for successfully integrating technology into modern educational environments, including the need for equitable access to resources, comprehensive training, and an emphasis on ethical considerations. As educational institutions

continue to evolve in response to technological advancements, these lessons remain relevant and provide a solid foundation for future innovations in teaching and learning.

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GEOGRAPHIES OF CHILDREN: QUO VADIS HEDUM?

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ABSTRACT

Studies of childhood geography reflect the significance of place and space of childhood. It is inseparable from the geography of the child, the main actor of childhood. The geographies of childhood are primarily focused on the way adult society shapes childhood, whereas the children's geography is more concerned with their experiences. In order to analyse and identify the framework and tendencies of contemporary geographies of children, the author formulates the following questions: 1) What research methods have been applied to research the geographies of children? 2) Which factors define the 'map' of geographies of contemporary children in the context of education?
To identify the spatial and time frame of geographies of contemporary children and to answer the stated questions, the following criteria were set for the scoping review: the Web of Science database was chosen and open access articles in English with the period 2019–2023 were selected using the keywords "geographies of children" in the category "Education; Educational Research". A selection of 47 articles was made of which 19 were analysed as relevant to the focus of this scoping review.
Public and private narratives of geographies of contemporary children are intertwined, driving geographies of children from the micro to the macro level. The promoters of geographies of children in educational contexts identified in the review are largely socio-geographical, with human rights as an important feature of geographies of children, since a significant amount of research focuses on the geographies of children from marginalised groups.

Keywords: *children, childhood, geographies of children, geographies of childhood, education.*

Introduction

UNICEF estimates, based on the 2022 Revision of World Population Prospect, that the world is currently inhabited by approximately two billion three hundred and ninety-seven million four hundred and thirty-five thousand and five hundred and two people under the age of eighteen (United Nations, 2022). What are the paths of these children and how do they relate to education? According to UNESCO, by 2022, 244 million children and young people are unable to attend school and receive an age-appropriate education. The environment is more than just a background for the activities (Djohari et al., 2018), from an educational point of view, the geography "map" of

contemporary children is as diverse as the environments which they inhabit whether or not it is possible to attend educational institutions.

Before mapping the contemporary geography of children and childhood, it is important to define the origins – geography evokes certain associations. The first use of the word "geography", or "writing about the world" as the ancient Greeks termed it, was by Eratosthenes of Cyrene. The key connection between Antiquity and the Renaissance, which marked a significant leap in the discoveries of the intellectual and spatial world, was when in 1533 Erasmus of Rotterdam edited Claudius Ptolemy's "Geographia" (or "*Geographike Hyphegesis*"), written around 160 AD (Ormeling, 2015). Although geography is a discipline with a long heritage, it has the potential to evolve continuously with sub-disciplines, including cartography and GIScience, as well as human, material and environmental and social geography. Notwithstanding the constant discussion on the issue of whether geography should generate idiographic or nomothetic literacies, geography has, over the past decades, undergone a dynamic development of specialisation within its subfields (Sui & Turner, 2022). The difficulty in defining human geography is complicated – human geography is seen as a sub-discipline of geography because of the relatively recent formalisation of the human geography discipline (Gibson, 2009). The division between geography and human geography continued for most of the 20th century (Shaw et al., 2014). Albeit children and youth were often absent from the wider human geography epistemology, the understanding of the geographies of childhood and youth that has been acquired challenges, supplements or broadens the fundamental changes that other forms of socio-cultural diversity have generated in human geography (Horton et al. 2008).

The social perspective on childhood, though it had earlier foundations, thrived in the geography of children, young people and families from the early 1990s (Holloway, 2014). To pick a particular year or even day and declare that "the world really changed then" is quite satisfying and sometimes very understandable (Mitchell, 2018), and indeed the most comprehensive human rights treaty in history – the Convention on the Rights of the Child – marked a significant turning point for children around the world. The issue is whether the rights are a guarantee? According to the United Nations, one in six children experience extreme poverty on a daily basis (United Nations, n. d.); these data point to grave violations of children's rights. The respect (and violation) of children's rights affects the children's geography from the micro to the macro level.

Theoretical background of childhood and children's geography

The late 1960s mark perhaps the greatest geographical achievement – the Apollo 11 crew landed on the Moon, and for the first time in the history of human geography, man set foot on Earth's natural satellite, stimulating not only the imagination, but also the demand for education. The educational context has conventionally been at the centre of histories of children and youth (Sköld & Vehkalahti, 2016). The history of education and childhood studies are research fields that have developed alongside each other.

The children's geography and the geography of childhood have indirectly accompanied this process of development, but as a field of research are relatively recent.

Children's geography emerged in the 1970s in the United States of America. A decade later neo-Marxists, feminists and critical theorists addressed children's geography through a relatively political prism, initiating important processes and promoting the right of children and young people to freedom of action (Aitken, 2018). Gill Valentine (2003) highlights research papers that pioneered the development of children's geographies – William Bunge's and Robert Bordessa a study (1975) on how children experience spatial oppression and James Morris Blaut and David Stea's research (1971) on children's early mapping skills. These papers launched research on children's life experiences, in particular their access to and use of spatial resources. Various practices of humans generate and exploit diverse spatial concepts (Harvey, 2009). Research on the historiographical geography of the concepts of time and space reveals that the construction of these concepts is grounded in the way they are produced and in the social relations that characterise them (Harvey, 1990), turning space into place. Unequal geographical patterns of everyday life and children's exposure to issues based on these patterns led to an increase in social projects for environmental activism (Gregory, 2011).

The geography of childhood often focuses on the ways in which adult society constructs childhood, whereas the children's geography is centred on the daily practices of children. Studies of childhood geography explore the dynamics of power among adults and youth (Disney, 2018) – a process that takes place throughout the history of childhood.

For more than 20 years, the geography of childhood has become a dynamic cross-disciplinary study of the everyday nature of children's lives. Childhood is a diverse and changing phenomenon, shaped by many factors (Gregory, 2011). Furthermore, children shape themselves by inhabiting and creating places.

The concept of children's geography includes the research of children and youth habitats, which are defined through experiences, ethical values, political, religious factors and cultural influences (Aitken, 2018), which in fact presents a particular challenge for geographers of childhood and children – researching, analysing and inferring makes a vast contrast between a researcher and a child/youth, for whom a certain experience might be unique. In essence, Aitken & Herman (1997) characterise it as a representational crisis.

Methodology

The research for this article is based on a scoping review. Initially, 47 articles were selected for abstract and keyword analysis. 19 articles were found to be relevant to answering the research questions.

Two following research questions were initially formulated:

1) What research methods have been used in studies of children's geographies?
2) What factors determine the 'map' of contemporary children's geography in educational contexts?

A keyword search was carried out in the Web of Science database. The selection criteria were the thematic framework of education and educational research, English language and open access. The time frame for the selection of articles was 2019–2023. The time frame chosen for the selection of the articles clarifies the current relevance of children's geography and the situation in the field of research, revealing the impact of current factors on the issue under study. Based on the research question of this paper, the keywords "children's geographies" were applied. The initial selection was made by reviewing the titles and abstracts of the selected scientific articles. The articles selected were focused on children's geography rather than childhood geography. After reviewing abstracts of 47 articles, 34 papers were selected and analysed. 15 articles were excluded as not being relevant to the stated objective of the scoping review.

Inclusion criteria:

- Research on children's geography is linked to access to education;
- Research on children's geography is related to the quality of education;
- Grounded methodology.

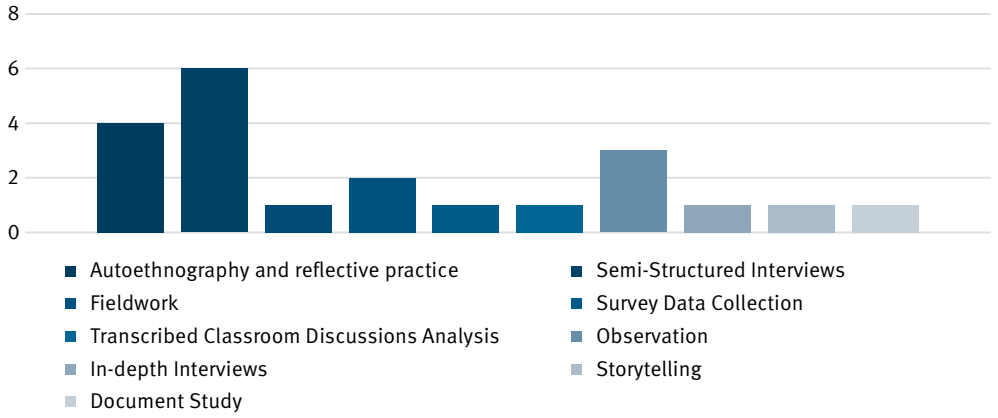
Exclusion criteria:

- The generalised articles refer to the geography of childhood;
- Case studies that are not appropriate to the general research;
- The article does not include a theoretical framework.

Findings

After a qualitative analysis of 34 papers with the keywords "children's geography" and on the basis of inclusion and exclusion criteria, 19 papers were identified as relevant. The selected articles were searched for two defining aspects: 1) The methodology of research on children's geography; 2) Factors affecting education, the quality of education or access to education in the context of children's geography and vice versa. The studies reported in the articles selected were conducted worldwide and are relevant to the social sciences. Qualitative research design dominates the 16 articles reviewed. One of the selected articles represents a quantitative design research and one – mixed research design.

The tendency to attribute children's geography research to the application of qualitative research design leads to concerns about the trustworthiness of the research. Credibility is a measure of the extent to which qualitative research is a true reflection of the phenomenon or process being studied (Mārtinsone et al., 2016). Although there are concerns about the reliability of the findings, the studies analysed come close to reflecting many of the realities faced by researchers or authors in the context of children's geography. The use of qualitative research designs highlights the importance of: 1) The researcher's understanding of the geography of children (including political, socio-economic, cultural spheres of influence); 2) The risk of ethical misconduct in research; 3) Children and/or child carers as comparably involved research participants.



Graph 1 Overview. Research methods

The methods most commonly used in the development of the selected articles are autoethnography and reflective practice, semi-structured interviews and observation. In-depth interviews, storytelling, documentary research, analysis of transcripts of classroom conversations, questionnaire data collection and statistical analysis are identified in smaller numbers.

Autoethnography and reflective practice – four, semi-structured interviews – six, observation – three, field research – two, other methods – one each (see Graph 1). The methods used in the selected studies mainly reflect the relatively intimate and exploratory nature of the research. The three most commonly used methods in the articles selected for this scoping review were also considered.

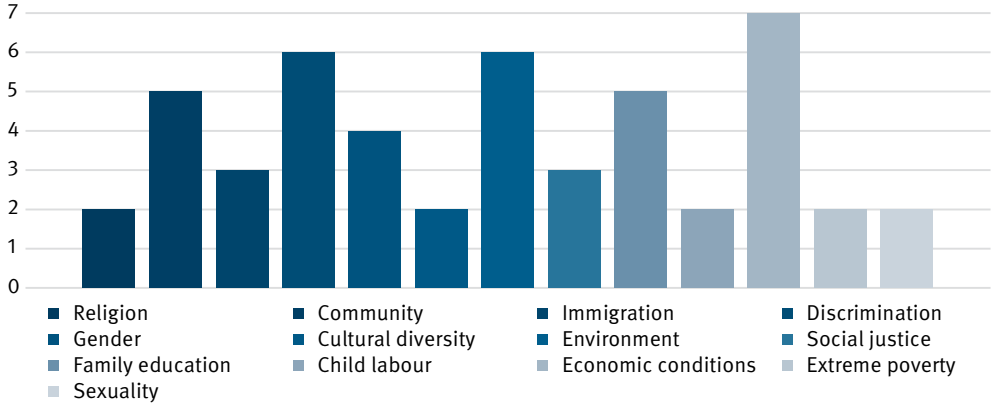
Autoethnography portrays the personal practices of the researcher analysing their personal experiences, it is a people-centric approach. Any paper that refers to autoethnography must contain one's private experience and, by means of a considered discussion, show why this experience is meaningful and historically and/or culturally relevant (Sparkes, 2020). From this perspective, personal interests often overshadow the main objective of the research. However, this is not necessarily in conflict with the aim of scientific research per se, and the use of autoethnography in children's geography research strengthens the ethical aspects of the research as it allows biases to be seen through personal narratives. Autobiographical practices, often complementary, whose methodology includes autoethnography, are used in children's geography research (see Cahill, 2007; Woodyer, 2008). In children's geography research, the use of autoethnography promotes the presence and participation of participants and the development of shared knowledge between participants and the researcher, establishing a relationship of trust.

Semi-structured interviews form an insight into the thoughts and feelings of the research participants. The interview is probably the most used methodological and research instrument in the social sciences; it is the core of qualitative research strategies (Edwards & Holland, 2020). The importance of taking into consideration the social context when using interviews as part of the information gathering practices in which

they are carried out should be stressed (Herod, 1993). Personal interviews are considered a benchmark because they provide a large amount of information (Edwards & Holland 2020), which can provide abundant dataset for children's geography research and help map the geography of the modern child in the child's own words, also interviews can be adaptive and flexible to reflect studies on sensitive topics. Interview as participatory research might involve the independent and autonomous expression of views by research participants, which is not always justified as children do not always need adult support to construct ideas and perspectives (Rautio, 2013). An ethical approach to research is essential in children's geography, so the researcher has the opportunity to control the course of the interview by stimulating it or allowing it to be guided by the research participants.

Observations. In a social science context, research on the meaning of place focuses on how routines, experiences, identities and practices are shaped in the context of place, rather than independently of it (Djohari et al. 2018). It is a method of research in defined settings observing the research participants and phenomena in their natural environment, which is an important prerequisite for the study of children's geography, as this area of research focuses on children's construction and perception of place and space. Observation as a research method has many advantages for children's geography research. However, one of the most relevant issues in the context of research ethics is power relations, not only during data collection but also in the interpretation of findings (Morrow, 2008) analysed from an adult perspective.

It should be noted that online and offline dimensions blend in the construction of the identity of the contemporary person – *Homo digitalis* (Rubene, 2024). Videos have rapidly grown in mainstream contemporary culture, from TV to on-line video streaming and private live feeds on social networks (Lau & Bratby, 2023) and it seems quite common that part of the qualitative data extraction methods are carried out on-line, that is *Homo Digitalis* familiar, natural environment where, in addition to the aspects that are specific to the digital realm, the same impact on children's geographies mapping prevails as in the physical world.



Graph 2 Overview. Factors that define the 'map' of geographies of contemporary children in the context of education

Relatively high scores for discrimination, community and environmental influences, economic conditions, and family educational attainment – for example, whether one or both parents have any qualifications or education (Compton-Lilly et al., 2019). It is useful to analyse these factors in conjunction. Disruptive circumstances are socio-economic disadvantages, negative experiences in early childhood or other barriers that usually affect educational achievement (Dvorakova, 2024). An important factor indirectly influencing children's geography is attachment, which plays an important role and affects social competences. Positive attachment to an adult can ease circumstances (Sebre & Miltuze, 2022) and promote changes of habitual mobility "stopovers", however, children's geographical routes do not always intersect with the person of attachment.

Discussion

Social and personal relations and ties in both space and time are formed around material things (Kestere & Strazdins, 2023) and it is often material things that determine life practices. Michel Foucault was among the first to question why history is dialectical and bold with multiple meanings, while space is viewed as constant (Whittingham, 2019) – time as linear ever-changing movement versus static background of space. Indeed, social science traditions favoured time and marginalised space (Gregory et al., 2011).

Place and space are different, but constructively connected (Whittingham, 2019). In the articles selected for this scoping review, these concepts are often complementary or substitutable. Place is a human-made construction. From a perspective of human geography, place location is often given a wider meaning and is defined as a human-made or pre-existing spatial transformation (Gregory et al., 2011). Place is constructed with cultural or subjective meanings and overlays, and is therefore in a continuous production state. The interactions between people, place and space are important not only for scholars working in the field of geography, but also for educational institutions (Hammond, 2023). Space, place and time are the dimensions of children's geography which are complemented by material objects.

Neither the world, nor perceptions, nor man-made images or other representations of the world are the same as geography (Lowenthal, 1961), which is constructed from an early age. It has to be noted that geographical imaginaries are fundamentally involved in the physical and sensuous creation of the physical world. Geographical imaginaries are more than representations of the world (Gregory et al., 2011). It is worth considering this question from two points of view: first to dwell on the idea expressed by Maurice Merleau-Ponty (1961) that the human hand cannot trace the illusion of place constructed and imagined by the eye and mind, and second on the personal, subjective nature of geographical imaginaries.

Innovations, both tactile and non-physical, transfer one from physical mobility to imaginary. Likewise as stained glass in a cathedral, picture books have the same spatial and educational abilities. As a provocative yet simple educational tool – picture books – provide a shared imaginative space for exploring ideas and experiences (Oberman, 2023)

that leads back into imaginary fields of geography. Contemporary education systems are undergoing changes that make education adaptable, and inclusive (Rozhi et al., 2023) – changes that are everlasting. Nearly any subject, including those that in the comparatively recent past would have been taught on-site, can be taught via online learning, complementing theoretical knowledge with tools for parallel or virtual reality. Imagination, combined with relatively realistic representations, such as in computer games, can not only expand children's (and adults') spatial horizons, but also support the learning of particular content (Tüzün et al., 2019). The digital environment is an area of significant importance for children's geography, as any nonphysical place involved in the processes of education. In summary, children's geography does not have to be obvious, but can be derivative, individually constructed and not revealed to others.

The early age illustrations and their non-verbal nature provide opportunities for children to interpret and create meaning (Oberman, 2023). These may be interpretations that are not notable to adults. Children's drawing studies are a tool for discovering features which are familiar to children and how they connect and navigate in their environment. Besides being a platform for children's self-expression, drawings also helps to articulate the internal models that children acquire about their living environment as they evolve and progress in their cognitive development (Sanchis et al., 2022). From a social science perspective, aspects of children's use of space can influence adults' understanding of their use of space (Berkhuizen, 2020). The researcher / adult should take into account not only the children's movement patterns, but also the semiotic construction and interpretative meaning, the choice and use of means of expression, and creative solutions.

Play and games (both physical and digital) inherently provide a lot of information about children's geography though creative world modelling and situation construction in a creative way. Observation and analysis of children's play often reveals unexpected areas, as such observation can take place without an academic or research purpose and often borders on ethics and child protection (Henderson, 2018). Play and creative self-expression is a highly valuable area of research in children's geography, particularly with relatively young research participants. Article 31 of the Convention on the Rights of the Child states that appropriate and equal leisure opportunities should be respected and promoted (United Nations Convention on the Rights of the Child, 1989) which means that every child should have the freedom to enjoy playtime.

Children's rights are an important aspect that threads through the papers of this scoping review. Certain experiences are used to understand, recognise and explain the social world (Pinandita et al., 2020), so in some societies child labour and/or decision to work from an early age due to extreme poverty is normalised in order to pay school fees or support the family. The labour market for children varies depending on socio-economic conditions. Children often work outside school hours if their workplace is not located far from home (Ango et al., 2022). Child labour is just one of the inequalities that characterise the geography of children. Unequal access to the digital environment as another aspect affecting everyone's right to education (Rivera-Vargas et al., 2023). Accessibility to education can also be presented in the language used for education and at home

(Gunnlaugsson et al., 2021). Language barriers might lead to exclusion and isolation. Based on the diversity of transnational practices, the geography of children and young people is not only influenced by the resources available to them. Receptive literacy practices involve the literacy texts that people consume and access (Compton-Lilly et al., 2019). Parental education, comprehension and language proficiency play a significant part holding a child accountable for the practices and geography of their parents. Critical social research and the geography of children and youth have contributed to a transition from focusing on children in their domestic context (Punch, 2006), however it would be unfair to discuss the geography of children as a whole in isolation from that.

Until the early 19th century, in Western culture, human biography was seen as a continuous sequence of development, and childhood was considered the first stage prior to the real life (Jeffrey, 2009). The sense of belonging to a place or a particular social group is formed in childhood. Understanding one's sense of belonging is an essential part of identity formation and self-confidence. A sense of security with certain people and places has been recognised as a basic necessity (Baumeister & Leary, 1995). A diffuse explanation of belonging is common at different ages, and one of the studies reviewed indicates that younger participants tended to reflect on home in terms of significant social relations such as with their families, while the elder participants explored the idea of home in emotional aspects of attachment, focusing on the various associated emotional experiences (Maine et al., 2021). Children who move or are born to immigrant parents often face stereotypical attitudes not only towards themselves but also stereotypical judgements about different practices and places (Hammond, 2023), and while children's contemporary international perceptions are considerable, many misconceptions and stereotypes exist. Children's knowledge of international issues is incomplete and sometimes inaccurate (Compton-Lilly et al., 2019). On one side, this is due to the different characteristics of the ageing process, on the other to confusion about the overly broad information landscape.

Another important factor is the dilemma of belonging from an adult perspective. The aspects shown in Graph 2 have an impact on the household, i.e. adults. Socio-economic capabilities, both within and across generations, as well as over time and place, render the relationship between children and their families mutually dependent, as a consequence of limited schooling (Punch, 2015). Education is the key to reducing inequalities in society, as it is linked to income, employment and general wellbeing, but the flip side of the coin is that education also reinforces inequalities, as educational qualification level tends to be maintained from generation to generation (OECD, 2017) furthermore, UNICEF's Education Strategy 2019–2030 has as one of its three main objectives to eliminate unequal access to education for children and adolescents (UNICEF, 2019) which shows that equal access to education is a pressing issue that needs to be addressed.

Child care and access to educational facilities are assets for supporting families with children, as it both keeps parents in employment and offers an appropriate context for positive child development. Childcare friendly neighbourhoods are a welcome signal for new families and enterprises considering where to relocate (Sipple et al., 2020). Having

a convenient, affordable and efficient pre-school education in the neighbourhood, which also provides day care, reduces economic risks not only for the individual, but also for society. OECD member states are focusing more on parent training and education, devoting more resources to it, ensuring the education of children (Holloway & Pimlott-Wilson, 2019).

Another issue is the religious considerations underlying the geography of children. Gender as a factor determining access to education for religious reasons is a fierce area of children's geography. According to UNESCO, there are countries (Iran, Afghanistan and Malawi) where girls are not educated about puberty (UNESCO, 2019), which is an important factor affecting girls' mobility and geography. Gender, sexuality and family norms, limiting people's agency, control individuals and collectives (Reimers, 2024). Religious prejudice creates unnecessary stereotypes in educational contexts. Models of religion and identity navigate multiple and at times contradictory social spaces in the construction and representation of their identities (Hammond, 2023), reinforcing stereotypical images not only of children, but also of their behaviour and pathways.

Stereotypical perceptions can be related to another issue that emerges in the articles analysed: how to talk about sexuality in the context of geography with children. How to teach the geography of children's sexuality (Hall, 2020) if there are so many bias and risk of marginalisation. A sensitive approach to the presentation of specific and potentially controversial visual content to children in the classroom, including prior screening of the appropriateness of such content and consideration of the necessary preview of content, with warnings about controversial content being given priority (Zebracki & Hall, 2020). A curriculum that is not needlessly graphically challenging encourages not only learning, but also thinking, breaking down prejudices and promoting inclusion.

The above considerations underline the use of mostly qualitative research design in "mapping" children's geography – these are sensitive or rather personal topics. Although often taking place in a public context, the mobility and the geography of the individual are private. The concept of mobility is embodied in the principle of motion. From a historic viewpoint, daily mobility are essentially about the separation between a space of residence and other locations (school, workplace etc.). In addition to socio-economic changes, mobility is also driven and challenged by innovation (Šūmane, 2010). Access to education and educational innovations differs between and within countries, for example due to differences in wealth, location, gender, nationality, language, religion, ethnicity and mobility (UNESCO, 2020). The articles analysed in this scoping review cover a broad array of national contexts, but there is a common feature that ties these studies with each other: their participants are at risk of being marginalised if they are not already.

Conclusion

Children's geography is associated with certain stereotypes and preconceptions about what it studies. It is a broad research field, where qualitative research methods currently dominate, but quantitative approaches are also inevitably used, both in terms of primary statistics and data synthesis.

Childhood geography is a field of social sciences that studies the social, cultural and environmental contexts that shape children's experiences and development. Children's geography is a branch of childhood geography that addresses children's life experiences, in particular how children perceive and interact with their environment. Childhood geography and children geography are research fields based on two pillars: human geography and childhood studies, which allow the field to be studied from different perspectives that are affected by social, economic, ethical, religious, political aspects. The geography of childhood explores how the geography of children is influenced by adults in the context of these issues, while the geography of children explores how place is constructed and navigated by children. Contemporary researchers of children geography emphasise social issues and challenges, with a particular focus on the geography of children from marginalised groups.

Equitable access to quality education for all young people should be ensured to support social inclusion and improve socio-economic outcomes. This will not only be an improvement for today's children, but also a cornerstone for the quality of life of future generations.

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PERSEVERANCE AND CONSCIENTIOUSNESS SCALES AS INDICATORS OF STUDENTS' SCHOOL SUCCESS

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ABSTRACT

When thinking about students' achievement, the first thing associated with it is future success. When trying to explain why all things being equal some students may achieve highly and others may not, researchers have identified a variety of influencing factors, both those that can be measured by the tests of cognitive abilities and intelligence, and those that represent student's personality and temperament. While cognitive achievement is usually closely related to intelligence, personality and temperament are not. Researchers are still searching for the best factors to explain the impact of personality on student's achievement in learning and in everyday life and work. One such factor is perseverance that is measured in Grit scale; according to research, students with higher perseverance show better academic performance and achieve higher results in later career. Similarly, student's personality in various personality tests have shown a high correlation between achievement and personality trait Conscientiousness.

The aim of this study is to adapt an instrument for measuring perseverance, to create an instrument for measuring conscientiousness in the Latvian language, and to test whether these instruments can be used in adolescent population. The study involved 219 sixth and ninth grade students from 15 schools in Latvia. The factor structure of these two concepts were created and approved using exploratory and confirmatory factor analysis. The factor analysis resulted in two scales – one for each concept, which were compared with the students' self-reported diligence, working hard and academic achievement at current school year. Results showed that students' conscientiousness is closely related to perseverance and academic achievement. Overall, students' self-reported academic achievement can be explained by perseverance ($R^2 = 0.48$) and conscientiousness ($R^2 = 0.59$). Both constructs explain 62% of student self-reported academic achievement.

Keywords: *Academic achievement, Grit, perseverance, conscientiousness, school specific Grit, Short Grit Scale, Non-cognitive skills.*

Introduction

It has been a "black box" for educators to understand why there are differences in students' performance if all measurable features like socio-economic background, gender, age, intellect are similar (Kampmane et al., 2023). It was believed that intellect explains

academic achievement, but several meta-analysis studies showed that this correlation is only 0.5 (Roth et al., 2015) and that cognitive abilities did not explain income distribution later in students' life (Osborne et al., 2001). Scholars and practitioners have suggested that other students' features like attitudes, personality, perseverance and conscientiousness as well as self-concept, self-efficacy are as important as students' cognitive abilities (Chuna & Heckman, 2007; Humphries & Kosse, 2017; Kampmane et al., 2023; Kampmane & Ozola, 2022; Geske et al., 2021a; Geske et al., 2021b). Although it is believed that some students' features like personality traits are relatively stable, researchers suggest calling all these features as skills (Roberts et al., 2014) and believe that they can be trained (Bleidorn et al., 2016).

Perseverance and conscientiousness are highly popular words among educators when talking about students' success. Both are associated with responsibility, habit of hard work, diligence and achievement striving (Crede et al., 2017; John & Srivastava, 1999; Meyer et al., 2023). Some researchers have concluded that perseverance explains educational attainment better than intelligence, whereas conscientiousness explains financial income better than cognitive abilities (Palczynska & Swist, 2018).

Perseverance is defined as non-cognitive feature that can be measured by persistence and passion to achieve long-term goals (Duckworth et al., 2007). Duckworth and colleagues created and validated perseverance measurement scale and called the concept as Grit. Meta-analysis studies have found that perseverance that was measured in Grit scale was strongly and positively correlated with academic achievements (Lam & Zhou, 2019). Schmidt and colleagues (Schmidt et al., 2017; Schmidt et al., 2019) suggest adapting Grit scale to schooling in order to help students to give more precise answers, and suggest naming scale's two factors as interest and effort. Researchers have found that if perseverance was measured in domain (for example, Mathematics) specific Grit scale, it was not related to academic achievement as strong as if it was measured as school specific. Whereas Abu Hassan and colleagues (Abu Hassan et al., 2020) have concluded that results of perseverance measurement instruments that used Grit scale were not consistent among age, nationalities and languages. Some authors have argued that perseverance is the same concept as conscientiousness (Rimfeld et al., 2016; Dumfart & Neubauer, 2016). Conscientiousness have been defined as one of the five personality traits that is characterized as socially acceptable impulse control, high self-efficacy, ability to wait one's turn, ability to plan ahead and prioritize tasks in a manner that helps to accomplish them (John & Srivastava, 1999; Costa & McCrae, 2008). Several studies have provided evidence that among all personality traits, conscientiousness had the highest correlation with students' academic achievement (Poropat, 2009; Hattie, 2023), although Bardach and colleagues (Bardach et al., 2023) conclude the opposite that conscientiousness did not have significant correlation with academic achievement.

Purpose, Hypothesis and Research Questions

The purpose of this study is to 1) adapt and validate the perseverance instrument, 2) to create, adapt and validate instrument for conscientiousness measurement as stand-alone

concept without associating it as a personality trait, and 3) to evaluate the shared variance of academic achievement distribution of perseverance and conscientiousness.

The hypothesis of this study is that if perseverance is measured with school specific Grit scale's questionnaire, the construct consists of two factors – interest and effort, and both factors can be added as second order factors that represent perseverance as one concept.

The first research question of this study is – what would be the best factor structure for conscientiousness measurement? The second research question of this study is – how perseverance is related to conscientiousness and if they are related, do they share common variance of students' academic achievement distribution?

Methodology

The Sample

The sample in this study consists of two student groups that were attending 6th and 9th grades during data collection in May 2023 and January 2024. Randomly chosen schools from convenience sample were contacted and volunteering students were searched. Altogether there were 254 students from 15 schools – one class from every school. After data cleaning 219 students were eligible as respondents – 107 students from 6th grade and 112 students from 9th grade, 108 girls and 92 boys and 19 students that did not indicate their gender. All students were divided in three groups – 54 students responded to all questions, 79 students responded to questions about their conscientiousness and 86 students responded about their perseverance. In total, 132 respondents participated in conscientiousness questionnaire and 139 respondents participated in perseverance questionnaire.

Measurement Instrument of Perseverance

Perseverance is measured by Grit scale's questionnaire items that were translated from Schmidt et al. (2017). The instrument consisted of 8 items as described in appendix. As neither Duckworth and Quinn (2009) nor Schmidt et al. (2017) scales were previously translated into the Latvian language, the author of this research asked two independent translators to approve translation and conducted field study or pre-study by interviewing six 6th grade students via parents' e-mail and all 9th grade students from one 9th grade with a help of their teacher. As none of selected students had any questions or misunderstandings about the translation or meaning of questionnaire's items, the author used the translation approved by translators. Original items in Grit scale were evaluated into 5-point Likert type scale from fully agree to fully disagree. The translated questionnaire was adapted according to the Likert type scale used in large international comparative studies like IEA PIRLS and TIMSS and in other studies that are used at schools in Latvia with four items from fully agree (value 4) to fully disagree (value 1).

Measurement Instrument of Conscientiousness

Conscientiousness scale items were constructed using several personality trait tests (Goldberg, 1999; Schmitt et al., 2007; Johnson, 2014; Maples-Keller et al., 2019; Perkona, 2022). Two instruments of Schmitt et al., 2007 and Perkona, 2022 were already translated and adapted into the Latvian language in the adult population, but none of the instruments was adapted for an adolescent population. Using Schmidt et al. (2017) suggestion to specify the items for students to think of an academic setting when answering, the author created her own conscientiousness questionnaire with 12 items as described in appendix. Items in questionnaire were evaluated into 6-point Likert type scale from "This is exactly like me" (value 6) to "This is not at all like me" (value 1).

Other Measured Items in the Research Questionnaire

Other items included general information about respondents – gender (girl, boy, do not want to indicate), current grade (6th or 9th) and age (11–16). Respondents made self-assessment about how hard they worked for schoolwork by marking values from 0 (not at all) to 10 (very hard), diligence – how diligent they were during their study semester by marking "Not diligent enough" (value 1), "Somewhat diligent" (value 2), "Quite diligent" (value 3), "Very diligent" (value 4) and academic achievement in current school year:

- Mostly what are your marks/grades in mother tongue?
- Mostly what are your marks/grades in reading (literature)?
- Mostly what are your marks/grades in Mathematics?

Students marked one of four options: "Very weak" (marks from 0 to 3, value 1), "Weak" (marks from 4 to 5, value 2), "Optimal" (marks from 6–8, value 3), "Very good" (marks from 9–10 , value 4)

Data Analysis Methods

To confirm internal factor structure of perseverance that was measured in Grit scale as it was already discovered in Schmidt et al. 2017, confirmatory factor analysis was performed. To obtain internal factor structure of conscientiousness that was measured by different items from different questionnaires, explanatory factor analysis was performed. To estimate model fit (whether retained number of factors are enough) four fit measures were applied – Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and Goodness of Fit (GFI) index. TLI and CFI compare how well null model fits with a currently tested model where TLI returns higher values for simpler (parsimonious) models but CFI – evaluates improvement of fit. Goodness of fit index (GFI) compares correlation matrix that of factor structure and base model. Values for all three indices varies from 0 to 1, values above 0.9 are considered to be good (Finch, 2020; Hu & Bentler, 1999). RMSEA is absolute fit index that analyses base model degrees of freedom and existing model degrees of freedom. The smaller the difference, the better model fit. Traditionally, the value of 0.06 or lesser identifies good model fit (Hu & Bentler, 1999), although there are no such "golden standard" for all cases that is why researchers suggest using more than one fit measure (Chen et al., 2008).

After factor structure was approved, scales were created from composite variables by calculating average values per each respondent (Song et al., 2013) and the scale internal consistency test was performed by calculating Cronbach's Alpha coefficients (Taber, 2018).

Before correlation analysis test of normality was performed. Following recommendations Shapiro-Wilkinson test was used. Data is normally distributed if the result of this test is not significant (Yap & Sim, 2011). Correlation analysis was performed to calculate the concurrent criterion validity of constructs (Kimberlin & Winterstein, 2008) between perseverance and conscientiousness. Correlation analysis was performed also between these two constructs and students' self-reported academic achievement, diligence and hard work. Linear regression models were analysed to calculate the predictive validity of instruments and to find the explained variance in students' self-reported academic achievement that could be explained by conscientiousness and perseverance.

For data analysis IBM SPSS 29.0.0 and Jasp 0.18.3. software was used.

Results

Perseverance Factor Structure and Dimensional Reliability

To test the hypothesis of this study that perseverance that is measured with school specific Grit scale's questionnaire is constructed of two factors – interest and effort, Confirmatory Factor Analysis (CFA) with two factor model was built as described in the previous studies (Duckworth & Quinn, 2009; Schmidt et al. 2017). Figure 1 shows factor structure and standardized loadings with sample of 140 respondents.

As it is displayed in Figure 1, perseverance consists of two factors (Fc1 and Fc2) that are moderately correlated. Both factors have 4 items with loadings above 0.4. As a sample size N<200 is considered to be fair (Comfrey & Lee, 1992), 3 to 4 items per factor were recommended (Marsh & Hau, 1999). Factors were estimated using Generalized Least Squares Method (Yuan et al., 2017), excluding cases listwise. Other fit indices are summarised in Table 1.

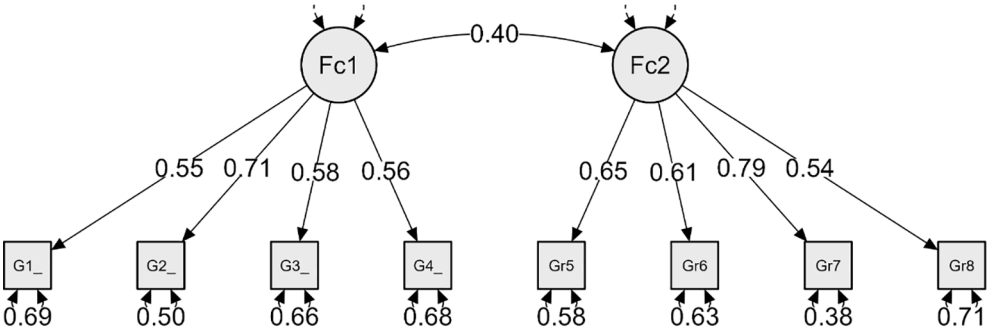

Figure 1 Two Factor Model with Standardized Loadings of Grit Scale

Note. Fc1 – factor represents Interest and Fc2 – factor represents Effort. G1_ – G4_ and Gr5 – Gr6 are Grit Scale items (see appendix)

Table 1 Two Factor Model Grit Scale Fit Indices

Indices	Value
Comparative Fit Index (CFI)	1.000
Tucker-Lewis Index (TLI)	1.046
Root mean square error of approximation (RMSEA)	0.000
Goodness of fit index (GFI)	0.967
Kaiser-Meyer-Olkin (KMO) test (Overall)	0.742
Bartlett's tests of sphericity ($p < 0.001$) degrees of freedom	205.084

All three indices – CFI, TLI and GFI were larger than 0.95 demonstrating excellent model fit as well as RMSEA is less than 0.06 (Finch, 2020; Hu & Bentler, 1999). KMO test result was larger than 0.7 and Bartlett's tests of sphericity was significant demonstrating adequacy of the sample size (Watkins, 2018). As Smidth and colleagues (Smidth et al. 2017) suggested, both factors could be extracted as a second order factors, thus both created one higher order factor perseverance. Interest and effort were moderately correlating with perseverance – 0.63 and 0.64 respectively.

To evaluate the impact of perseverance on academic achievement, a scale was created by calculating average values. According to Gerbing and Anderson (1988), the scale must be unidimensional, and its reliability coefficient Cronbach's alpha (CA) should be greater than 0.7 (Taber, 2018). As both factors could be extracted as second order factors, a perseverance scale was created. In this case CA = 0.713 (excluding cases listwise) what is considered to be reasonable.

Conscientiousness Factor Structure and Dimensional Reliability

As the conscientiousness questionnaire was created from scratch, there were no previous studies about its factor structure. To find the answer to the first research question, Exploratory Factor Analysis (EFA) was performed. Factors were extracted using Generalized Least Square Method (Yuan et al., 2017) with Oblique Promax rotation (Matsunaga, 2010), based on assumption that eigenvalue > 1 (Zwick & Wayne, 1986). As a result, the analysis suggested to extract three factor structure (see Table 2).

Table 2 Factor Model of Conscientiousness Questionnaire Items

Item name	Factor 1	Factor 2	Factor 3	Uniqueness
In school stuff like order and systematicity	0.870	–	–	0.336
Strive to excel in my schoolwork	0.708	–	–	0.408
Fulfil my commitments to schoolwork	0.674	–	–	0.438
Do schoolwork according to a plan	0.657	–	–	0.441

Item name	Factor 1	Factor 2	Factor 3	Uniqueness
Like order	0.558	–	–	0.694
Am always prepared for my schoolwork	0.436	–	–	0.542
Always do my homework	0.420	–	–	0.663
*Leave my school belongings unordered	–	0.740	–	0.479
*Neglect my duties at school	–	0.441	–	0.677
*Often forget to put school things back in their proper place	–	0.424	–	0.744
*In schoolwork am often confused	–	–	0.742	0.495
*Shirk my schoolwork duties	–	–	0.482	0.588

Note. Applied rotation method is promax; * Items reversely coded

Factor 3 consisted only of two items, and Factor 2 – only of three items. In both cases only one item was loaded more than 0.7. It is not suggested to assume that the extracted factor structure is good (Velicer & Fava, 1998; Watkins, 2018). Bartlett's test was significant and overall KMO was equal to 0.755; that shows adequacy of sample size for this model (Shrestha, 2021), but other fit measures were not satisfactory TLI = 0.663, CFI = 0.727 and RMSEA = 0.125 (Schermelleh-Engel et al., 2003). As any of the reversely coded items did not load on Factor 1, the author of this research deleted these items along with items that were not from questionnaire adapted in the Latvian language by Perkona (2022) leaving only these 5 items:

- In school stuff (things) like order and systematicity (factor loading = 0.741),
- Do schoolwork according to a plan (factor loading = 0.724),
- Strive to excel in my schoolwork (factor loading = 0.631),
- Am always prepared for my schoolwork (factor loading = 0.612),
- Like order (factor loading = 0.585).

After modifications overall KMO was 0.818, additional fit indices indicated good model fit – RMSRA = 0.00, TLI = 1.002 and CFI = 1.000 (Schermelleh-Engel et al., 2003). Besides, out of all tested combinations, this factor structure was considered to be the best fitting structure of all tested models. As all items loaded on one factor the conscientiousness scale was created as average values (Gerbing & Anderson, 1988). Its unidimensional reliability CA = 0.792 with excluding cases listwise, is considered to be good (Taber, 2018). As the reliability of the scale could be improved by adding one more item to the scale "Fulfil my commitments to schoolwork" to CA = 0.822, the author created this scale with six items, although when adding the item to EFA, it lessened the model fit.

Relationships Between Conscientiousness, Perseverance, Diligence and Achievement

Before answering the second research question, the test of normality was performed on all variables (see Table 3).

Conscientiousness and perseverance scales were normally distributed whereas other scales were not. If data is not normally distributed (Shapiro-Wilkinson test is significant), to obtain significancy in corelation analysis bootstrapping method is suggested (Bishara & Hittner, 2012). The correlation analysis between all five variables were performed (see Table 4).

Table 3 Variables Used in Correlation and Linear Regression Analysis

Variable	Shapiro-Wilk (*p* value)
Working hard	‹.001
Diligence	‹.001
Mean self-reported academic achievement	‹.001
Mean conscientiousness (scale)	0.066
Mean perseverance (scale)	0.172

Table 4 Pearson's Correlations with Bootstrapping Method Between Perseverance, Conscientiousness, Working-hard, Student Self-reported Marks and Diligence

				Perseverance	Conscientiousness	Average marks	Diligence	Working hard
Perseverance	Pearson Correlation			1	0.602**	0.352*	0.527**	0.420**
	Sig. (2-tailed)			–	‹ .001	0.01	‹ .001	0.002
	Bootstrap	Bias		0	−0.01	0.003	−0.002	−0.009
		Std. Error		0	0.099	0.107	0.099	0.124
		BCa 95% CI	Lower	–	0.37	0.111	0.287	0.133
			Upper	–	0.751	0.557	0.695	0.619
Conscientiousness	Pearson Correlation			0.602**	1	0.619**	0.474**	0.484**
	Sig. (2-tailed)			‹.001	–	‹ .001	‹ .001	‹ .001
	Bootstrap	Bias		−0.01	0	0.005	−0.004	−0.005
		Std. Error		0.099	0	0.067	0.092	0.106
		BCa 95% CI	Lower	0.37	–	0.46	0.276	0.242
			Upper	0.751	–	0.768	0.64	0.673

				Perseverance	Conscientiousness	Average marks	Diligence	Working hard
Average marks	Pearson Correlation			0.352*	0.619**	1	0.464**	0.546**
	Sig. (2-tailed)			0.01	‹ .001	–	‹ .001	‹ .001
	Bootstrap	Bias		0.003	0.005	0	0.003	–0.003
		Std. Error		0.107	0.067	0	0.112	0.101
		BCa 95% CI	Lower	0.111	0.46	–	0.224	0.328
			Upper	0.557	0.768	–	0.694	0.708
Diligence	Pearson Correlation			0.527**	0.474**	0.464**	1	0.484**
	Sig. (2-tailed)			‹ .001	‹ .001	‹ .001	–	‹ .001
	Bootstrap	Bias		–0.002	–0.004	0.003	0	–0.006
		Std. Error		0.099	0.092	0.112	0	0.131
		BCa 95% CI	Lower	0.287	0.276	0.224	–	0.143
			Upper	0.695	0.64	0.694	–	0.702
Working hard	Pearson Correlation			0.420**	0.484**	0.546**	0.484**	1
	Sig. (2-tailed)			0.002	‹ .001	‹ .001	‹ .001	–
	Bootstrap	Bias		–0.009	–0.005	–0.003	–0.006	0
		Std. Error		0.124	0.106	0.101	0.131	0
		BCa 95% CI	Lower	0.133	0.242	0.328	0.143	–
			Upper	0.619	0.673	0.708	0.702	–

Note. * significant at $p < 0.05$ **significant at $p < 0.01$
Bootstrap results are based on 1000 bootstrap samples, Listwise $N = 52$

All correlations were significant as none of the bootstrapping confidence intervals (CI) crossed zero (Field, 2017). Correlation between perseverance and conscientiousness was 0.602, but between conscientiousness and student self-reported marks – 0.619. Correlation between diligence and perseverance was 0.527 and correlation between diligence and conscientiousness (0.474) and diligence and marks were 0.464. All these correlation coefficients can be considered as moderate (Schober et al., 2018). Moderate correlations between perseverance and conscientiousness in this study prove the concurrent criterion validity of constructs (Kimberlin & Winterstein, 2008).

To evaluate the impact of conscientiousness and perseverance on academic achievement, three linear regression models were constructed. In all three models the student self-reported academic achievement was a dependent variable.

Table 5 Coefficients of Determination of Linear Regression Equations Representing How Student's Self-reported Achievement Was Affected by the Selected Independent Variable

Independent variable	R^2
Conscientiousness	0.59
Perseverance	0.48
Conscientiousness (C) and Perseverance (P)	0.62

If in a linear regression model both perseverance and conscientiousness were analysed, the model explained 62% of academic achievement distribution whereas conscientiousness alone explained 59% of distribution but perseverance alone – 48%. Thus, both constructs shared the same variance, but conscientiousness explained students' academic achievement more than perseverance. If conscientiousness was considered, perseverance added only three additional percent to explained variance of students self-reported academic achievement. The linear regression models provided construct predictive validity on students' academic achievement.

Conclusions

The hypothesis of this study was proved successfully and the answers to both research questions were found. As hypothesized, perseverance that was measured in the Grit scale was constructed of two factors – interest and effort. Both factors could be extracted as second order factors, thus, of perseverance. In this case a unidimensional measurement scale of perseverance was created. The answer to the first research question was found by extracting factors of conscientiousness questionnaire with EFA. After the analysis, only five items were left as these created the best fitting one factor structure. To answer the second research question, a unidimensional measurement scale of conscientiousness was created. To add more reliability to the scale, one more item from the conscientiousness questionnaire was added additionally to the factor structure extracted by EFA. The correlation analysis between perseverance and conscientiousness provided the concurrent criterion validity of both constructs. Linear regression models provided the predictive validity of both constructs on students' academic achievement. Conscientiousness explained the academic achievement better than perseverance, but both constructs together explained 62% of academic achievement variance. This research has provided evidence that conscientiousness is closely related with perseverance, however, these constructs are not the same. The results indicate the significance of students' non-cognitive skills. Thus, the author suggest that educators and parents dedicate more attention to developing conscientiousness and perseverance skills, as these are closely related to academic achievement.

The main limitation of this study is the sample – 6th and 9th grade students from only 15 schools in Latvia participated, and in each school whole class was selected. The results of this study might be biased by student's personality and classroom environment.

Students whose personality is more conscientious and who are more persistent might invest more attention and energy in answering questionnaire questions more thoroughly. Students' answers might be biased by social desirability. As the results of this study were consistent with previous studies none of biases mentioned before can be taken as a reason of veracity. Thus, further studies are needed with adapted instruments to continue the validation process in Latvian language. Students' self-reported perseverance and conscientiousness should be compared with actual not self-reported academic achievement longitudinally. Students throughout primary and secondary school should be researched to generalize the results of the study.

Ethic's statement

This research was conducted in full accordance with the ethical guidelines governing social research. All participants were instructed on the purpose of this study and their free choice to participate – participation was entirely voluntary. Participants' confidentiality and anonymity were strictly maintained throughout the study, with data being anonymous – no information was gathered that would let anyone to be identified. The data were securely stored to prevent unauthorized access.

There were no conflicts of interest that could have influenced the research outcomes. Additionally, cultural norms and values were respected throughout the research process, ensuring that the study was sensitive to the diverse backgrounds of the participants.

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Appendix

Table 1 Girt Scale Items and Translation into the Latvian Language (Schmidt et al. 2017)

Items in English	Abbreviation in Figure 1	Items' Translation into Latvian
I often set a goal in school but later choose to pursue a different one	G1_	Bieži mainu savus mācību mērķus
New ideas and plans sometimes distract me from my goals in school	G2_	Jaunas idejas un plāni novērš manu uzmanību no mācību mērķiem
In school I have been obsessed with a certain plan or project for a short time but later lost interest	G3_	Mācībās esmu bijis(usi) ar kaut ko ļoti aizrāvies(usies), bet vēlāk zaudēju par to interesi
I have difficulty maintaining my focus on school projects that take more than a few weeks to complete	G4_	Man ir grūtības koncentrēties mācību projektiem, kas ir ilgāki par dažām nedēļām
In school I finish whatever I begin	Gr5	Mācību darbā es pabeidzu visu, ko esmu iesācis(kusi)
In school setbacks don't discourage me	Gr6	Turpinu mācīties arī tad, ja man neveicas
I work hard for school	Gr7	Es uzcītīgi pildu mācību uzdevumus
I am a diligent student	Gr8	Esmu centīgs skolēns

Table 2 Conscientiousness Scale Items and Translation into the Latvian Language (adapted from Goldberg, 1999; Schmitt et al., 2007; Johnson, 2014; Maples-Keller et al., 2019; Perkona, 2022)

The name of the variable	Items in English	Items translation into Latvian	Items' adapted translation into Latvian	Back translation into English
Consc8_rec	Often forget to put things back in their proper place (Goldberg, 1999; Johnson, 2014)	Bieži aizmirstu nolikt lietas atpakaļ savās vietās (Perkona, 2022)	Bieži aizmirstu skolas lietas nolikt atpakaļ savās vietās	Often forget to put school things back in their proper place
Consc9	Like order (Goldberg, 1999)	Patīk kārtība (Perkona, 2022)	Patīk kārtība	Like order
Consc4_rec	Leave my belongings around (Goldberg, 1999; Johnson, 2014)	Atstāju savas mantas nesakārtotas (Perkona, 2022)	Atstāju savas skolas lietas nesakārtotas	Leave my school belongings unordered
Consc3	Am always prepared (Goldberg, 1999; Johnson, 2014)	Esmu vienmēr sagatavojies (Perkona, 2022)	Esmu vienmēr sagatavojies(usies) mācībām	Am always prepared for my schoolwork

The name of the variable	Items in English	Items translation into Latvian	Items' adapted translation into Latvian	Back translation into English
Consc6	Mess things up (Goldberg, 1999) Like to tidy up (Johnson, 2014; Maples-Keller et al., 2019)	Patīk kārtība un sistemātiskums (Perkona, 2022)	Skolas lietās patīk kārtība un sistemātiskums	In school stuff like order and systematicity
Consc5_rec	Neglect my duties (Goldberg, 1999)	Nevērīgi izturos pret saviem pienākumiem (Perkona, 2022)	Nevērīgi izturos pret saviem pienākumiem skolā	Neglect my duties at school
Consc12_rec	Is easily distracted (Schmitt et al., 2007)	Viegli apjūk (Schmitt et al., 2007)	Mācību darbā bieži apjūku	In schoolwork am often confused
Consc10_rec	Shirk my duties (Goldberg, 1999)	Izvairos no savu pienākumu pildīšanas (Perkona, 2022)	Izvairos no savu skolas pienākumu pildīšanas	Shirk my schoolwork duties
Consc11	Do things according to a plan (Goldberg, 1999) Carry out my plans (Maples-Keller et al., 2019)	Daru darbus saskaņā ar plānu (Perkona, 2022)	Daru mācību darbus saskaņā ar plānu	Do schoolwork according to a plan
Consc7	Usually do my homework	Parasti izpildu mājas darbus (Perkona, 2022)	Vienmēr izpildu mājas darbus	Always do my homework
Consc1	Follow through on my commitments (Goldberg, 1999) Complete tasks successfully (Johnson, 2014)		Mācībās izdaru to, ko esmu apņēmies(usies)	Fulfil my commitments to schoolwork
Consc2	Excel in what I do (Goldberg, 1999; Johnson, 2014)		Mācību darbā tiecos būt izcils(a)	Strive to excel in my schoolwork

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DYNAMICS OF PRIMARY SCHOOL PUPILS' ORIENTATION TO MORAL GROWTH: A LONGITUDINAL STUDY

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ABSTRACT

This article presents the dynamics of primary school pupils' orientation to moral growth in Latvia between 2022 and 2023. Within a longitudinal study, in spring 2022, 518 pupils in grade 2 participated in the 1st measurement in all regions of Latvia. A repeated measure was done in spring 2023 with 451 pupils in grade 3. This study used a questionnaire consisting of 25 scale items, organized into four sections related to the key components of the moral growth process: (A) understanding (cognitive-emotional perception of the moral character development process); (B) purposefulness (voluntarily and consciously committing to moral growth); (C) moral crafting (engaging practically in moral growth activities); and (D) moral identity (experiencing joy and support throughout the process of moral development). Quantitative data were analysed to identify the differences between both measurements. The component "Understanding of the moral growth process" had the highest scores, while the lowest scores were related to the component "pupils' moral identity". Comparing the two measurements, a positive (increasing) dynamic was observed in pupils' rating of their understanding of moral character development (component A) and of their involvement in moral crafting (component C). On the other hand, slightly negative trends were observed in the indicators "Purposefulness" and "Moral identity" of moral growth, which could indicate a certain instability in pupils' perception of their commitment to moral development, alongside a still fragile and emerging moral identity, as well as an increase in demanding attitudes towards oneself and others. The results of the study could be useful for parents, educators, and school administrators willing to nurture moral growth in middle childhood.

Keywords: *primary school, virtues, moral character, moral growth, longitudinal study.*

Introduction

The resurgence of interest in character education across various educational levels and countries (De Ruyter et al., 2022; OECD, 2021; Stevenson, 2022) reflects an ongoing effort by psychologists, philosophers, and educators to effectively develop students' character

for holistic growth (Osman, 2019). Despite this increased focus, the structure and content of the concept of character remains under discussion (Wang et al., 2015). This diversity of opinions underscores the complexity of defining and nurturing moral character and moral identity, particularly among children and early adolescents.

Empirical studies challenge the notion that pre-adolescents already possess a developed moral character, which is typically evident in adults and older adolescents (Krettenauer & Hertz, 2015). Instead, research suggests that elements of moral identity begin to form in middle childhood (8–12 years), laying foundational aspects of what will later mature during adolescence (Kingsford, 2018; Kingsford et al., 2018, 2021; Tomasello, 2019). Some studies indicate that the moral self in early childhood may serve as an early form, 'precursor' (Hardy & Carlo, 2011) or 'developmental source' (Lapsley, 2015) for the mature moral character seen later in life. This developmental progression is often characterized by the transformation of the moral self of early childhood into the more complex moral character of adolescence (Kingsford et al., 2021; Krettenauer & Hertz, 2015). Still the academic debate goes on, regarding the question, as reviewed by Lerner (2018), whether moral development is a continuous, incremental process or it rather involves sudden, distinct shifts in capability and understanding.

Furthermore, the evolution of moral character is influenced not only by age but also by the child's social and cultural environment. Children shape their moral perspectives and character based on societal interactions, experiences, and cultural norms (Christner et al., 2020; Yalçın, 2021). The variability in how the moral self develops across different cultures further complicates the understanding of when and how moral character emerges. Despite the importance of this question, the developmental stage of middle childhood (7–10 years of age) has been relatively overlooked in moral character research, both empirically and theoretically (Kingsford et al., 2018). To comprehensively understand moral development in middle childhood, more focused research is necessary.

This gap in research motivated the current study, which aimed at capturing the dynamics of primary school (grades 2–3) pupils' orientation to the development of their moral character. The key components of the moral development process addressed in this study were: (A) understanding (cognitive-emotional perception of the moral character development process); (B) purposefulness (voluntarily and consciously committing to moral growth); (C) moral crafting (engaging practically in moral growth activities); and (D) moral identity (experiencing joy and support throughout the process of moral development) (Fernández González, 2019).

The research took place between spring 2022 and spring 2023 in Latvia. Like many countries which have endured Soviet occupation, Latvia has undergone significant changes in moral values over the past century, transitioning from socialist ideals to a wide spectrum of ideologies, including liberal, conservative, neo-liberal, and human-inclusive approaches. In 2015, amendments to the Law of Education (Saeima, 1998) revitalized the implementation of moral education in the school system, which makes this research even more topical.

The overarching research question guiding this study was: What were the dynamics of primary school pupils' orientation to the development of their moral character? This question was broken down into four questions addressing the four components of moral growth: What were the dynamics of pupils' understanding of what moral growth is and how it happens? Were there any changes in their interest and willingness to engage in their own moral growth? What were the dynamics of their experience (motivations, barriers, strategies) in enacting and practising the virtues in their daily lives? How their moral identity, i.e., their feelings of satisfaction and support in their moral growth, evolved during this period?

Methodology

Research design

This study was part of a 3-year longitudinal research project regarding school pupils' orientation to the development of their moral character. The research used the randomised controlled trial approach and adopted an experimental trial design, using pre-, intermediate- and post-test with experiment and control groups clustered at the class level in three strata: grades 2–4, grades 5–7, and grades 7–9. This study is based on the analysis of pre-test and intermediate-test results obtained within the first strata in spring 2022 and 2023. The study received the ethical approval of the Ethics Committee for Research in Humanities and Social Sciences of the University of Latvia (approval number 30-95/5, April 12, 2022).

Research instrument and methods

Data collection instrument and methods

The multicomponent questionnaire used for data collection contained 25 scale items which captured the four components of the moral growth process: A – Understanding (this section was based on the character growth understanding and mind-set scale adapted from Dweck, 2000), B – Purposefulness (based on identity status theory (Marcia, 2002)), C – Moral crafting (based on the virtue grit scale (adapted from Duckworth, 2016)), and D – Moral identity (based on expectancy motivation theory (Vroom, 1964)). The questionnaire, initially developed in English in 2018, underwent translation into Latvian and was tailored to the participants' age group with appropriate vocabulary.

Section A (understanding) contained six statements to be rated in a dichotomous scale (agree-disagree), addressing several key points of character growth (e.g., whether it can be improved during the whole life, its relationship with personal freedom, the emotional dimension of character development, the role of moral reasoning in this process, the necessity of training, and the importance of joy for growing in virtue).

Section B (purposefulness) aimed to identifying participants' commitment to moral growth by asking them to choose the statement which described them best from a list of four levels of maturity in the decision of becoming a better person: (1) I am not interested, (2) I never thought about it, (3) I have doubts about engaging, and (4) I engaged in moral growth after overcoming a moral crisis.

Table 1 Reliability test results for scale questions

Moral growth category	Cronbach's alpha 1st measurement (spring 2022)	Cronbach's alpha 2nd measurement (spring 2023)
Section A – Understanding	.490 (6 items, a dichotomous scale)	.509 (6 items, a dichotomous scale)
Section B – Purposefulness	N/A (1 item, a 4-point scale)	N/A (1 item, a 4-point scale)
Section C – Moral crafting	.652 (13 items, a dichotomous scale)	.689 (13 items, a dichotomous scale)
Section D – Moral identity	.644 (5 items, a 3-point scale)	.589 (5 items, a 3-point scale)
Sections A, B, C, & D	.785 (25 items)	.771 (25 items)

Section C (moral crafting) contained two subsets of statements to be rated in a dichotomous scale (agree-disagree): The subset C1 "Strategic involvement in moral growth" had six statements pointing to strategies pupils could use for moral growth, e.g., avoiding events that incite to bad moral behaviour, meeting with friends who demonstrate a good moral example; and the subset C2 "Practical activities for moral growth" had seven statements about pupils' practical involvement in different moral growth activities at school, in the family, in sports, etc.

Section D (moral identity) contained five items to be rated in a 3-point scale within two dimensions, which captured the internal and external dimensions of moral identity development: D1 "Self-assessment of involvement and experienced joy in moral growth" (internal dimension); and D2 "Perceived support and recognition from friends, family, and school" (external dimension).

At the beginning of 2022, class teachers from across Latvia were invited to join the research through their local municipal educational authorities and school leaders, as well as through social media platforms like Facebook. 31 teachers from 21 schools voluntarily applied to take part in the study. To instruct teachers for collecting themselves their classroom data, a presentation and guidelines for teachers were prepared, and an online seminar was held. The first data collection took place both on paper and online in the spring of 2022. One year after, 27 teachers from 18 different schools continued their involvement by participating in the second round of measurements. The internal consistency test of the scale questions in the questionnaire demonstrated acceptable reliability for the 1st and 2nd measurement data (Table 1).

Research sample

In spring 2022, 518 pupils (M_{age} = 8.51, SD = .562) in grade 2 participated in the 1st measurement. A repeated measure was done in spring 2023 with 451 pupils (M_{age} = 9.48, SD = .571) in grade 3. In both measurements, the majority of respondents were from Riga region and Kurzeme region, but all regions of Latvia were represented in the research (see Table 2).

Table 2 Characteristics of the research sample

Category of analysis	1st measurement (spring 2022)	2nd measurement (spring 2023)
Number of respondents	518	451
Gender	Boys – 53%, girls – 47%	Boys – 54%, girls – 46%
Age	8–9 years old – 97%	9–10 years old – 96%
Region of Latvia	Riga region – 54% Kurzeme region – 23% Vidzeme region – 9% Zemgale region – 4% Latgale region – 9%	Riga region – 52% Kurzeme region – 27% Vidzeme region – 8% Zemgale region – 5% Latgale region – 8%
Number of classes	32	27
Number of schools	21	18

The study is representative at the level of the Latvia's education system for the grades involved. Given that in the 2021–2022 school year there were 19,551 pupils in grade 2 in Latvian general education institutions (excluding special education institutions) implementing general basic education programmes (Ministry of Education, 2021), a representative sample participated in the 1st measurement of the longitudinal research in spring 2022 (n = 518), which allows to generalise the results to all pupils in grade 2 with a margin of error of 4% at 95% confidence level (Fisher et al., 1995). Given that in the 2022–2023 school year there were 19,693 pupils in grade 3 in Latvian general education institutions (excluding special education institutions) implementing general basic education programmes (Ministry of Education, 2022), a representative sample participated in the 2nd measurement of the longitudinal research in spring 2023 (n = 451), which allows to generalise the results with a margin of error of 5% at 95% confidence level (Fisher et al., 1995).

Data processing and analysis methods

The primary quantitative data were processed and analysed using IBM SPSS for descriptive statistics (e.g., frequencies, descriptives, crosstabs). The test of the correspondence of the empirical distribution of the data to the theoretical distribution was performed by applying the Kolmogorov–Smirnov Test. The data did not have a normal distribution. The Related Samples Wilcoxon Signed Rank Test was employed to determine the differences between two measurements and then a measure of effect size (Eta squared – η^2) for statically significant differences was calculated and interpreted (Lenhard & Lenhard, 2016).

Results

The overall dynamics of primary school pupils' orientation to the development of their moral character were revealed by the dynamics of each moral growth component. According to the descriptive statistics results, in both measurements, the component A (understanding of the moral growth process) had the highest scores, while the lowest scores were related to the component D – pupils' moral identity (see Table 3).

Table 3 Descriptive statistics and ranking results

Ranking	Spring 2022 Mean / min.-max.	Standardized score (10-point scale)	Spring 2023 Mean / min.-max.	Standardized indicator and its dynamics
1st	A – Understanding (*M* = 0.91 / 0–1)	9.10	A – Understanding (*M* = 0.92 / 0–1)	9.20 ↑
2nd	B – Purposefulness (*M* = 3.44 / 1–4)	8.13	C – Moral crafting (*M* = 0.82 / 0–1)	8.20 ↑
3rd	C – Moral crafting (*M* = 0.78 / 0–1)	7.80	B – Purposefulness (*M* = 3.41 / 1–4)	8.03 ↓
4th	D – Moral identity (*M* = 2.53 / 1–3)	7.65	D – Moral identity (*M* = 2.47 / 1–3)	7.35 ↓
	A total standardized indicator	8.17	A total standardized indicator and its dynamic	8.20 ↑

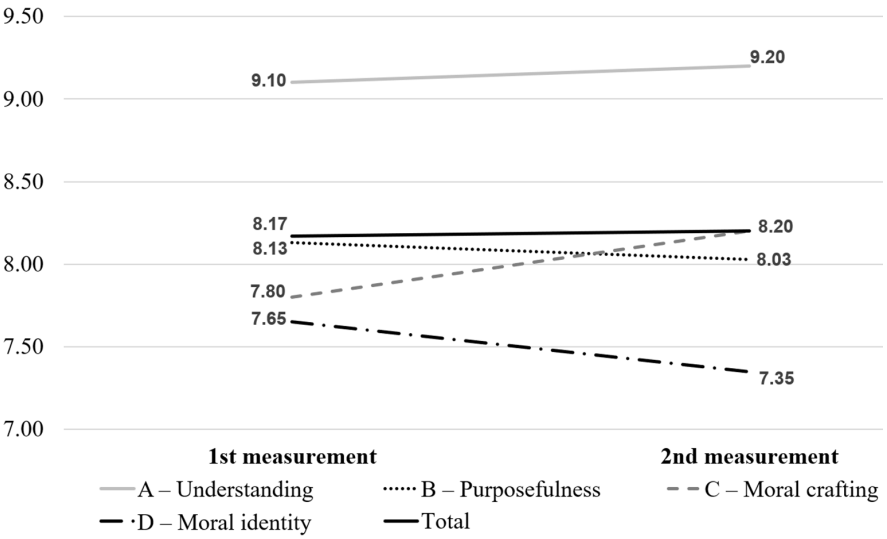

Figure 1 Dynamics of primary school pupils' orientation to the development of their moral character

Comparing the two measurements (calculation based on a standardized score in a 10-point scale), a positive dynamic was observed in the moral growth components A – Understanding and C – Moral crafting (see Figure 1), which indicates that pupils' rating of their understanding of moral character development and their involvement had increased. On the other hand, slightly negative trends were observed in the indicators of the B – Purposefulness and D – Moral identity components of moral growth (see Figure 1), which could indicate a certain instability in pupils' perception of their commitment to moral development, alongside a still fragile and emerging moral identity, as well as a stricter assessment of oneself and others, as pupils might become more demanding as they grow in age and in their understanding of what is moral growth all about.

Table 4 The Related Samples Wilcoxon Signed Rank Test results

Components of the moral growth process	Positive ranks	Negative ranks	Ties	Z	Asymp. Sig. (2-tailed)
A – Understanding	14	12	1	–.076[a]	.939
B – Purposefulness	8	17	2	–1.211[b]	.226
C – Moral crafting					
C1 – Strategic involvement	16	11	0	–1.058[a]	.290
C2 – Practical activities for moral growth	17	9	1	–1.793[a]	.073
D – Moral identity					
D1 – Self-assessment of involvement and experienced joy in moral growth	5	21	1	–2.897[b]	.004
D2 – Perceived support and recognition from friends, family, and school	8	19	0	–1.694[b]	.090

Note. a. Based on negative ranks.
b. Based on positive ranks.

According to the Related Samples Wilcoxon Signed Rank Test results, a statistically significant difference with a large effect ($Z = –2.897$, $p = .004$, $\eta^2 = .311$) between both measurements at the class level was identified only in the dynamics of D component (pupils' moral identity), more specifically – in its internal dimension D1 (self-assessment of involvement and experienced joy in moral growth) (see Table 4).

As regards the most significant changes in concrete indicators, the highest increase in the criteria "Understanding" was in the indicator "*Good character can be developed throughout life*" (92% agreed in 2022, and 95% in 2023). The more marked difference in the criteria "Purposefulness" was in the indicator "*I hesitate to engage in good character development*" (10% chose this option in 2022, and 19% in 2023). As regards the criterion "Moral crafting", the most marked increase was in the indicators "*I get involved in religious and spiritual activities*" (39% agreed in 2022 and 58% in 2023), and "*I get involved in voluntary work*" (from 76% of agreement in 2022 to 85% in 2023). And in the criteria "Moral identity", the biggest difference was in the indicator "*I do everything possible to develop my character*" (59% chose this option in 2022, but only 39% in 2023). These results point to the complexity of the development of moral character among primary school pupils, showing a mix of progress and challenges over the study period.

Discussion

This study aimed to capture the dynamics of primary school pupils' orientation to the development of their moral character, as revealed in each moral growth component. Overall, pupils' understanding of moral growth has shown positive dynamics over the study period. There was an increase in their comprehension of moral character development from spring 2022 to spring 2023, suggesting a deeper cognitive and emotional

perception of moral values and behaviours. This is consistent with recent studies pointing that, at this age, children start grasping more abstract moral principles beyond mere obedience to authority, and they typically show an increased capacity for empathy, which is crucial for moral development (Knafo & Plomin, 2006; Wilke & Goagoses, 2023).

The results indicate that pupils were increasingly involved in moral growth activities, reflecting an active engagement in practicing virtues. At the end of the period under study, 85% of children said they prefer friends which help to behave well, and 90% of children see themselves as actively helping at home. This result is consistent with Piaget's (1965) observation that around this age, coinciding with a shift in the child's cognitive structure from egocentrism to perspective taking, the autonomous morality stage starts, in which the goals of mutual respect and cooperation become more relevant. However, in this period, pupils' admiration for people of good character (moral authorities) has not progressed, and their involvement in awe-inspiring spiritual/religious activities, while increasing, is still at a low level compared with other moral growth strategies. Following Kristjánsson's (2016) suggestion of promoting an 'enchanted' moral life, it would be advisable to use those underutilized opportunities for moral growth, creating opportunities for emotional awe during middle childhood to inspire and foster moral development.

Pupils' interest and willingness to engage in moral growth seem to have experienced some fluctuations. While there was an increase in activities related to moral crafting, indicating greater involvement in moral growth, there was a slight decline in purposefulness, suggesting some instability in their commitment to moral development. Also, despite the fact that at the end of the period under study 91% of pupils enjoy or very much enjoy the moral growth process, and 96% of children feel some or a lot of support for their moral growth from their family, there is a statistically significant negative dynamic of their self-assessment about their efforts to become better persons, including in the digital environment (Rubene, 2018), which can point to a still fragile emerging moral identity, as well as to an increase in demanding attitudes towards oneself. Recent studies point to the fact that middle school children, under the influence of different parenting styles and depending on their temperament (dos Santos et al., 2020), develop a deeper moral self-awareness and begin to internalize societal standards and expectations. This heightened self-awareness (Thompson, 2020) can lead to increased self-criticism and higher standards for their own moral behaviour.

Conclusions

In conclusion, the dynamics of pupils' orientation to the development of their moral character varied depending on the aspect of moral growth considered: while pupils' cognitive-emotional understanding and their assessment of their practical involvement increased, their assessment of their personal commitment to moral growth and their efforts in this process slightly decreased. Overall, at the 2nd measurement point in May 2023, Latvian pupils had:

- a high level of understanding of the process of moral character development, which has shown positive dynamics since the 1st measurement (May 2022), suggesting a deeper cognitive and emotional perception of moral values and behaviours.
- a certain maturity in their decision of becoming better persons, which has slightly declined since May 2022, suggesting some instability in their commitment to moral development. Pupils need to be supported to think purposefully about their own moral development.
- an increasingly active engagement in practicing virtues, reflecting that pupils were more strategically involved in moral growth activities since May 2022. Enriching pupils' cultural, artistic, as well as spiritual and religious experiences, where they can draw inspiration for moral development, should be particularly encouraged.
- a quite strong moral identity, which has however slightly decreased since the first measurement. There is a notable number of pupils' whose self-assessment of involvement in moral growth has slightly declined.

These preliminary conclusions, drawn from the intermediate findings of an ongoing longitudinal study, provide a novel perspective on the development of moral character from the viewpoints of pupils. This article could be useful for parents, educators, and school administrators focused on nurturing moral growth, contributing significantly to the evolution of moral education in Latvia. The insights offered are not only useful for personal reflection but also may serve to enrich discussions across various educational settings including family discussions, classroom activities, teacher meetings, school leadership seminars, and educational policy debates. Additionally, this study could serve as a resource for academic professionals involved in both the training of future educators and the professional development of current teachers.

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PERCEPTION OF DEMOCRACY IN EDUCATION DURING LATVIA'S INDEPENDENCE RESTORATION, 1988–1995

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ABSTRACT

Democracy is under threat due to the massive dissemination and accessibility of information, increasing misinformation and false reporting. Any democratic society is based on participatory democracy and a dialogue between the people and their elected representatives. Youth involvement in the political processes is low – political participation in Latvia has declined over the last 20 years. The article aims to understand the transformation of the concept of democracy to gain insight into the interpretation of democracy in education in Latvia during the restoration of state independence from 1988 to 1995. The research question is how democracy was interpreted in education in Latvia during the transition period to the restoration of state independence from 1988 to 1995. Critical discourse analysis was used in this article by analysing educational periodicals and systematic literature analysis on interpreting the concept of democratic education. Findings reveal that in 1988, democracy in education was interpreted as a tool to guarantee the end of the ideology of the Soviet Union and as a symbol of freedom, whereas, from 1991 up to 1995, democracy emerged as not only a theoretical but also a practical system of governance in education with four active actors: teacher, child, family and society, of which the child was the central component.

Keywords: *content analysis, democracy, democratic education, democratisation, education reform.*

Introduction

Democracy emphasises the role of individuals in governance and social interactions (Shapiro et al., 2024). It is a form of government, culture, and ethos, embodying a way of life that influences personal development and community participation (Dewey, 1966; Rogach Alexander, 2023). Democracy reflects an attitude of respect and equality and must be practised rather than imposed, aligning with humanistic goals and ongoing societal progress (Culp et al., 2023; Roberts, 2023). The author notes that "*democracy*" is defined in various ways across different sources, making contemporary consensus on the term elusive. Making a political system democratic, known as "*democratisation*" (Kauffman, 2023), involves introducing democratic ideas, restructuring foundations, and transitioning to democracy.

Democracy has inherent tensions, such as balancing majority rule with minority rights and managing effective governance in polarised environments, leading to contradictions between the people's will and its representation by the state (Rustighi, 2022). Discontent arises from the paradox of seeking greater participation while demanding efficient governance, a conflict exacerbated by historical shifts like the Cultural Revolution's focus on individual rights, the Market Revolution's economic growth and inequality, the Political Revolution's dismantling of social systems, and the Internet Revolution's role in increasing polarization (Shattuck, 2016).

Significant research has been conducted on the Latvian education system and educational sciences following national independence, providing a valuable foundation for exploring democracy within education (Ķestere, 2009; Ķestere et al., 2013; Ķestere, 2020). Research about the relationship between Soviet-era parenting and media (Procevska, 2006), and educational renewal in Estonia, with comparisons to Latvia and Lithuania (Sarv, 2020). Further research has focused on civic education reforms, civic engagement from pupils' perspectives (Čekse, 2021; Čekse et al., 2023), and youth involvement in democratic life in Latvia (Jonāne et al., 2022). This paper addresses a gap in the literature by exploring the interpretation of democracy within an educational context, offering a basis for future studies.

Educating young people in democratic processes is crucial, as programs designed to enhance democratic competencies in schools lead to higher levels of these competencies (Sant, 2019; Keating, Janmaat, 2016). Studies indicate that social sciences, politics, and democracy can enhance political efficacy, interest in politics, political trust, tolerance, anti-racism, and knowledge of political systems (Teegelbeckers et al., 2023). Youth political participation in Latvia has significantly declined over the past 20 years, with only 20% of individuals aged 18–30 actively engaged (Jonāne et al., 2022). The International Civic and Citizenship Education Study (IEA ICCS) in 2016 revealed that Latvian youth scored the lowest in civic education among Baltic Sea countries, with just 19% achieving A-level competence, compared to 43% in Estonia, 58% in Sweden and 53% in Denmark (Čekse, 2021). The IEA ICCS 2022 study found that only 47% of Latvian students view democracy as the best political system, and many lack an understanding of democratic threats, with 14% expressing that Latvia could become part of Russia or cease to exist (Čekse et al., 2023). Political leaders and education policymakers in Latvia must analyse these views to prevent future threats to democracy. The decline in youth political participation, low civic education scores, and limited understanding of democratic values among Latvian students underscore the urgent need to enhance democratic education and engagement to safeguard Latvia's democratic future.

The article aims to understand the transformation of the concept of democracy to gain insight into how democracy was interpreted in education in Latvia during the restoration of state independence from 1988 to 1995. 1988 laid the foundations for restoring Latvia's independence. In 1995, Latvia took significant steps toward aligning with European democratic standards by applying to join the European Union (EU) (Ārlietu ministrija, 2023) and becoming a member of the Council of Europe (Ārlietu ministrija, 2024a). These actions reflected Latvia's commitment to upholding fundamental values

such as human rights, democracy, and the rule of law. As the EU is founded on representative democracy, Latvia's decision to pursue EU membership implied a gradual adoption of EU standards, including those in education. This period marked Latvia's firm commitment to democracy and rejection of authoritarianism, making it a critical phase for understanding the development of modern democratic principles during the transition. The research question is: How was democracy interpreted in education in Latvia during the transition period to independence from 1988 to 1995?

Historical background explained

Latvia was occupied by the Soviet Union from 1940 until 1991. Gorbachev's perestroika in 1988 initiated the path to Latvia's independence, introducing concepts like "*spontaneous democracy*" or "*self-democratization*" within the education system. The Soviet totalitarian regime, with its censorship and restrictions on free movement, isolated Latvian educators from contemporary educational advancements (Ķestere, 2009; Ķestere et al., 2013). In Soviet culture, education combined knowledge acquisition with attitude formation, ensuring students aligned with the regime's ideological goals (Procevska, 2006).

The Latvian desire to live according to Western traditions, to fight for freedom, and to emphasise Latvian culture were reasons for the revolution that resulted in the independence of Latvia in 1991 (Raudys et al., 2013). Then the education system underwent radical changes which included modernising, decentralising, and democratising schools and education, replacing Soviet ideology with Latvian traditions and values, removing political influences from the curriculum, offering more educational choices, and shifting management responsibilities from central authorities to local governments and individual schools. Reforming educational content became a crucial priority in the shift from a totalitarian socialist regime to a democratic and open society (Providus, 2004). Between 1991 and 1995, the Latvian education system was shaped by Western cultural influences – it was believed that it was a more advanced and progressive model, leading the government and local authorities to adopt and emulate Western political approaches and ideologies (Abens, 2020; Ķestere, 2009; OECD, 2016).

Since the radical educational reform and the enactment of the Law of Education in 1991, Latvia's education system has been significantly reformed to establish European and democratic principles. Reforms aim to replace ineffective systems with more effective methods, driven by the belief that changes in curricula, access, and outcomes will improve society and individual opportunities (Ķestere, 2019). New teaching standards reflecting democratic values were introduced in 1992/1993 (Providus, 2004). Despite challenges during the economic instability of 1995–1996, reforms resumed with economic growth between 1996–1998, leading to further legal and curricular developments (OECD, 2001). In 2004, the "60/40" minority education reform required 60% of secondary school courses to be taught in Latvian, with 40% in Russian (Ivlevs, King, 2004). In 2016, the Ministry of Education and Science launched a reform to implement competency-based curricula, including fostering national patriotism through an integrated approach across various subjects (Čekse, 2021).

Additionally, becoming a member state of the United Nations and the United Nations Educational Scientific and Cultural Organization (further on UNESCO) in 1991 (Ārlietu ministrija, 2022), the European Council in 1995 (Ārlietu ministrija, 2024a), the European Union (Ārlietu ministrija, 2023) and NATO in 2004 (Ārlietu ministrija, 2024b) introduced democratic practices to Latvia, fostering the development of laws that supported, for instance, human rights, civic engagement, and the rule of law in education. Through the integration of these values into the curriculum and the encouragement of a democratic involvement culture at all educational levels, the alignment served to strengthen dedication to democracy.

Methodology

This paper employs qualitative and conceptual history research, focusing on how the meanings of the social and political concept of "*democracy*" evolved from 1988 to 1995. While many approaches can explore historical developments from a language-centred approach, this approach analyses the dynamic changes in concept meanings throughout history (Rodriguez, Van Ruyskensvelde, (2023). Methods including content analysis (Bengtsson, 2016; Krippendorff, 2019) and hermeneutics (Crotty, 1998) were used in the research.

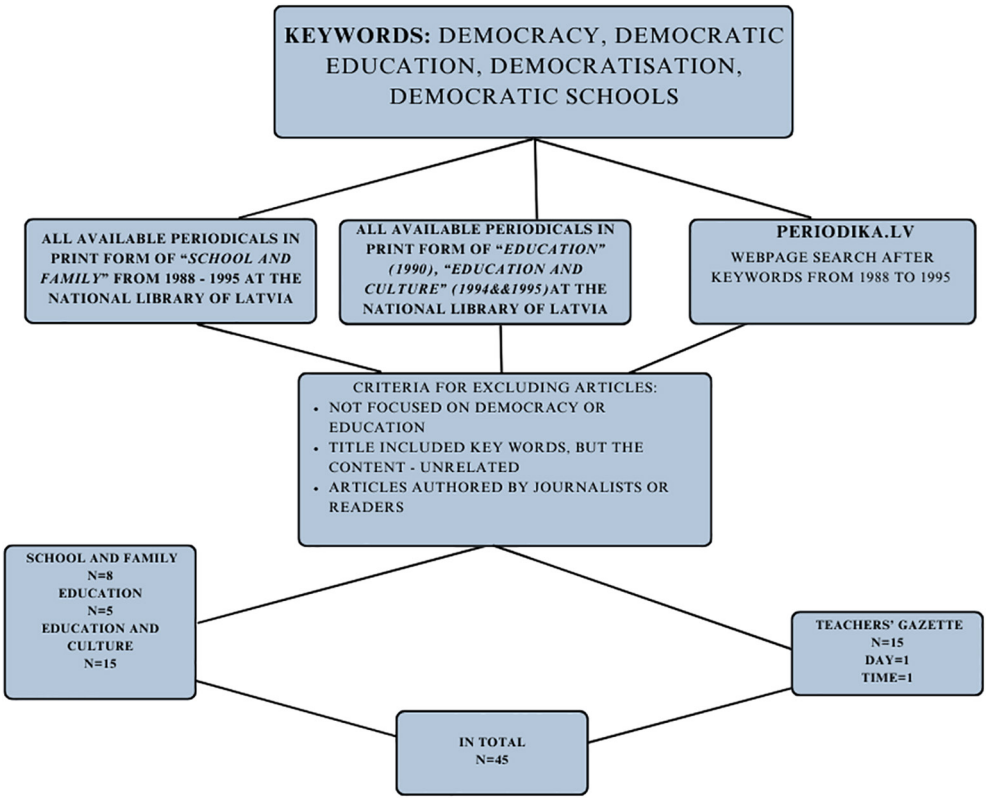

Figure 1 Process of choosing and setting criteria for data extraction

The search strategy aimed to identify as many periodical articles relevant to the keywords *democracy*, *democratic education*, *democratisation*, and *democratic schools* as possible from 1988 to 1995 (see Figure 1). The focus was on articles written by teachers, education policymakers, ministers, or other education field workers. In the Soviet Union, media played a crucial role in education. People grew up with constant media exposure and were unfamiliar with life without radio and television. Media was integrated at all educational levels and valued as a teaching tool due to its extensive use and varied influence techniques (Procevska, 2006).

A total of 45 periodicals served as a basis for primary data by giving characteristics of the perception of democracy from 1988 to 1995. The author notes that periodisation is based on historical sources, highlighting that some democratic principles from 1988 may still be relevant in 1995, complicating clear distinctions between these periods.

Results

Interpretation of democracy in 1988–1989

In 1987, Latvia held the Teachers' Congress, which is seen as a shift in pedagogical thought, focusing on democracy, decentralisation, and curriculum diversification, but active education reform began in 1988 in Latvia and was called "*reordering*" ("*pārkārtošana*" in Latvian) of the education system (Puškarevs, 1988). New principles of education were human values in education and the right of parents to choose the direction of their children's education; democracy as a way of life and a part of education, not just a political movement; a national curriculum; preservation of the national cultural heritage; and the need for an open society, especially in the field of education; values-based teacher professionalism and involvement in educational interest groups and from 1989–1991, the foundations were laid for an independent Baltic education law and curriculum (Sarv, 2020; Ķestere et al., 2013).

The term "*democratisation*" was used to describe changes in the educational process towards democracy in 1988 and 1989. Figure 2 displays the author's created map of the concept of "*democratisation*" with five dimensions and typical characteristics for the given period.

The influence of democracy on education was marked by increased autonomy for schools and teachers, promoting innovation and modern teaching methods (Pliners, 1988). School democratisation was viewed as both a goal and a mechanism to ensure lasting educational reform (Piebalgs, 1988). This shift emphasised prioritising individual needs over departmental interests, fostering diversity in academic content and methods, and transforming pedagogical relationships into a cooperative and dialogical system (Skolotāju Avīze Nr. 36, 1988a).

Changes in school leadership were necessary (see Figure 3), with principal elections as key to democratisation. However, challenges arose due to the need for more precise guidelines, and it was suggested that elections should only occur in schools with stable environments to avoid biased outcomes (Šmite, 1988; Pliners, 1989).

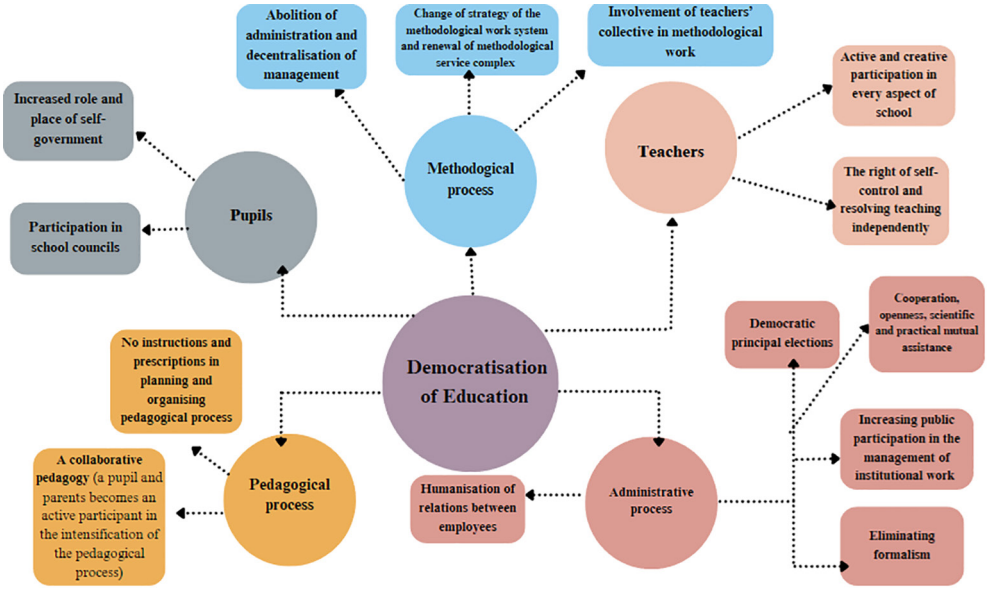

Figure 2 Educational Democratisation in 1988 and 1989 (Elksne, 1988; Skolotāju Avīze Nr. 12, 1989, Šmite, 1989)

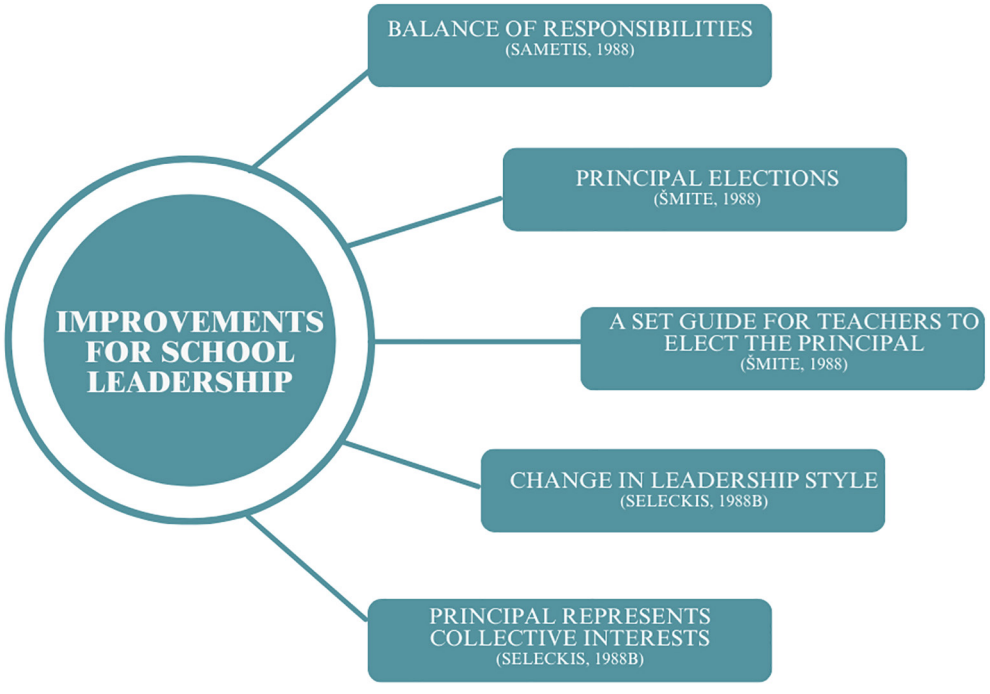

Figure 3 Key Reforms for Enhancing School Leadership

To address past authoritarian practices and promote equal opportunities, democracy in education was emphasised as essential. Higher education facilitated the development of creative curricula, student councils, and faculty autonomy (Plaude, 1988; Puškarevs, 1988; Pikulis, 1988). Democracy and humanism were seen as intertwined, requiring gradual development supported by moral, legal, and cultural frameworks (TASS, 1988). Schools were regarded as critical environments for fostering a democratic culture characterised by mutual respect, where pupil councils played a crucial role in teaching governance and decision-making. Although students initially lacked management expertise, the focus was on empowering them to make decisions, express themselves, and learn from their experiences. Democracy was also viewed to enhance educational quality and reduce bureaucracy and dogmatism (Pliners, 1988; Jagodins, 1988b; Seleckis, 1988a; Seleckis 1988b). The article "*Only One Method, Only Democracy* (Jagodins, 1988b), gives the reader a direct, specific, and non-negotiable sense of the text. The language used in the text includes some emotionally solid words and phrases, such as "*pain*", "*because the fate of our land depends on their future arrangement*", "*faith of our country*", and "*I beg*".

Democracy was seen as *the hope for freedom* and *empowerment* within academic institutions, focusing on openness and broad democratic development as the path forward for the new school system (Skolotāju Avīze Nr. 50, 1988b; Jagodins, 1988a). In the article by Jagodins (1988a), the term "*democratic principles*" was invoked when choosing a child's native language for education. Suppose parents wanted their child to be educated in Russian. In that case, it should be allowed as a democratic right, including the creation and use of textbooks in both Russian and Latvian to support this inclusion.

It was argued that democracy involved the wisest dedicating their efforts to the welfare of others. Nevertheless, the authoritarian style remained prevalent in education, highlighting teachers' lack of practical skills to implement democratic teaching (Skola un Ģimene, 1988). Authoritarian schools emphasise the collective's role, contrasting it with individuality in a democratic society (Jurs, Pelnēna, 2022).

Interpretation of democracy in 1990

The Declaration "*On the Restoration of Independence of the Republic of Latvia*" laid the foundations of democracy and defined Latvia as an independent and democratic republic, where the state's sovereign power belongs to the people of Latvia and the Saeima was elected by universal, equal, direct, and secret suffrage in 1990 (Bleiere, 1996). School associations, school councils, subject associations and education associations were active in 1989–1991, serving as an example of the democratisation of school governance. The period 1987–1991 has been referred to as the Third Awakening: new curricula and standards, textbooks, methodologies, and alternative pedagogies were developed in Latvia, Lithuania, and Estonia (Sarv, 2020).

In 1987/88, the notion of *democracy was a metaphor*, and the public had a weak, somewhat idealistic understanding of the nature and practical application of the term due to a lack of shared knowledge and democratic experience. The understanding of

democracy developed rapidly in the following years as Western literature became available and people cooperated and joined in joint activities to understand the nature and processes of democracy. In 1989/90, democratisation was not just *a keyword* and *a goal* but *a practical method for rebuilding the education system* (Sarv, 2020).

Tasks of general education reform were set, such as providing opportunities for young people to become spiritually active, acquiring pragmatic knowledge and skills, gradually changing the teaching methodology and ensuring the inheritance of Latvian and world cultural and historical values. In addition to the above, a system of three documents was established: *the model regulations*, which established the school's right to develop its curriculum in consultation with the local authority and the school council; *the model lesson plans* (setting out the school's responsibilities, such as which subjects to teach, for how long, and regulating the teaching load of pupils) and *educational standards,* which set out the school's responsibilities – why, what and how much needs to be taught (Kalniņš, 1995).

More articles about the opposing sides of democratisation in education appeared in the periodicals in 1990 (see Figure 4). Despite all the positive aspects, it was believed that the education mechanism was still old in 1990, and the education system was far from democracy. For example, the article "*The Game of Democracy is Over*" (Ruskulis, 1990) includes expressiveness and metaphors ("*the land of happiness*") and personification ("*the power slips from the hands*"), suggesting a vivid and emotionally charged critique of the democratic process. The wording consists of formal and informal words and exclamations such as "*Enough, the game of democracy is over!"* Also, a rhetorical question: "*But where is the surprise word "to work"?* Moreover, aposiopesis, which is a symbol of silence where the imagination may finish the ending, can be seen in the text: "*So far, that I think, democracy even is moving away because it is impossible to see it…".* These literary devices might be used to convey the disillusionment or failure of democracy, portraying it as an elusive ideal ("*the land of happiness*") and illustrating the loss of control or authority as democracy fails to deliver on its promises ("*the power slips from the hands*"). It reflects a critical perspective on the outcomes of democratisation efforts, emphasising the gap between democratic ideals and reality.

Society was in denial about the improvements offered, demanding something more democratic, but political leaders could not deliver it. For example, history lessons were required instead of music lessons, but there was lack of teachers of the subject and no textbooks (Meiere, 1990). Furthermore, the democratisation was hampered by insecurity, over-regulation, isolation in pedagogy, limited global awareness, and management errors. However, establishing councils in municipalities, districts, and schools served as a positive example of democratisation, with discussions on enhancing the roles of school conferences and pedagogical councils in staff development (Šmite, 1990).

Category	Subcategory	Description
Challenges in Implementation	Lack of Teacher Preparedness	Teachers lacked the practical skills and understanding necessary to effectively teach democratic principles (Meiere, 1990).
Nostalgia for Soviet System	Loss of Structure and Effectiveness	Increased autonomy in teaching under democracy perceived as leading to a decline in structure and effectiveness compared to the Soviet era (Sametis, 1990).
Barriers to Democratisation	Insecurity and Over-Regulation	Democratisation efforts were hindered by insecurity, over-regulation, and isolation in pedagogy, along with management errors (Šmite, 1990).
Critique of Inaction	Lack of Genuine Reform	Society criticized the old system but failed to create meaningful changes, merely altering titles and positions without substantive reform (Meiere, 1990).
Public Disillusionment	Waning Enthusiasm	Public enthusiasm for democracy faded due to frustrations with leadership disagreements and the complexities of reform (Klišāns, 2018).
Systemic Issues	Fragmented Responsibilities	Need for centralization of education policy under a single ministry to avoid unnecessary overlap and inefficiency (Seleckis, 1990).

Figure 4 Opposing Aspects of Democracy in Education in 1990

Seleckis (1990) wrote in "*The Time for Concrete Action is Approaching*" that until 1990, the main direction of the Latvian people was to criticise and analyse past mistakes. However, it was time to build a new education system actively. The existing education system needed to be replaced entirely with a new one, requiring changes such as restructuring and integrating subjects, translating textbooks, training teachers in psychology, and addressing the significant lack of material resources (Meiere, 1990). The language used in the article is emotional and rich in imagery, comparing the education system in 1990 to *"(...) a house that needs a good foundation and a good roof ridge, but not just pretty bricks, you need to think about how the bricks fit into the overall façade of the house"*. The article asks the reader questions such as "*Why? How can Latvia take action to receive advice from wise experts?*" to give the reader a sense of dialogue and presence. The author tried to inspire the reader to take an active role and get involved in the new educational system with words like "*a crucial time of change*" and "*(..) transformations must be aimed at unleashing people's dormant energy and stimulating activity and initiative*".

At the end of 1990, the upsurge in Latvian society began to fade somewhat. This decline in public enthusiasm highlighted the challenges of transitioning to democracy, as

societal expectations clashed with the realities of leadership disagreements and the complexities of educational reform.

Interpretation of democracy in 1991–1992

After gaining independence, democratisation, decentralisation, cultural revival, and humanisation of Latvia were the most critical changes in the education system (Sarv, 2020). By 1992, the governance of the education system was reorganised, defining the functions of the Ministry of Education and Science, municipalities, and school boards. The number of school board staff was reduced, officials were elected to the boards, and their functions were changed. State education inspectors were charged with monitoring compliance with legislation and implementing national education policy in district education institutions. The inspectors were to liaise between the educational establishments, the municipality, and the Ministry of Education (Kalniņš, 1995).

Between 1991 and 1992, Latvia introduced a system allowing students to select subjects and courses and implemented a new method for assessing secondary school students' achievements. Educational standards were established in primary education in the 1992/93 academic year. The government promoted the creation of private schools, fostering competition. In higher education, decentralisation and democratisation efforts led to transforming universities into autonomous public institutions, approving their constitutions, and introducing private entrepreneurship in the sector (Kalniņš, 1995). It was believed that education contributes to the democratisation of society. Learning democracy was seen as acquiring specific capacities and skills: the ability to cooperate and communicate, tolerance and acceptance, gender equality, acceptance of people with special needs, and different religions by emphasising these skills because communities live in a multicultural environment (Ķestere, 2009) while exchanging experiences abroad in education as in other democratic societies.

The concept of a democratic education system was characterised by viewing each child as an individual and in the centre of education, focusing on their emotional world, and rejecting authoritarian teaching methods. This perspective was gaining significant acceptance in society. How children were treated became the foundation of educational philosophy, distinguishing humane and democratic approaches from totalitarian and autocratic pedagogy (Albrehta, 1992).

1991–1992 marked a significant transformation in Latvia's education system, integrating democratic principles, decentralisation, and cultural revival. These reforms emphasised individualising education, fostering democratic skills, and transitioning from authoritarian methods to a more humane and inclusive approach, laying the groundwork for a modern, democratic society.

Interpretation of democracy in 1993–1994

In 1993, the Ministry of Education and Science was established in Latvia to have a central administration, subordinate, and supervisory bodies. Furthermore, a new system of assessing pupils' achievements was introduced in primary education, and educational

standards were introduced in general secondary education (Kalniņš, 1995). Nevertheless, the education system was still in chaos due to acquiring freedom and an uncertain future, stating that the education level was lower than before World War II, especially for youth. Little funding was allocated to education, and there were teachers' strikes (Gžibosvka, 1993). The education system had gained freedom and was undergoing self-democratization, but educators and policymakers were uncertain how to utilise this newfound autonomy effectively. Emphasis was placed on democratic education in which each child's inner world and potential are as significant as any other individual's (Grundulis, 1993), underscoring the importance of recognising and nurturing their unique capabilities.

The reorganisation of the education administration in 1994 marked a significant step in refining the structure of the ministry, allowing for a more evident division of responsibilities between national policymaking and strategy development (Kalniņš, 1995), aiming to improve the efficiency and effectiveness of educational governance in Latvia. The foundational principles of education in 1994 integrated values such as humanity, democracy, and individualisation with creativity, national identity, professionalism, and scientific rigour, reflecting a commitment to traditional and modern educational ideals (Vaivads, 1994).

"*Centre for the Development of Democracy*" (further on CDD) promoted democracy to protect and empower children within families, advocating for its education among children, parents, teachers, and social experts (Tūna, 1994). The "*Civil Knowledge in Latvian Schools*" course taught democratic skills through experiential learning, focusing on active participation and new classroom methods to reshape school content and format (Catlaks, 1995a), underscoring the crucial role of education in fostering democratic values within society, emphasising active participation and experiential learning to cultivate informed and empowered citizens.

Democracy, which entailed equality and representation, was not universally realised. By 1994, some schools lacked school councils, and efforts to involve students in director elections were unsuccessful. However, it was permissible for pupils to be represented on school councils to democratise school life and learning. Students needed to be prepared for a democratic society, and both schools and teachers had responsibility for the learning process (Ginote, 1994). Teachers' willingness to work with pupils, parents, and the municipality was crucial.

Education was vital in transitioning from communism to democracy, as it needed to foster democratic principles within society. This involved creating and applying methods to cultivate a democratic culture, recognising that a newly declared democracy takes time to mature (Andersons, 1994). Improving education required clear guidelines on integrating democratic values into primary schooling. A democratic school emphasises dialogue between students and teachers, blending science, art, tradition, and creativity and integrating religious and secular perspectives with broader societal engagement (Sevčenko, 1994). Democracy was essential for a balanced education, protecting youth, and upholding dignity.

Interpretation of democracy in 1995

Society still lacked a clear understanding of democracy and its processes – for some, it was seen as disorder and chaos. In contrast, others expected it to bring immediate prosperity. Critics argued that the complexity of democracy led to confusion and misunderstandings, contrasting with the explicit purpose of Soviet education (Tomašūns, 1995). Therefore, people needed examples of good practices from countries where democratic principles worked successfully (Grunte, 1995b), signalising the acceptance and perception of democratic principles did not happen in one moment but was a continuous process.

Youth must be allowed to learn about the history and development of their country, their rights and responsibilities, and the opportunities to participate in public and school administration (Catlaks, 1995b); for example, councils and various types of boards continued to be implemented as an example of democracy at school (Brice, 1995). Pupil parliaments, with pupils electing representatives through secret ballots, using one of three proposed models: municipal, Latvian electoral, or majoritarian (Masule, 1995), were proposed to address school issues and teach democracy by helping students understand that not all problems stem from teachers or administration (Vītols, 1995), but are also shaped by student involvement.

Positive development in the understanding of democracy included introducing civics courses, student self-government, and debate programs. Discussions on whether democratic values and critical thinking were being taught appeared (Muižnieks, 1995). Developments of criteria for educational work in a democratic country were required: motivational diagnostics, criteria for pupil-teacher communication, and criteria for the dynamics of the pedagogical process. To strengthen the requirements for educational work, sufficient funding was needed; teachers needed to be responsibly involved, and pupils needed to be actively engaged (Grunte, 1995a).

The "Civic Education Project" (CEP) and "National Democratic Institute" (NDI) played critical roles in reforming Latvian universities to cultivate future democratic leaders (Grunte, 1995a). American influence extended to civil sciences, with the CDD promoting democratic understanding and publishing materials on democracy and the market economy (Berga, 1995; Catlaks, 1995b). The "USA Studies Centre" at the University of Latvia offered resources and training, while civics education, covering socio-political topics, was introduced in schools in 1995, supported by teacher training (Grunte, 1995d; Catlaks, 1995b). Democracy required protection by informed and active citizens, with education emphasising the need for students to understand democratic principles and take political responsibility (Berga, 1995). In this context, "*analysis*" replaced "*control*" (Grunte, 1995c), reflecting trust in the professionalism of educators.

By 1995, critical achievements in democratising Latvia's education system included introducing an applied research and development program, quality control measures, and establishing school accreditation and final inspections (Kalniņš, 1995). However, challenges persisted due to teachers' reliance on outdated Soviet training and a shortage of curricula for previously politicised subjects like history (Abens, 2020). Democratic

education focused on forming parents' councils, integrating schools into local communities, and promoting student participation and respect for diverse opinions.

Conclusions

The democracy in Latvian education from 1988 to 1995 evolved significantly during the country's transition to independence. Initially interpreted as a metaphorical ideal of freedom, openness and autonomy, democracy gradually became an interpretation of a practical framework for educational reform, emphasising decentralisation, individual rights, and public involvement. The reforms aimed to counteract past authoritarian practices, promote equality, and integrate democratic principles into governance and curriculum. However, the transition faced complex challenges, including outdated teacher training, limited resources, and lingering authoritarian attitudes. The emphasis on the child's core values emerged. Democracy fostered humanistic values, individual rights, and social responsibility. The transition involved a shift from authoritarian practices to democratic, emphasising individualisation and active participation in educational processes.

Despite obstacles, by 1995, Latvia had made substantial progress in embedding democratic values in its education system, laying the foundation for a more inclusive and participatory approach. Further research is needed to explore how these early reforms have continued to shape Latvian education in the years since.

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READING LITERACY ACQUISITION IN PRE-SCHOOL AND SCHOOL: SUCCESSION ASPECT

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ABSTRACT

The acquisition of reading literacy has been an important issue from generation to generation, nonetheless it is especially relevant today, when the concept of reading literacy has expanded under the impact of various social and economic circumstances, requirements for a good reader and writer have changed.

The relevance of the problem originates from the results of recent scientific research in the world and in Latvia and surveys of preschool and primary school teachers.

The goal of the research is to analyse the teachers' understanding of reading literacy acquisition in preschool and primary school, and needs how to ensure targeted succession in reading literacy.

The methodology of the study is based on theories about reading and interaction, theories about integrated approach from the point of view of succession, task–based learning theories. The empirical data have been obtained by analysing 96 pre-school, 84 primary school teachers' surveys.

In order to ensure higher reliability of the data, the survey involved teachers with at least four years of teaching experience in pre-school and primary school, gained while working with 5–7 year old children in pre-school and first grade in different regions of Latvia. Descriptive statistical methods have been used in the analysis of the data obtained in the study.

The results of the research show that in the process of reading literacy acquisition, the results and recommendations of recent years of research have not been taken into account in order to promote the development of reading literacy, there are significant "gaps" from the point of view of succession: there is no exact coherence between the goal of reading literacy and the anticipated results to be achieved, in terms of the curriculum and its acquisition methodology between pre-school and primary school. A common understanding of the terminology of the research field, as well as the coherence of curricula, cooperation among teachers of both educational stages are also a topical problem.

The significance of the results is related to the fact that the real situation shows in which aspects it is necessary to improve the teaching content and methodology intended for the successive acquisition of reading literacy in preschool and primary school.

Keywords: *integrated language skills, process of preschool education, process of primary school education, reading literacy, succession.*

Introduction

The acquisition of reading literacy has been an important issue in different centuries, nevertheless it is especially relevant today as we live in a time when information and its acquisition resources change so rapidly that without the ability to read and write well, an individual is not only unable to navigate information, but also to solve everyday problem situations related to everyday life and be an active member of society. No less important is the fact that we live in a space of different languages and cultures, and some children have to learn the basics of reading literacy in a language that is not their mother tongue. Nowadays, in addition to printed texts, one must be able to read and write digital texts as well.

The relevance of the problem originates from the OECD *(Organisation for Economic Development and Cooperation)* International Student Assessment Programme PISA *(Programme for International Student Assessment)* 2022 study, also the results of recent scientific research in the world and in Latvia (Gupta, 2023; Ozola et al., 2023; Krieķis, 2022; Anspoka & Tūbele, 2015), surveys of preschool and primary school teachers.

The results of the OECD PISA 2022 study show that, compared to the achievements of pupils of Latvia in 2018, in 2022, pupils' reading skills and attitudes towards reading have decreased (PISA Results, 2022).

Studies related to reading literacy show that there are a number of psychological, cognitive and social problems to be solved in the educational process (Gupta, 2023; Ozola et al., 2023; Krieķis, 2022). Groups of preschool children and primary school classes are becoming more and more ethnically and linguistically heterogeneous, because alongside the children whose language of instruction is also their mother tongue, the literacy is also acquired by the children who have very little or no knowledge of the language of instruction (Anspoka et al., 2023; Krieķis & Anspoka, 2020; Anspoka & Tūbele, 2015). Taking into account the different environment in which the child grows and develops, the individual needs of each child become more and more pronounced. In the process of reading literacy acquisition, preschool and primary school teachers should increasingly think about the adaptation of the educational environment and resources depending on the child's abilities and previous experience (Gupta, 2023; Anspoka et al., 2023).

The goal of the research is to analyse the teachers' understanding of reading literacy acquisition in preschool and primary school, and needs how to ensure targeted succession in reading literacy.

Methodology

The methodology of the study is based on theories about reading and interaction, theories about integrated approach from the point of view of succession, task–based learning theories. The empirical data have been obtained by analysing surveys of pre-school and primary school teachers.

The empirical data has been obtained by analysing the results of the questionnaires of 96 preschool teachers and 84 primary school teachers. All questionnaires were distributed electronically – to pre-school teachers from February to May 2023, and to primary school teachers from September to October of the same year. The survey involved teachers with at least four years of teaching experience in pre-school and primary school, working with 5–7 year olds in pre-school and first grade pupils in school. The selected educational institutions are those with which the University of Latvia has cooperation agreements in all regions of Latvia to provide internships. The questionnaires included questions that allowed teachers to express their opinion not only on the pupils' learning of reading literacy, but also on how the process of continuity between preschool and primary school is ensured.

The data were collected and analysed using the Microsoft Excel software. Descriptive statistical methods have been used in the analysis of the data obtained in the study. The obtained data are ranked and expressed in percentages depending on the number of the obtained data and interpreted in relation to the purpose of the study.

Results

Understanding of reading literacy

Reading literacy is mostly the ability to read and write, i.e., the skill to read and write; also, the opposite of illiteracy (Skujiņa et al., 2011, 70). In a broader sense, the concept of *reading literacy* is understood not only as reading and writing skills, but also as listening and speaking skills (Moats, 2020), also numeracy (Education for All: Literacy for Life, 2006), since these basic skills are the most important ones in human life. A child who is not able to read and write, as well as listen, speak and perform arithmetic operations, has limited opportunities to acquire successfully education and later develop their career.

Reading literacy is not just about a specific skill. It is closely related to vocabulary, correct pronunciation of words, as well as attitude to reading and writing as interrelated processes.

Reading literacy, on the one hand, is an individual value, because it significantly affects the development of an individual's personality, their quality of life; on the other hand, it is also an important value for society, for only an educated society is able to promote sustainable development of itself and specific social environment (Krieķis, 2022; Teaching Reading in Europe: Contexts, Policies and Practices, 2011; Education for All: Literacy for Life, 2006).

Taking into account the development trends of society and the corresponding needs, the concept of literacy has expanded in recent years. If in the 20th century, literacy was understood as the ability to replace sounds with appropriate letters, while reading or writing words, sentences or text and analyse it, then today literacy is also understood as the ability to assess critically and use the read or written textual, visual and audiovisual information in order to achieve their goals (Krieķis, 2022; Anspoka & Tūbele, 2015).

Literacy comprises in itself various activities: information perception by listening, reading or writing, working independently with this information, selection and application of the information acquisition resources according to the purpose, seeing connections between facts, generalization, creating new judgments, as well as feedback, discussion with others orally and in writing (Gupta, 2023; Krieķis, 2022; Language and Reading Research Consortium, 2015; Gee, 2014).

In order to be able to make judgments based on the data, it was important to find out how preschool and primary school teachers understand the concept of reading literacy. It should be noted that 84% of preschool teachers and 83% of primary school teachers understand reading literacy as learning sounds and letters, to join letters together, with special emphasis on reading and writing individual syllables and individual words. Only 10% of preschool and nearly 11% of primary school respondents admit that in addition to learning sounds and letters, the ability to decode sounds into words, there is also the perception and understanding of sentences and short texts and the analysis of what has been read or written. Accordingly, 5% of preschool teachers and 7% of primary school teachers had no opinion about the topic. None of the teachers interviewed emphasised that reading literacy is an individual value (the overview of the obtained results can be seen in Table 1).

Table 1 How is reading literacy understood by preschool and primary school teachers

Indicators	Preschool teachers		Primary school teachers	
	%	*n*	%	*n*
Learning sounds and letters, reading words	84.24	81	82.8	69
Reading, analysis of sentences and short texts	10.4	10	10.8	9
No opinion	5.2	5	7.2	6

The obtained data allow us to conclude that the majority of respondents' understanding of literacy is too narrow, reducing it only to the technical side of reading and writing. An individual's level of literacy cannot be judged only by how quickly they decode sounds into words, if at the same time they are unable to read or write consciously, how to apply what they have read or written in a specific situation. Reading and writing with understanding are the most important signs of the quality of reading literacy (Krieķis, 2022). If in everyday life reading literacy is understood as the ability to spell, connect letters into words and words into sentences, then such a literate person does not differ much from a functional semi-illiterate person who is either unable to meet the necessary reading and writing requirements, or is only partially able to read and write (Ozola et al., 2023). It is also important to look at reading literacy from a social and emotional point of view, as a positive atmosphere activates the need to discuss with others what has been read or written, to confirm oneself, to enjoy the process. Whereas, negative emotions, such as

fear of failure, anxiety and self-doubt, reduce the capacity of brain to process information (Gupta, 2023; Ozola et al., 2023; Anspoka et al., 2023).

Development of reading literacy

Reading literacy to read and write are not innate. It can only be learned by reading and writing, and this happens very gradually from an early age, also with effort, time and patience. The children who have started learning it at an early age in the family and continued purposefully in preschool and school have better literacy results at school (Ozola et al., 2023; Moats, 2020; Morrow, 2005).

During the research, it has been important to find out the opinion of preschool and primary school teachers, at what age should children start learning the basics of reading literacy in the educational process (see the obtained data from the survey in Table 2).

Table 2 Attitude of preschool and primary school teachers towards the age from which the literacy

Indicators	Preschool teachers		Primary school teachers	
	%	*n*	%	*n*
2–3 years	12.4	12	0	0
4–5 years	30.4	29	90.5	76
5–7 years	57.2	55	9.5	8

The obtained data demonstrate that teachers have different opinions. If 12% of preschool teachers believe that the acquisition of the basics of literacy begins at an early age (2–3 years old), and its initial stage is associated with activities such as reading aloud, getting used to flipping through books, looking at pictures and talking about them or discussing them together, drawing letters, "writing according to one's own understanding", the main thing is to "read" one's own writing, then primary school teachers do not mention such an age at all. 30% of preschool teachers consider 4–5 years of age as the most favourable time, while the other 57% of preschool teachers consider 5–7 years of age as the time for reading literacy acquisition. On the other hand, 90% of primary school teachers believe that the reading literacy acquisition could begin in 4–5 years of age, while 9% of respondents consider 6–7 years of age as the initial stage of reading literacy acquisition.

Regarding the importance of starting the acquisition of reading literacy at the earliest possible age, after each OECD PISA international study, recommendations are also developed, emphasizing that at first the child should be introduced to the reading and writing process as a whole, the so-called pre-reading and pre-writing tasks should be performed, and only then they should be introduced gradually in the world of sounds and letters, and these kinds of tasks cannot be left only to the family. This has to be done professionally in preschool and continued at school (Ozola et al., 2023; Latvia in the OECD

International Student Assessment Program PISA 2018 – First Results Conclusions, 2019; Geske et al., 2013). The survey also included a question on whether teachers are aware of the results of the international study and how research-based recommendations are taken into account in practice. All teachers surveyed are made aware of this research, but 48% of the teacher answers suggest that research results are not or are not sufficiently promoted in pedagogical process and not incorporated in methodological and teaching aids.

Teachers' answers show that they know about these studies, but only partially or episodically take them into account in their professional activities. Conversely, the other respondents have chosen not to answer this question at all.

In order to see the reading literacy of preschool children who will go to Class 1 the following school year, their reading and writing skills have been studied during play-based lessons at the end of May, 2023. A survey of teachers has also been conducted to find out their opinion about how ready the children are to start school and proceed with their studies successfully. In order to obtain objective results, the questionnaire offered theory-based criteria for assessing reading literacy:

- ability to recognize letters and pull them together into words in the text,
- ability to answer questions about what has been read,
- ability to replace printed letters with written letters, writing words and short sentences according to the task requirements,
- ability to understand reading literacy as an important individual value, to gain information from reading, enrich their emotional experience and help them learn more about maths, science and social studies.

Teachers believe that by observing the pedagogical process, they can see, that 92% students know the letters, join them together into words skilfully enough. However, only 37% are able to answer questions and talk about the connection of what they have read with their own experience. 77% of students write consciously, they are able to write a sentence according to the set task. Undoubtedly, we cannot yet talk about the skill of writing the hand-written letters and connecting them into words to form a neat, individual handwriting. This is due to the fact that 6–7-year-old children still have poorly developed hand musculature, they have difficulty drawing out the shape of a letter accurately, connecting letters into words, observing the width and height of the letters (Anspoka & Tūbele, 2015). Teacher survey data shows that among the students 23% have low writing skills (do not distinguish between printed and hand-written letters, mix upper- and lower-case letters, write incorrectly, cannot read what is written), but none of the teachers surveyed believe that pre-primary and Year 1 pupils are able to see reading literacy as an important individual value in order to gain information from reading, to enrich their emotional experience and to be better able to learn mathematics, science and social studies.

The overview of the previously analysed results can be seen in Figure 1.

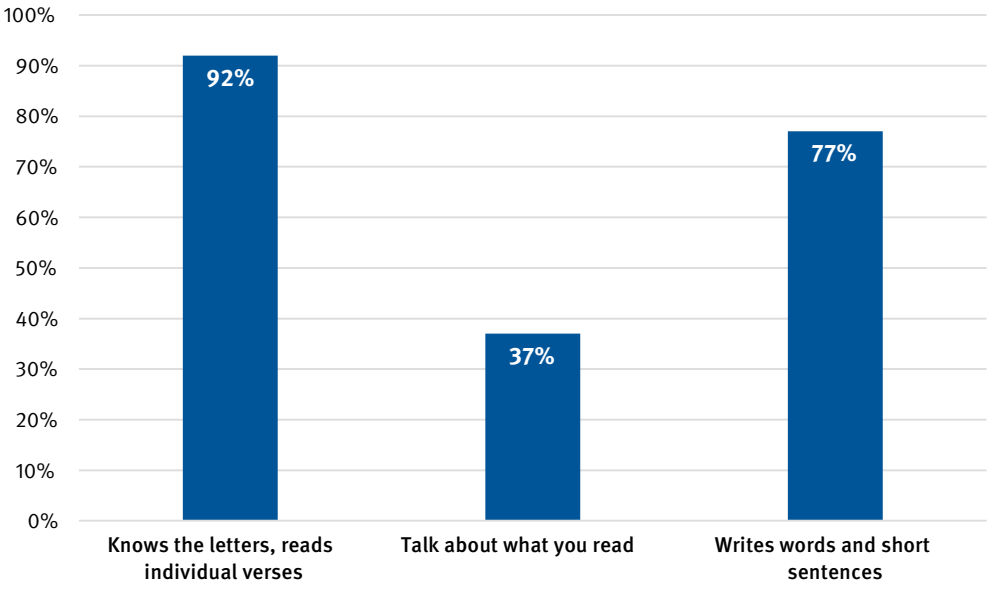

Figure 1 Reading literacy quality of 6–7-year-old children in May, 2023

Preschool teachers' responses to the survey on children's readiness for school are proportionally divided into two groups. As teachers believe, half of the respondents consider that the children are fully ready for school and will not have any difficulties to fit into the school environment, to cope with school assignments, while the other half of the respondents state that preschool requirements and school requirements are not exactly aligned with preschool. A high level of reading literacy in all subjects is required from the child already in the first weeks, regardless of the fact that it cannot be ensured in preschool. No less important is the opinion expressed by preschool teachers that often when children come to school, they have a distinctly different learning organization, and a gradual transition to a more academic environment is not ensured.

Ensuring continuity of reading literacy development

Since the didactic principle of succession requires taking into account previous experience and the provision of gradual acquisition of new experience, moving from the known to the unknown, from the easiest to the most difficult, the first most important task of the Class 1 teacher, commencing the school year, is to diagnose the physiological, psychological, social readiness for school, level of literacy acquisition, special individual needs, etc. A precisely diagnosed situation enables us to select a more targeted learning content, its arrangement in syllabus, educational aids, to choose the teaching methodology, plan deliberately the differentiation of pupils' work in Class 1, especially in the first half of the year, etc. For this reason, the same criteria have been applied to diagnose the level of literacy of the same respondents when they started learning in Class 1 (the overview can be seen in Figure 2).

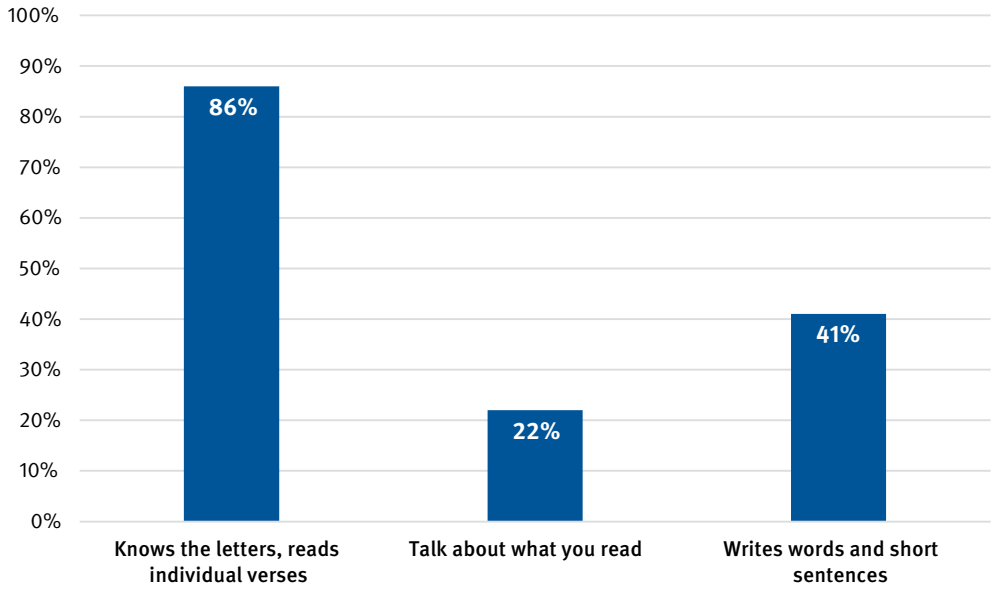

Figure 2 Reading literacy quality of 6–7-year-old children in September, 2023

According to the obtained data, the level of children's reading literacy has decreased in all indicators after the summer. The survey for primary school teachers also includes the same criteria as for pre-primary school teachers. The results of the teacher survey outline that 86% of the students are able to recognize letters and join them together into words with sufficient skill, whereas only 22% of the students have shown the ability to answer questions and talk about the connection of what they have read with their own experience. The biggest decline is in terms of writing reading literacy. If in the spring, 2023 77% of students have been testified that they have sufficient writing skills, without paying attention to handwriting, then in autumn, only 41% of students have demonstrated sufficient writing skills. When surveying primary school teachers, 84% of them are worried about the obtained results, because they believe that the part of pupils who do not have good enough reading and writing skills will not be able to cope with the educational content in other subjects. There is an objective basis for this, because in natural sciences, social sciences, mathematics and also in the Latvian language, both textbooks and workbooks contain texts, instructions of the assignments, the perception and execution of which is possible only if the child has good literacy. The results of the survey of primary school teachers show that the most inconsistencies are in how children are taught the basics of writing in preschool and school. According to the results of the survey, it can be concluded that 53% of primary school teachers are concerned that in preschool, the necessary attention is not paid to how children hold a writing tool and move it along the paper while writing, how letters are joined into words in a written text. Teachers believe that this is essential, because as the amount of writing increases, the child gets tired faster, cannot concentrate, inattention and other errors occur, and the child's health

suffers as well. In its turn, 42% of preschool teachers believe that primary school teachers require more work with texts during the process of reading literacy acquisition in order to promote conscious reading literacy. Children have difficulty understanding the content of mathematics, science or social studies, psychological discomfort occurs, motivation to learn decreases.

Discussion

The process of reading literacy acquisition does not begin with learning sounds or letters, but with the creation of an interest in the processes of reading and writing, with understanding of what the benefits of a person are if they know how to read or write, what is important to them in life. Initially, there is the family environment, it is done professionally successively in preschool, later in school. Nowadays, when working in an ethnically and linguistically heterogeneous environment, it is necessary to take into account the child's mother tongue, without forgetting that the acquisition of literacy is closely related to the ability to listen, ability to concentrate, ability to retain attention, ability to speak, etc. If initially parents or teachers read aloud in front of the children, and the child listens to them from their birth, after that the read material is discussed with the child, then at the age of two or three they are already ready to be actively involved, predict the content of the text based on pictures, headlines or individual fragments read in front of them, and talk about it , with the specific set task of listening to the adult's reading and getting involved frequently in a talk on what has been heard. Undoubtedly, a book or text is read in this way for a longer time, and it also requires the adult's patience, nevertheless it is a benefit for the development of the child's understanding of reading as a meaningful activity. Even more, if there are also words next to the pictures, the child is allowed to see these words, "photograph" them with their eyes, associate the words with their meaning in a specific context and even remember them in another situation. In the initial stages of literacy acquisition, the vocabulary development, phonological and phonemic perception is an essential prerequisite, and this is particularly important for children who have low language skills, the language of instruction is different from their mother tongue (Zariņa 2021; Gee, 2014). Even later, while learning the skill to recognise letters corresponding to their sounds, it is not useful at first to learn to read and write mechanically by calling or writing individual syllables that have no relation to the meaning of the word in a sentence (a syllable is a unit of speech, not a unit of language), in order to start doing it after some time later with understanding, if in a methodically thought-out system both processes – word decoding and perception and understanding of the meaning – can be learned simultaneously. Reading literacy is a complex skill. It is important to note that reading and writing skills can be acquired in a mutual relation, as they influence each other. Similar to the process of reading, writing is also based on complex mental processes – phonemic perception of speech, analysis and synthesis of sounds, coordinated operation of visual and movement analysers. Before writing, the child must hear the sounds, remember the corresponding letters and write them in

the correct order, the same way as they should be named when reading a word (Zariņa, 2021). Considering the data obtained in practice, in Class 1 the sort of acquired alphabet learning in preschool must not be neglected. It is important for children, regardless of their literacy level, to enter gradually the world of sounds and letters when they start school, to improve the basics of reading and writing according to each individual's needs, rather than immediately working with long texts. From the point of view of succession, teachers must consider carefully which of the methods of literacy acquisition will be dominant in both stages of education, because undoubtedly one has to count on children who are already reading alongside those who still need to learn letters when they come to school. In terms of succession provision, there will be problems if in preschool teachers have worked by choosing a text as the basic didactic unit, but at school teachers will take a step back and the pupil will learn to recognise letters, put them together in syllables, read words from them, and only after some time they will discover that words form sentences, and, in its turn, the sentences in the text allow us to judge the content of what has been read. Some of the children can quickly get bored with such activities, and they will lose interest in reading and writing. In terms of succession, a common understanding of both educational stages on the process of literacy acquisition, the conditions for the selection of literacy methods, the common terminology and how the specific method and methodological technique affects the child's intellectual, emotional development and the development of will, is really important.

In order the transition to school happened gradually, there would be no different requirements in the educational organization, preschool teachers should also take responsibility for how children are trained gradually to control and manage their behaviour, adhere to the rules, are able to listen, perceive the content of what they have heard, learn to overcome difficulties, finish the work they have started, acquire elementary behavioural norms, work culture.

Results of the teacher survey show that in terms of succession nowadays there are also other issues to which conscious attention should be paid. Since in recent years the educational institutions of the Latvian language of instruction have become multicultural, as children have different language levels within a single school, more attention should be paid to tasks of different levels in the content of literacy acquisition. If children with different experiences study in the same room and at the same time, then each of them has both the obligation and the right to participate in the educational process and receive the necessary help. Regardless of whether a child is of preschool or school age, each of them has a need for something new, interesting, exciting in the surrounding world, the need to find out the interrelations of things and phenomena, the need for contact with others in order to show oneself, the need to act, be active, the need to imagine, fantasize, see the results of one's efforts, to be recognized for it. The teacher just needs to learn to separate what it means to help the child and what it means to interfere with their work, in case the child cannot cope with the task at some point.

From the point of view of succession, uniform criteria for the children's achievement assessment are also important. When choosing them, the level of perception and

knowledge, which includes remembering facts and information, as well as the level of understanding to make sure that the information is sufficiently understood and the level of skills that make it possible to use the obtained information analytically, must be matched. On the other hand, a child who is capable of going deeper should be given the opportunity to create new knowledge applying the information they have learned or found, and to assess their own and other's experiences in this regard. The teacher in both stages of education cannot focus only on the needs of children, group or class with the average ability. It is important for teachers to recognise that it is equally important to ensure the reading literacy of all students, regardless of their cognitive and social experience.

Conclusions

- Teachers understand reading literacy as the ability to read and write. Most of the teachers surveyed associate reading literacy only with the technical side. Reading literacy is also not assessed from a social and emotional point of view.
- Preschool and primary school teachers also differ in their views on the age at which to start reading literacy. While 12% of pre-primary teachers consider it important to start reading literacy at two to three years, primary teachers do not mention this age at all. 31% of pre-primary teachers consider 4–5 years to be the best time, while the remaining 57% of pre-school teachers consider 5–7 years to be the best time to start learning to write.
- Teachers point out that a high level of reading literacy in all subjects is demanded of children in their first weeks at school, without taking into account that this cannot be achieved in pre-school. Often there is a different organisation of learning in pre-school and in primary school.
- As the level of literacy in all the indicators has dropped after the summer, in order to ensure the succession between preschool and primary school, it is essential to select the teaching content and methodology in a precisely diagnosed situation, so that the process of literacy acquisition would continue gradually, if necessary, also by stepping back and proceeding with the alphabet learning at school.

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A SENSE OF BELONGING FOR PROMOTING INCLUSION IN A DISTANCE LEARNING SECONDARY SCHOOL

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ABSTRACT

The research investigates the sense of belonging in distance learning environments within Latvian secondary schools, aiming to address challenges in fostering inclusion and engagement in virtual settings. The study was conducted across two distance education schools, involving 245 students and 23 teachers. Data collection was carried out through questionnaires tailored to assess perceptions of belonging, the learning environment, relationships, and cooperation. Quantitative data were analysed using descriptive statistics, analysis of variance (ANOVA), and correlation analysis. Results indicate that students generally report a positive sense of belonging, with a Belonging Index score averaging 25 out of 32. However, the study found no significant correlation between belonging-promoting activities (such as the learning environment, relationship-building and cooperative learning) and the students' sense of belonging. Both teachers and students acknowledged the presence of these activities, but their impact on fostering a strong sense of community was limited. Discrepancies were also noted between teachers' and students' perceptions of the frequency and effectiveness of these activities.

The research underscores the importance of enhancing meaningful interactions and collaborative opportunities to strengthen students' sense of belonging in distance education. The findings suggest that while current activities are somewhat effective, they may not be the primary drivers of belonging in a virtual learning context, pointing to areas for further improvement and targeted strategies.

Keywords: *distance learning, inclusive education, sense of belonging, secondary education, online engagement.*

Introduction

Access to education is a critical aspect of societal development, especially in contemporary times where diversity and inclusivity are valued. One significant mode of education that addresses these needs is distance learning, which offers quality, affordable, and accessible education, thanks to advancements in digitalization (Valsts izglītības attīstības aģentūra, 2021; Guri-Rosenblit, 2009). While the concept of distance education has

historical roots dating back to the 19th century, its modern incarnation has evolved significantly, particularly within Latvia, where students now have the opportunity to engage in distance learning from as early as Grade 1 (Valsts izglītības attīstības aģentūra, 2021).

Amidst the global pandemic, the relevance of distance learning has been underscored, with its popularity expected to persist (Amemado, 2020; Xie et al., 2020; Rajeh et al., 2021). It is essential to differentiate between distance learning and emergency remote learning, with the former emphasizing tailored learning environments and materials that promote self-directed learning. However, implementing a constructivist approach to learning, which encourages active participation and collaboration, poses challenges for educators in the distance education realm (Olusegun, 2015; Vrasidas, 2000).

Central to effective distance learning is fostering a sense of belonging among students, which promotes inclusivity and engagement. This involves creating a supportive environment where students feel accepted and valued, contributing to their motivation and participation in the learning process (Goodenow,1993; Baumeister & Leary, 1995; Mahar et al., 2012; Allen et al., 2021). While traditional notions of community are based on physical interactions, distance education necessitates redefining these concepts to suit virtual environments (Shaffer & Anundsen, 1993).

The concept of belonging is not only foundational in traditional educational settings but also critical in online and distance learning environments, where physical separation can challenge students' sense of connection and community. A comprehensive examination of the literature reveals a consistent emphasis on the importance of belonging for student engagement, emotional well-being, and academic achievement.

Greenwood and Kelly (2019) conducted a systematic review that explores how educational staff perceive and cultivate a sense of belonging among students. Their findings highlight the importance of a supportive school culture, underscoring the active role that educators must play in fostering belonging. This aligns with the current study's focus on distance education, where creating such a culture requires deliberate and innovative strategies.

Similarly, Peacock et at. (2020) emphasized the significance of belonging in online learning environments. They demonstrated that a strong sense of belonging can significantly enhance student engagement and mitigate feelings of isolation, which are common challenges in virtual classrooms. Their research highlights the need for educators to be proactive in creating interactive and inclusive online learning experiences.

McMillan and Chavis (1986) provided a foundational theory on the sense of community, which has been adapted to various educational contexts, including online learning. Their theory underscores the psychological and emotional dimensions of belonging, which are essential for student retention and success in distance education. These dimensions become even more critical in online settings, where traditional social interactions are absent, also highlighted by Seifert and Bar-Tal (2023).

Shea et al. (2005) and Shackelford and Maxwell (2012) examined the role of learner-to-learner interaction and teaching presence in building a sense of community in online education. Their studies found that these interactions are crucial for developing a supportive learning environment, directly influencing students' motivation and academic

performance. This highlights the importance of structured opportunities for interaction in online courses.

Furthermore, Goodenow (1993) was first to define the relationship between classroom belonging and academic outcomes among adolescents. She created a scale for measuring the perceived belonging or psychological membership in the school environment and found a strong positive correlation between students' sense of belonging and their motivation and achievement, providing a basis for similar investigations in distance learning contexts. The importance of nurturing the feeling of belonging through deliberate community-building in order to achieve academic success, a theme that resonates strongly within the reworked framework of online education as highlighted in research done by Peacock and Cowan (2019).

Lastly, Gunawardena and McIsaac (2004) and Guri-Rosenblit (2009) discussed the broader challenges and misconceptions associated with distance education. Their work highlights the necessity of developing strategies to promote inclusion and a sense of community in online environments, addressing common barriers to student engagement and success.

Despite the substantial body of literature on belonging in educational settings, there remains a gap in understanding its dynamics within the specific context of Latvian distance learning. This gap is particularly notable given that Latvian students are often excluded from international education surveys (Izglītības un zinātnes ministrija, 2022). Therefore, investigating the factors that contribute to a sense of belonging in Latvian distance education institutions is both timely and necessary. The current study aims to address this gap, exploring strategies to enhance students' sense of belonging in a Latvian distance learning secondary school setting.

The primary research problem addressed in this study was the challenge posed by distance learning in fostering a sense of belonging among students, given its lack of regular in-person interactions.

To address this research problem some **research questions** were formulated:

- RQ1 – What factors contribute to a sense of belonging in distance learning, and how do these factors compare across two different schools?
- RQ2 – To what extent are the factors that promote belonging implemented in everyday learning?
- RQ3 – What is the relationship between the belonging activities mentioned in the theory and students' sense of belonging?

The aim of this study was to investigate the aspects that influence students' sense of belonging in distance learning and to develop recommendations for promoting a sense of belonging and an inclusive environment in distance learning secondary schools.

To achieve the aim of this study, some **objectives** were set as follows: analyze the literature on the topic of sense of belonging in distance learning. Develop teacher and student questionnaires based on activities and recommendations for promoting a sense of belonging. Survey teachers to determine the extent to which belonging-promoting methods and activities are utilized and identify additional recommendations from their personal

experiences. Survey students to assess the implementation and effectiveness of belonging-promoting activities and gather suggestions for further fostering a sense of belonging. Analyze the survey results and formulate recommendations to enhance a sense of belonging in distance education secondary schools. Develop recommendations for fostering a sense of belonging and an inclusive environment in distance learning secondary schools.

Methodology

This study employed theoretical research methods grounded in social integration and community-building theories within educational settings, particularly focusing on distance learning environments (Goodenow, 1993; Shackelford & Maxwell, 2012). Data was collected through teacher and student questionnaires designed to assess perceptions and experiences related to the sense of belonging and inclusion in distance education. A case study approach was adopted to allow for an in-depth exploration of the sense of belonging within the specific context of distance education secondary schools. This approach enables a nuanced understanding of the experiences and perceptions of students and teachers, which might not be captured through other research methods (Yin, 2009). Quantitative data obtained from the study are analysed using descriptive statistics, analysis of variance, and correlation analysis to identify patterns and relationships among variables (Field, 2013).

Measurements

In this research, data collection was conducted through carefully designed questionnaires targeting both students and teachers in distance learning secondary schools. The questionnaires were adapted from established instruments, with modifications made to align with the specific context of Latvian distance education (Goodenow, 1993; Mullis & Martin, PIRLS 2016 Assessment Framework (2nd ed.), 2015; Mullis et al., 2016; OECD, 2019). To create the Sense of Belonging Index, questions were drawn from well-known educational assessments like Goodenow's PSSM, PIRLS, TALIS and OECD PISA, ensuring the reliability and validity of the measurements. Ideas from Beldarrain, Y. (2006), Elias, T. (2010) and Shen et al. (2008) were used to create the questions for the environment section, and ideas from Conrad, D. (2005), Peacock et al. (2020) and Shackelford, J. L., & Maxwell, M. (2012) were used for the Relationship Index. Lastly, to create the Cooperation Index, ideas from Conrad, D. (2005), Shackelford, J. L., & Maxwell, M. (2012) and Jiang, W. (2017) were utilized. The student questionnaire focused on the effectiveness and frequency of specific belonging-enhancing activities within the school environment, while the teacher questionnaire aimed to gather insights into the frequency of these activities as perceived by educators.

Data Collection

The study was conducted across two distance learning secondary schools in Latvia. A total of 245 students and 23 teachers participated. Participants were selected through

a non-probability sampling method, specifically convenience sampling, which allowed the inclusion of individuals readily available and willing to participate in the study. The questionnaires were distributed electronically, ensuring accessibility for all participants regardless of their location, in line with the digital nature of distance education (Dillman et al., 2014).

Data Analysis

The data collected from the questionnaires were subjected to both descriptive and corelation statistical analyses. Descriptive statistics, including measures of central tendency (mean, median) were utilized to summarize and describe the main features of the data (Field, 2013). In addition to descriptive analysis, analysis of variance (ANOVA) was employed to assess differences in perceptions between different groups (e.g., students vs. teachers), and correlation analysis was used to explore the relationships between the frequency of belonging-promoting activities and students' reported sense of belonging. These statistical tools were chosen to ensure a comprehensive understanding of the data, allowing for the identification of patterns and relationships that are critical to the research questions. Data analysis was conducted using SPSS, which provided the tools necessary for conducting both descriptive and corelation statistical analyses.

Ethical Considerations

This study was conducted with strict adherence to ethical guidelines. Participants were informed that by submitting their responses, they were providing their consent to participate in the study, acknowledging their understanding of the study's purpose, procedures, and any associated risks. Participation was entirely voluntary, and participants were informed of their right to withdraw from the study at any point. The confidentiality of all participant data was rigorously maintained, ensuring privacy and anonymity.

Results

In this study, both students and teachers offered valuable insights into the factors that contribute of belonging within the context of distance education. Students were asked to express their level of agreement with each statement on a Likert scale, ranging from disagree to agree. The responses were then scored, with positive statements contributing positively to the index and negative statements contributing negatively. The cumulative score from these responses formed the Belonging Index with a Cronbach Alfa coefficient of 0.76, providing a single metric to represent the overall sense of belonging among the students. A significant factor contributing to a sense of belonging was the students' connection to their school. Despite many students admitting to having few or no friends at school, this lack of social connections did not significantly affect their overall sense of belonging. They expressed pride in attending their school and a willingness to recommend it to others, with most students indicating they did not feel excluded or lonely (See Figure 1).

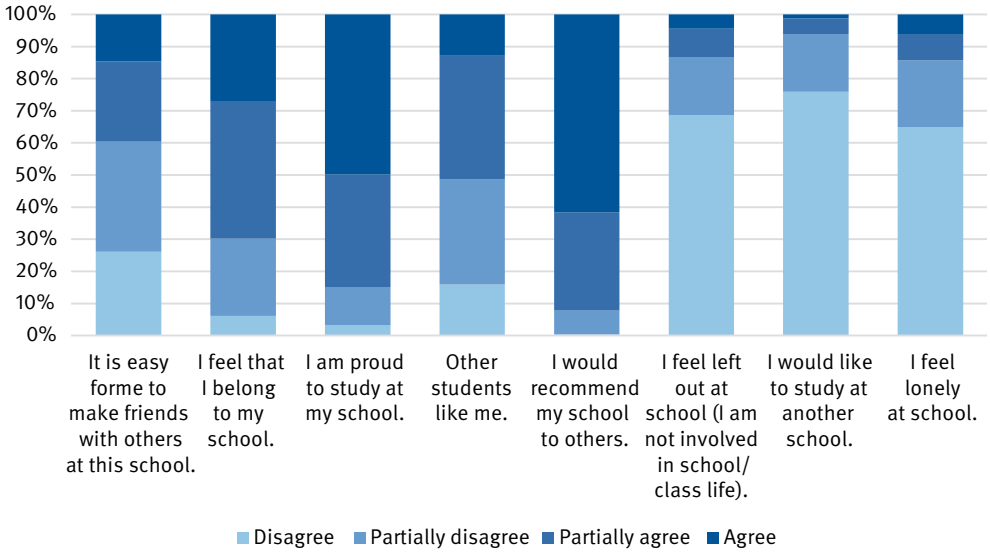


Figure 1 Distribution of responses to the statements that make up the Belonging Index

Further comparison of the Belonging Index between the two surveyed schools revealed no statistically significant differences. The average score in both schools was around 25 out of a possible 32, indicating a generally positive and consistent sense of belonging among students across both institutions (See Figure 2).

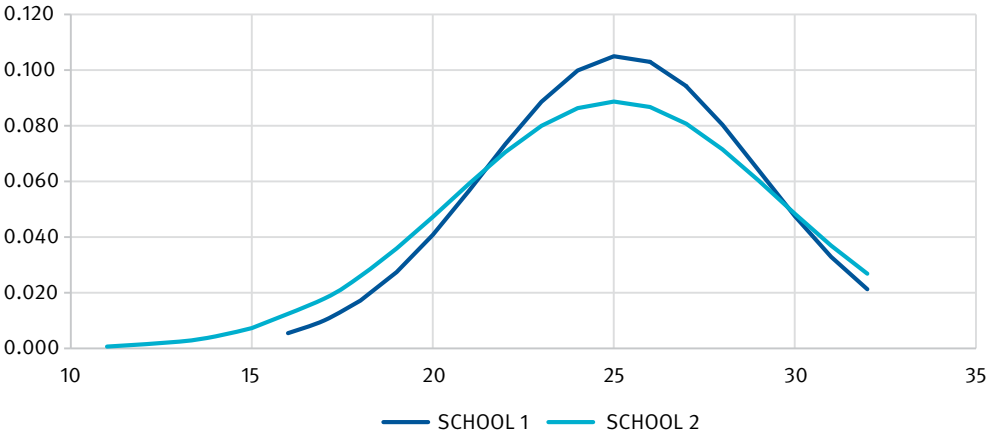


Figure 2 Differences between schools in the Belonging Index

Further qualitative insights were gathered from open-ended questions posed to both teachers and students. Teachers highlighted several activities they believe promote a sense of belonging, such as organizing trips or educational expeditions, working with parents, and involving students in competitions, Olympiads, and international projects.

Additionally, teachers mentioned the importance of face-to-face activities, celebrating holidays together, and fostering self-evaluation and reflection in the educational model. On the student side, 104 students provided suggestions for enhancing their sense of belonging, with many indicating satisfaction with the existing activities. However, some students expressed that they chose distance learning specifically to avoid participation in such activities (See Figure 3).

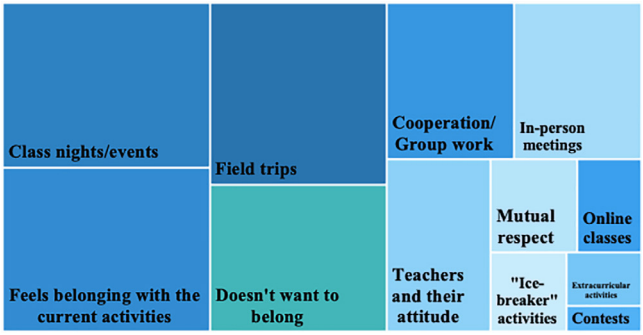
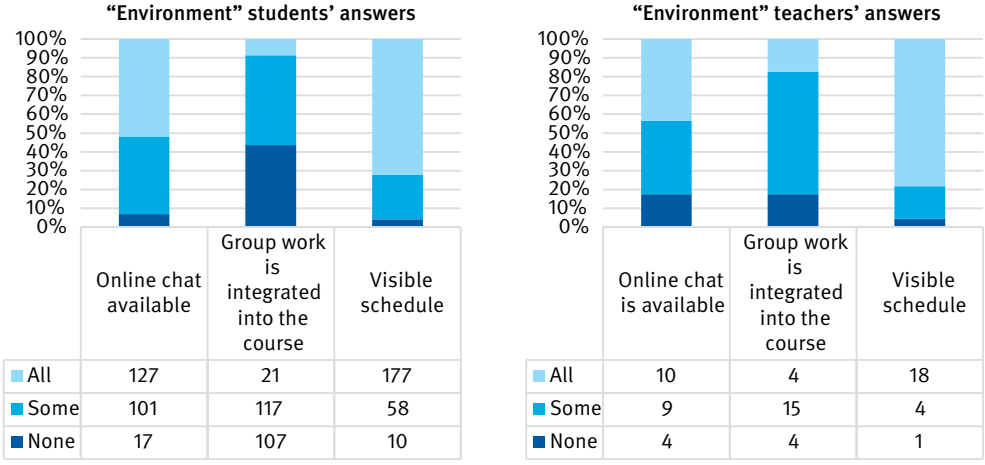


Figure 3 Distribution of students' recommendations

During the study, students and teachers also offered insights into the extent the factors that promote belonging, along with specific activities, were integrated into the learning environment. A significant portion reported opportunities for communication via online chat in most courses, although the frequency of use varied. However, activities that promoted group collaboration without teacher involvement were perceived as less common, and there was a difference in perceptions between teachers and students regarding their occurrence. Both groups, however, agreed on the presence of structured elements in their courses, such as clear timetables for assignments and deadlines (See Figure 4).



	Online chat available	Group work is integrated into the course	Visible schedule
All	127	21	177
Some	101	117	58
None	17	107	10

	Online chat is available	Group work is integrated into the course	Visible schedule
All	10	4	18
Some	9	15	4
None	4	4	1

Figure 4 Students' and teachers' answers in the Environment section

When summarizing the responses to the questions on activities integrated into the learning environment, there was no statistical difference in the mean scores of teachers' and students' responses. Overall, both students and teachers responded positively about the mentioned activities (See Figure 5).

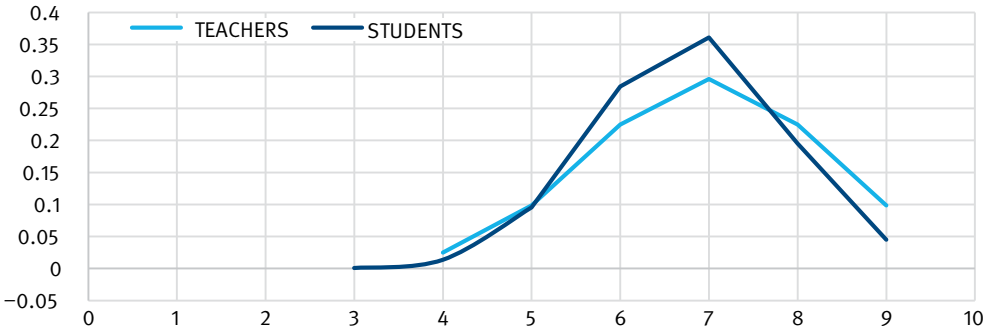


Figure 5 Difference between teachers' and students' opinions in the Environment section

In terms of relationship-building, while teachers reported more frequent positive communication with students, students perceived these interactions as less frequent, suggesting a gap in the implementation of relationship-building activities. Students and teachers indicated a lack of encouragement for forming relationships outside of school, with students noting infrequent ice-breaker activities and occasional interactions around personal interests during lessons. This gap suggests areas where relationship-building efforts could be improved (See Figure 6).

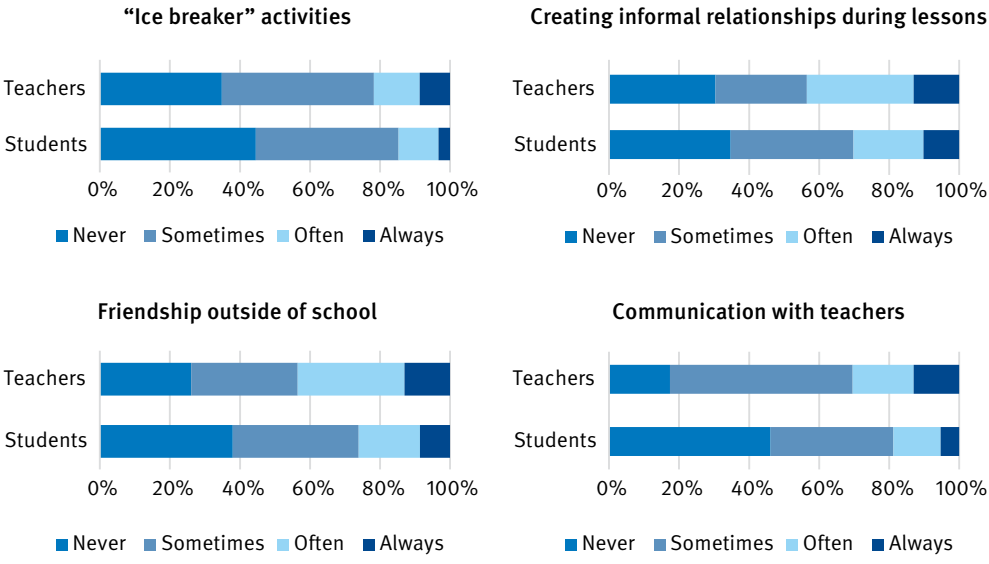


Figure 6 Students' and teachers' answers to the frequency of implementation of the activities in the "Relationship" section

The Relationship Index, with a Cronbach alpha coefficient of 0.72, was created to ensure that the combined data was consistent and comparable across the different question and allow comparison between teachers and students and the mentioned activities and belonging. Summarizing these activities, showed a statistically significant difference between teachers' and students' responses, with teachers generally responding more positively (See Figure 7). However, no correlation was found between the Relationship Index and the Belonging Index, suggesting that these activities did not directly contribute to a heightened sense of belonging among students.

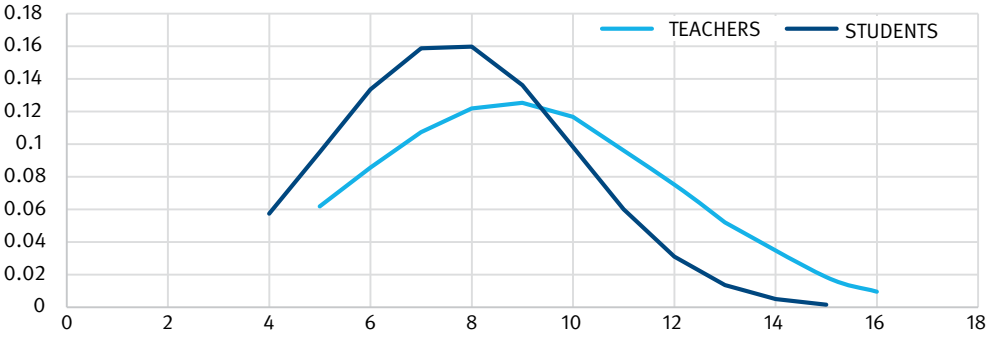


Figure 7 Difference between teachers' and students' opinions on the Relationships index

Similarly, opportunities for collaborative learning, such as group work and peer sharing of materials, were viewed as limited by both students and teachers. In-person meetings, another potential avenue for fostering belonging, were also reported to be infrequent, further indicating areas where implementation could be improved (See Figure 8).

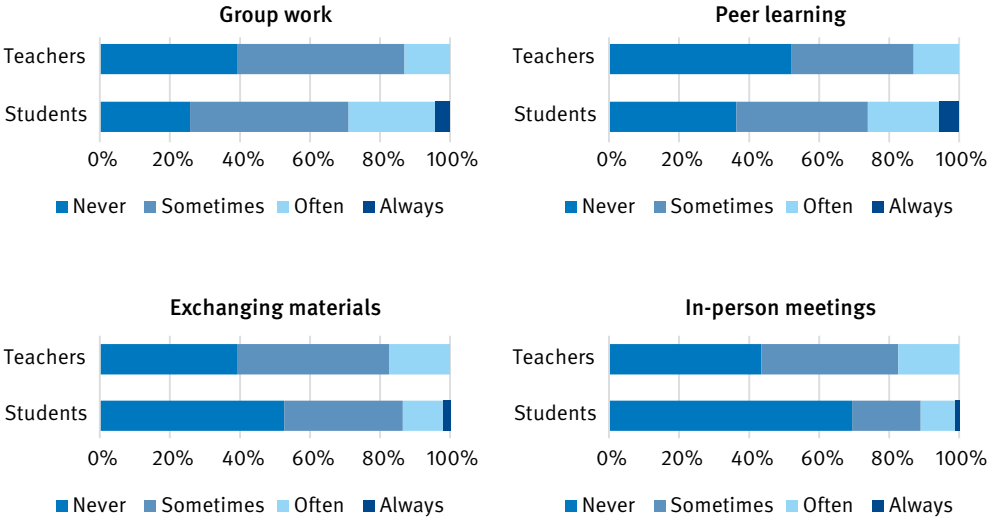


Figure 8 Students' and teachers' answers to the frequency of implementation of the activities in the "Cooperation" section

The Cooperation Index, which had a Cronbach's alpha of 0.74, showed no significant differences between teachers' and students' views on the frequency and effectiveness of cooperative activities (See Figure 9). Like the Relationship Index, the Cooperation Index did not correlate with the Belonging Index, further indicating that these collaborative activities, while present, do not necessarily enhance students' overall sense of belonging.

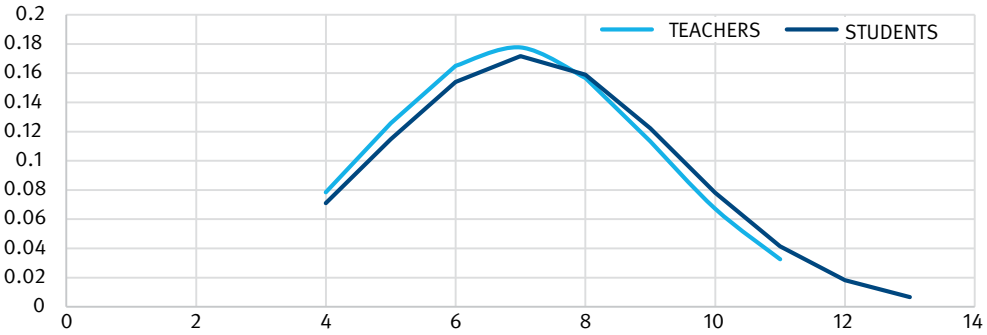


Figure 9 Difference between teachers' and students' views on the Cooperation index

The relationship between activities aimed at promoting belonging that are mentioned in the theory and students' actual sense of belonging was assessed through the Relationship and Cooperation Indices and questions regarding the learning environment. The Relationship Index revealed a statistically significant difference between teachers' and students' perceptions, with teachers generally responding more positively. Despite this, there was no significant correlation between the Relationship Index and the Belonging Index, suggesting that the activities designed to foster relationships may not directly contribute to a heightened sense of belonging among students. Similarly, the Cooperation Index and the questions regarding environment did not correlate with the Belonging Index, further indicating that these activities, while present, do not necessarily enhance students' overall sense of belonging.

In conclusion, the findings of this study indicate that while students generally report a positive sense of belonging, the factors theorized to promote this sense, such as relationship-building and cooperation activities, do not show a significant impact when measured through the respective indices. This suggests that while these activities are valued and somewhat implemented, they may not be the primary drivers of belonging in a distance learning context. The insights provided by both students and teachers suggest potential areas for improving the implementation and effectiveness of these activities, with an emphasis on enhancing meaningful interactions and collaborative opportunities that could further strengthen students' sense of belonging.

Discussion

The findings of this study provide nuanced insights into the dynamics of belonging, learning environments, collaboration, and relationships within the context of distance education. These insights are valuable for educators, policymakers, and researchers.

Despite the inherent challenges of distance learning, the study revealed a generally positive sense of belonging among students. This finding underscores the resilience and adaptability of students in navigating virtual learning environments, consistent with the observations of Greenwood and Kelly (2019), who emphasize the importance of educators in fostering belonging even in virtual settings. Similarly, Peacock et al. (2020) assert that a strong sense of belonging is crucial for student engagement in online learning environments, reinforcing the positive results of this study. However, while students expressed satisfaction with the current activities designed to promote belonging, there remains untapped potential for further enhancement. Goodenow (1993) found a positive correlation between belonging and academic outcomes, but the findings of this study indicate that the activities aimed at promoting belonging did not strongly correlate with students' sense of belonging, suggesting areas for improvement.

Opportunities for collaboration and relationship-building are critical components of a thriving educational community. The study identified specific areas where improvement is needed in facilitating collaborative activities and encouraging interpersonal connections. This finding aligns with McMillan and Chavis (1986), who argue that fostering a sense of community is vital for student retention and success. By incorporating student feedback, educators can tailor interventions to better meet the diverse needs of students, thereby fostering a stronger sense of belonging and engagement. However, contrary to these findings, Shea et al. (2005) and Shackelford and Maxwell (2012) emphasize the importance of structured learner-to-learner interaction in building a sense of community, suggesting that more structured approaches may be necessary to achieve similar outcomes in different contexts.

The study also highlighted discrepancies between teacher and student perceptions regarding the frequency of communication and the effectiveness of collaborative activities. Addressing these disparities is crucial for fostering mutual understanding and trust between educators and students. By bridging the gap between perception and reality, educators can cultivate more meaningful and effective learning experiences. This discrepancy could be further explored in light of the broader challenges discussed by Gunawardena and McIsaac (2004) and Guri-Rosenblit (2009), who emphasize the need for targeted strategies to promote inclusion and community in distance education.

Moving forward, it is imperative to build upon the findings of this study to inform evidence-based practices in distance education. By leveraging technology and innovative pedagogical approaches, educators can create more dynamic and interactive learning environments that promote student engagement and success. This perspective is supported by McMillan and Chavis (1986), who highlight the importance of community in educational settings, and by recent reports from Oxford Learning College (2023) and

the World Economic Forum (2022), which emphasize the growing significance of digital platforms in education.

The initial hypothesis of this study posited that a strong sense of belonging is essential for boosting student engagement and inclusivity in virtual learning environments. The findings partially support this hypothesis, as students report a positive sense of belonging. However, the lack of a significant correlation between belonging-promoting activities and the Belonging Index suggests that these activities alone may not be sufficient to enhance the sense of belonging, challenging the hypothesis that these factors are crucial drivers of engagement.

Given these insights, future research could explore additional or alternative factors that might influence a sense of belonging in online education, such as personalized learning experiences, mentorship programs, or the role of cultural and linguistic diversity in fostering inclusivity.

In summary, while this study provides valuable insights into the sense of belonging in Latvian distance learning schools, it also highlights the complexity of fostering this sense in virtual environments and suggests areas for further exploration and innovation in educational strategies.

Conclusions

This study aimed to investigate the sense of belonging among students in Latvian distance learning schools, particularly focusing on the impact of the learning environment, relationship-building and cooperative activities on students' sense of belonging.

The study found that students generally report a positive sense of belonging in their distance learning environments. This indicates that the virtual educational setting in Latvia is supportive and capable of fostering a sense of community among students.

Contrary to expectations, the results showed that there is no strong correlation between the learning environment, relationship-building and cooperative activities and students' overall sense of belonging. Although these activities are appreciated by students, they do not significantly enhance their sense of belonging, suggesting that other factors may play a more critical role.

The study identified notable discrepancies between teacher and student perceptions regarding the frequency and effectiveness of collaborative activities. This misalignment points to the need for improved communication and better alignment of expectations between educators and students.

In conclusion, while the research confirms that students in Latvian distance learning schools generally feel a sense of belonging, it also underscores the complexity of fostering this feeling through conventional means. The findings challenge educators to rethink and innovate their approaches to enhancing student engagement and inclusivity in virtual learning environments. Future research should continue to explore diverse strategies that could more effectively contribute to students' sense of belonging in distance education.

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AN EMPIRICAL STUDY ON THE USE AND TRANSITIONS OF REPRESENTATIONS IN PRIMARY MATH LESSONS

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ABSTRACT

The goal of mathematics education is no longer the fast production of correct computations that technology can do more precisely and quicker than a human. An important goal today is to develop the ability to see the use of mathematical concepts as problem-solving tools. To be able to use mathematical ideas creatively one must first understand them. To foster conceptual understanding of mathematics one needs to make connections among concepts. For that, instructional content should incorporate diverse representations of mathematical ideas, and students should be given opportunities to link these representations together. This study aims to explore the use of representations and the connections between them in elementary math classrooms. Participants were 11 teachers from Latvia, Sweden and Norway. The data gathering was self-reflective. Teachers recorded the representations and transitions they used in their mathematics lessons. Beforehand, a consensus on the understanding of five representations (visual, math symbols, language, real-world and manipulatives) was gained via workshops and discussions. Closer understanding of transitions was achieved by collectively watching and analyzing a lesson video recording and agreeing on the transitions seen. The results show that manipulative and real-world situations are the least used in the lessons and the most used transitions were from visual to math symbols and from language to math symbols. While the importance of representation use is generally acknowledged in elementary math education, our study reveals a noticeable gap in the integration of concrete objects and real-life situations in everyday lessons. This raises a question about bridging the gap between research insights and actual teacher practices. Identifying strategies to enhance the incorporation of manipulatives and real-world scenarios in classrooms becomes imperative for fostering a deeper conceptual understanding of mathematics among students.

Keywords: *elementary math, making connections, representations, transitions, manipulatives, real-world situations, teaching for understanding.*

Introduction

Mathematics education aims for students to gain mathematical literacy, to learn to reason mathematically and to be able to use math in diverse real-world situations (Organization for Economic Co-operation and Development [OECD], 2018). However, findings from the OECD's PISA2022 report reveal a concerning gap: on average, only 9% of 15-year-olds globally reach level 5 (in Latvia – 6%, Sweden – 10%, Norway – 7%). Level 5 indicates that a student can develop models of complex situations and work within the model, are able to justify actions, and evaluate the results. (OECD, 2022). It has been shown that student performance in later years is heavily predicted by their experience in primary school and the foundational math skills gained during this time (Duncan et al, 2007). This connection underscores the importance of early education in shaping future outcomes, which brings us to the age group of this research. A fundamental element of math learning for understanding is learning mathematical ideas by experiencing them through multiple representations and transitions between them (Van de Walle et al., 2018). Representations are beneficial for primary students in learning and applying abstract mathematical concepts. These tools are particularly effective when used to facilitate the understanding of new concepts and enhance students' problem-solving abilities. Although there is robust and strong support for students to explore these transitions, "questions about how to develop students' transitioning from one representation to another remain unsolved" (Sokolowski, 2018). To gain a better understanding of how teachers are incorporating the use of different representations, and more importantly the transitions between them for understanding math ideas in their classrooms, a trial empirical research study was conducted that involved teachers recorded their use of representations in a protocol and participated in a reflection session.

Aim of the study: To explore teacher-administered use of representations and their connections in elementary math classrooms.

Research questions:

1. What is the frequency of use of each of the five representations (static pictures, manipulative models, written symbols, real scripts and spoken language) in math lessons in elementary school?
2. What are the most commonly used transitions between representations in math lessons in elementary school?

Theoretical background

Benefits of a use of a variety of representations in math learning

The authors agree with the idea that understanding mathematics is "the ability to represent a mathematical idea in multiple ways and to make connections among different representations" (Cramer & Karnowski, 1995). The idea that math understanding is not an undetectable phenomenon or a mystical feeling, but the ability to translate ideas, concepts and solutions in various ways. This idea is backed by many recent research

studies. For example, using diverse mathematical representations such as graphs, equations, and real-world models enables students to see the same information from different perspectives, thus fostering a deeper comprehension of the underlying mathematical concepts (Ozgun-Koca, 1998). Providing varied representations can help students abstract essential mathematical ideas more effectively (Sokolowski, 2018). Younger students who are better at solving problems using manipulatives are more likely to use sophisticated strategies later in school (Siegler, 1993). Linking representations is a component of children's number sense (Sarama & Clements, 2009). For learners to be proficient in learning mathematics, the ability to translate one representation to another is an important skill that needs to be developed (Mainali, 2021). Students who have difficulty translating a concept from one representation to another also have difficulty solving problems and understanding computations (Lesh et al., 2003).

The authors would like to point out a potential misunderstanding: that it is sufficient to use just manipulatives and visual depictions of mathematical ideas for students to gain understanding. Teachers have to explicitly show or provide experiences where students link manipulative or visual representations to the symbolic analog, otherwise, students may have the impression that a mathematical idea they experienced with manipulatives is different from the one they learn when working with symbols. For example, a student shows how a new ten is formed when adding two numbers, but then when he learns the addition algorithm the student does not realize how the blocks on his desk are linked to the numbers in his notebook. This happens because "mathematical relationships do not exist in objects and children do not acquire these relationships through empirical abstraction from objects" (Kamii et al., 2001). The "how" of using various representations in the classroom should be considered not just the "if", because there might be all kinds of situations in the classroom that do not embrace the potential of representations. For example, a teacher giving manipulatives to students so they can use them to solve a problem without explaining or modeling how the manipulatives can help (providing dienes blocks for the first time for calculating three-digit addition). Another example is a teacher showing how to get the right answer for an operation by using visual aids, but not exploring why it works ("jump down in a hundred square when adding tens, jump to the right when adding ones").

In the well known research Visible Learning conducted by John Hattie only a surprisingly average effect size (0.39, where the desired effect size starts from 0.4) for Manipulative materials on math was recognized (Hattie, 2023). This indicates that manipulative use has a potential to accelerate learning but does not reach the potential to considerably accelerate student achievement. The research studied in this meta-study regarded the existence and impact of various representations used in lessons, not the quality of use. This reinforces the importance of the quality of the representation use, the necessity for students to see the interconnections, and to link the representations. Proficient problem solvers instinctively switch to the most convenient representation at any point of the problem-solving process, they are flexible in using relevant representations (Warner et al., 2002).

Representation framework

The authors would like to start this subsection with a citation from Bruner and Kenney's highly influential work "Representation and Mathematics Learning" (1965) where their ideas about bridging the gap between abstract mathematical concepts and student's existing cognitive structures with the help of concrete, pictorial and abstract representations (enactive, iconic, and symbolic stages of representation) are described:

> "With the help of a symbolic notation that remains invariant across transformations in imagery, the learner comes to grasp the formal or abstract properties of the things he is dealing with." (Bruner & Kenney, 1965, p. 56)

After Bruner's idea of learning mathematical ideas by starting with concrete models (manipulatives), then moving to pictorial images and finishing with abstract representations, a more versatile and multidirectional model emerged (see Figure 1). Since Lesh, Post and Behr published their "Representations and Translations among Representations in Mathematics Learning and Problem Solving" (Lesh et al., 1987) it has been the basis and main reference for scholars and practitioners when discussing representation use in math education. The five representations are:

1. evidence-based scripts – real-world situations, the context;
2. manipulative models – physical objects that students can use to explore and understand mathematical concepts;
3. pictures or diagrams – static figural models, internalized "images";
4. spoken language;
5. written symbols, that as well as spoken language involve math specific phrases as well as everyday language.

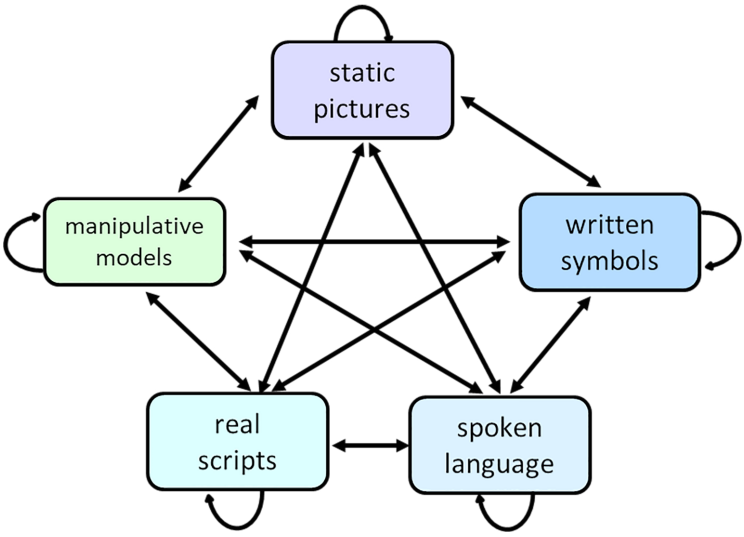

Figure 1 Author visualization for Lesh Translation Model

There are some expanded versions of this model, for example, Johnson in her Mathematical Representational Model (Johnson, 2018) added Technological representation to the basic five representations. She discusses mostly the availability of other representations via technology, not Technological representation as a different form of showing mathematical ideas. The nuisance change and probably why Johnson chose to separate it out is that technology provides opportunities for "moving pictures", also known as virtual manipulatives, such as sliding counters, grouping base ten blocks, adding fractions etc. The use of animated pictorial representations might help to bridge the gap between manipulative models to static pictures. Another example of an expanded version of the Lesh's Translation model is the Web of Representations (Van de Walle, 2018) that shows the ways students can demonstrate their understanding. In this model the pictorial component is divided into three separate ones: create a graph; display data in a table; and draw a diagram. The other representations are directly related to the basic ones: give a context (real-life example); explain meaning in words; illustrate with physical tools; write using symbols.

For this research, we chose to use the original model – Lesh's Translation Model. We opted to forego Johnson's model since usually the technological representation is one of the basic five, just administered via some form of technology. It would also complicate data gathering for teachers since they would have to decide whether a chosen representation is technological or pictorial or other. The Web of Representation is not suitable, since it specifically describes ways a student can show his understanding not build his understanding.

Methodology

As a first step to investigate how teachers are using transitions between representations to help students make meaning of math, a workshop was organized to align understanding of representations of mathematical ideas used in lessons. Teachers discussed each representation and created examples so that all participants in the research was using the same terms for the same ideas (see Figure 2). Teachers decided to use the term "language" for any form spoken or written instead of "oral language" or "verbal" as described in the theoretical literature, and the term "math symbols" for greater clarity instead of "symbolic" or "written symbol" to avoid discrepancies. The term "transitions" was used, not "translations" when referring to connecting one representation to another or another form of the same representation, thus avoiding miscommunication possibilities. This was agreed upon since the discussions occurred in English by non-native speakers and the word translations was confusing.

The sample consisted of 11 primary school teachers (2 from Sweden, 5 from Norway, and 4 from Latvia). This was a convenience sample formed of teachers participating in a lifelong learning project to explore and improve one's teaching. When joining the project teachers agreed that the data they provide will be used in research. Recordings/notes of 107 lessons were made displaying the use of representations. In regards to tracking the use of transitions 7 out of all the teachers made notes about 71 lessons. These activities were proposed for teachers to reflect on their practice from a specific perspective to ensure a purposeful discussion inbetween the participants after the data gathering.

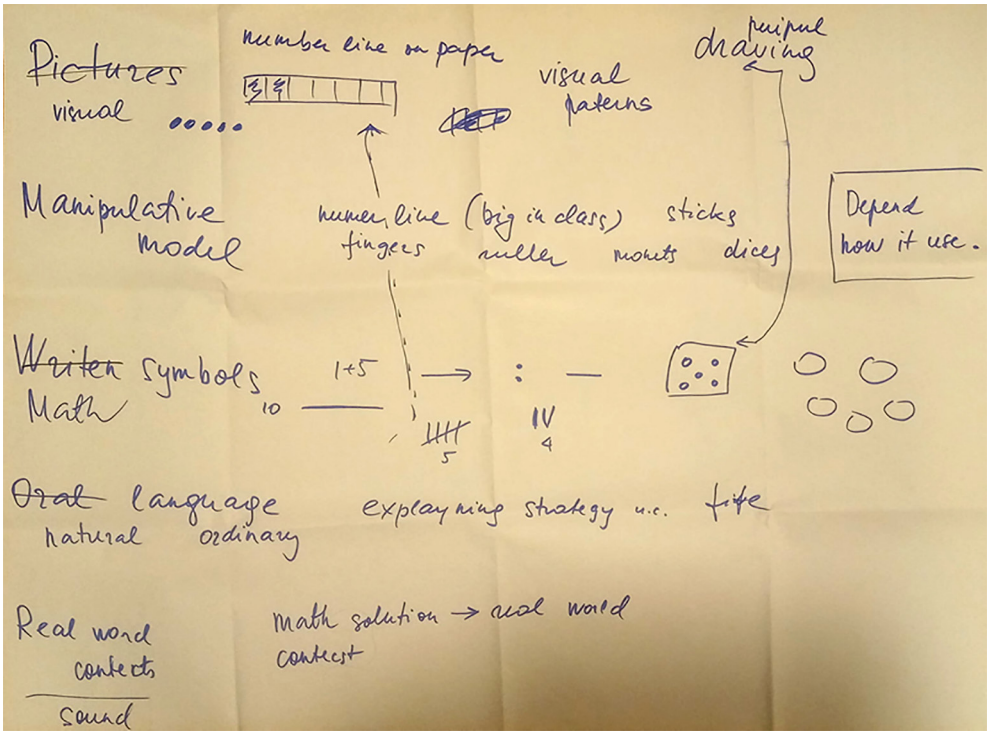

Figure 2 An example of notes of the discussion made by a participant

Date	Visual representation	Math symbols	Language	Real-world situations	Manipulative models	Translations between and within	Clarification, short description	Topic, aim of the lesson/lessons
10.1.2023	x	x	x			**Language→Visual representation** **Visual representation→ Math symbols** **Visual representation→Language**	Reads the description of the situation, depicts it in a schematic drawing (draws the whole, divides it into equal parts, writes down the given value, calculates the value of the basic part, calculates the value of the part). Explains what is given, what needs to be calculated, the solution	Create a shematic drawing to represent the given situation

Figure 3 Example of a teacher's recordings of representations and transitions

Second, teachers were asked to observe a video of a math lesson and record each example of a representation used and, more importantly, what transitions between those representations they noticed. Afterwards, teachers agreed on what was seen regarding the depiction of math ideas in the video.

When common ground was set, teachers were asked to reflect on their own math lessons for one grade for at least two weeks and record what kind of representations they used in each lesson as well as the transitions. An example is shown in Figure 3.

When data was collected a reflection session was organized, where teachers shared their experiences, observations and insights gained while recording their observations. Then the common results were shown to them and further discussion was led in order to pinpoint which results were intuitive and predictable and what surprised or disappointed the participants.

Results

RQ1 The use of representations

The average use of each form of representation was calculated for each teacher (see Table 1). For example, teacher 1 used manipulatives in 67% of his lessons. Most of the teachers used Visual, Math symbols and Language representations more than Real-world and Manipulative models except teachers 5 and 11. Teacher 5 used Real-world models more than Visual representations, but teacher 11 used Manipulatives the most with Visual representations in second place.

The average use of each form of representation was calculated overall (see Figure 4). The most common representations used were Language, Visual and Math symbols, but the least used were Manipulatives and Real-world situations. In 37 of all lessons (35%) neither Real-world situations nor Manipulatives were used.

Table 1 Frequency of representation use individually

Teacher	Visual	Math symbols	Language	Real world	Manipulatives
1	92%	100%	100%	25%	67%
2	100%	100%	100%	60%	60%
3	100%	86%	100%	57%	43%
4	93%	73%	87%	27%	53%
5	67%	89%	100%	78%	33%
6	100%	100%	100%	60%	60%
7	100%	80%	60%	0%	20%
8	71%	100%	100%	43%	43%
9	95%	86%	90%	10%	19%
10	67%	67%	100%	0%	33%
11	75%	58%	67%	50%	91%

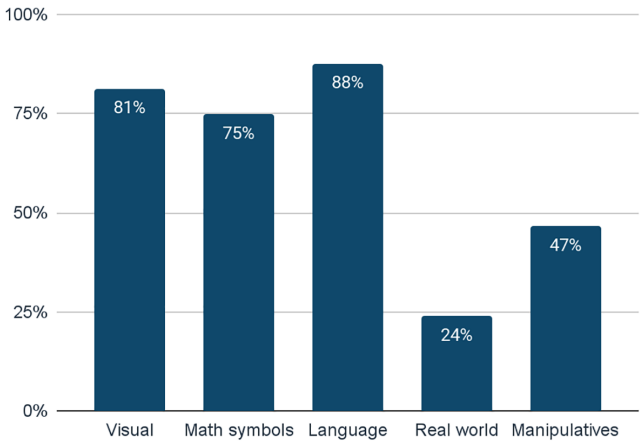

Figure 4 The average use of a representation overall

RQ2 The use of transitions between representations

Similarly, the average use of each transition was calculated for each teacher (see Table 2) and overall (see Figure 5). The following are abbreviations used in the table and figure: Visual representation (V); Math symbol (S); Language (L); Real world (R) and Manipulatives (M). If the teacher noted that in the lesson he used a transition from a visual representation to a symbolic it is denoted followingly: V→S. Only the transitions that at least one teacher recorded are depicted.

The transitions used in classrooms differed greatly from teacher to teacher, and the usages of a transition varied up to 86% (V→S).

The most common transition teachers claimed to be using in their lessons was Visual to Symbolic (49%), followed by Language to Symbolic (42%) and Visual to Language (35%).

Surprisingly the transition Manipulatives to Visual representation was used by only 3 out of 7 teachers in their practice (and two of them very sparsely in 5% and 8% of their lessons), although it is the Bruner suggested learning trajectory.

The authors noticed, that when looking at the directions of the transitions, symbolic representations are more frequently the representation that is at the end of the transition, meaning that it is the representation that describes the math idea previously shown by another representation. Inversely, manipulative models are most frequently the beginning part of a transition, and later described using another representation.

Table 2 The average use of a transition of representations individually

Teacher	V→S	L→S	V→L	M→L	M→S	L→V	M→V	S→S	R→L	S→L	R→V	S→V	S→M	L→M	V→V	S→R	R→S
1	75%	25%	8%	58%	58%	0%	58%	0%	17%	8%	8%	0%	0%	0%	0%	0%	0%
2	20%	80%	40%	40%	20%	0%	0%	0%	20%	0%	20%	0%	0%	20%	0%	20%	0%
7	60%	20%	40%	0%	20%	0%	0%	20%	0%	0%	0%	0%	20%	0%	0%	0%	0%
8	86%	86%	0%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
9	67%	10%	71%	19%	19%	52%	5%	38%	10%	14%	0%	19%	0%	0%	5%	0%	5%
10	33%	67%	67%	33%	22%	22%	0%	0%	0%	22%	0%	22%	11%	11%	0%	0%	0%
11	0%	8%	17%	8%	0%	0%	8%	0%	8%	8%	17%	0%	0%	0%	17%	0%	8%

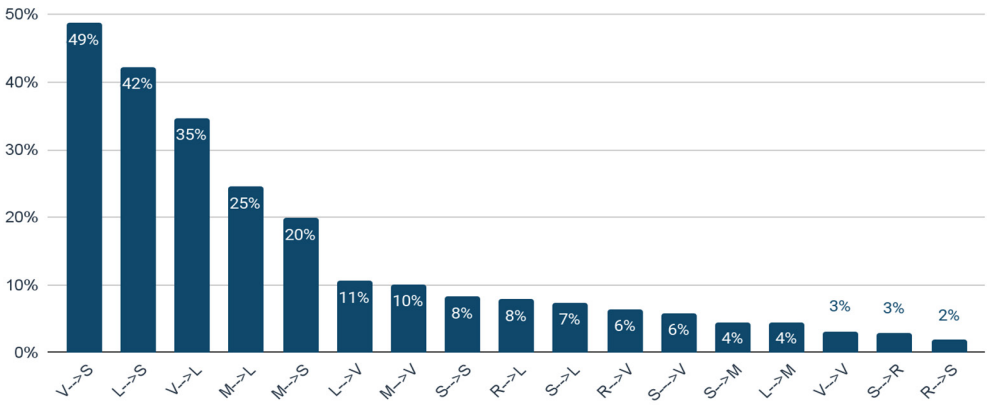

Figure 5 The average use of a transition of representations overall

Insights from teacher reflections

At the beginning of the research, teachers were skeptical, and not keen to add more duties to their day, but after the reflective work and gathering data on their practice, all of them agreed they gained some form of benefit. The necessity to reflect on their practice led to better awareness, and understanding of their own practice especially from the perspective of representation use. The experience resulted with a determination by many participants to change their practice to add more of a specific representation in their teaching. For precise teacher insights see Table 3.

Table 3 Teacher reflections after recording their use of representations

Teacher	Excerpt from transcript
1	I saw that mostly it was always one way in my lessons: models or concrete objects to symbols.
3	It gave me a more clear picture of how my lessons are.
4	What we [talking about himself and his colleague, teacher 5] understood, was that we do a lot of representations, but we were not aware of that. That has been a learning point, to talk about with colleagues, I hope, that after this tracking experience my lessons will be a little bit better.
6	I am more aware of how I teach, I use more manipulative models now, because I noticed, that I didn't do it enough.
11	I noticed that I use a lot of pictures, which is good, but my takeaway from this is that I need to incorporate more real-world situations.

Discussion and conclusions

Noteworthy are the results, that Visual representations were one of the three most frequently used representations alongside Language and Math symbols, which means that their students experienced visual depictions of math ideas in lessons, not just abstract forms of math. Not surprisingly the least used were Manipulatives (47%) and Real-world situations (24%). These findings pertain to existing research on the subject, arguing that although teachers have an understanding of the importance of these representations, their practice is not consistent with it (Spillane & Zeuli, 1999; Moyer, 2001; Boaler, 2002). It is hard to argue if it is enough that students had the opportunity to use concrete models in almost half of the lessons, but we should not forget the importance of experiencing math ideas concretely, especially in early education. The most concerning is the fact that in only a quarter of lessons, students had the opportunity to connect their abstract math knowledge to everyday life, which is the ultimate goal of math. Here the authors see the gap between scholarly research and practitioners, meaning that the theoretically desirable practice is not fully brought to everyday classrooms.

Another noticeable aspect based on the gathered data is that students have very different experiences learning math in each classroom –this notion is consistent with existing research (e.g., Hiebert & Grouws, 2007; Čakāne et al., 2024). For example, in

some (2 participating teachers) classrooms there was no records of real-world representations, but in others (4 teachers) in more than half of the lessons. Another illuminating fact is that teachers have their "favorite" transitions that they use more frequently and some they don't use at all (or don't recognize them if they do) and these differed greatly from teacher to teacher. This raises a question of whether all students have equal opportunities for qualitative education to reach their potential. Here the authors would like to bring to attention the lack of research and examples of good practice of illustrated transitions and the benefits of each or the most suitable ones for specific mathematical ideas that might help to bring theory to practice. Guidelines for teachers to follow on how to make connections between different representations would be beneficial.

Teachers mostly chose to use transitions that end with Language or Symbolic (V→S, L→S, V→L, M→), and very rarely ones that end with Visual or Manipulative (R→V, S→V, S→M, L→M). This signals that students mostly experience translations from more concrete representations to more abstract ones. That brought the authors to think about the Web of Representations and the importance for students to be able to show their understanding diversely where inverse transitions are highly useful. A student's ability to show an equation with manipulatives or provide real-life context can identify a more profound understanding than calculating the right answer. Whether the low frequency of transitions ending with more concrete representations was sufficiently used in the lessons is hard to argue, but the authors tend to think that those should be incorporated more often. To the authors' knowledge, there is no other research to the present day that looks specifically on the use of transitions of representations in elementary math classrooms.

Alongside the main aim of this research, it was noticeable that it is not a part of participating teacher everyday practice to reflect on their teaching from a specific perspective. Teachers' beliefs about their practices varied from what the data showed, and they came to conclusions about what they should change by themselves only by reflecting on their teaching and recording representations they used. The reflective nature of data gathering was beneficial for teacher professional awareness and illuminated the positives and negatives of their practice and could be incorporated into teacher professional development models as a valuable component.

Limitations

The participants' understanding of each representation might have been different regardless of the discussion and examples provided. The perception of representations or transitions the teachers recorded as being used in their lesson are also subject to interpretation.

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ENHANCING GEOGRAPHY EDUCATION THROUGH VIRTUAL REALITY: EXPLORING PEDAGOGICAL AND TECHNOLOGICAL PRINCIPLES

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ABSTRACT

The new educational content framework Skola2030, which was implemented from 2020 to 2023 in Latvia, made it possible to improve the teaching of geography at the secondary level in order to deepen students' understanding of the intricate relationships between natural environments and human activities. All traditional educational tools, such as textbooks, infographics, movies, maps, and simulations focusing on the movement of plate tectonics, are available to students. Still, they address only a small portion of the complex internal operations. Textbooks may provide simplified diagrams of volcanoes that do not accurately portray their many characteristics, and videos showing volcanic disasters could misinterpret the true nature of volcanic eruptions. There are also examples when simulations, as well as cartographic resources, just disregard many unique features of some types of volcanoes, overlooking the diverse attributes of different volcano types, concentrating merely on their geographical occurrences. This well-designed education model allows students to carefully explore a vast number of such features as part of a useful learning experience. This can help in fostering a deep awareness of internal processes and their real-world ramifications.

The study question focuses on the educational and technological principles needed to create an interactive learning tool for comparing various types of volcanoes in a virtual reality setting. These concepts were identified through a systematic literature review. The established principles can be used as recommendations for developing interactive learning aids to compare different types of volcanoes or to assess similar educational resources.

Keywords: *education technologies, geography education, learning experience, technology enhanced learning, virtual reality.*

Introduction

The rapid development of educational technologies and the potential to integrate virtual reality technologies (VR) into the learning process have marked the necessary changes in the methodology of teaching subjects (Hu-Au & Lee, 2017; Kavanagh et al.,

2017). Historically seen as an emerging technology for over six decades, VR's potential in education has become increasingly tangible in the last ten years (Wohlgenannt et al., 2020; Allcoat et al., 2021), paralleling advancements in technology and pedagogical approaches (Hu-Au & Lee, 2017). When introducing the new education program Skola2030, the geography subject emphasizes the need to visualize the processes taking place on Earth (Skola2030, 2019) in order to achieve the goals set in the educational standard of both elementary schools (Latvijas Vēstnesis, 2018, 249) and secondary schools (Latvijas Vēstnesis, 2019, 197). The achievable results of the educational curriculum Latvijas Vēstnesis, 2019, 197) foresee a practical, experience-based learning process, the aim of which is to deepen students' understanding of complex and abstract natural processes. However, it is not feasible to observe all the topics and processes covered in the high school geography course in Latvia or to create a learning experience based on these processes. Virtual Reality (VR) technologies offer a unique opportunity for students to gain the necessary experience by depicting processes and phenomena that, without technology, would be logistically challenging, expensive, or impossible due to security concerns, such as visiting the historic Robben Island prison in South Africa or witnessing the construction of the Statue of Liberty in New York (Google Arts & Culture, n. d.).

In order to judge the possibilities of VR for providing a meaningful learning process, it is necessary to define the concept of "virtual reality" and what essential elements characterize it. Virtual reality is a computer graphics simulation close to the real world, characterized by three main elements: presence, interactivity, and immersion (Walsh & Pawlowski, 2002; Rusilo, 2019). These three elements provide an opportunity to "experience" and "learn" with the help of VR technology, creating learning experiences in a VR environment. On the other hand, we can ensure the meaningful use of technology in the learning process by implementing a technology-enchanced learning process, which involves integrating technology with other learning methods (Dror, 2008; Kirkwood & Price, 2014; Dreimane, 2020). This approach creates a learning environment in which technology serves as a tool to support the learning process.

In order to find out the best way for implementing VR technology based teaching tool in secondary school geography eduacation, two research questions were raised:

1. What are the key pedagogical principles that should guide the development of VR-based educational tools to ensure they align with the educational standards and learning outcomes in geography?
2. What technological and GIS (geographic information systems) principles are essential in designing a VR learning tool that accurately represents and simulates the diverse characteristics of different types of volcanoes?

The research draws attention to the limitations of the materials available so far (for example, textbook images and diagrams and video materials), which are not always able to cover the dynamic nature of geological phenomena. The research outlines the principles that should be followed when creating a VR learning tool for the secondary school stage for comparing types of volcanoes, exploring the possibilities of creating a detailed and interactive learning experience that is capable of depicting the characteristic features

of different types of volcanoes, and ensuring the meaningful use of technology in the learning process.

Methodology

This study utilizes a systematic literature review methodology (Booth et al., 2016) designed to investigate the principles needed to develop interactive VR learning tools, with a specific emphasis on geography education.

1. **Search strategy:** The literature search was conducted through several well-established academic databases – Google Scholar, Web of Science, Scopus and Primo. These platforms were selected due to their comprehensive coverage of peer-reviewed academic journals and their significance to the field of educational technology research. The search started with broad keywords such as "virtual reality in education." As the search progressed, additional keywords were identified and utilized to refine and expand the search, i.e., "technology-enhanced learning," "VR in geography education," "learning cognitive tools," and "interactive learning environments." Findings and terminologies prevalent in initial search results guided the evolution of search terms. Boolean operators (i.e., "and", "or") were used to combine and refine search terms.

   In order to propose pedagogical principles, literature was searched that covers pedagogical theories and strategies mentioned in the technology-enhanced learning process, such as constructivist theory (Piaget, 1956) and experiential learning (Kolb, 1984). The latest trends in the production of digital teaching materials, multimedia, VR and cartography design were considered to establish the technological and GIS principles.
2. **Selection Criteria:** The studies included in this review were selected based on their focus on VR applications within educational contexts, relevance to enhancing students' understanding, and contributions to pedagogical methods. Most studies published between the 2014 and 2024 were considered to ensure the relevance of the technology discussed. This review included studies focusing on VR applications in education, their relevance to enhancing students' understanding, and empirical evidence supporting their effectiveness. Exclusion criteria included lack of rigorous research methodology, and articles that do not specify computer, VR or technology learning. The final review included articles based on these criteria.
3. **Quality Assessment:** Each source was assessed for quality and relevance based on the rigor of the research methodology, the clarity of the data presentation, and the impact of the findings on the field of educational technology. Quality criteria included research methodology, data presentation, and the study's contribution to educational technology and VR-based learning tools. Articles not meeting the quality threshold were excluded from the final analysis, ensuring a strong understanding of pedagogical and technological principles for VR learning tools.

The systematic approach ensured comprehensive coverage of relevant academic literature, providing a robust foundation for understanding pedagogical and technological principles that need to be applied in the developing of VR learning tools. The review aimed to identify key pedagogical, technological, and geographic information systems (GIS) principles for developing effective VR-based learning tools in geography education. It focused on student engagement, knowledge construction, and experiential learning. Pedagogical and technological requirements were determined, and GIS integration was explored to enhance geographical learning.

Pedagogical Principles for Enhancing VR Learning Experiences in Geography Education

The integration of virtual reality (VR) in the learning process needs to be carefully coordinated with pedagogical principles that promote effective learning and meaningful use of technology. This section will outline key pedagogical principles that need to be followed when designing VR learning experiences. Despite the study's focus on geography learning, developing any learning tool in a VR environment should adhere to pedagogical principles.

According to Piaget (1956) and Kolb (1984), the learning tool must facilitate progress towards a specific, achievable result. The design of a VR learning tool should directly or indirectly link each element to the student's expected result while also incorporating additional elements that heighten the student's interest in the subject (Jonassen, 1992; Bacca-Acosta et al., 2022). When developing a learning tool in a VR environment, it is essential to follow a student-centered approach, which forms the basis of effective learning process design (Mor & Winters, 2007; Aiello et al., 2012). This means that the VR learning tool serves as one of the methods used in the learning process to move towards an achievable result.

A VR learning tool should not only focus on simple knowledge acquisition or a one-dimensional achievable result but also promote higher-level cognitive thinking, problem solving, and synthesis (Jonassen, 1992; Chen & Teh, 2013). Taking into account the complex results that can be achieved in learning the subject of geography (Latvijas Vēstnesis, 2019, 197), the VR teaching tool for learning natural science subjects should be such that it reflects real-world problems and complex natural phenomena, thus allowing students to transfer and apply the newly acquired knowledge in different contexts (Lajoie & Derry, 2013; Hu-Au & Lee, 2017).This method is in line with Kolb's (1984) ideas about experiential learning, which say that solving realistic, difficult problems that are like real-life situations is the best way to learn (Kolb, 1984; Gentry, 1990; Sharlanova, 2004; Fromm el al., 2021). A number of scientific sources (Aiello et al., 2012; Chen & Teh, 2013; Fowler, 2015; Dreimane, 2020) say that constructivism is one of the most important ways to think about how VR can be used to help people learn (Piaget, 1956). Depending on the field of application, constructivism can take on various definitions, but fundamentally, it unifies with the creation or 'construction' of new knowledge from existing knowledge or experiences (Piaget, 1956; Winterbottom & Blake, 2008; Aiello et al., 2012).

By basing the learning process on the constructivist approach (Piaget, 1956), the role of the educator changes from "main source of knowledge" to "coordinator of the learning process," (Holt-Reynolds, 2000) rather supporting students' learning needs. This implies that the educator must adapt the teaching tool to assist the student in self-constructing new knowledge, drawing from their life experiences or prior knowledge (Piaget, 1956; Winterbottom & Blake, 2008), enabling them to consolidate the newly acquired knowledge over time. The VR learning tool should be the next logical step in learning the subject, so that the student can independently move towards the desired result.

In order for the student to be able to independently construct knowledge, according to the framework of constructivist theory (Piaget, 1956), the VR learning tool must include additional elements supporting the learning process, or cognitive tools (Jonassen, 1992; Chen & Teh, 2013). These tools help the learner understand new concepts and build understanding through interaction rather than passive perception (Jonassen, 1992; Mayes, 1992; Huitt & Hummel, 2003). Students can deepen their understanding of a topic by using charts, simulations, and exercises that require data analysis.

In order for an effective learning process to take place, it is essential to provide appropriate feedback for the learning process (Winterbottom & Blake, 2008; Chen & Teh, 2013; Hu-Au & Lee, 2017). Feedback is crucial for both the student and the educator, as it helps them understand what they still need to learn and the extent to which they have achieved the intended learning goal (Winterbottom & Blake, 2008; Chen & Teh, 2013; Hu-Au & Lee, 2017). One can provide feedback by incorporating it into the learning tool, providing immediate feedback on task performance, or utilizing other methods in the learning process, such as teacher feedback (Lee & Wong, 2008; Schartel, 2012). Therefore, it is crucial to consider the method of providing feedback when developing a teaching tool.

This section outlines the main pedagogical principles for creating interactive learning tools in VR environments. When developing a learning tool, it's crucial to start with a single achievable goal that the student can work towards. With the learning tool and the teacher's support, students can also progress towards a more complex, achievable goal, fostering a student-centered approach.

Technological Principles for Enhancing VR Learning Experiences in Geography Education

Creating a comprehensive and meaningful virtual reality (VR) learning experience involves not only the use of pedagogical principles but also technological principles that, when integrated into the learning tool, can facilitate or hinder the student's progress toward the desired outcome (Lee & Wong, 2008). This section will define the main technological principles involved in the development of a VR learning tool. These principles are very important when developing VR learning tools because the VR environment not only supports learning but is also able to meet the student's cognitive abilities and needs.

The VR environment offers a variety of ways to display necessary information, fostering an interactive environment that allows the student to select their preferred method of information acquisition, including images, cartographic material, and audio format

(Dalgarno & Lee, 2010; Chen & Teh, 2013; Fowler, 2015). Understanding the appropriate amount of information to display, given the variety of options available, is crucial to avoid creating an overabundance of information and interactive elements. The visual representation is the main information in the VR environment, so overflowing the visual field with excessive elements can overload their cognitive abilities and interfere with progress towards the achievable result (Mayer, 2008). Effectively placing additional elements in the design of VR learning experiences can serve as cognitive tools (Jonassen, 1992; Mayer, 2008). A successful VR learning tool provides enough interactive elements to engage students without causing cognitive overload. When implementing the technology enhanced learning process in school, the teacher should remember that the teaching material should be based on the results achieved by the student and the construction of knowledge, not on the technological possibilities that a solution can provide (Dror, 2008). Resources such as audio explanations, images, and navigation tools should be intuitively located and easily accessible (Mayer, 2008). According to Lee & Wong (2008) and Chen & Teh (2013), it's crucial to consistently deploy these resources to enhance the duration of information searches and maintain the learning process.

Considering the possibilities offered by the VR environment for displaying information, a VR learning experience should present information in a way that facilitates information acquisition processes without requiring students to split their attention between different methods of information perception. Mayer (2008) mentions that it is best to display visual and audio format in technological teaching aids, in which it is possible to insert a variety of multimedia information – if it is necessary to obtain information from visual aids, then, without dividing attention, it is impossible to read information in text format, so audio information perfectly complements the possibilities of obtaining information. The technical quality of VR information sources also plays an important role (Dalgarno & Lee, 2010; Newman et al., 2022). Clear visuals and high-quality audio are required to maintain a sense of presence in the VR learning experience and bring it as close as possible to the real-life experience.

For the VR experience to be a constructivist-based learning process, students must be able to freely and intuitively use virtual spaces. Navigation is necessary to enable the user to use the required VR environment at their own pace, promoting an active learning process and knowledge construction process (Van Joolingen, 1999; Winterbottom & Blake, 2008; Fowler, 2015). Good navigation promotes spatial sense and facilitates a sense of presence, which is important for experiential learning to occur (Dror, 2008; Chen & Teh, 2013).

This section outlines key technological principles for creating interactive learning tools in VR environments. When integrating these technological principles into the design of VR learning experiences, it is very important to align with the pedagogical principles defined above. It is crucial to fully utilize the pedagogical potential of technology and other teaching methods. Instead, supplementing existing learning materials with appropriate learning methods is needed, enabling students to construct knowledge and progress towards achievable outcomes.

Geographic Information Systems (GIS) principles for Enhancing VR Learning Experiences in Geography Education

When creating a teaching aid with cartographic data in the geographic information systems (GIS) environment, it's crucial to consider the specifics of the topic and subject of the chosen learning tool and adhere to certain principles. The process of incorporating real-world objects or views into a virtual environment demands a detailed and accurate representation to reflect the complexities observed in nature. This precision is required to avoid oversimplification of visual information and authentically present the diverse characteristics and processes (Aiello et al., 2012; Weber et al., 2021; Newman et al., 2022).

Using GIS technologies for the creation of a VR learning tool, it is also necessary to display cartographic data that would reflect the processes of the lithospheric plates and the processes taking place within their boundaries, which would direct the student to the complex achievable result. When representing GIS data, symbols and colors are necessary to promote intuitive understanding and cognitive efficiency (Semmo et al., 2015). Representation is important, as is creating a system of associative symbolism that allows students to grasp information without constant reference to the map legend or symbolism. The challenges also stem from the fundamentals of good cartography and the need to balance the information in the cartographic material without oversaturation (MacEachren, 2004). This means that while we represent related data like lithospheric plate boundaries and volcano locations in a single cartographic material, we do not include geospatial data on the most common plant species, as it lacks a direct connection to endogenous processes.

By following the principles of a realistic environment—apparence and proportions close to reality—it is possible to increase the sense of presence during the VR learning experience (Newman et al., 2022). Displaying objects of true-to-life size within a VR environment facilitates an authentic experience, fostering a deeper connection with the subject matter (Chan et al., 2022). When considering scale, a user of a VR learning experience may struggle to comprehend the actual size of natural objects, even when represented at a real 1:1 scale. Adding a geospatial data layer as a cognitive tool could address this issue by numerically displaying the relative height of an object or the distance between objects.

Selecting the appropriate viewpoint for each object is critical to highlighting natural objects' defining features. By manipulating the viewing angle and perspective, the VR experience can emulate the learner's vantage point if they were observing the features in reality (Newman et al., 2022). This allows for a more profound exploration of the spatial relationship and physical characteristics of the geographical elements.

This section defines the main principles of the GIS environment, outlining the steps to follow when developing a learning tool for geography in a VR environment. To get the best results, it's important to connect the rules of the GIS environment with both the pedagogical rules that tell you how to teach and the technological rules that show you how to use multimedia materials effectively in the VR environment.

Discussion

The literature analysis highlights three principle groups that influence the learning process in the VR environment: five pedagogical principles, four technological principles, and three GIS environment principles. These principles are crucial to adhere to when developing a virtual reality learning tool for comparing volcano types (see Table 1). Despite the focus on a specific geography subject, the principles apply to the development of VR learning tools in other natural science subjects that require the representation of natural objects and cartographic data.

Table 1 Pedagogical, technological and GIS principles to follow when developing a VR learning tool for comparing volcano types

Group	Principle	Explanation
Pedagogical principles	The principle of progress towards the achievable result	The VR learning experience guides the student towards achieving a specific outcome. The main principle when developing a VR learning tool is to focus on the achievable result and how the developed learning tool facilitates the student's path to it.
	The principle of the complex achievable result	The VR learning experience intermediately helps the student move towards the complex achievable result by including elements that contribute to the achievement of higher levels of cognitive thinking.
	The principle of knowledge construction	VR learning experiences enable the construction of knowledge according to constructivist theory (Piaget, 1956).
	The principle of cognitive tools	The design of VR learning experiences incorporates cognitive tools that support the student's learning process.
	The principle of feedback	To ensure a continuous learning process and knowledge transfer, it is essential to provide the student with feedback on their progress towards the achievable result.
Technological principles	The principle of spatial communication	To reduce cognitive load, it is necessary to consistently present sources of additional information.
	The principle of element saturation	To reduce cognitive load, pay attention to the saturation of complementary elements when creating a VR learning experience.
	The principle of information representation	When designing a VR learning experience, it is important to choose information sources that do not require students to divide their attention in order to acquire meaningful information.
	The principle of navigation	Navigation tools enable the student to freely navigate VR learning experience to promote a sense of presence and motivation.
GIS principles	The principle of symbolization	When displaying GIS data, follow the theme of associative symbols and cartographic materials.
	The principle of appropriate scale	To promote the feeling of presence and motivation, natural objects should be depicted in their true size.
	The principle of point of view on the object	The selection of appropriate viewpoints, which represent the characteristic features of the object, ensures the student's progress towards the achievable result.

The methods used in the learning process are constantly changing, integrating more and more new technologies, and the opportunities to meaningfully implement the use of VR technology in the learning process indicate this use. This research has outlined a framework of pedagogical and technological principles that underpin the development of VR learning tools, in the sense that these principles are inseparable and mutually reinforcing.

The educational tool's development in the VR environment places a primary emphasis on adhering to pedagogical principles. These include constructivism, which promotes student-centered principles that help students achieve learning goals and actively build knowledge. The educator's role shifts from "provider of information" to "coordinator of the learning process," supporting students' learning according to these principles.

The technological principles that emerge from VR's possibilities serve pedagogical purposes. The technological element they provide enables the achievement of learning goals, emphasizing that the selection of technology should prioritize the student's needs and learning objectives while also taking into account existing technological possibilities. The process of developing VR educational resources follows pedagogical principles.

Despite being a smaller component of VR learning design, any educational resource that incorporates geospatial or cartographic data can utilize GIS principles. These principles must be linked to the pedagogical and technological principles used in the development of VR learning experiences.

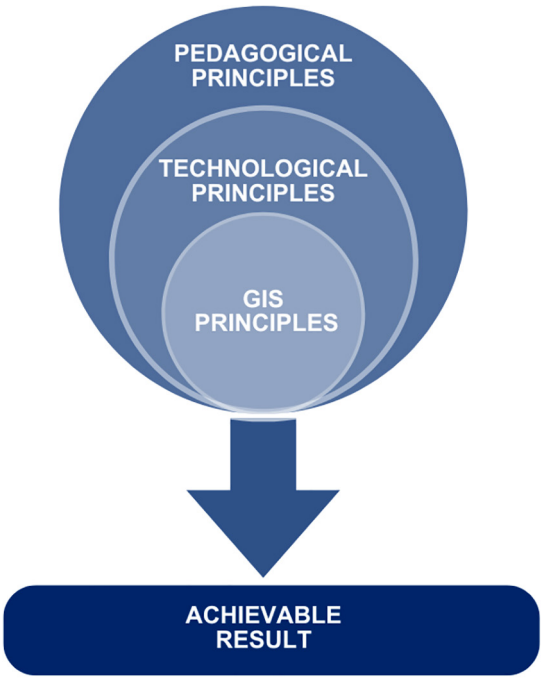

Figure 1 Application of Pedagogical and Technological Principles to Compare Volcano Types of VR Learning Experiences in the Creation Process (Concept made after Tenberga, 2023)

At the heart of any learning tool's development is a focus on the student and his learning needs. The main step in the process is the application of pedagogic principles, which allow students to build knowledge, achieve learning goals, and promote interest and motivation in learning the subject, ultimately leading to a complex and achievable result (see Figure 1). The development of teaching aids primarily revolves around pedagogical principles, with technological principles playing a secondary role, chosen based on their capacity to support pedagogical goals.

Adhering to the conditions and adhering to all three sets of principles can ensure a successful VR learning experience in geography education, facilitating a technology enhanced educational process that meaningfully guides students toward learning goals. In conclusion, the paper not only provides a theoretical basis for the empirical part of the study and the modeling of VR educational tools, but it also serves as a blueprint for future efforts to create a multi-technological learning environment. As future directions of research, how the principles are practically used in the creation of a VR learning tool can be studied not only in the subject of geography but also in other subjects of the natural sciences.

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EXPLORING PARENTAL EXPECTATIONS ABOUT CHILDREN'S EDUCATIONAL OBJECTIVES IN LATVIA: A TEACHER'S PERSPECTIVE

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ABSTRACT

This study investigates the nuanced view of parental expectations regarding their children's educational objectives in Latvia, with a focus on the perspective of teachers. As parental involvement is an important determinant of a child's educational journey, understanding the dynamics of these expectations becomes paramount for educational stakeholders. The study aims to provide a comprehensive analysis of teacher observations and experiences related to parental expectations, shedding light on the intricate interplay between home and school environments.

The methodology employed for this research includes mixed methods: literature context analysis and surveys for teachers (n = 1150).

Preliminary findings reveal a spectrum of parental expectations, ranging from a desire for academic excellence to broader developmental goals. The study identifies commonalities and variations in teacher experiences, highlighting cultural influences and socio-economic factors that may impact the nature and intensity of parental expectations.

This research contributes to the broader field of education by providing a localized understanding of the role parental expectations play in shaping children's educational trajectories. Insights gained from teacher perspectives can inform educational policies, interventions, and practices aimed at fostering a collaborative and supportive partnership between parents and educators.

Keywords: *common understanding, cooperation in education, educational objectives, parental expectations, partnership in education, primary education, teacher's perspective.*

Introduction

In the dynamic environment of basic education, parent-school collaboration is a cornerstone of a child's academic achievements and holistic development. Parents, as children's first teachers and leaders of educational opportunities, influence a child's education, parental expectations, beliefs, and meaningful engagement with the education system shape the child's learning experience (Robinson & Aronica, 2015). A common understanding of the objectives of primary education, which is possible in cooperation, in

which understanding of school objectives, mission, vision, school ethos and values, and parental expectations contributes to the achievement of the objectives of primary education (Goodall & Montgomery, 2014). Parental expectations play an important role in shaping a child's academic experiences and outcomes. From the perspective of teachers, understanding and navigating parental expectations is essential for effective communication, collaboration, and child support (Henderson et al., 2011; Park & Holloway, 2017).

The study on parental expectations about the objectives of primary education, and their evaluation to promote cooperation with the school, evaluates parental expectations in the context of the objectives of primary education. An assessment of parental expectations is necessary to explain the interaction of parental expectations with the school from the perspective of children's educational achievement.

Parental expectations from the teacher's perspective outline several aspects of the problem – the level and structure of cooperation and collaboration between parents and teachers, the way how teachers perceive and react to parental expectations, educational objectives that are common for all educational actors, and parents as educational actors with their vision about education, cooperation, and collaboration in educational process. The objective of this research is to study teachers' perspective about parental expectations about a child's educational objectives. In order to achieve the objective pursued by the study, the following research question is identified: what is teachers' view of parental expectations about primary educational objectives?

Theoretical background

The theoretical background of the study reveals different theories that describe teachers' perspectives on parental expectation. To describe the question of the study: what is teachers' view of parental expectations about primary educational objectives, several theories were analyzed to reveal teachers' perspectives about parental expectations (see Table 1) – Humanist theories, Social Cognitive Theory, Expectancy-Value Theory, Parental Involvement Theory, theories, that describe parents as educational actors, studies about parental expectations, Cultural Capital Theory and theories that describe cooperation in the educational process.

Table 1 Theoretical background – describing teacher's perspective about parental expectations

Theory	Parental expectations from teachers' perspective
Humanist theories (Maslow, 1954; Rogers, 1961; Erikson, 1963; Freire, 1970; Brofenbrenner, 1979, 2009; Giligan, 1982; Noddings, 2005; 2013; Ryan&Deci, 2017; Miller, 2016; Pink, 2011; Seligman & Csikszentmihalyi, 2014)	Parental expectations and their related actions that highlight human value and meaning based on the concepts of fair and unfair, correct and wrong, emphasizing personal development through actor collaboration.
Social Cognitive Theory (Bandura, 1969, 1977, 2016; Schunk, 2012; Pajares & Urdan, 2006; Schunk & DiBenedetto, 2020; Maddux, 2016; Lent & Brown, 2013; Miller & Rollnick, 2012; Usher & Pajares, 2008; Hoffman, 2015; Wood & Bandura, 1989)	The emphasis on the dynamic interaction between teachers and parents, their behavior, and their environments.

Theory	Parental expectations from teachers' perspective
Expectancy-Value Theory (Atkinson, 1964; Eccles & Wigfield, 2020; Fishbein & Ajzen, 2010; Wigfield, Tonks & Klauda, 2009; Wigfield & Cambria, 2010; Flake et al., 2015; Durik & Harackiewicz, 2007; Trautwein et al., 2009; Gaspard et al., 2015; Hulleman et al., 2010; Simpkins, Davis-Kean & Eccles, 2006)	The educational goal-directed actions are guided by expectations that certain behaviors are likely to lead to a desired outcome and by the extent to which the outcome is valued.
Parental Involvement Theory (Epstein, 1995, 2001, 2002, 2005, 2010; Epstein et al., 2002; Jeynes, 2011; Fan & Chen, 2001; Walker et al., 2005; Sheldon, 2003; Pomerantz et al., 2007)	Children whose parents are involved in their education will be more likely to develop a strong, positive sense of efficacy for successfully achieving school-related tasks.
Theories describing parents as educational actors (Epstein & Sheldon, 2016; Hoover-Dempsey & Sandler, 2010; Weiss, Lopez & Rosenberg, 2011; Jeynes, 2011) Mapp & Kuttner, 2013; Patall, Cooper & Robinson, 2012)	The essential role of parents as educational cooperation partners in a successful educational process is revealed.
Studies about parental expectations (Hornby & Lafaele, 2011; Froiland et al., 2013; Wang & Sheikh-Khalil, 2014; Dumont et al., 2014; Lareau, 2011; Yamamoto & Holloway, 2010; Hill & Tyson, 2009; Muller, 1998)	Studies regarding parental expectations, their formation, and the factors that affect them describe the value of parental expectations in the educational process and child's motivation to study.
Cultural Capital Theory (Bourdieu, 1977, 1986; Lamont & Lareau, 1988; Lareau, 2011; Kingston, 2001; Dumais, 2002; Reay, 2004)	Family-embodied cultural capital is measured by parents' daily reading time after work, frequency of cultural activities, parents' educational expectations, and parents' requirements for academic achievement.
Cooperation in the educational process (Epstein, 2018; Henderson & Mapp, 2002; Sime & Sheridan, 2014; Hornby & Lafaele, 2011)	Studies and theories regarding cooperation in the educational process, which promote the understanding of other actors regarding the parental expectations regarding educational objectives and ways to implement such objectives in cooperation.

These theories disclose the importance of cooperation in education between educational actors, which is essential for schools to promote the quality of school and children's educational achievements. Parental expectations from a teacher's perspective indicate the role of observational learning and self-efficacy, highlighting how students' beliefs in their abilities shape their academic outcome, the importance of parental expectations for success and the value they place on educational objectives, the significant impact of parents' engagement in their children's education and importance of socio-economic and cultural resources influence students' access to educational opportunities and success.

Methodology

A mixed method research design (Kristapsone, 2008; Cohen et al, 2018, Creswell & Creswell, 2018) was applied to make systematic literature analysis and to collect

quantitative data using semi-structured questionnaires using Google Forms (Bryman, 2016).

The aim of this study is to determine the teacher's perspective about parental expectations about educational objectives.

Before creating questionnaire, a systematic literature analysis was done- studies and articles that characterize parental expectations from the teacher's perspective The analysis of systematic literature was carried out on a seven-stage model (seven-step model) – planning, data collection, data analysis, data evaluation, (Onwuegbuzie & Frels, 2016), following the basic principles of the SALSA (Search, Appraisal, Synthesis and Analysis) method (Mengist et al., 2010).

Code of ethics. The study uses the principle of fair research, implemented at all stages of the study. When developing questionnaires and collecting data, participants are only provided with confidentiality, anonymity, non-traceability, ethical monitoring, and access to data (British Educational Research Association, 2018). The study used FAIR (findable, accessible, interoperable, reusable) data principles where data can be found, available, interoperable, and reusable (Wilkinson et al., 2016). The General Data Protection Regulation and ethical considerations were respected and the study was approved by the Research Ethics Committee of Social Sciences and Humanities of the University of Latvia (13 September 2023; Nr. 71-46/134).

Questionnaire participants. Questionnaire for Latvia primary school teachers (Ponto, 2015) was designed as a data acquisition method. Questionnaire was implemented in Latvia from September – November, 2023 and was distributed via Latvian county Educational governance network. 1150 respondent answers were collected that represent 17.92% of primary school teachers in Latvia.

The structure of the questionnaire. There were several types of questions used to reveal the teacher's perspective – Osgood scale questions (Osgood semantic differential scale questions (Semantic Differential Scale (Osgood et al., 1957) questions in the survey consist of a list of seven-point scales (–3; 0; +3) between bipolar, contrasting opinions to measure teacher's perspectives about parental expectations), open questions, multiple choice questions, demographic questions (Fowler, 2013).

There are several views of parental expectations about educational objectives that reveal the teacher's perspective that was established in questionnaire:

1) What are parental expectations about a child's educational objectives?
2) How do parents form their expectations?
3) How do parents form their expectations about a child's educational objectives?
4) How do parents inform teachers about their expectations about educational objectives?
5) Do parental expectations change when a child grows?
6) Do parental expectations influence a child's well-being?
7) Do parental expectations affect a child's motivation?
8) Whether parental expectations are taken into account in the school education process?

Data collection and analysis. Data was collected online using Google Forms, the data is anonymous, accessed by study researchers and stored in Google Drive with dual authentication protection. Data analysis as data processing method was done using different methods –

1) XLSTAT – data preparation, data research analysis, analysis of study questions, reflection and modeling of results;
2) Osgood's semantic differential scale analysis was performed in program XLSTAT describing and displaying data in differential analysis;
3) Analysis of open questions in phases – preparation of data, extraction of unifying elements, rotation of elements, interpretation of elements, presentation of results of analyzed elements using Factor analysis system (Tavakol & Wetzel, 2020).

Results

1150 respondents – primary school teachers participated in a survey revealing their perspective about parental expectations about educational objectives.

Descriptions of respondent profiles disclose that:

1. 90% of respondents were women, 9% men, and 1% specified gender as other.
2. Analyzing the age of the teachers that participated in the survey – 34% of teachers are 51–60 years old, 30% are 41–50 years old and 22% are 61 and more years old.
3. Respondents' profiles reveal that a major part of teachers (79%) have master's degrees.
4. Describing the region, where teachers work, 38% of teachers detect that the capital city Rīga is their workplace, 11% – the region around Rīga, 20% Kurzeme, 11% equally Zemgale un Vidzeme, 7% Latgale, 2% Sēlija.
5. Analyzing the educational level that teachers work with, 27% of teachers work with classes 1–3, 38% of teachers work with classes 4–6, and 35% of teachers work with classes 7–9.
6. There are several areas describing subjects that teachers teach 30% of teachers teach languages, 19% of teachers are primary school teachers that teach multiple subjects, 13% of teachers teach science, 11% of teachers teach social sciences and civic education, 9% of teachers teach art like music, art, design and technologies, 7% of teachers teach mathematics, 7% of teachers teach information and technologies, 4% of teachers teach health and physical education.

The question "What are parental expectations about a child's educational objectives?" from the teacher's perspective, discloses five main parental expectations (see Figure 1). Teacher's perspectives about parental expectations about educational objectives reveal the importance of knowledge and high educational achievements that are connected with future education and professions. Negative opinions about parental expectations describe high pressure and parental power as well as the fulfillment of parents' dreams.

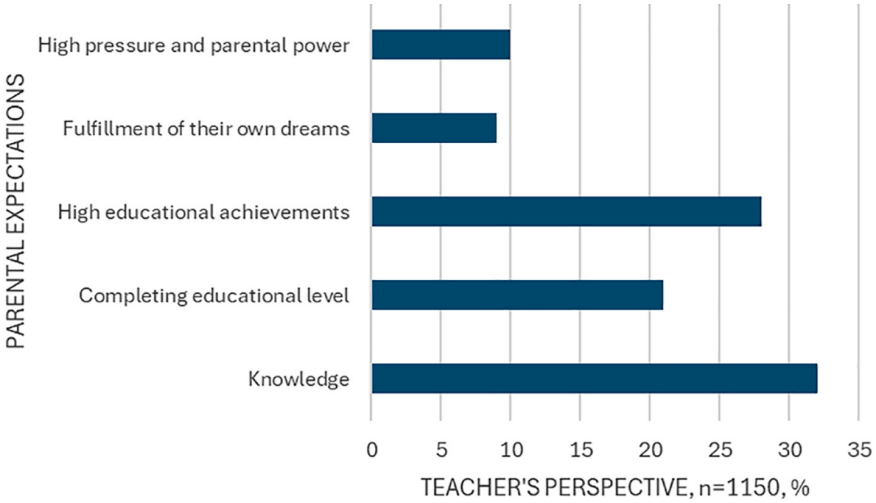

Figure 1 Parental expectations about educational objectives from teachers' perspective

Question about parental expectation relationship with a child's possible future occupation for example profession, competitive pay, and others, detects teacher's perspective assessing valuing emotions – a major part of teacher's (see Figure 2) reveal a positive relationship with parental expectations and child's future profession commitment.

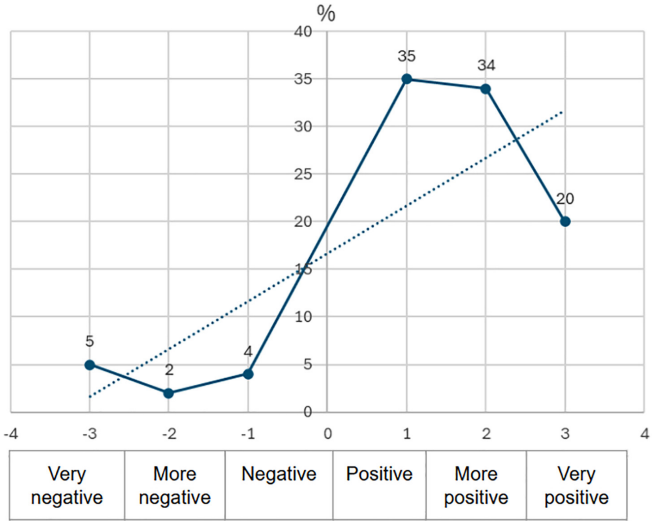

Figure 2 Parental expectations about relationship with child's future occupation, teachers' perspective

Teachers' perspectives disclose several aspects of the manner how parents form their expectations (see Figure 3). The major part (54%) of teachers indicate that parental expectations about educational objectives are specific but often not related to the educational objectives, 17% of teachers note that parental expectations are low or do not exist, 14% of teachers specify that parental expectations are formed in cooperation with child, they are clear, justified and well defined, 12% of teachers state that parental expectations are formed in cooperation with child, but they are unclear, unjustified and uncertain, 3% of teachers describe parental expectations as non-existent or they are not related to the child.

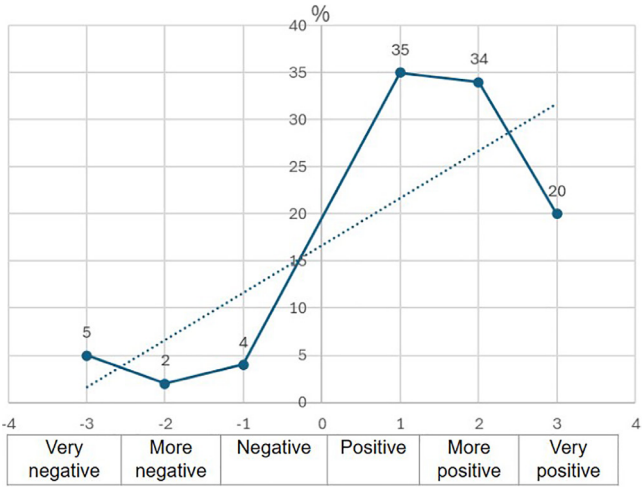

Figure 3 Parental expectations about relationship with child's future occupation, teachers' perspective

Question about parental expectations and child's well-being, 14% of teachers specify a negative impact on a child's well-being, indicating parental power and pressure, 34% of teachers note that parental expectations positively affect a child's well-being, respect in the school, society, peers, confidence (see Figure 4).

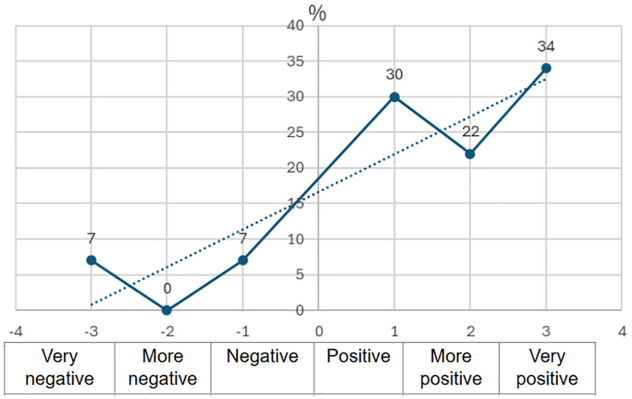

Figure 4 Parental expectations and child's well-being from teachers' perspective

A teacher's perspective about parental expectation influences a child's motivation, and ability to learn and make decisions for themselves to promote a child's learning achievements state positive opinion. 25% of respondents emphasize a very positive attitude between parental expectations and child's motivation, 28% detect a medium positive attitude, and 34% positive opinion. Only 11% of teachers state a negative perspective between parental expectations and a child's motivation, and 2% of teachers indicate a very negative impact on a child's motivation.

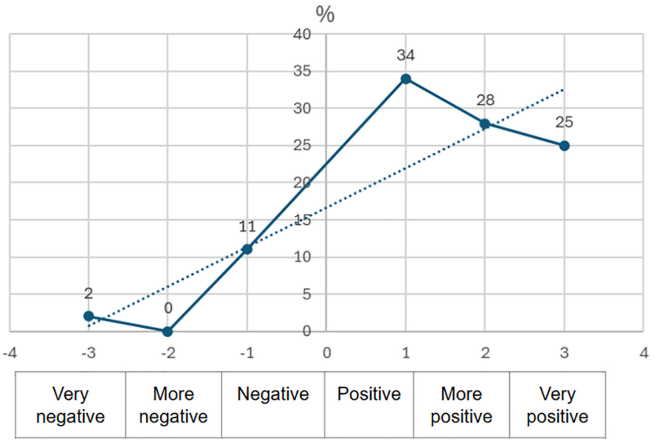

Figure 5 Parental expectations impact on child's motivation from the teachers' perspective

Teachers' opinion about how parents inform teachers about their expectations about educational objectives is common – 74% of teachers state that parents do not inform the school about their expectations, 13% of teachers specify that parents inform teachers using different information channels (e-klase, WhatsApp, etc.) 11% of teachers reveal that parents inform teachers about their expectations in conversation (parent-teacher meeting, individual conversation and others), 2% of teachers state that parents inform school management about their expectations about educational targets.

3% of teachers state that they feel very negative about how parents inform teachers about their expectations, 9% of teachers state more negative opinions and 10% reveal their negative opinion. Positive attitudes to communication between parents and teachers are for 38% of teachers, 15% feel more positive and 25% very positive about communicating parental expectations to teachers or school management (see Figure 6).

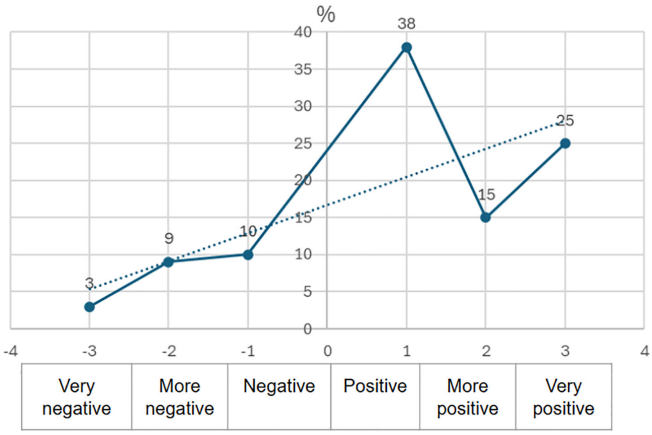

Figure 6 Parental expectations communication to teachers from teachers' perspective

Respondents' perspectives on whether parental expectations are taken into account in the school education process (see Figure 7) detect that 48% of teachers are positive about parental engagement in the educational process, 20% of teachers feel medium positive and 4% very positive. Negative perspectives of parental engagement detect 12% of teachers as negative, 9% more negative and 7% of teachers state this engagement as very negative.

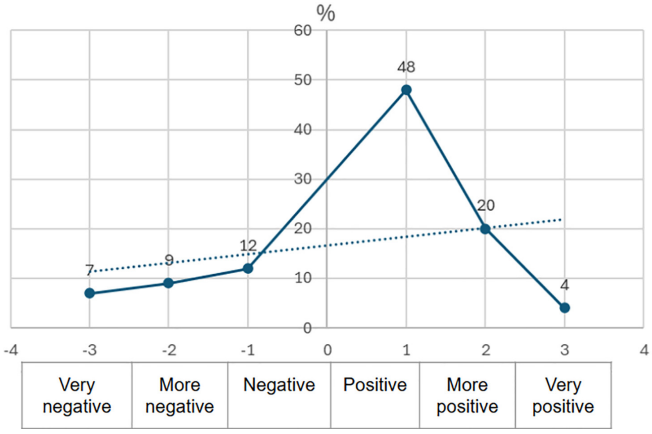

Figure 7 Parental expectations in school education process from teachers' perspective

81% of teachers reveal that parental expectations about educational objectives change when a child grows, while 19% of teachers state that parental expectations do not change.

Summarizing teacher's questionnaire answers about parental expectations about educational objectives (see Table 2), the most positive importance of parental expectations from teacher's perspective is connected with parental expectations relationship with child's future occupation, the most negative interest teacher's reveal is the problem of parental expectations role in school education process.

Table 2 Teacher's perspective about parental expectations about educational objectives

Question	Semantic differential scale, Teacher's perspective, %							
	–3	–2	–1	% negative	1	2	3	% positive
Parental expectations about educational objectives relationship with child's future occupation	5	2	4	11	35	34	20	89
Parental expectations and child's well-being	7	0	7	14	30	22	34	86
Parental expectations impact on child's motivation from the teachers' perspective	2	0	11	13	34	28	25	87
Parental expectations communication to teachers	3	9	10	22	38	15	25	78
Parental expectations in school education process	7	9	12	28	48	20	4	72

Conclusions

The intersection of parental expectations, teacher perceptions, and a child's educational outcomes is a complex and multifaceted issue that requires careful consideration and analysis, and engagement from all educational actors.

Analyzing a teacher's perspective about parental expectations about educational objectives, teachers describe a positive relationship with a child's future occupation, significant part of teachers state that parental expectations impact on educational process has negative influence (see Table 3). Semantic differential analysis disclose that teachers' perspective is mainly positive to parental expectations. Teacher's perspectives disclose that parental expectations are connected with a child's future occupation, well-being, motivation, and the way how parents communicate about their expectations and expectation impact on the educational process. Teachers consider parents as important educational actors.

Teachers consistently emphasize the importance of parental involvement and communication in supporting a child's learning and development. However, despite this acknowledgment, research reveals a significant gap between the perceived importance of parental expectations and the actual communication between parents and teachers regarding these expectations. While teachers recognize the crucial role of parental expectations, they often report a lack of information from parents about their educational goals and aspirations for their children.

Furthermore, there are various factors contributing to the formation and evolution of parental expectations over time. As children progress through different stages of development, parental expectations may shift in response to changing circumstances and contexts. Understanding these factors is essential for educators to effectively engage with parents and support their children's educational journey.

Effective communication between parents and teachers is paramount for bridging the gap between parental expectations and teacher perception. Teachers play a crucial role in interpreting and responding to parental expectations, and their perceptions can significantly impact students' motivation and academic outcomes. Positive teacher-parent relationships built on trust, respect, and open communication are essential for fostering a collaborative approach to education.

Moving forward, there is a clear need for proactive efforts to improve communication and collaboration between parents and teachers in setting and achieving educational objectives. Establishing clear channels of communication and defining the frequency and format of parent-teacher interactions can facilitate meaningful dialogue and mutual understanding. Additionally, developing models of cooperation that explicitly address parental expectations and incorporate them into the educational planning process is crucial for promoting student success.

Furthermore, addressing the question of leadership in education and the role of effective communication is essential for fostering a culture of collaboration and shared responsibility among all stakeholders. Educational leaders have a vital role to play in creating supportive environments that encourage open communication and partnership between parents, teachers, and students. By promoting a collaborative approach to education, leaders can empower stakeholders to work together towards common goals and aspirations.

In conclusion, the research underscores the teacher's perspective about the importance of parental expectations in education and the critical role of teachers in interpreting and responding to these expectations. By fostering positive teacher-parent relationships and promoting effective communication and collaboration, we can create supportive environments that enable all students to thrive academically, socially, and emotionally.

Summarizing:

1. Teachers indicate that parental expectations are essential, yet parents do not inform teachers about them.
2. Teachers perceive and interpret different levels of parental engagement in a child's education positively.
3. Teachers highlight the relationship between parental expectations, teachers' notions, and students' motivations.
4. The issue of disproportionate parental expectations and the stress a child experiences is being raised.
5. Actual is a question about leadership in education and the role of effective communication in reconciling the expectations of parents and teachers.
6. Existing models of cooperation between parents and teachers in setting and achieving educational objectives do not reveal the expectations of the parents.

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RETRIEVAL PRACTICE ACTION RESEARCH TO DEVELOP MIDDLE SCHOOL STUDENTS' KNOWLEDGE OF BIOLOGY TERMINOLOGY

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ABSTRACT

The researchers, a Secondary school Biology teacher and a language learning specialist, brought their respective fields of competence together to apply the research on retrieval practice, according to which this strategy has a high impact on learning. The students participating in this study were a group of 22 Grade 8 students, predominantly Russian-speakers, attending an English-speaking international school. Their level of English varied from A1 to C1 according to the Common European Framework of Reference (CEFR). The problem identified was the students' lack of confidence in using and understanding Biology terminology effectively. This study aimed to evaluate the effectiveness of retrieval practice as a strategy for English as an Additional Language (EAL) students to improve their competence in this area. The Biology teacher split the unit of work in two; students received a formative test with open books (no retrieval practice) for the vocabulary related to the first half of the unit, and a formative test with closed books (retrieval practice) for the vocabulary related to the second half. Students were then assessed summatively on the full unit. The results for the content which had been formatively tested with open books were compared with the results for the content which had been formatively tested with closed books. The effect measured was small, but confirmed the hypothesis according to which retrieval practice has a positive impact on learning. Metacognition, reflection, and collaboration are all part of the approaches to learning skills modelled to students in this study. Through these skills, which the action research model supports, we not only sought to evaluate the effectiveness of a particular strategy, but also to promote a culture of inquiry and self-directed learning. It offers practical insights for educators seeking to enhance their pedagogical practices and supports students in mastering subject-specific terminology in a second language.

Keywords: *action research, language pedagogy, retrieval practice, Middle School, vocabulary instruction, technology.*

Introduction

Stepping away from the routine of surviving through the demands of teaching, there is one thing passionate educators have in common: they want to have an impact. In fact, according to John Hattie, teachers are more likely to have an impact on learning if they are passionate about helping their students learn (Hattie, 2012). They draw intrinsic motivation from knowing that what they are doing has a purpose and makes a difference for their students' learning (Phelps & Benson, 2012). However, a lack of expertise in meeting the needs of particular groups of students may be a hindrance to the impact even passionate teachers intend to have. Subject teachers teaching students speaking English as an additional language (EAL) face particular challenges, especially when they are not trained language teachers and are concerned with delivering a prescribed curriculum, as is the case in our study. Secondary school teachers frequently feel ill-prepared to meet the needs of EAL students (Rubinstein-Avila & Lee, 2014). Yet research on supporting EAL students in learning content is readily accessible, for instance research according to which explicit vocabulary instruction has a positive impact on EAL students' learning (Oxley & de Cat, 2021). However, good teaching is characterized by thoughtful decision-making and the strategic application of various elements from various techniques to enhance and support student learning, rather than being exclusively linked to one approach (Creemers, 2013). Also, subject teachers may be reluctant to adopt approaches which they might feel detract from their purpose of teaching their subject content. Finally, for teachers to see the value of research findings, they need to see research as relevant to their educational environments. To do so, "learning how to do research through action research projects is amongst the best ways of promoting [...] openness to published research" (Waks, 2020).

The objective of this paper is to evaluate the effectiveness of a learning strategy known to be impactful, retrieval practice, through a participatory action research in the context of a Grade 8 class in an international school in Latvia. Participatory action research ticks the boxes of what John Hattie identified as factors having a high impact on learning, with teachers reflecting on their own practices in their own classroom (Hattie, 2023). Through action research, the Grade 8 Biology teacher and the author of this paper, the Head of Languages, collaborated to apply evidence-based research, monitor the teacher's impact on students' learning and to adjust her approach accordingly, which allowed her to seek to improve her own teaching through student feedback and analysis of results. Students were also involved in the process, thereby developing their metacognition. The class' heterogeneity in English language competence, and the students' observed challenges in using and comprehending complex language in biology, served as the impetus for the research. We sought to experimentally evaluate the idea that retrieval practice could enhance students' understanding of subject-specific terminology by putting it into practice and comparing the outcome of learning subject content with and without retrieval practice. This strategy aimed to contribute to the larger body of educational research on the effectiveness of retrieval practice in a variety of language and cultural contexts, in addition to improving pedagogical strategies for teaching EAL students subject-specific vocabulary.

Literature review

Action research

Action research in educational settings has been linked to teachers' professional efficacy, empowering both students and teachers in their perception as active change agents as opposed to mere observers (Seider & Lemma, 2004). Teachers become active participants in their professional development and focus on issues specific to their particular audience and context through the 4 stages of action research. As seen in figure 1 (Esparza, Lynch-Arroyo, & Olimpo, 2022), the first step relates to the identification of a particular problem and planning the intervention to tackle it; in the second step, the intervention is carried out and data collected to be evaluated in the third step; finally, in the fourth step, the successes and shortcomings of the chosen approach are reflected upon (Carr & Kemmis, 2005).

In addition to helping educators and students grow professionally, participatory action research (PAR) also assists in creating a cooperative environment that all involved gain from (Sokhanvar & Salehi, 2019). Additionally, McIntyre (2008) defines PAR as an alliance-building initiative that enables researchers and instructors to co-create knowledge by fostering a "self-and critical-awareness that leads to individual, collective, and/or social change" (McIntyre, 2008). Since researchers outside of the classroom setting are "strangers" to practise and gather data for their own objectives, their findings may be far removed from those stemming from practitioners' self-reflection (Waks, 2020). This gap between research and practice in the subject widens even further when the research is published and recognized as authoritative knowledge. It is challenging for practising instructors to comprehend and use the knowledge gleaned from research because of this gap. Educational research needs to fulfil specific requirements in order to support good teaching practices. It is imperative that educators identify with the chosen research materials, perceive the research settings and treatments as applicable to their own classroom environments, and derive meaningful insights from the research process.

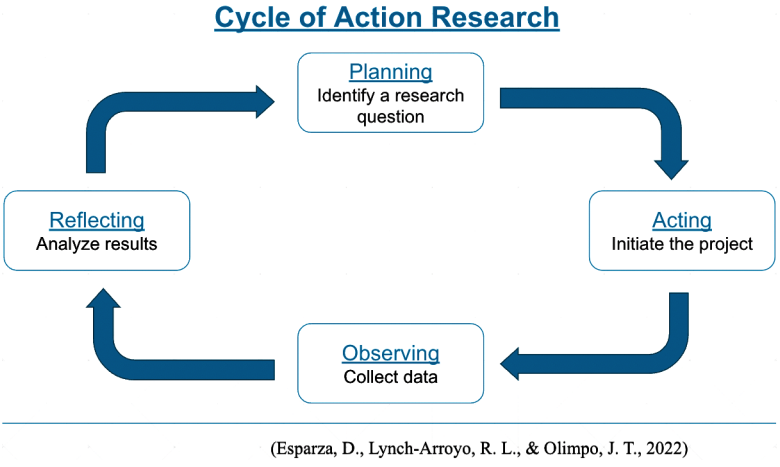

Figure 1 Action research steps [graph used with permission from the authors]

However, the implementation of action research in high school classrooms depends on a number of factors, such as support from the administration, which can be in the form of time provided to research literature and plan interventions, as well as promoting "cooperation and collaboration among colleagues and substantive opportunities for professional reflection" (Seider & Lemma, 2004). Another potential hurdle is student resistance to action research, as identified by Esparza, Lynch-Arroyo, and Olimpo (2022). This is another reason why participatory action research was chosen, as it becomes a platform for learning as well as a source of research, thus giving a purpose for participation (Cooper, Shepardson, & Harber, 2002).

Retrieval practice

Retrieval practice is a learning technique aiming to improve learning and recall by having learners retrieve previously taught material from long-term memory (Agarwal, Nunes, & Blunt, 2021). Learning across a range of ages, content areas, and media was consistently increased by retrieval practice, according to Agarwal, Nunes, & Blunt's (2021) systematic review of practical studies conducted in classrooms and schools. The review examined 37 studies with n = 5374, 50 trials, and 49 total effect sizes. Of the studies that were reviewed, the majority (57%) had medium or large effect sizes. The review also revealed that because there are so many variables, classrooms are difficult places to conduct experiments. The evaluation concentrated on data from studies conducted solely in classroom settings and highlighted a number of issues that require further investigation in the future, including the ideal frequency of retrieval practice and whether or not it is beneficial for all topics and age groups. One aspect also identified was that the majority of studies were conducted in WEIRD countries (Western, Educated, Industrialised, Rich, Democratic), with only "3 out of 50 experiments [...] conducted outside the USA and Western Europe" (Agarwal, Nunes, & Blunt, 2021).

A different review of applied research on retrieval practice in educational settings led by Moreira and colleagues brought up a number of issues that still needed to be resolved, including whether or not retrieval practice is enhanced by corrective feedback and whether some test kinds are more (or less) useful than others in educational contexts. Twenty-three articles that satisfied the inclusion criteria were included in the review (Moreira et al., 2019).

Methodology

Context and participants

The action research was led in an international secondary school, where the language of instruction is English, but set in Latvia, a non-English speaking country. The participating students were 22 Grade 8 (13 to 15 year olds) students. There was an equal number of male and female students. Nineteen of the students were native Russian speakers, two were native Latvian speakers, one was an Ukrainian native speaker but also a Russian-speaker. All the students were non-native English speakers, or EAL learners, of

varying levels of competence in English. The school uses the Common European Framework of Reference (CEFR) to identify the level of the students in English. According to the CEFR, A1 is the lowest level of competence, meaning an ability to understand and communicate in basic everyday interactions, but not yet showing a Cognitive Academic Level of Proficiency (CALP) allowing them to interact with complex academic content (Cummins, 2013). C1 is the highest level of the framework, indicating an ability to comprehend and produce language in an academic setting in accordance with their age group (Council of Europe, 2014). Within the group, the majority of students were at A2 to B2 level, with a few at the lowest (A1) and highest (C1) level (see table 1).

Table 1 Sample group's level of English according to the CEFR

CEFR level	Frequency	Percent	Valid Percent	Cumulative Percent
A1	2	9.091	9.091	9.091
A2	6	27.273	27.273	36.364
B1	7	31.818	31.818	68.182
B2	4	18.182	18.182	86.364
C1	3	13.636	13.636	100.000
Missing	0	0.000		
Total	22	100.000		

As part of their middle school programme, the Grade 8 students follow the Cambridge International Education Combined Science curriculum (code 0653), which includes a Biology component (Cambridge International Education, 2023). The curriculum is split into different chunks of learning, or "units", which are taught over the course of around 4 weeks each, and which include prescribed learning outcomes assessed in the Grade 10 external examination. The unit taught as part of this study was Animal Nutrition, with the first half of the unit focusing on names of the processes and tooth structure and the second half on alimentary canal structure. The course is not designed with EAL students in mind, so teachers have to be responsive to the needs of their students through implementing recommended strategies, such as pre-teaching vocabulary, scaffolding learning, translanguaging etc.

Design

The following research question informed the study:

Does retrieval practice help to develop Grade 8 students' ability to use and understand Biology terminology effectively?

The inquiry method used was action research, described by Koshy as a productive inquiry, in which the researcher plans, executes, assesses, refines, and gains knowledge about certain issues through experience. The process of learning never stops for the researcher, who also passes on freshly acquired knowledge to others who could find

use for it (Koshy, 2010). As such, this is a method of inquiry fitting the particular needs of the teacher, presented with the contextual issue of having a heterogeneous language competence group to which she had to teach a prescribed curriculum, without being a trained language teacher. The teacher was aware of the difficulty many of her students had in accessing the curriculum, and came to the researcher, the Head of Languages at the school, for support. According to Agarwal, Nunes, and Blunt's systematic review of applied research in schools and classrooms, retrieval practice resulted in an improvement in learning in "nearly all conditions in schools and classrooms" (Agarwal, Nunes, & Blunt, 2021). Therefore, it was decided to focus on this particular strategy to identify whether students' use and understanding of Biology terminology could improve.

Three different online platforms were used as tools to gather data and generate formative quizzes. An Outlook online form, and the teacher online quiz creator Kahoot were used to create anonymous online self-reflection surveys to gather data on students' perception of learning. Retrieval practice was implemented using Quizlet, a web-based software, as well as a mobile device application, which allows users to create their own sets of terminology or other content to memorise through retrieval practice.

Data collection

Quantitative data was collected through both surveys and test results. The teacher and the researcher first designed an online self-reflection survey to evaluate how students currently perceived their ability in understanding and using subject-specific terminology. The anonymous survey was conducted with the students, asking them to rate themselves on a 5-point likert scale, in answer to four prompts, purposely written in very simple English to ensure even A1 students could understand. The same survey was given again at the end of the experiment, prior to the findings on retrieval practice being shared with the students.

The data generated by the survey confirmed the students lacked confidence overall, in particular while producing language, using Biology terms both in speaking and writing.

A list of key terms was created by the teacher on the online formative tool Quizlet. The application then generates a variety of retrieval practice online activities, including quizzes with a choice of written answers, multiple-choice questions, right or wrong answers, which can either be self-marked online, or printed as a paper quiz. This tool was used to create retrieval practice activities for the students. The independent variable of the study was the formative testing throughout the learning phase. The unit was split in two parts: the first part was formatively assessed through quizzes at the beginning of every lesson the week after the content was taught, with students not allowed access to their books. This meant that students were activating retrieval practice. The second part of the unit was formatively assessed through quizzes as well, this time with open books, hence putting students in a situation where they did not have to activate retrieval practice. The teacher was cautious to ensure that both parts of the unit were of the same level of difficulty.

At the end of the unit, students sat a final summative test, made up of a mix of different types of questions (multiple-choice, labelling and open questions) targeting both parts of the unit. To be noted is that 2 students missed the end of unit test, hence bringing the total number of students to 20. Two versions of the test (test 1 and test 2) were created to avoid students cheating on the student sitting next to them during the test, thus increasing the validity of the results. The students' results were entered in a spreadsheet, with a clear indication of which question matched which part of the unit, to be able to relate results to whether students had used retrieval practice throughout the learning phase or not.

Results

Test results

We compared students' use and understanding of terminology for the content formatively quizzed with open books (no retrieval practice) with the content formatively quizzed with closed books (retrieval practice). The closed-book conditions yielded a 60% accuracy rate in correct answers, while the open-book conditions resulted in a 51% accuracy rate in correct answers. Using Jasp, Jeffrey's Amazing Statistics Program (JASP), an open-source software, for the analysis of students' answers to each of the summative test questions, we generated a more detailed statistical analysis.

Shapiro-Wilk Test

Validating the assumption of normalcy is a crucial consideration for the analyst when performing statistical analysis utilizing parametric methods (Yap & Sim, 2011). To assess the normality of the data distribution, the Shapiro-Wilk test was employed. The test examined whether the data followed a normal distribution, with a p-value above 0.05 indicating normality. In this study, the p-value exceeded 0.05, suggesting that the data was normally distributed (see table 2). Normal distribution implies that the data is equally spread on both sides of the mean score.

Table 2 Descriptive statistics

	closed	open	overall
Valid	20	20	20
Missing	0	0	0
Mean	0.600	0.507	0.554
Std. Deviation	0.267	0.342	0.280
Shapiro-Wilk	0.907	0.906	0.955
P-value of Shapiro-Wilk	0.056	0.054	0.447
Minimum	0.000	0.000	0.000
Maximum	1.000	1.000	1.000

Effect Size

Effect size (Cohen's d)

The size of the observed difference between closed book and open-book settings was determined using Cohen's d. According to Cohen (1988), the effect magnitude was found to be small to medium (see table 3).

Paired Samples T-Test

A paired samples T-test (see table 3) was used to assess the statistical significance of the observed differences between closed-book and open-book circumstances given the normal distribution. The purpose of this one-tailed test was to ascertain whether, as predicted, performance under one condition was significantly better than the other.

Table 3 Paired samples T-Test and Cohen's d

							95% CI for Cohen's d	
Measure 1		**Measure 2**	**t**	**df**	**p**	**Cohen's d**	**Lower**	**Upper**
closed	–	open	1.667	19	0.056	0.373	−0.013	∞

Note. For all tests, the alternative hypothesis specifies that closed is greater than open.
Note. Student's t-test.

Survey results

The surveys conducted at the beginning and at the end of the experiment showed an increase in students' participation, as well as an increase in their confidence. In the first survey, 10 students out of the 22 did not respond, even though all students attended the lesson when the form was shared, due to a technical issue, as many students had difficulty accessing the Microsoft Outlook form. In the second survey, carried out using Kahoot, all students responded. In the pre-experiment survey, out of the 10 students who responded, only 8% felt they understood the teacher's instructions all the time, versus 27% post experiment (see tables 4 and 5). The written instructions comprehension also showed a jump in the level of confidence (see tables 6 and 7).

Table 4 Frequencies for "I understand the teacher's instructions when she talks" pre experiment

I understand the teacher's instructions when she talks pre experiment	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
All the time	1	4.545	8.333	8.333
Most of the time	10	45.455	83.333	91.667
Sometimes	1	4.545	8.333	100.000
Missing	10	45.455		
Total	22	100.000		

Table 5 Frequencies for "I understand the teacher's instructions when she talks" post-experiment

I understand the teacher's instructions when she talks post experiment	Frequency	Percent	Valid Percent	Cumulative Percent
All the time	6	27.273	27.273	27.273
Almost never	1	4.545	4.545	31.818
Most of the time	11	50.000	50.000	81.818
Sometimes	4	18.182	18.182	100.000
Missing	0	0.000		
Total	22	100.000		

Table 6 Frequencies for "I understand the teacher's written instructions" pre experiment

I understand the teacher's written instructions pre experiment	Frequency	Percent	Valid Percent	Cumulative Percent
All the time	1	4.545	8.333	8.333
Most of the time	10	45.455	83.333	91.667
Sometimes	1	4.545	8.333	100.000
Missing	10	45.455		
Total	22	100.000		

Table 7 Frequencies for "I understand the teacher's written instructions" post-experiment

I understand the teacher's written instructions post experiment	Frequency	Percent	Valid Percent	Cumulative Percent
All the time	7	31.818	31.818	31.818
Most of the time	12	54.545	54.545	86.364
Sometimes	3	13.636	13.636	100.000
Missing	0	0.000		
Total	22	100.000		

Regarding production of language, pre-experiment, 42% of students felt they were confident all the time and most of the time using Biology terms while speaking. Post experiment, 54% students felt they were confident all the time and most of the time using Biology terms while speaking (see tables 8 and 9). While using Biology terms in writing, 58% of students felt they were confident all the time or most of the time pre experiment. Post experiment, 72% of students reported feeling confident for the same (see tables 10 and 11).

Table 8 Frequencies for "I can use Biology terms (words) when I speak in English" pre experiment

I can use Biology terms (words) when I speak in English pre experiment	Frequency	Percent	Valid Percent	Cumulative Percent
All the time				
Most of the time	3	13.636	25.000	25.000
Sometimes	2	9.091	16.667	41.667
Missing	7	31.818	58.333	100.000
Total	10	45.455		
	22	100.000		

Table 9 Frequencies for "I can use Biology terms (words) when I speak in English" post experiment

I can use Biology terms (words) when I speak in English post experiment	Frequency	Percent	Valid Percent	Cumulative Percent
All the time	3	13.636	13.636	13.636
Almost never	1	4.545	4.545	18.182
Most of the time	9	40.909	40.909	59.091
Sometimes	9	40.909	40.909	100.000
Missing	0	0.000		
Total	22	100.000		

Table 10 Frequencies for "I can use Biology terms (words) when I write in English" pre experiment

I can use Biology terms (words) when I write in English pre experiment	Frequency	Percent	Valid Percent	Cumulative Percent
All the time	3	13.636	25.000	25.000
Most of the time	4	18.182	33.333	58.333
Sometimes	5	22.727	41.667	100.000
Missing	10	45.455		
Total	22	100.000		

Table 11 Frequencies for "I can use Biology terms (words) when I write in English" post experiment

I can use Biology terms (words) when I write in English post experiment	Frequency	Percent	Valid Percent	Cumulative Percent
All the time	2	9.091	9.091	9.091
Almost never	14	63.636	63.636	72.727
Most of the time	4	18.182	18.182	90.909
Sometimes	2	9.091	9.091	100.000
Missing	0	0.000		
Total	22	100.000		

Discussion

In line with the literature on retrieval practice (Agarwal, Nunes, & Blunt , 2021; Yiğit, Kiyici, & Çetinkaya, 2014; Levlin et al., 2022), this study confirms findings according to which retrieval practice has a positive effect on learning. It addresses the challenge identified by Agarwal, Nunes and Blunt in implementing research in a classroom setting. It also contributes to research stemming from non-WEIRD countries, as this study was implemented in the Eastern European region, with predominantly Russian and Latvian native speakers. However, the effect size remains small, and the sample size represents a limitation to the findings of the study. Further avenues for discussion may be considered, such as applying the research in a different educational setting, for example public schools. Broadening the scope of research by targeting bigger groups of more diverse students from a variety of linguistic backgrounds could enhance the findings of the study. It would also be valuable to observe the long-term effect of retrieval practice by applying this research throughout a longer period of time to determine whether retrieval practice leads to sustained improvement in knowledge and application. Further research could also explore the relationship between retrieval practice and student motivation and engagement.

Conclusion

The effect size showed that using retrieval practice had an impact on performance in this particular classroom setting. This was somewhat supported by the increased level of confidence shown by the survey answers, although the difference in the number of students responding to the survey pre and post experiment constitutes a limitation to this finding. This also highlights the challenges of conducting action research in the classroom. However, the results are encouraging, in that the participation of students and their explicit reflection on their confidence showed that more should be done to include

learners in solving problems faced by teachers in meeting the particular needs of their students. There are implications for teachers' professional development, as conducting action research implies a rigorous approach to identifying a specific problem, discussing solutions and data collecting. Further considerations also need to be given to the potential for collaboration between subject teachers and educators with specific areas of expertise, in this case language learning.

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THE EFFICACY OF A VIDEO LIBRARY IN ALLEVIATING MATH ANXIETY: A CROSS-COUNTRY ANALYSIS OF PROSPECTIVE AND PRIMARY SCHOOL TEACHERS' PERSPECTIVES

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ABSTRACT

This study investigates the impact of a video library containing learning scenarios for mathematics classes on the perceptions of prospective teachers and primary school teachers, with the primary objective of reducing math anxiety. Participants from five different countries provided 541 responses to a questionnaire, evaluating various aspects of the scenario and video content. The research analyzes the key factors influencing participants' perceptions and explores diverse comparisons based on status, age, work experience years, and country of origin. The questionnaire covers a range of criteria, including the relevance of content, adherence to didactic principles, integration of new technologies, alignment with mathematics curriculum requirements, incorporation of robotics, and effectiveness in reducing math anxiety. The study further delves into the promotion of purposeful teaching/learning processes, differentiation of tasks, suitability for various literacy levels, and encouragement of active participation. The findings contribute valuable insights into the global applicability of scenario-based videos, especially in leveraging educational robotics to enhance mathematics education and alleviate math anxiety among students.

Keywords: *Educational Robotics, In-service Teachers, Math Anxiety, Prospective Teachers, Scenario-Based Learning, Teachers Feedback.*

Introduction

Globally the field of education keeps pace with the development of technology, as changes in technology lead to major changes in training. Various studies show that we can no longer perceive the instructional process in schools without the involvement of technology (Chiou, 2004; Highfield et al., 2008; Hamidi et al., 2011; Ng, 2015; Mubin et al.,

2013; Atman Uslu et al., 2023). A special role is played by educational robot technology widely applied in the teaching approach for any level of education, even in primary education. Teachers are the first to look for solutions for the application of educational robots for their use as valuable teaching material accepted by children. They seek to include educational robots for any curriculum area in primary education (Highfield et al., 2008). In addition, educational robots are seen as a basic part of Science, Technology, Engineering and Mathematics (Atman Uslu et al., 2023). Mathematics is an important subject and at the same time special because of the difficulties that children encounter since primary school, difficulties in understanding fundamental notions and forming abstract concepts (Acharya, 2017). These barriers to understanding mathematics in the primary cycle lead to anxiety and fear of mathematics and certainly major failure in later academic years (Ashcraft & Faust, 1994; Chang & Beilock, 2016).

Primary school teachers have the main role in detecting symptoms of anxiety, and in forming conditions in which children do not reach states of anxiety, and fear. They can intervene with interactive tools such as educational robots and mock or even reduce even the lowest chances of being anxious in math (Hak, 2014; Highfield et al., 2008).

The basic characteristics of educational robots that can be used to teach mathematics are fun, safe, open and easy to use (Pei & Nie, 2018a). Research shows that new solutions are being sought to improve these features, namely as educational robots, complemented with other important features such as extensibility, durability, compatibility and others depending on the domain used (Pei & Nie, 2018b).

The role of educational robots in mathematics learning

Mathematics as a science is not only definitions, abstract concepts, and fundamental notions but also a series of rules, algorithms and symbolic representations. Which makes a close connection between mathematics and educational robots as a concept of bilateral application. The common part for both is the precision with which one can solve problems and determine solutions through multiple paths, but also the feeling of control over the knowledge to apply it easily in other new situations, and challenges.

The role of educational robots in teaching and learning mathematics can be highlighted by several statements reflecting the most valuable part of applying educational robots to mathematics: (1) educational robots lead to higher-order thinking skills, namely thinking with higher comprehension power, solving individual and collaborative problem situations, which makes abstract notions better understood (Atman Uslu et al., 2023), lead to the development of cognitive infrastructure, where accuracy and prediction are related to the programming process (Highfield et al., 2008); (2) development of social skills, involving students in groups to solve a common problem, leads to teamwork capabilities (Atman Uslu et al., 2023); (3) educational robotics contributes to the development of emotional characteristics, establishing positive relationships with robots which leads to a state of joy, friendship and psychological comfort (Atman Uslu et al., 2023); (4) educational robots help to increase motivation for learning mathematics, performance and greater interest in learning mathematics in other forms (Atman Uslu et al., 2023).

Teachers take these statements into account when using educational robots in the classroom, which goes a long way in reducing math anxiety. For teachers looking for interactive solutions for teaching, they also need new approaches to learning and training.

Scenario-based learning is a relatively modern method of learning for teachers as well. Through scenario-based learning, they connect theory and practice, where scenarios as a learning tool become a good guide for understanding and applying what has been learned (Hursen & Fasli, 2017). Scenario-based learning is a new didactic approach that leads to reflective learning in teacher training.

Methodology

The aim of this study is to examine the opinions of teachers and prospective teachers about the "Video Library of Mathematics Activities with Robots" (https://blwithrobotics.eu/videos/), which was prepared to reduce anxiety about mathematics within the scope of BlwithRobotics project and implemented with primary school students in five different countries.

There are three sub-problems within the framework of the purpose determined in the research:

1. What are the opinions of teachers and pre-service teachers about "Video Library of Mathematics Activities with Robots" and does it vary according to various variables (country of residence, gender, age groups and status)
2. What are the opinions of teachers about "Video Library of Mathematics Activities with Robots" and do they vary according to various variables (country of residence, gender, age groups and years of training experience)?
3. What are the opinions of pre-service teachers about "Video Library of Mathematics Activities with Robots" and do they vary according to various variables (country of residence, gender, age groups and the year of study he/she is currently in the PIPP programme)?
4. The research was designed in a descriptive survey model, which is one of the quantitative research models. The study group of the research consists of a total of 541 participants, 205 teachers and 336 student/pre-service teachers, selected by non-random convenience sampling method. Demographic characteristics of the study group are presented in Table 1.

When Table 1 is analyzed, 541 participants were from five different countries, 148 (27.4%) from Turkey, 81 (15%) from Poland, 103 (19%) from Lithuania, 105 (19.4%) from Romania and 104 (19.2%) from Latvia. 86% of the study group were female and 46.6% were between the ages of 18–22. Table 1 shows that when 205 participants whose status is teacher are analyzed in terms of years of training experience, the majority (43.9%) are between 1–5 years; 336 participants are Student/Pre-service teacher, the majority (58.3%) are first and second year (first year 28.3%, second year 30.1%).

Table 1 Demographic Characteristics of the Study Group

Variables	Groups	Frequency (f)	Percent (%)	Cumulative Percent
Country	Turkey	148	27.4	27.4
	Poland	81	15.0	42.3
	Lithuania	103	19.0	61.4
	Romania	105	19.4	80.8
	Latvia	104	19.2	100.0
	Total	541	100.0	–
Gender	Female	465	86.0	86.0
	Male	76	14.0	100.0
	Total	541	100.0	–
Age	18–22	252	46.6	46.6
	23–27	91	16.8	63.4
	28–32	57	10.5	73.9
	33–37	59	10.9	84.8
	38–42	35	6.5	91.3
	43–47	24	4.4	95.7
	48 and over	23	4.3	100.0
	Total	541	100.0	–
Status	Teacher	205	37.9	37.9
	Student/Pre-service teacher	336	62.1	100.0
	Total	541	100.0	–
Years of training experience (for teachers)	Less than a year	23	11.2	11.2
	1–5 years	90	43.9	55.1
	6–10 years	35	17.1	72.2
	11–15 years	14	6.8	79.0
	16–20 years	19	9.3	88.3
	21 and over years	24	11.7	100.0
	Total	205	100.0	–
The year of study (for Student/ Pre-service teacher)	First year	95	28.3	28.3
	Second year	101	30.1	58.3
	Third year	85	25.3	83.6
	Fourth and over year	55	16.4	100.0
	Total	366	100.0	–

In this study, the scale of "Prospective Teachers' and Teachers' Opinions on "Video Library of Mathematics Activities with Robots" developed by researchers from five different countries was used. The scale is a five-point Likert-type scale (1 strongly disagree, 2 disagree, 3 somewhat agree, 4 agree, 5 strongly agree). It consists of 22 items and one dimension. Each item in the scale is related to the activities in the video library on

the BlwithRobotics project website (https://blwithrobotics.eu/videos/). The participants examined these activities before answering the scale and then answered the scale voluntarily by taking these activities into consideration. "The Cronbach Alpha (α) value calculated for the reliability analysis of the "Prospective Teachers' and Teachers' Opinions on "Video Library of Mathematics Activities with Robots" Scale is 0.96.

Results

Descriptive statistics were used in the analysis of the research data. The data were analyzed using SPSS software. In determining the statistical techniques to be used in the analysis of the data; kurtosis and skewness values of the distributions were examined to determine whether the distributions showed normal distribution (see Table 2).

Table 2 The Kurtosis and Skewness Values of the Scale

Kurtosis	Std. Error	Skewness	Std. Error
2.908	.210	–1.263	.105

Table 3 shows that Kolmogrov-Smirnov and Shapiro-Wilk test values are significant at $p < .05$ level. Based on the analyses made to determine whether the distribution is parametric or not, it was deemed appropriate to use the "Mann Whitney U" test for the sub-problems with two independent variables and the "Kruskal Wallis H" test for the sub-problems with more than two independent variables among the nonparametric statistical techniques in solving the research problem (Tabachnick & Fidell, 2013).

Table 3 Kolmogrov-Smirnov and Shapiro-Wilk Test Significance Values

Kolmogrov-Smirnov			Shapiro-Wilk		
Statistic	***df***	***p***	**Statistic**	***df***	***p***
.133	541	.000*	.892	541	.000*

Findings Related to the Opinions of Teachers and Pre-service Teachers about "Video Library of Mathematics Activities with Robots"

Within the scope of the first sub-problem of the research; arithmetic averages and standard deviations of teachers' and pre-service teachers' opinions about "Video Library of Mathematics Activities with Robots" are presented in Table 4. When Table 4 is examined, the arithmetic means of the items vary between 4.30 and 4.54 and the arithmetic mean of the total scale is 4.40. The teachers and pre-service teachers who constitute the study group have positive opinions about "Video Library of Mathematics Activities with Robots" at the level of "strongly agree".

Table 4 Analysis Results of Teachers' and Pre-service Teachers' Opinions on "Video Library of Mathematics Activities with Robots"

Item	$\bar{x}$	Ss
1. Content of scripts and videos is relevant to its purpose (including target group)	4.45	.691
2. Scenarios and videos align with the principles of education in general	4.40	.725
3. Contents of scripts and videos are based on new technologies	4.50	.671
4. The tasks in the scenarios and videos are directly related to the field of mathematics education for primary school	4.37	.710
5. Scenarios and videos include tasks to learn or improve math knowledge and skills using robotics	4.54	.639
6. Scenario and video tasks can be used to reduce students' math anxiety	4.41	.739
7. Scenarios and videos raise potential teachers' awareness of opportunities to reduce students' math anxiety	4.30	.801
8. Scenarios and videos promote learning processes with clearly defined purpose	4.45	.691
9. The tasks and exercises in the scenarios and videos are strategic in terms of lesson planning	4.31	.775
10. Video scenarios and exercises are suitable for different proficiency levels in the mathematics subject for primary education	4.38	.718
11. Scenarios and videos provide different ways to reduce math anxiety by encouraging active participation	4.41	.695
12. Scenarios and videos provide ways to make learning more fun for all children by using new technologies	4.53	.687
13. Video library offers easy-to-learn robotics applications for teaching math	4.36	.763
14. Contents of scripts and videos are presented in a clear way	4.36	.787
15. The video library offers scripts and videos adapted to the national context	4.33	.785
16. Visual design of scripts and videos is aesthetic and encourages learning	4.42	.772
17. The content of scripts and videos is appropriate, avoiding unnecessary or irrelevant information.	4.42	.707
18. Scenarios and videos are suitable for incorporation into blended learning environments.	4.41	.719
19. Scenarios and videos are suitable for incorporation into flipped classroom strategies.	4.33	.747
20. Scenarios and videos motivate teachers or prospective teachers to explore responses to children's math anxiety by seeking additional information from various sources.	4.33	.727
21. Videos available on the online learning platform can be used as teaching materials	4.44	.712
22. The results of the online projects available on the site inspire the search for new software programs and robotics to improve children's mathematical skills	4.44	.701
TOTAL	4.40	.535

Within the scope of the first sub-problem of the research; the results of the analyses related to the examination of the opinions about "Mathematics Activities with Robots Video Library" in terms of various variables (country of residence, gender, age groups and status) are presented in Table 5, Table 6, Table 7 and Table 8.

Table 5 Analysis of Teachers' and Pre-service Teachers' Opinions According to the Variable of the Country of Residence

Country	*N*		Mean Rank	*df*	X^2 (Chi-Square)	*p*	Significant Difference
Turkey (1)	148	4.26	219.79	4	54.745	.000*	1–2 (.001) 1–3 (.000) 2–3 (.006) 2–5 (.017) 3–4 (.002) 3–5 (.000)
Poland (2)	81	4.50	294.99				
Lithuania (3)	103	4.73	359.15				
Romania (4)	105	4.34	268.51				
Latvia (5)	104	4.28	240.40				

*$p < .05$

When Table 5 is examined, it is seen that the opinions of teachers and pre-service teachers about "Video Library of Mathematics Activities with Robots" differed at $p < .05$ level according to the country variable (X2(4) = 54.745, p=.000). When it was analyzed which countries there was a significant difference between Turkey and Poland (p = .001) and Lithuania (p = .000) against those living in Turkey; Poland and Lithuania (p = .006) against those living in Poland; Poland and Latvia (p = .017) against those living in Latvia; Lithuania and Romania (p = .002) and Latvia (p = .000) in favor of those living in Lithuania.

Table 6 Analysis of Teachers' and Pre-service Teachers' Opinions According to Gender Variable

Gender	*N*		Mean Rank	Sum of Ranks	*U*	*p*
Female	465	4.41	273.08	126984.00	16701.000	.442
Male	76	4.39	258.25	19627.00		

According to Table 6, the opinions of teachers and pre-service teachers about "Video Library of Mathematics Activities with Robots" do not show significant differences according to gender variables.

Table 7 Analysis of Teachers' and Pre-service Teachers' Opinions According to Age Group Variables

Ages	*N*		Mean Rank	*df*	X^2 (Chi-Square)	*p*	Significant Difference
18–22 (1)	252	4.34	246.12	6	17.439	.008*	1–3 (.010) 1–4 (.006) 1–7 (.006)
23–27 (2)	91	4.37	267.01				
28–32 (3)	57	4.53	303.03				
33–37 (4)	59	4.51	306.79				
38–42 (5)	35	4.42	289.97				
43–47 (6)	24	4.46	288.48				
48 and over (7)	23	4.58	341.15				

When Table 7 is examined, it is seen that the opinions of teachers and pre-service teachers about "Video Library of Mathematics Activities with Robots" differed at $p < .05$ level according to the age groups variable (X2(6) = 17.439, $p = .008$). When it was analyzed between which age groups there was a significant difference, it was found that there was a significant difference between 18–22 age groups and 28–32 ($p = .010$), 33–37 ($p = .006$) and 48 and over ($p = .006$) age groups against 18–22 age groups.

Table 8 Analysis of Teachers' and Pre-service Teachers' Opinions According to Status Variable

Status	*N*		Mean Rank	Sum of Ranks	*U*	*p*
Teacher	205	4.49	298.48	61187.50	28807.500	.001*
Student/Pre-service teacher	336	4.35	254.24	85423.50		

According to Table 8, the opinions of teachers and pre-service teachers about "Video Library of Mathematics Activities with Robots" show a significant difference in favor of teachers at $p = .001$ level according to the status variable. As a matter of fact, there was a significant difference against the participants between the ages of 18–22 in Table 7. Considering that the participants with student/pre-service teacher status are generally between the ages of 18–22; these two findings support each other.

Findings Related to Teachers' Opinions on "Video Library of Mathematics Activities with Robots"

Within the scope of the second sub-problem of the research; arithmetic averages and standard deviations related to teachers' opinions about "Video Library of Mathematics Activities with Robots" are presented in Table 9.

Table 9 Analysis Results of Teachers' Opinions on "Video Library of Mathematics Activities with Robots"

Item	$\bar{X}$	Ss
1. Content of scripts and videos is relevant to its purpose (including target group)	4.49	.704
2. Scenarios and videos align with the principles of education in general	4.46	.750
3. Contents of scripts and videos are based on new technologies	4.52	.654
4. The tasks in the scenarios and videos are directly related to the field of mathematics education for primary school	4.46	.696
5. Scenarios and videos include tasks to learn or improve math knowledge and skills using robotics	4.61	.596
6. Scenario and video tasks can be used to reduce students' math anxiety	4.49	.683
7. Scenarios and videos raise potential teachers' awareness of opportunities to reduce students' math anxiety	4.39	.723
8. Scenarios and videos promote learning processes with clearly defined purpose	4.54	.660
9. The tasks and exercises in the scenarios and videos are strategic in terms of lesson planning	4.37	.753

Item	$\bar{X}$	Ss
10. Video scenarios and exercises are suitable for different proficiency levels in the mathematics subject for primary education	4.45	.645
11. Scenarios and videos provide different ways to reduce math anxiety by encouraging active participation	4.48	.646
12. Scenarios and videos provide ways to make learning more fun for all children by using new technologies	4.59	.633
13. Video library offers easy-to-learn robotics applications for teaching math	4.46	.744
14. Contents of scripts and videos are presented in a clear way	4.45	.800
15. The video library offers scripts and videos adapted to the national context	4.47	.731
16. Visual design of scripts and videos is aesthetic and encourages learning	4.49	.745
17. The content of scripts and videos is appropriate, avoiding unnecessary or irrelevant information.	4.53	.653
18. Scenarios and videos are suitable for incorporation into blended learning environments.	4.50	.690
19. Scenarios and videos are suitable for incorporation into flipped classroom strategies.	4.44	.688
20. Scenarios and videos motivate teachers or prospective teachers to explore responses to children's math anxiety by seeking additional information from various sources.	4.43	.687
21. Videos available on the online learning platform can be used as teaching materials	4.56	.659
22. The results of the online projects available on the site inspire the search for new software programs and robotics to improve children's mathematical skills	4.55	.652
TOTAL	4.49	.510

When Table 9 is examined, it is seen that the arithmetic means of the items vary between 4.37 and 4.61 and the arithmetic mean of the total scale is 4.49. The teachers in the study group had very positive opinions at the level of "strongly agree" about "Video Library of Mathematics Activities with Robots".

Within the scope of the second sub-problem of the research; the results of the analyses of the teachers' opinions about "Video Library of Mathematics Activities with Robots" in terms of various variables (country of residence, gender, age groups and years of training experience) are presented in Table 10, Table 11, Table 12 and Table 13.

Table 10 Analysis of Teachers' Opinions on "Video Library of Mathematics Activities with Robots" According to the Variable of Country of Residence

Country	*N*		Mean Rank	*df*	X^2 (Chi-Square)	*p*	Significant Difference
Turkey (1)	50	4.33	84.13				
Poland (2)	16	4.49	100.00				
Lithuania (3)	53	4.72	118.91	4	11.355	.023*	1–3 (.000)
Romania (4)	52	4.46	112.57				
Latvia (5)	34	4.40	92.74				

When Table 10 is analyzed, it is seen that teachers' opinions about "Video Library of Mathematics Activities with Robots" differ at $p < .05$ level according to the country they live in (X2(4) = 11.355, $p = .023$). When the significant difference between which countries was analyzed, a significant difference emerged between Turkey and Lithuania ($p = .000$) against the teachers living in Turkey. When the arithmetic averages are analyzed, it can be said that teachers living in Lithuania have the most positive views, while teachers living in Turkey have the most negative views compared to other countries.

Table 11 Analysis of Teachers' Opinions on "Video Library of Mathematics Activities with Robots" According to Gender Variable

Gender	*N*		Mean Rank	Sum of Ranks	*U*	*p*
Female	175	4.51	105.92	18536.50	2113.500	.087
Male	30	4.36	85.95	2578.50		

According to Table 11, teachers' opinions about "Video Library of Mathematics Activities with Robots" do not differ significantly according to gender variable. When the arithmetic averages are analyzed, it can be said that female teachers have more positive opinions.

Table 12 Analysis of Teachers' Opinions on "Video Library of Mathematics Activities with Robots" According to Age Group Variables

Ages	*N*		Mean Rank	*df*	X^2 (Chi-Square)	*p*
18–22	17	4.34	91.59			
23–27	37	4.38	87.93			
28–32	45	4.54	99.67			
33–37	38	4.53	107.55	6	7.026	.318
38–42	26	4.47	110.87			
43–47	20	4.50	104.60			
48 and over	22	4.62	125.36			

According to Table 12, teachers' opinions about "Video Library of Mathematics Activities with Robots" do not show a significant difference at $p < .05$ level according to age groups. (X2(6) = 7.026, $p = .318$). When the arithmetic averages are analyzed, it can be said that teachers in the age range of 48 and over have the most positive opinions, while teachers in the age range of 18–22 have the most negative opinions compared to teachers in the other age range.

Table 13 Analysis of Teachers' Opinions on "Video Library of Mathematics Activities with Robots" According to Years of Training Experience Variable

Years of Training Experience	*N*		Mean Rank	*df*	X^2 (Chi-Square)	*p*
Less than one year (0)	23	4.30	81.91	5	7.747	.171
1–5 years (1)	90	4.46	99.79			
6–10 years (2)	35	4.56	105.70			
11–15 years (3)	14	4.67	119.93			
16–20 years (4)	19	4.43	98.84			
21 and over years (5)	24	4.61	124.73			

According to Table 13, teachers' opinions about "Video Library of Mathematics Activities with Robots" do not show significant difference at $p < .05$ level according to years of training experience variable (X2(5) = 7.747, $p = .171$). When the arithmetic averages are analysed, it can be said that teachers with years of training experience in the range of 11–15 years have the most positive views, while teachers with less than one year have the most negative views compared to other teachers. As a matter of fact, in Table 12, it was found that teachers in the 18–22 age range had more negative views than teachers in other age ranges. Considering that teachers with less than one year of training experience are generally between the ages of 18–22; these two results support each other.

Findings Related to Prospective Teachers' Opinions on "Video Library of Mathematics Activities with Robots"

Within the scope of the third sub-problem of the research; arithmetic averages and standard deviations of pre-service teachers' opinions about "Video Library of Mathematics Activities with Robots" are presented in Table 14.

Table 14 Results of the Analyses of the Pre-service Teachers' Opinions on "Video Library of Mathematics Activities with Robots"

Item		$\bar{X}$	Ss
1.	Content of scripts and videos is relevant to its purpose (including target group)	4.42	.682
2.	Scenarios and videos align with the principles of education in general	4.36	.708
3.	Contents of scripts and videos are based on new technologies	4.49	.682
4.	The tasks in the scenarios and videos are directly related to the field of mathematics education for primary school	4.32	.714
5.	Scenarios and videos include tasks to learn or improve math knowledge and skills using robotics	4.49	.660
6.	Scenario and video tasks can be used to reduce students' math anxiety	4.35	.767
7.	Scenarios and videos raise potential teachers' awareness of opportunities to reduce students' math anxiety	4.24	.842
8.	Scenarios and videos promote learning processes with clearly defined purpose	4.40	.706
9.	The tasks and exercises in the scenarios and videos are strategic in terms of lesson planning	4.28	.788

Item	$\bar{X}$	Ss
10. Video scenarios and exercises are suitable for different proficiency levels in the mathematics subject for primary education	4.34	.756
11. Scenarios and videos provide different ways to reduce math anxiety by encouraging active participation	4.37	.721
12. Scenarios and videos provide ways to make learning more fun for all children by using new technologies	4.50	.717
13. Video library offers easy-to-learn robotics applications for teaching math	4.29	.768
14. Contents of scripts and videos are presented in a clear way	4.31	.776
15. The video library offers scripts and videos adapted to the national context	4.24	.804
16. Visual design of scripts and videos is aesthetic and encourages learning	4.38	.786
17. The content of scripts and videos is appropriate, avoiding unnecessary or irrelevant information.	4.35	.730
18. Scenarios and videos are suitable for incorporation into blended learning environments.	4.36	.732
19. Scenarios and videos are suitable for incorporation into flipped classroom strategies.	4.26	.774
20. Scenarios and videos motivate teachers or prospective teachers to explore responses to children's math anxiety by seeking additional information from various sources.	4.26	.744
21. Videos available on the online learning platform can be used as teaching materials	4.37	.734
22. The results of the online projects available on the site inspire the search for new software programs and robotics to improve children's mathematical skills	4.38	.723
TOTAL	4.35	.545

When Table 14 is examined, the arithmetic means of the items vary between 4.24 and 4.50 and the arithmetic mean of the total scale is 4.35. The pre-service teachers in the study group had positive opinions at the level of "strongly agree" about "Video Library of Mathematics Activities with Robots".

Within the scope of the third sub-problem of the research; the results of the analyses related to the examination of pre-service teachers' opinions about "Video Library of Mathematics Activities with Robots" in terms of various variables (country of residence, gender, age groups and the year of study he/she is currently in the PIPP programme) are presented in Table 15, Table 16, Table 17 and Table 18.

Table 15 Analysis of Prospective Teachers' Opinions on "Video Library of Mathematics Activities with Robots" According to the Country of Residence Variable

Country	*N*		Mean Rank	*df*	X^2 (Chi-Squar)	*p*	Significant Difference
Turkey (1)	98	4.23	138.24	4	47.677	.000*	1–2 (.000), 1–3 (.000) 2–3 (.024), 2–4 (.013) 2–5 (.012), 3–4 (.000) 3–5 (.000)
Poland (2)	65	4.50	194.33				
Lithuania (3)	50	4.75	241.84				
Romania (4)	53	4.22	146.50				
Latvia (5)	70	4.22	151.14				

*$p < .05$

When Table 15 is examined, it is seen that pre-service teachers' opinions about "Video Library of Mathematics Activities with Robots" differed at $p < .05$ level according to the country variable (X2(4) = 47.677, $p = .000$). When the significant differences between which countries are analyzed, it is seen that there is a significant difference between Turkey and Poland (p=.000) and Lithuania ($p = .000$) against the pre-service teachers living in Turkey, between Poland and Lithuania ($p = .024$) against the pre-service teachers living in Poland, between Poland and Romania ($p = .013$) and Latvia ($p = .012$) in favor of pre-service teachers living in Poland; between Lithuania and Romania ($p = .000$) and Latvia ($p = .000$) in favor of pre-service teachers living in Lithuania. When the arithmetic averages are analyzed, it can be said that pre-service teachers living in Lithuania have the most positive views, while pre-service teachers living in Romania and Latvia have negative views compared to other countries.

Table 16 Analysis of Pre-service Teachers' Opinions on "Video Library of Mathematics Activities with Robots" According to Gender Variable

Gender	*N*		Mean Rank	Sum of Ranks	*U*	*p*
Female	290	4.34	167.59	48601.50	6406.500	.666
Male	46	4.41	174.23	8014.50		

According to Table 16, pre-service teachers' opinions about "Video Library of Mathematics Activities with Robots" do not differ significantly according to gender variable. When the arithmetic averages are analyzed, it can be said that male pre-service teachers have more positive opinions.

Table 17 Analysis of Prospective Teachers' Opinions about "Video Library of Mathematics Activities with Robots" According to Age Group Variables

Ages	*N*		Mean Rank	*df*	X^2 (Chi-Square)	*p*
18–22	235	4.34	163.10			
23–27	54	4.37	179.41			
28–32	12	4.51	212.54			
33–37	21	4.47	194.40	6	7.611	.268
38–42	9	4.27	150.72			
43–47	4	4.28	141.00			
48 and over	1	3.77	45.50			

According to Table 17, pre-service teachers' opinions about "Video Library of Mathematics Activities with Robots" do not differ significantly at $p < .05$ level according to their age groups (X2(6) = 7.611, $p = .268$). When the arithmetic averages are analyzed, it can be said that pre-service teachers between the ages of 28–32 have the most positive opinions.

Table 18 Analysis of Prospective Teachers' Opinions about "Mathematics Activities with Robots Video Library" According to The Year of Study He/She is Currently in the PIPP Program Variable

The Year of Study He/She is Currently In The PIPP Program	*N*		Mean Rank	*df*	X^2 (Chi-Square)	*p*	Significant Difference
First year (1)	95	4.22	142.92				1–2 (.009)
Second year (2)	101	4.40	179.93		9.245	.026*	1–3 (.017)
Third year (3)	85	4.40	177.18				1–4 (.027)
Fourth and over year (4)	55	4.42	178.29				

According to Table 18, pre-service teachers' opinions about "Video Library of Mathematics Activities with Robots" differ significantly at $p < .05$ level according to the year of study he/she is currently in the PIPP program variable (X2(3) = 9.245, $p = .026$). When the significant difference between the pre-service teachers in the first year and the second year ($p = .009$), the third year ($p = .017$) and the fourth year ($p = .027$) was analyzed, a significant difference emerged against the pre-service teachers in the first year.

Discussion

The results of the study provide valuable insights into the efficacy of the "Video Library of Mathematics Activities with Robots" in alleviating math anxiety among teachers and pre-service teachers across different countries. The results suggest a high level of agreement among participants, reflecting a favorable view of the intervention. Overall, teachers and pre-service teachers from Turkey, Poland, Lithuania, Latvia, and Romania showed divergent views. Notably, Poland, Lithuania, and Latvia demonstrated more positive perceptions compared to Turkey, with statistically significant variations. Participants in the 18–22 age group differ significantly from those in the 28–32, 33–37, and 48 and over age groups. This implies that age plays a role in shaping perceptions, with younger individuals holding distinct views on the video library.

Teachers perception. Regarding country-specific perspectives of teachers, a significant difference is noted between Turkey and Lithuania, with Lithuanian teachers expressing more positive views. This emphasizes the need for a nuanced understanding of cultural and contextual factors influencing perceptions. Despite the absence of significant differences, the arithmetic averages reveal a notable trend. Teachers aged 48 and over exhibit the most positive opinions, while those in the 18–22 age range express more negative views compared to their counterparts. This finding aligns with the notion that experience and maturity may contribute to a more favorable perception of innovative teaching tools. The absence of a significant difference based on years of training experience is noteworthy. However, the analysis of arithmetic averages unveils an interesting pattern. Teachers with 11–15 years of training experience hold the most positive views, while those with less than one year of experience express more negative opinions. Corroborating this, the study reveals that teachers in the 18–22 age range, often corresponding

to less experienced educators, share less positive sentiments. This interplay suggests that both age and experience may contribute to shaping teachers' perceptions.

Pre-service teachers perception. Notably, pre-service teachers in Lithuania exhibit the most positive views, whereas those in Romania and Latvia express comparatively negative opinions. This variation underscores the importance of considering cultural and educational context when implementing educational interventions. It also aligns with the findings which indicate that age groups among pre-service teachers do not significantly impact their opinions, emphasizing that other factors such as cultural context may play a more influential role.

A significant difference emerges, suggesting that pre-service teachers in their first year have distinct opinions, less positive, compared to those in subsequent years. This emphasizes the dynamic nature of perceptions, potentially influenced by evolving pedagogical knowledge and exposure to educational practices throughout the program.

Recommendations

In light of the cross-country analysis on the efficacy of the "Video Library of Mathematics Activities with Robots" and the nuanced perspectives revealed among teachers and pre-service teachers, several recommendations can be proposed. Firstly, educational practitioners and policymakers should consider tailoring the implementation of video libraries to address the distinct needs and preferences of teachers in different countries. Understanding the cultural and contextual factors influencing perceptions, as evidenced by the significant variations in Table 5 and Table 15, is crucial for designing effective interventions. Additionally, efforts should be directed towards providing targeted professional development programs for younger teachers and pre-service teachers, as indicated by the less positive views in Tables 12 and 17. These programs should focus on enhancing their familiarity and comfort with innovative teaching tools, thereby fostering a more positive outlook.

Furthermore, given the interconnected findings regarding age, years of training experience, and program progression, institutions offering teacher education programs, such as the initial teacher training program, should consider integrating technology-enhanced teaching methods throughout the entire curriculum. This can ensure that pre-service teachers, regardless of their program year, are adequately prepared and receptive to incorporating video libraries into their future classrooms. Lastly, continuous research efforts should be undertaken to explore the evolving landscape of educational technology and its impact on mathematics anxiety. Longitudinal studies tracking the changing perspectives of teachers and pre-service teachers over time can provide valuable insights into the sustained efficacy of video libraries and inform ongoing improvements in their design and implementation.

Conclusion

In conclusion, the cross-country analysis of teachers' and pre-service teachers' opinions on the "Video Library of Mathematics Activities with Robots" provides a multifaceted understanding of the factors influencing their perceptions. The overall positive views indicate the potential of such interventions in alleviating math anxiety. However, the significant variations based on country, age, and years of training experience underscore the need for targeted strategies in implementation. The findings emphasize that a one-size-fits-all approach may not be suitable in diverse educational contexts. Instead, a tailored approach that considers cultural nuances, age-related preferences, and experience levels is essential. The recommendations aim to guide educators, policymakers, and researchers in fostering a more inclusive and effective integration of video libraries in mathematics education, ultimately contributing to the ongoing improvement of teaching practices and the reduction of math anxiety among both current and future educators.

Limitations and Future Research

It is crucial to acknowledge the limitations of the study, such as the potential influence of cultural biases and the need for more extensive research to validate the findings. Future studies could explore additional variables and employ diverse methodologies to provide a comprehensive understanding of the relationship between resources like video libraries and math anxiety.

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THE IMPACT OF STUDENTS' MORPHOLOGICAL AWARENESS: SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

In the Latvian education system and society, concerns are growing about students' language competencies, including grammar. The relevance of these problems is also reflected in societal concerns about insufficient grammar skills and a lack of systematicity in the teaching content. Grammar is a system that includes word formation, morphology and syntax. Mastery of the grammatical systems of native languages is one of the most critical conditions for fully developing a child's/scholar's speech and mental abilities; however, it is essential to understand how precisely the comprehension of some regions of grammar influences language usage. Therefore, the research question is – how is "morphological awareness" defined in international literature and what domains of native language use are impacted by it? A systematic literature analysis, with a focus on global perspectives, was conducted to answer this question. The study aimed to clarify the explanation of morphological awareness in international literature (comparing it to what is used in Latvian grammar) and determine its role in using the native language.

A comprehensive review of studies from 2003 to 2024 published in the Scopus database was conducted for this study. The material was selected using the keywords "morphological awareness/competence". Using strict inclusion (articles published between year 2003 and 2024, articles in English) and exclusion criteria (not related to native language acquisition, language not belonging to the Indo-European language family, not focusing on school-aged children, focusing only on students with learning disabilities), 23 articles (from the USA, the UK, Brazil, Portugal, Spain, Switzerland, Canada, Norway, Germany, Netherlands) on morphological awareness were selected. These articles were then meticulously analysed, ensuring a thorough and reliable research process, using thematic analysis, focusing on their primary results and conclusions.

The article summarises the research results on language domains influenced by morphology and explains the use of morphological awareness in foreign scientific literature. The term mentioned in the analysed studies is primarily related to identifying word composition and realising the meanings of morphemes. Analysing studies on students' morphological awareness in several Indo-European language families (English, German, French, Dutch, Portuguese, Spanish, and Norwegian), it is concluded that it significantly affects reading comprehension, writing, vocabulary, and pronunciation. Its importance is particularly significant in languages with deep orthography.

Keywords: *morphological awareness, reading comprehension, orthography, vocabulary, writing.*

Introduction

Current issue: lack of knowledge of grammar

Language understanding and usage are formed both outside formal education and within schools. Schools play a significant role in development; however, the results of state language proficiency exams in Latvian have been mediocre for years. The biggest problems arise with language competence (grammar) assessment tasks. For instance, in diagnostic tests for 6th graders from 2017 to 2022, an average of 54% of students correctly completed grammar tasks (not exceeding 60% in any year) (VISC, 2017–2022).

There is a trend of reducing the emphasis on grammar in the curriculum, transitioning from a grammatical approach to a communicative one. Society has raised concerns that this negatively impacts language quality (Laiveniece & Lauze, 2021). This applies to Latvian grammar and English, as a similar trend has been observed (The Guardian, 2019).

Morphology – an important part of grammar and an essential branch of linguistics

Morphology, which focuses on the word, is the foundation of grammar. It examines the structure of the word, its forms and paradigms, grammatical relationships expressed with word forms, grammatical categories, and morphological groups or parts of speech (Paegle, 2003). Morphology can be considered the basis upon which other knowledge is built; therefore, inadequate mastery of it can lead to problems in overall language usage.

However, it is essential to note that understanding morphology as a branch of linguistics can differ across languages. In modern Latvian linguistics, it is accepted that word structure is studied by the subfield of morphology called morphemics, while word formation is considered an independent branch of linguistics (Kalme & Smiltniece, 2001). Together with syntax and morphology, these fields form the core of grammar. In English, however, morphemics and word formation are considered parts of morphology, meaning that grammar consists only of morphology and syntax (Carlisle, 2003).

State of art

When it comes to researching the significance of morphology, Joanne Carlisle's (Carlisle, 2000) name should be mentioned. A significant focus of her research is the impact of morphology on reading proficiency. Similar research interests and essential contributions in exploring the role of morphology are also made by John Kirby (2012, 2017) and Hélène Deacon (2004, 2011). Their research confirms that morphology plays a significant role in language usage, particularly in reading and writing.

In Latvian linguistics, morphology has been widely researched. In the 21st century, morphology has been studied by researchers such as Daina Nītiņa (2001), Vilma Kalme, Gunta Smiltniece (2001), and Dzintra Paegle (2003).

A notable addition to this body of research is a book, *Latvian Grammar (*Kalnača & Lokmane, 2021*),* written in English, making it accessible to an international audience. It thoroughly examines Latvian grammar and contains detailed section on morphology.

This chapter is precious for linguists and language enthusiasts worldwide who are interested in Latvian morphological aspects.

Dissertations on the topic have also been developed in the last decade. Special attention is given to various verb aspects (Ivulāne, 2015; Deksne, 2021).

Notable works in morphemics include those by Andra Kalnača (2004) and Anna Vulāne (2013a, b). In the field of word formation in the Latvian language, Emīlija Soida (2009) has made significant contributions. This area is also within Anna Vulāne's (2013b) scientific interests. She has studied word formation from a linguistic perspective and from the standpoint of school didactics (Vulāne, 2011).

Since morphological competence is also related to correct pronunciation, it should be noted that linguist Dace Markus has made a notable contribution (Markus, 2013). Moreover, the linguist has researched the development of children's language, which is particularly important in pedagogy (Markus, 2018; Markus & Vulāne, 2015).

Comprehensive attention has been given to Latvian language didactics by Zenta Anspoka (Anspoka, 2008; Anspoka & Tūbele, 2016) for the primary school stage and Diāna Laiveniece (2003) for older students, but there is a lack of interdisciplinary research focused on specific language aspects, such as morphology and its acquisition in schools.

Current study

Although the significance of morphology has been studied, it is essential to know the latest research in this field, not only that related to the English language. The more languages considered, the more comprehensive results are obtained, which can also be applied to the Latvian language. Given the limited interdisciplinary research addressing aspects such as morphology and its acquisition in the Latvian language, such a study is essential.

Considering that, unlike Latvian, word formation is regarded as a component of morphology in many other languages, this distinction will not be made in this article. It will determine how the term "morphological awareness" is interpreted in the analysed articles to conclude from this perspective.

However, the main research question is: What role does morphological awareness have in understanding and using one's native language? This question will serve as a good starting point for further exploration of students' morphological competence development.

Methodology

A systematic literature review was conducted to achieve this study's goal. In this review, database searches were carried out in line with a systematic review approach (Grant & Booth, 2009).

The articles were selected in the *Scopus* database using the keywords "Morphological awareness and competence." The Scopus database is indexed and offers access to various journals. Since the term "morphology" is also relevant to other scientific fields, articles were searched within the subject area of "Social sciences."

Table 1 Article selection

Criteria		Justification	Number of articles
inclusion	**Scopus** database, keywords: morphological competence and/or awareness	Indexed database and offers access to a wide range of journals	1052 ↓
	Articles published between 2003 and 2024.	The chosen period is a broad timeframe, allowing for a comprehensive overview of recent and older studies.	274 ↓
	Articles in English.	To avoid misinterpretation.	
	Open access articles.	To access and read the entire article.	
exclusion	It is not related to language morphology.	The term "morphology" is relevant to other scientific fields as well.	86 (reading titles) ↓ 23 (reading abstract or full text)
	It is not related to native language acquisition.	Many studies (Yuan & Tang, 2023; Matwangsaeng & Sukying, 2023, etc.) examine morphology's role in foreign language acquisition, highlighting its heightened importance in second language learning. However, given the author's specific interest in native language development, criteria for exclusion were implemented accordingly.	
	Language not belonging to the Indo-European language family.	Since Latvian (the focus of the author's interest) belongs to the Indo-European language family, related languages were selected.	
	Not focusing on school-aged children.	The author's research interest lies in school-aged children and educational didactics.	
	Only focusing on students with learning disabilities (e.g., dyslexia).	The approach to teaching and material perception differs for children with learning disabilities. This review aims to demonstrate the general pattern.	

Using the inclusion criteria, the search resulted in 274 articles. A qualitative review of all abstracts was further performed to narrow down the most relevant material for analysis, and exclusion criteria were developed. Using this selection process, initially, by only reading the titles of the articles, 86 articles were selected. After reading the abstract or the entire article, 23 articles were chosen for this study. All criteria, their rationale for development and a sequential overview of article selection can be found in Table 1.

After selection, articles were organised in a table, focusing on the purpose, definition of morphological awareness, analysed language, type of study, age of participants, and main results and conclusions. All the articles were analysed using thematic analysis, as themes were identified within them to evaluate the role of morphological awareness.

The selected articles primarily focused on English language morphology (14), with additional research conducted on the German language (3), Portuguese (2), as well as French, Dutch, Spanish, Norwegian, and Danish. Most of the studies were quantitative (17), utilising regression analysis to determine the correlation of morphological

awareness with various language usage domains. Six articles were qualitative studies involving literature analysis. In the quantitative studies, the total number of participants was 3741. The age range of participants was from 5 to 19 years old (from preschool to the end of secondary school), with 2749 participants aged 9 to 11 years old, indicating that this age group is studied the most in the context of morphological acquisition.

Results

Firstly, it was clarified that in all the selected articles, "morphological awareness" was defined as the ability to recognise, understand, and use morphemes to understand or create words (Apel, 2014), indicating that morphemics, morphology, and word formation are not differentiated.

Following a thorough analysis of the articles, four themes related to the impact of morphological awareness were identified: reading (16 articles), writing (8 articles), vocabulary (5 articles), and pronunciation (2 articles). Following a thorough analysis of the articles, four themes related to the impact of morphological awareness were identified: reading (16 articles), writing (8 articles), vocabulary (5 articles), and pronunciation (2 articles).

Reading

The role of morphological awareness in reading was most extensively studied. The term "reading" encompasses reading comprehension (7 articles), literacy skills (3 articles), word reading accuracy and fluency (4 articles), and reading ability (2 articles).

Studies involving students of various ages demonstrate that morphological awareness significantly influences reading proficiency. Particularly crucial is the age range from 6 to 13 years old, although a positive impact is observed across all age groups (Lázaro et al., 2015; Carlisle, 2003; Haase & Steinbrink, 2022; Görgen et al., 2021; Levesque et al., 2019; McCutchen et al., 2014; James et al., 2021; Tong et al., 2014). Additionally, morphological learning most prominently enhances students' reading proficiency, initially performing at lower levels (Bowers et al., 2010).

In early childhood – in preschool and elementary school – morphological awareness aids in learning to read based on well-developed oral language skills. Morphological awareness significantly predicts word reading accuracy and speed, pseudoword reading accuracy, text reading speed, and reading comprehension (Kirby et al., 2012). Joanna Carlisle (2003) initially points out that morphological knowledge is often perceived as self-evident, as most children seem capable of expressing themselves clearly and accurately. Therefore, mastery of grammar and morphology is not an instructional goal. Additionally, a belief exists that a common but perhaps mistaken view is that derivations are too complex for children or are not crucial for children's literacy development until middle school. As the researcher indicates, an understanding of morphemes helps to grasp words as a whole and pronounce them correctly, and attention should be paid to them from an early age (Carlisle, 2003).

Meanwhile, other studies indicate that the role of morphological understanding in developing reading skills changes as students grow older. Reading instruction in the early years (preschool and primary school) promotes morphological understanding, whereas, in later years, the opposite process is observed – morphological understanding helps better comprehend the text (Inoue et al., 2023; Lee et al., 2023; Hasan et al., 2022, Kristensen et al., 2023) because the ability to recognise morphemes in words is directly linked to understanding the meaning of the word.

One of the essential aspects of word comprehension is the ability to determine its prime word (the original word from which the given word was derived), which is a significant component of morphological understanding. A study on the Portuguese language indicates that this ability was observed in children around the age of 9; younger children typically couldn't determine the prime word in most cases. Determining the prime word and recognising morphemes also play a significant role in spelling (Rosa & Nunes, 2008).

To summarise, morphological awareness greatly influences reading proficiency across various age groups, with its significance evolving throughout schooling. Early education emphasises its role in reading acquisition, while later years highlight its importance in comprehension and spelling skills, underscoring its pivotal role in literacy development.

Writing

It is natural for reading to be closely linked to writing, so knowledge of morphology also influences writing skills. The impact of morphological awareness on writing skills has been described in 8 articles. This is particularly important in languages with deep orthography, such as English (Carlisle, 2003; Lee et al., 2023; Kristensen et al., 2023). In languages with shallow orthography (such as German), morphological understanding plays a more significant role in primary school, starting around the 4th grade, when more complex words are used (Weiss et al., 2010; Haase & Steinbrink, 2022). This supports the idea that individuals gain more experience with literacy, and their morphological awareness becomes increasingly important. This heightened awareness becomes crucial once they have mastered the connections between phonemes (individual sound units) and graphemes (written symbols) in a language. When a person reaches a level where correct spelling depends on understanding larger written language units, such as morphemes, their morphological awareness becomes a key factor. This implies that a deeper understanding of the structure and meaning of words, beyond individual sounds and letters, is essential for accurate spelling (Görgen et al., 2021).

The results of the experimental study confirmed that intensive morphological instruction positively impacted the spelling abilities of 9–10-year-old children in English. The most significant improvement was demonstrated by those students who initially had poorer spelling results (McCutchen et al., 2014). The same is confirmed by a study involving high school students, where the instruction length was 2–3 weeks (Weiss et al., 2010).

This indicates that knowledge of morphemes enhances understanding of word spelling (as with reading). A similar result was also described in a study on the French language. Children of the same age were involved in the study, and after using appropriate morphological methodology, students' spelling performance significantly improved. Notably, the acquired knowledge enabled students to use it in new situations as well. Specifically, the words used in the learning process were spelt correctly, and morphemes were also recognised in other, less familiar words, facilitating their accurate transcription (Ardanouy et al., 2023). In all the mentioned studies, students successfully used the learned morphemes in word creation, which is crucial for expanding vocabulary.

Morphological knowledge significantly influences writing skills, particularly in English with deep orthography. In primary school, understanding morphemes becomes more crucial as complexity increases, aiding spelling accuracy. Intensive instruction enhances spelling abilities, especially for students initially struggling with spelling. This understanding also aids word creation and vocabulary expansion.

Vocabulary

As mentioned, vocabulary is tightly connected with reading comprehension, word derivation, and creation. This is why vocabulary expansion is another aspect where morphological understanding plays a significant role.

Five articles discuss the relationship between vocabulary and morphological understanding. Morphological understanding helps in forming words and incorporating them into one's lexicon (McCutchen et al., 2014; Spencer et al., 2015; Kristensen et al., 2023; Inoue et al., 2023; Zhang et al., 2023). Students' morphological understanding is reflected in their precision in formulating thoughts using words with corresponding affixes (Spencer et al., 2015).

Similarly to the results of the previously described studies, the significance of morphological understanding regarding vocabulary also changes with students' age. The correlation between morphological understanding and vocabulary is lower in the younger grades. The older the child, the more morphological understanding and awareness influence vocabulary (Zhang et al., 2023).

The presence of morphological awareness as an additional dimension of vocabulary comprehension suggests that effective morphological teaching and intervention could directly impact vocabulary growth. Consequently, comprehensive vocabulary instruction should encompass a morphological element (Spencer et al., 2015).

So, students, ability to formulate thoughts accurately with corresponding affixes reflects their morphological understanding, emphasising its importance in vocabulary development across different age groups.

Pronunciation

It is not easy to separate the term *pronunciation* from the *word reading accuracy*, but morphology affects how the word is pronounced. This aspect of morphological awareness has been pointed out in two reviewed articles (Lee et al., 2023; Kristensen et al., 2023).

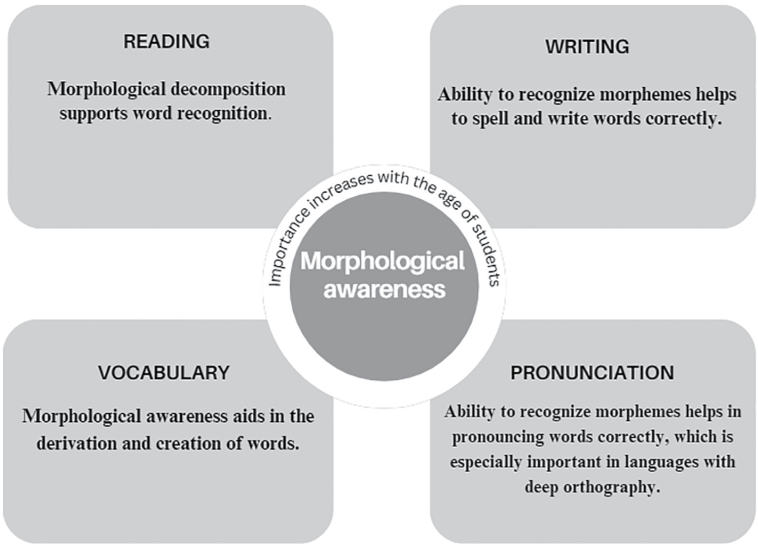

Figure 1 Domains impacted by morphological awareness

Languages featuring morphophonological writing systems prioritise conveying morphological information over phonological details. Consequently, in such writing systems, knowing phoneme-grapheme correspondences is often insufficient; instead, morphological awareness becomes crucial. English serves as an illustration of a morphophonological writing system. For instance, the word "react" is pronounced as re-act /riækt/, where the morphological structure is maintained rather than interpreting "ea" as a vowel team and pronouncing it as /ri:kt/ (Lee et al., 2023). This example demonstrates how morphemes can affect pronunciation.

The fact that morphological decoding (the decoding process involves breaking down words into their constituent morphemes) can enhance word reading accuracy is also concluded in the study on Norwegian (Kristensen et al., 2023).

Morphology plays a crucial role in pronunciation. In English, where morphological structures influence pronunciation, morphological decoding can significantly improve word reading accuracy.

The identified themes within the articles in which morphological awareness is significant, and the main results of this review are depicted in Figure 1.

Discussion

The analysis revealed that the definition of morphological awareness, as used in the analysed articles, differs from that of Latvian grammar. Parts of speech, grammatical categories, and their paradigms (which are highly significant and complex components of Latvian morphology, as it is a fusional language with diverse grammatical inflections) are not examined in this study, as the focus of the research, as reflected in

selected articles, is on recognising, understanding and using morphemes to understand or create words. As mentioned, word composition is viewed in morphemics as a subfield of morphology, whereas word formation in Latvian linguistics is an independent field of linguistics. However, this also has significant importance in learning, as understanding word composition is closely related to parts of speech, which are fundamental to Latvian morphology (Paegle, 2003).

The most analysed language was English, and it is considered an orthographically deep language, where there is a weaker correspondence between the sounds of a language and its written symbols. Consequently, much greater attention is paid to spelling, which is less relevant in Latvian because its correspondence between letters and sounds is much more pronounced. Considering this conceptual difference, this study cannot be attributed to morphology but only to its part from the perspective of the Latvian language. This indicates that it is necessary to explore literature further, paying particular attention to languages more closely related to Latvian or the most closely associated – Lithuanian language, the grammar of which could be more similar.

Summarising the results, two relatively contradictory observations emerge. On the one hand, studies indicate that morphological understanding in early childhood aids in acquiring reading and writing skills (Carlisle, 2003). On the other hand, a substantial amount of convincing research shows that morphological understanding increases with children's age when students consciously begin to recognise and use morphemes. In a study involving elementary and middle school students, the older children demonstrated the best results after morphology lessons (Weiss et al., 2010). This could be a topic for discussion on whether it is essential to learn morphology intensively in primary school or if it could be more effective at the middle school stage. Because positive effects are evident across all age groups, neglecting the significance of morphology instruction would be imprudent. It is also significant that in several experimental studies (Bowers et al., 2010; McCutchen et al., 2014), it was proven that morphology acquisition provides the most positive effect for students with lower academic achievements in reading and writing. This provides evidence that despite morphology often being considered complex, a formal language component with little relevance to practical language use, structured and consistent morphological instruction greatly supports language learning for children who find it more challenging.

However, it is essential to consider that morphology training courses described in the analysed articles were explicitly developed for research purposes, with methods differing from the approach commonly used in schools. Therefore, the question becomes relevant: How can a morphology learning methodology model be created to integrate into everyday school practices easily? Evidence indicates that teaching morphology is more effective when integrated with other aspects of literacy instruction (Bowers et al., 2010) and when utilised consistently (Hendrix & Griffin, 2017). It is also essential to understand that most experimental studies lasted less than ten weeks (Bowers et al., 2010; Weiss et al., 2010), a relatively short and intensive learning period. Despite this, they still yielded positive results: students were better able to recognise morphemes, use them in

forming new words, and better understand or infer the meaning of unfamiliar words by understanding the meaning of morphemes. This indicates that it is worth occasionally focusing more intensively on morphological issues within the integrated teaching model. Therefore, a combined teaching model could yield the best results. Since phonetics, syntax, and lexicology are the fields most closely related to morphology (Kalme & Smiltniece, 2001), it would be natural to address morphological issues when discussing these topics. Additionally, separate, more intensive lessons should be dedicated to studying and reinforcing previously acquired knowledge of morphology.

Conclusions

It can be concluded that morphological awareness plays a significant role in reading, as morphological decomposition supports word recognition. It is also crucial in writing, as recognising morphemes helps with correct spelling and word formation, thereby expanding vocabulary and aiding in the derivation and creation of new words. Furthermore, recognising morphemes contributes to accurate pronunciation, particularly in languages with deep orthography. As students grow older, the importance of morphological awareness increases due to the growing complexity of language use and the greater need for accurate morpheme usage.

Even though the term "morphological awareness" does not align precisely with the traditional divisions of linguistic fields in Latvian, its significance in acquiring the Latvian language remains undiminished. It should be noted that Latvian features a relatively grapheme-sound solid correspondence, which allows learners to benefit from straightforward decoding processes during the early stages of literacy development. However, as students progress, the language's rich inflectional morphology demands a deeper understanding of word structure. This understanding is crucial for both comprehending and constructing words in Latvian. Developing morphological awareness is essential for mastering advanced literacy skills, particularly writing and comprehension. Recognising the meanings of individual morphemes enables learners to decode unfamiliar words and grasp more complex language concepts, enhancing their overall language proficiency.

Based on the results, morphology should be integrated into the educational process from the early stages of primary school, with increasing intensity and systematic continuation as students grow older and the importance of morphological awareness becomes more pronounced. However, as previously mentioned, additional research is required to determine the most effective age and scope for morphology instruction.

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COMPARING THE DIFFICULTY OF TEXTS USED IN LATVIAN AND HUNGARIAN SCHOOL-LEAVING EXAMINATIONS IN ENGLISH AS A FOREIGN LANGUAGE

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ABSTRACT

Examinations in public education are supposed to guarantee that students' performances are measured using the same standards from exam period to exam period. One important element of guaranteeing the same standards is the use of materials that present the same degree of challenge to candidates in different examinations. In the assessment of foreign language proficiency, such materials primarily include target language texts.

This study offers a comparative analysis of the difficulty of texts used in the reading comprehension section of the school-leaving examinations of the past five years in English as a foreign language in Latvia, along with a comparative analysis of texts used for a similar purpose in Hungary in the same time period. The study examines how stable the difficulty of texts has been across the years, with special regard to the recent changes in the structure of the Latvian exam, along with a comparison of text difficulties and intended exam levels across the two countries. Text difficulty is examined in light of the Coh-Metrix Common Core Text Ease and Readability Assessor (TERA) measures, and similarities and differences are measured by means of applying statistical tests for significant differences. Findings indicate that text clusters from exams targeting the same level showed no significant differences in text difficulty measures; however, in the majority of cases, text clusters from exams targeting different levels showed no significant differences in text difficulty measures either. Thus, further research is needed in order to establish whether the required differences in difficulty were appropriately present in terms of the tasks to be performed by candidates.

Keywords: *school-leaving exam, language assessment, text difficulty, foreign language education, maintaining standards.*

Background

Assessment of learning outcomes is considered to be a critical element of measuring not only of learner achievement, but also of the effectiveness of educational systems.

Consequently, school-leaving exams have a particularly important role in feeding back to both learners and educational decision makers. Considering the importance attributed to foreign language education, school-leaving examinations testing language proficiency are of particular significance these days. It follows from this that guaranteeing the standards of such examinations is also of paramount importance. This is all the more so, as most such examinations tend to identify the level(s) they measure in relation to the Common European Framework of Reference (Council of Europe, 2001), and, more recently, to its Companion Volume (Council of Europe, 2020). Accordingly, comparability is a significant concern, and the most important issue appears to be whether examinations are successfully aligned with the CEFR levels (cf. Harsch & Hartig, 2015; Martyniuk, 2010). While detailed guidelines concerning the procedures of alignment have been available for some fifteen years in the form of the Manual for Relating Examinations to the CEFR (Council of Europe, 2009), doubts about how much exams supposedly aligned with the CEFR are actually comparable have not been dispelled entirely (e.g., Vinther, 2013). Moreover, it has also been argued that the actual alignment may well be the function of local interpretations of CEFR descriptors (e.g., Brunfaut & Harding, 2019).

In light of the above, it appears to be necessary to identify aspects of examinations which make it possible to compare exams across different exam periods as well as, potentially, across different contexts and educational systems. One such aspect that seems readily available is the difficulty of the target language texts that students are expected to understand in tests of comprehension.

Text difficulty in reading comprehension tests

When constructing tests of reading comprehension, it is essential to select texts which meet criteria established in accordance with the requirements of the specific context of assessment. Among many others, one such criterion is the appropriate level of the text. Indeed, text level may well be among the most important properties of a text used in an assessment task. Yet, when taking a closer look, it becomes clear that defining what exactly the term "level" means in this context can be quite challenging. Generally, the concept of text level tends to be first and foremost interpreted as a measure of how easy or difficult it is to understand what the text means. Meaning, nevertheless, is a concept not as straightforward as one may assume. It could be argued, for instance, that, instead of having meaning as such, texts merely have meaning potential (Halliday, 1978). In other words, any text will offer potentially different interpretations, and the actual meaning is rather a function of the reader than of the text itself. As Alderson points out, readers' knowledge and experiences influence how meaning potential is realized, and as their knowledge and experiences differ, so do the interpretations of a text (Alderson, 2000, p. 6). Accordingly, if interpretations differ, so do the elements of what may make the text easy or difficult to understand. Thus, one may claim text level as such does not exist; texts simply have specific characteristics. Though this may seem quite an extreme conclusion, it amply demonstrates the potential difficulties of determining the level of a text. Apart from reader involvement, however, there is another reason why text level

may be problematic to determine: it is possible to understand texts at different levels depending on how much detail or what degree of interpretation is called for. Indeed, approaching the concept of text difficulty in this way is justified by the fact that CEFR descriptors often make a difference between different levels based on whether it is only the main points or also the supporting details that are understood. Moreover, at higher levels, it is expected that readers should be able to understand implicit messages as well. (cf. Council of Europe, 2001).

In light of the above, it seems safe to claim that the concept of text level is interpreted in different ways. Despite these theoretical discrepancies, however, numerous attempts have been made to quantify text difficulty in a way that results in the production of some measure which could express difficulty and, in turn, text level. Predominantly, these measures have been readability indices. Arguably, the Flesch Reading Ease and the Flesch-Kincaid Grade Level indices are the best known such readability measures. Both of these indices are grounded on a relationship hypothesized to exist between the number of words, the number of sentences and the number of syllables (Klare, 1974–1975). While these measures have been used widely, several scholars (e.g., Alderson, 2000; Brown, 1998) have criticized them for being too simplistic, particularly in a second language context.

In response to the perceived inadequacy of traditional measures, more complex indices have also been developed. One notable example of the more modern and more elaborate measures is the Coh-Metrix readability formula (Graesser, McNamara, & Kulikowich, 2011; McNamara et al., 2014). Coh-Metrix provides a description of text characteristics in light of 53 measures. Of course, such an immense number of characteristics could potentially make it problematic to interpret the figures in a practical manner. In order to solve this problem, principle component analysis has been applied, the purpose of which was to reduce the number of measures to eight principal components: narrativity, referential cohesion, syntactic simplicity, word concreteness, causal cohesion, verb cohesion, logical cohesion, and temporal cohesion. Next the eight principal components were mapped to a five-level theoretical model presented by Graesser and McNamara (2011): Genre (narrativity), Situation model (causal cohesion, verb cohesion, logical cohesion, and temporal cohesion), Textbase (referential cohesion), Syntax (syntactic simplicity), and Words (word concreteness). As a result, the original Coh-Metrix measures can now be expressed along the five dimensions of the model, making the interpretation of the results simpler and more transparent.

As Coh-Metrix provides a combination of numerous facets of text difficulty, it appears to be a suitable tool for establishing the level of various texts in a multitude of different contexts. Accordingly, in the following Coh-Metrix measures will be used in comparative analyses in order to determine whether there are differences in the levels of a set of texts under scrutiny. The texts came from the reading comprehension sections of the school leaving examinations in English as a foreign language in Latvia and Hungary between 2019 and 2023.

Methodology

The focus of the study was to examine to what extent texts used in examinations targeting the same level were similar in terms of difficulty, but also to study whether examinations geared toward different levels used texts that differed significantly in terms of difficulty. Thus, on the one hand, the purpose was to check whether examination targeting the same level used texts of the same difficulty in a consistent manner and, on the other hand, whether the texts used in the Latvian and the Hungarian contexts showed any significant differences. In order to do so, texts were first collected from publicly available past exam papers from the reading comprehension sections of the school leaving examinations in English as a foreign language in Latvia and Hungary between 2019 and 2023.

It is worth noting here that the two countries' examination systems differ. In Latvia, up to 2021 only one exam was offered per exam period, although these examinations were designed to cover three levels, CEFR B1, B2, and C1 ("General secondary education in Latvia," 2020). From 2022, however, a new system was introduced in which students can either take the "optimal" level exam, targeting CEFR B2, or the "advanced" level exam, geared toward CEFR C1 ("Svešvaloda [angļu, franču, vācu, krievu] augstākais mācību satura apguves līmenis," 2024). In contrast to this, in the Hungarian system, which remained unchanged during the period under scrutiny, students could choose between the "intermediate" level exam, targeting CEFR B1 and the "advanced" level exam geared toward CEFR B2 ("Élő idegen nyelv," 2021). In order to guarantee representativeness, texts from all levels and exam types have been used in the analysis.

One more issue to be clarified about the texts themselves is related to the task types. In some cases texts were presented in the tasks in their complete form (e.g., in the case of multiple choice tasks), while in other cases they were not. In the latter case (e.g., in gap-filing tasks) before analysis the texts were reconstructed to have their original, complete form. The reason for this was to guarantee that texts are comparable across task types. In some cases tasks included multiple unrelated texts. Whenever this happened, these unrelated texts were analyzed as separate texts. In the course of the analysis a total number of 82 texts were analyzed, 42 of which came from Latvian, while 40 from Hungarian exams.

In conducting the study, texts were analyzed using the *Coh-Metrix Common Core Text Ease and Readability Assessor* (Jackson, Allen, & McNamara, 2017), also known as TERA. It is accessible as a web tool available online (https://soletlab.adaptiveliteracy.com:8443/). This web tool provides the following measures related to text difficulty and readability:

- narrativity
- syntactic simplicity
- word concreteness
- referential cohesion
- deep cohesion.

The results are expressed in percentile figures. A sample TERA output is presented in Figure 1.

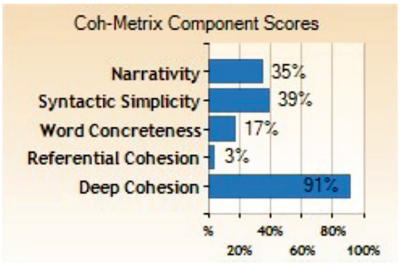

Figure 1 Sample TERA output

Narrativity is to be interpreted as a continuum stretching between texts whose nature is highly narrative, and which are thus thought to be easier to process, and informational texts, which present a higher degree of difficulty in understanding. Narrative texts are made up of a high proportion of high frequency words including easy-to-understand verbs as well as pronouns that make texts more engaging for readers (Jackson et al., 2017, p. 55)

Syntactic simplicity is the reflection of sentence complexity observable in the text. This index is derived from several measures of syntactic complexity, which include the number of clauses and the number of words in a sentence, along with the number of words before the main clause. The measure also accounts for the potentially observable similarities in sentence construction across paragraphs (Jackson et al., 2017, p. 56).

Word concreteness is defined as the proportion of abstract and concrete words included in the text. Abstract words are considered to make comprehension more difficult; consequently, a text in which the proportion of concrete words is large is believed to pose less of a challenge and is thus easier to understand (Jackson et al., 2017, p. 57).

Referential cohesion is characterized by the potential occurrence of overlaps between words, word stems and concepts from one sentence to the next. A high proportion of overlaps is considered to be an indicator of the text being easier to comprehend (Jackson et al., 2017, p. 57).

Deep cohesion is defined in terms of the number of connectives in the text, representing how much the events described or the variety of bits of information presented in the text are tied together. A high number of connectives is interpreted as an indication of stronger links, which make comprehension easier (Jackson et al., 2017, p. 58).

Once the measures above were obtained for all texts, statistical checks for significant differences across the texts were performed. On the one hand, it was examined whether the texts used in the same exam showed any significant differences both at the level of the TERA component scores and at the level of the composite of TERA measures. The rationale for the latter procedure was that, as all the component readability measures discussed earlier feed into the same construct, they may legitimately be considered as different facets of the same property of a text (i.e., difficulty). Thus, all the indices can be treated as scores. It needs to be noted, however, that these scores can only be conceptualized as defining an ordinal rather than an interval scale.

On the other hand, and perhaps more importantly, it was checked whether the texts used in different exams showed any significant differences. In order to detect significant differences, depending on the number of variables to be compared, independent samples Kruskal-Wallis tests or Mann-Whitney's U tests were run.

At this point it is important to clarify that, although the focus was on the levels of texts, this study did not intend to map Coh-Metrix scores on the CEFR or vice versa. Though references are made in the discussion to how TERA measures may be explained in terms of CEFR descriptors, this is only done in a tentative manner. The reason for this is that Coh-Metrix produces quantitative measures, while CEFR descriptors are qualitative in nature. In other words, they approach the concept of difficulty from different perspectives: Coh-Metrix focuses on objectively measurable text properties, while the CEFR descriptors attempt to capture what learners can do at particular levels. Accordingly, the purpose of the study is rather to examine the texts that have most probably been chosen with CEFR levels in mind using a variety of objective measures of text difficulty to see how they compare.

Results

In discussing the results of the study, first the comparison of TERA component scores within exams will be presented.

Figure 2 presents the measures for *Narrativity* in the Latvian exams. The size of the bars indicates the values of *Narrativity* in the individual texts. Exam tasks are marked with a number from 1 to 3. Letters refer to different texts found within the same exam task. The color coding identifies the different exam versions. Exam versions between 2019 and 2021 are marked with the indication of the years, while exams in 2022 and 2023 are also marked A ("advanced") and O ("optimal") according to level. As can be observed, actual measures varied greatly across the texts examined both within and across exam versions.

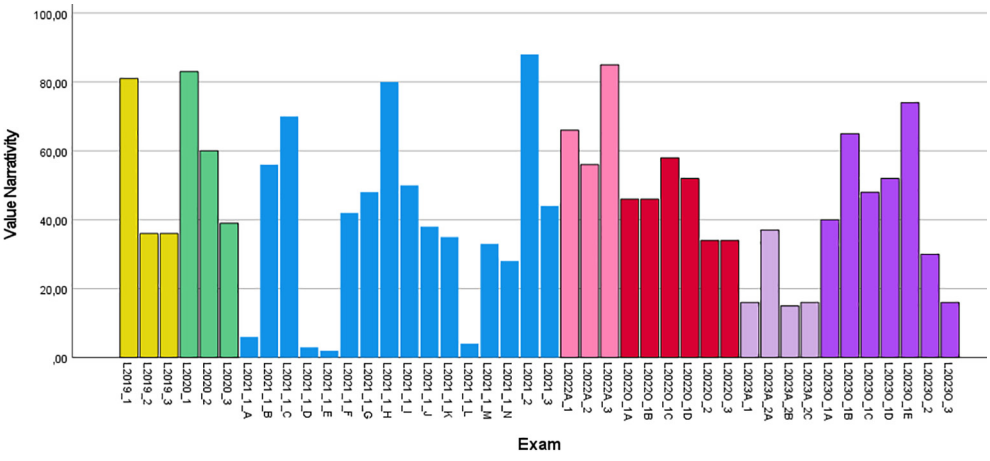

Figure 2 Narrativity measures in Latvian exams

This should come as no surprise, on the one hand, as texts in an exam are meant to be varied in terms of how story-like they are. The analysis also revealed, however, that, when different exam versions were compared, there were no significant differences across them, regardless of what level they were targeting.

Interestingly, a similar pattern can be observed in terms of the other TERA components as well. Individual texts varied a great deal in terms of the values of TERA measures, but these differences were not statistically significant. Next it was examined whether any significant differences can be observed when comparing the three different exam types, i.e., the old exam, targeting three levels, and the two new exams focusing on one specified level each.

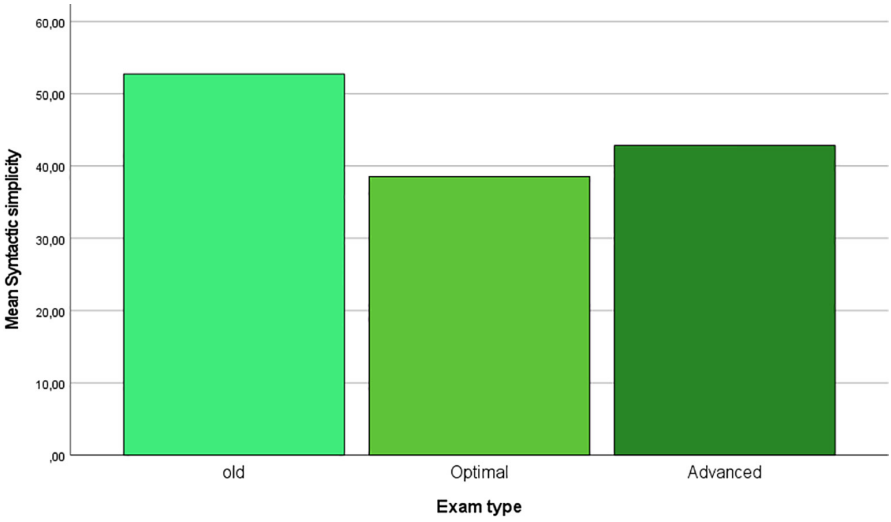

Figure 3 Mean Syntactic simplicity measures for Latvian exams by exam type

Figure 3 provides an illustration to examining TERA component measures according to exam types. In Figure 3 mean measures for *Syntactic simplicity* are presented across the three Latvian exam types. As can be observed, the three exam types appear to be different, although these differences do not seem to mirror the intended levels of difficulty. More importantly, however, these apparent differences were not statistically significant. Once again, a similar phenomenon could be observed in the case of the rest of the TERA components, too. While measures varied somewhat across the exam types, they were not found to be significantly different.

Concerning the Hungarian examinations and the texts therein, a similar tendency could be observed. Texts tended to be varied with respect to the TERA component measures, but they were not significantly different. One noteworthy exception is presented in Figure 4.

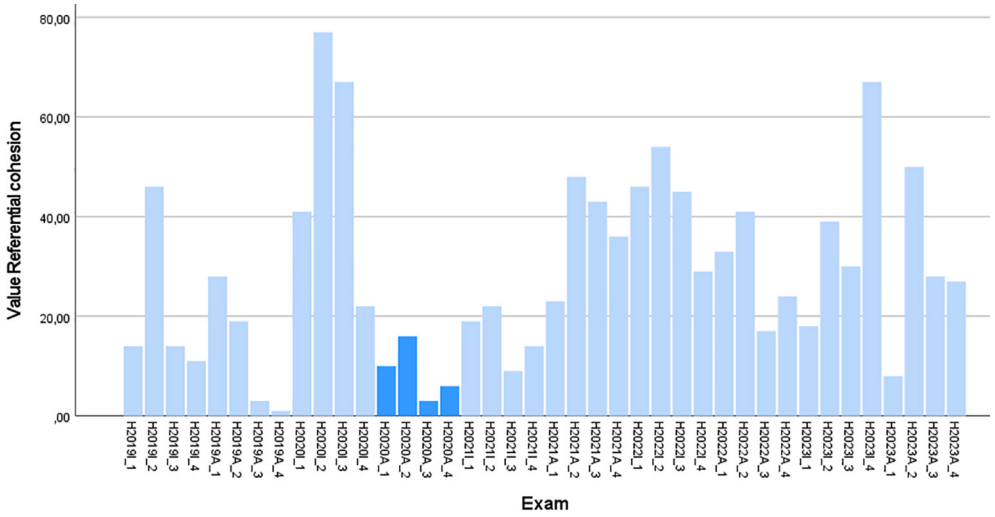

Figure 4 Referential cohesion measures in Hungarian exams

In the case of this measure texts, again, show considerable variation, and the differences in this case are close to being significant ($p = 0.011$), mainly owing to the texts used in the 2020 advanced level exam, highlighted in Figure 4, showing an apparent consistency in a low level of referential cohesion. Yet, at the level of exam types, the difference, again, is not significant.

As to the comparison of exam types in general, similarly to the Latvian exams, TERA measures tended to show no significant differences between the two types of exams. Again, there is a case of a nearly significant difference as presented in Figure 5.

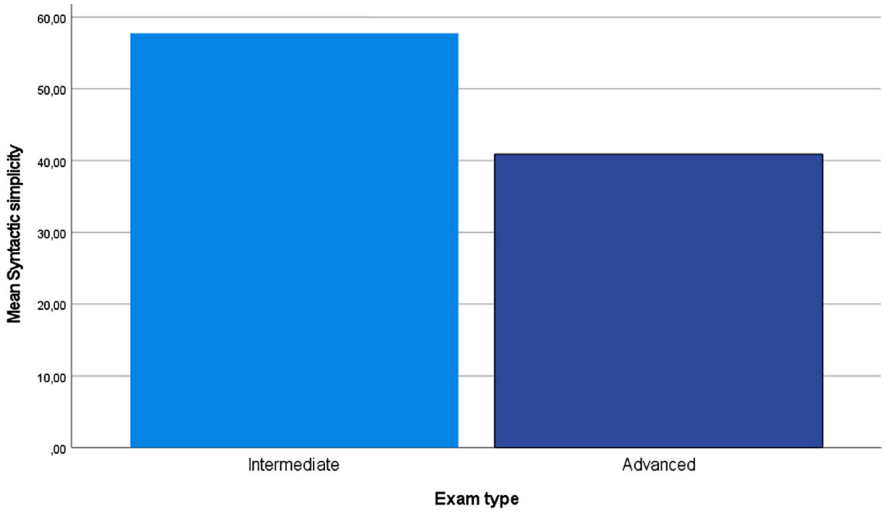

Figure 5 Mean Syntactic simplicity measures for Hungarian exams by exam type

In this case the difference in Syntactic simplicity measures is apparent, and is, indeed, close to being statistically significant ($p = 0.014$).

Finally, it was examined whether the TERA measures used as facets of a composite readability measure can be shown to be different across examinations. Initially, it was checked whether a difference can be detected between all the texts used in the examinations of two countries. Figure 6 presents the comparison in a graphical way.

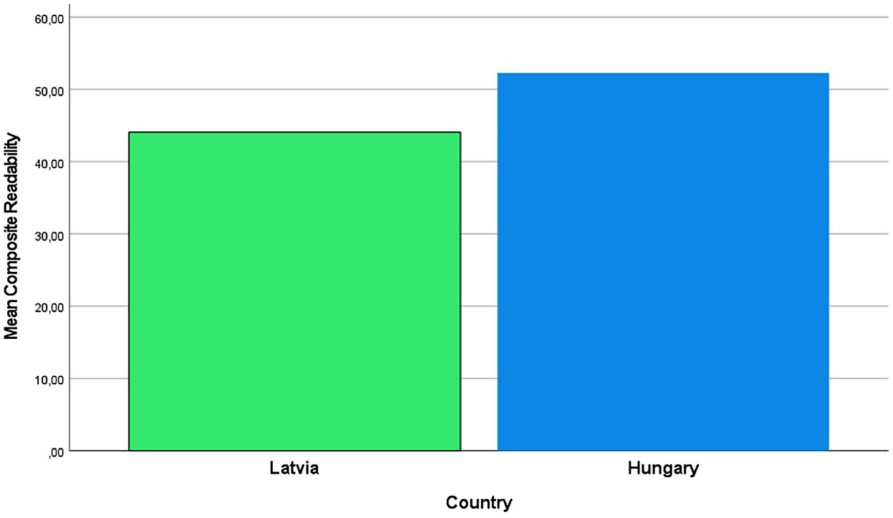

Figure 6 Mean composite readability figures of all texts in Latvia and Hungary

As can be observed, the composite readability of the texts used in Hungarian exams appears to be notably higher. Indeed, this difference was found to be statistically significant ($p = 0.002$). While this is an interesting finding, it should not be surprising, considering the fact that some of the texts in the Latvian exams were meant to be used in tasks targeting level C1, while no tasks meant to target this level in the Hungarian exams. Similarly, while half of all texts in the Hungarian exams were meant to be used in tasks targeting level B1, there was only a small minority of such texts in the Latvian exams. Thus, the overall difference being significant should hardly be unexpected. But such overall comparisons may mask all sorts of differences. It is perhaps more intriguing to compare the level-specific exams in both countries in terms of the overall readability measures. This comparison is presented in a graphical format in Figure 7.

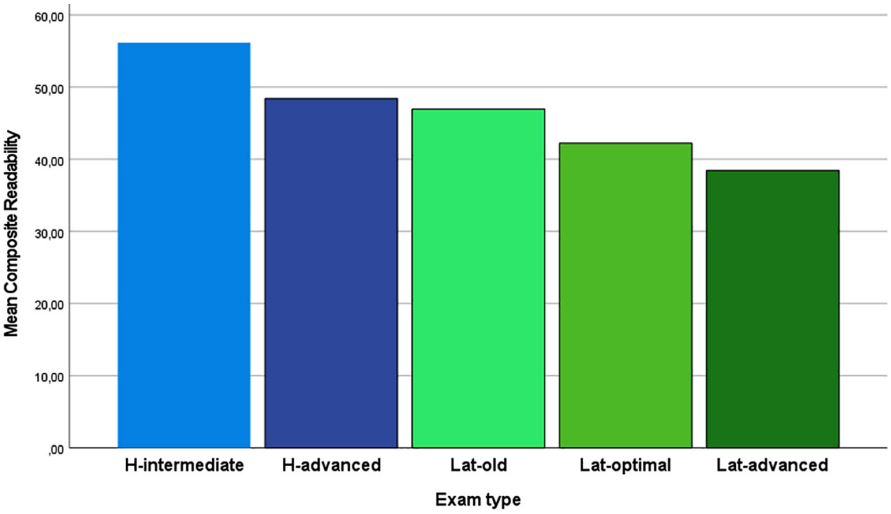

Figure 7 Mean composite readability figures of all texts by exam type

The composite readability figures appear to show a neat progression from the exam declared to target the lowest level (B1) to the one aiming at the highest level (C1). This impression may be somewhat deceptive, however, considering the fact that the "old" Latvian exam was meant to target three levels, and that the Hungarian "advanced" level exam is geared toward the same level (B2) as the Latvian "optimal" level exam. Nevertheless, more important than impression are the checks for statical significance of differences. As the results reveal, the composite readability of texts used in the Hungarian "intermediate" exams is significantly different from those in the Latvian "optimal" and "advanced" level exams ($p < 0.001$ in both cases), and the difference is nearly significant in the case of the "old" Latvian exam ($p = 0.016$). On the other hand, no other differences are significant, which raises interesting questions about the level of texts used in exams meant to target different levels.

Discussion

In light of the results, it is safe to make a few observations concerning the level of the texts used. First, it seems clear that the different versions of the exams have proven to be quite similar in terms of the various TERA measures, and thus in terms of the difficulty of the texts used. This is so even if the measures of the actual TERA components fluctuated considerably. Indeed, it seems this fluctuation should rather be interpreted as an indication of the variety found in the texts, which is often seen as a way to provide a sufficiently varied sampling of the targeted construct. The lack of significant differences is certainly a positive feature here, as it demonstrates that at least one element of the ways in which the consistency of exam levels can be guaranteed is, indeed, unproblematic.

Similarly, the second observation, namely that there are no significant differences between texts used in exams targeting the same level is also in line with expectations. Indeed, this appears to be an indication that exams in the two different countries seem to employ similar texts for the same purpose.

More puzzling, however, is the third observation concerning the lack of significant differences across exams targeting different levels. Indeed, as the results reveal, such differences do not appear to exist either in terms of individual TERA measures, whether examined by exam versions or by exam types, or in terms of composite readability figures, at least in the majority of the cases. While the texts used in the Hungarian "intermediate" exam seem to be significantly different from two of the Latvian exams with regard to composite readability, no such differences can be observed between the two Hungarian exams targeting different levels or across the three Latvian exams, also geared toward different levels. The case of the "old" Latvian exam is the least enigmatic, of course, as this is the only exam declared to have targeted all three levels in question, so the lack of significant differences may be explained on grounds that parts of the exam must necessarily have included texts to cater for the needs of candidates at various levels. In the case of the other exams, however, the apparent lack of significant differences seems to suggest that for testing different levels of reading comprehension texts of very similar properties have been used.

At this point it is important not to jump to false conclusions. While it may be tempting to suggest that the exams targeting different levels are, in fact, at the same level, this would not at all be justified in light of the results. It needs to be remembered that the difficulty of a reading task is only partly determined by the difficulty of the text. Indeed, it is quite possible to potentially use the same text at different levels, if the focus of the items differs in the two tasks. This, of course, is in line with the point made earlier in this paper about how texts do not really have levels, because they may be understood at different levels, depending on the depth of understanding required. Accordingly, the similarity of text characteristics tells us nothing about the nature of the tasks used in the examinations. Thus, without examining and comparing the actual tasks themselves, no opinions can be formed about the level of the exams, either.

It also needs to be remembered that, while the TERA measures provide an impressive account of text characteristics, they offer no information on a text feature that is of outstanding significance when it comes to determining level appropriacy: the topic of the text. Indeed, when it comes to CEFR and CV descriptors, one important way in which reading performances are differentiated according to level is related to the topic of the texts. It is quite possible that the texts from examinations at different levels analyzed in this study differ considerably in terms of topic. It should be noted, however, that classifying the topics would necessarily include some degree of subjective judgement, which is one reason why the topics of the texts analyzed were not examined in this study.

Conclusions

This paper intended to provide an insight into a study comparing the difficulty of texts used in Latvian and Hungarian school-leaving examinations in English as a foreign language. The findings indicate that, in the majority of cases, text properties were not significantly different in the case of examinations targeting the same levels, and the same is true of exams targeting different levels. On the one hand, this indicates a welcome consistency of difficulty in texts used in exams targeting the same level, but it also suggests a potential challenge related to texts in exams focusing on different levels.

As has been discussed, there are different potential explanations to why such results emerged. In order to clarify the matter, it would seem useful to conduct further research into both the properties of texts inaccessible to automatized text analysis, as well as into the qualities of the tasks in which the texts were used.

A further issue that could be raised is how TERA analyses may be utilized in the future for test construction purposes. In most examinations text selection is likely to be conducted on the basis of a subjective evaluation of text properties. As the current study has demonstrated, the process of text selection could also be made more efficient by employing automated analyses of potential texts. It has been shown that in the case of certain TERA measures exam texts displayed remarkable variety, which may be a positive feature in some cases (e.g., *Narrativity*), but which may also raise issues of standardization in other cases (e.g., *Syntactic simplicity*). By using TERA analyses on a regular basis, texts could be monitored for important characteristics influencing text difficulty, which would likely make the levels of the texts, and thus of the examinations themselves, even more stable and justified.

As has been demonstrated, an objective analysis of text properties provides an insight into certain elements of text difficulty. By employing such analyses, the transparency of national examinations could also be increased, which would contribute to a greater acceptance of test results, a goal all test providers seek to achieve.

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STUDENTS' MOTIVATION IN CHOOSING TO STUDY LESS COMMONLY TAUGHT LANGUAGE AT A GLOBAL UNIVERSITY

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ABSTRACT

The article examines the motivational factors that have the greatest and least influence on students' choice to study less commonly taught language(s) at the University of Washington. In 2023, a five-part online questionnaire was used to collect 88 students' responses. The main part of the questionnaire consists of 46 motivational factors grouped into five thematic groups: Advertisements of language courses and language learning; prior knowledge of the learning process of the target language; positive previous experience in learning languages and prior knowledge of/about the target language; language speakers, their communities in the US and worldwide; the use of language, its functionality; future perspective. Students were asked to measure the importance of each factor on a five-point scale. In addition, 26 students in the course "Latvian Literary and Cultural History" were surveyed, using open-ended questions to find out their language knowledge, language-learning experience, and beliefs about the value of language knowledge and learning at the university level.

The factors rated as extremely important in choosing to study a language were *Interest in languages* (63% of 88 responses), *Traveling, studying, or living in places where the target language is spoken* (57%), and *Learning about other people and their culture* (41%). In turn, the factors least influential in students' choice to study language(s) were *Regular posts about the course / language on social media* (51% of respondents), *Communication with relatives in their native / heritage language* (46%), and *Option to choose the number of credits (e.g., 3 or 5)* (46%). Such results indicate that students' intrinsic motivation has higher influence on their choice to study a language.

Keywords: *extrinsic motivation, integrative motivation, intrinsic motivation, instrumental motivation, less commonly taught languages, students at the University of Washington.*

Introduction

The University of Washington, or UW, is one of the largest and most prestigious public research universities in the United States. According to criteria such as teaching,

research environment, research quality, industry, and international outlook it is ranked 25th among world universities (The Times Higher Education, 2024).

To obtain a degree at UW, undergraduate students must learn various general education components, including a foreign language, in addition to the content of the chosen study program. Unless the student is a native speaker of a language other than English or has learned three years of a single foreign language in high school, the student must complete the third college quarter of a foreign language or pass a language proficiency test (Foreign Language, 2024). UW offers 46 foreign languages, including Arabic, Bulgarian, Indonesian, Latvian, Swahili, Urdu, and Vietnamese (Languages Taught at the UW, 2024). Most of these languages are considered less commonly taught languages (LCTLs) in the US (What is LCTL?, 2023).

The aim of the paper is to examine the main reasons (alongside the above-mentioned formal language requirement) why students choose to study LCTLs at UW, students' expectations and believes about language learning, and their awareness of the benefits of studying world languages.

The paper is mainly based on quantitative research, since to achieve the goal, two surveys of UW students in the spring of 2023 have been carried out.

The paper consists of six parts. The introduction (1) is followed by a discussion of the theoretical issues relevant to the study (2). The third part (3) describes the structure and distribution techniques of both questionnaires. The results of the questionnaires are presented in the fourth part (4), which are critically discussed in the fifth part (5). The paper concludes with main conclusions and ideas for future research (6).

Theoretical considerations

Motivation is an important concept in psychology, and it is defined as "a kind of central mental engine or energy-center that includes *effort*, *want* or *will* (cognition) and *task-enjoyment* (affect)" (Ng & Ng, 2015: 98).

Researchers in language pedagogy and educators strongly emphasize the importance of motivation for successful language learning (i.e., first language, or L1, second language, or L2, and foreign language, or FL). Motivation is theoretically considered in the context of factors such as *learner-specific factors* (e.g., cognitive and emotional factors, level of L2 or FL competence, personality traits, parental support, positive self-evaluation); *learning situational factors* (e.g., teacher, class size, composition of the learner group, syllabus and teaching materials, instructions and learning activities, norms and regulations); and *result-oriented factors* (e.g., academic achievements, job opportunities, new friends, and travel) and mainly examined in language classrooms (e.g., Guilloteaux & Dörnyei, 2008; Lasagabaster, Doiz & Sierra, 2014; Dörnyei, 2019).

According to Gardner and Lambert (1972), an individual's motivation to learn an L2 or FL is sustained by both attitudes toward the native language speakers' community and the goals, or orientations, sought through the acquisition of the target language. The scholars identified two types of orientations: *integrative* and *instrumental* orientation.

The first refers to a desire to learn the target language to have contact with, and perhaps to identify with, members from the native language speakers' community. It is more about interactions, communication, and belonging. The second, in contrast, refers to a desire to learn the target language to achieve practical goals, for example, course credit or job advancement. It is related to one's professional development, labor market and utilitarian needs.

A considerable amount of research has been dedicated towards distinguishing between types of motivation. The results of this research have been inconsistent due to conflicting findings (see more in Noels et al. 2000). There have been several attempts to develop alternative motivational models with efforts to complement the integrative–instrumental distinction. One formulation that has received the attention of several scholars is the distinction between *intrinsic* and *extrinsic* motivation (e.g., Brown, 1994; Vallerand, 1997; Noels et al., 2001).

Intrinsic motivation (IM) is related to the individual's identity and sense of well-being (Ng & Ng, 2015: 24), and it generally refers to motivation to engage in an activity because that activity is enjoyable and satisfying to do. In this sense, language learning (both independently and in the classroom) can be seen as one such activity. There are three types of IM: (1) IM-Knowledge, the motivation for doing an activity for the feelings associated with exploring new ideas and developing knowledge; (2) IM-Accomplishment, the sensations related to attempting to master a task or achieve a goal; (3) IM-Stimulation, motivation based simply on the sensations stimulated by performing the task, such as aesthetic appreciation, fun, and excitement (e.g., Deci & Ryan, 1985; Vallerand, 1997; Noels et al., 2000).

In contrast, extrinsic motivation (EM) comes from outside the individual (Ng & Ng, 2015: 98) and is related to actions to achieve positive instrumental outputs, for instance, a reward or avoidance of a punishment. Eternal rewards can either increase or decrease intrinsic motivation, depending on how they affect self-efficacy (ibid.).

Many researchers have combined all previously described motivation types: *intrinsic, extrinsic, integrative,* and *instrumental motivation* (e.g., Brown, 2007; Schunk, Meece & Pintrich, 2008; Özgür & Griffiths, 2013).

Methodology

Research data and its acquisition

Faced with the gradually decreasing number of students in the Department of Scandinavian Studies at UW, I desired to learn students' opinion about the advertising of language courses, their preferences in language course organization and content, and the importance of the acquired language knowledge in their future lives. In the spring of 2023, I developed the questionnaire "Motivation in Choosing to Study a Less Commonly Taught Language". Several survey issues were discussed together among colleagues in faculty meetings within UW's Department of Scandinavian Studies.

Since the research deals with students' retrospective view of why they have chosen to study the language(s) and what they have given crucial importance to, result-oriented factors were more considered for surveying first-year language students, adding learning situational factors meant for second- and third-year language students (i.e., continuing students) or first-year students considering further studies of the target language. However, this does not mean that students' perception of the language learning process before their actual enrollment in the language class do not play a role in the choice to study / not study languages at UW.

The developed questionnaire consists of five parts:

1. Student profile;
2. Ways of obtaining information about language courses;
3. Factors influencing the choice to study a particular LCTL at UW;
4. Motivation in continuing to study the target language;
5. Individual recommendations to language instructors.

In the first part, students were asked about their: (1) study level, (2) study major, (3) native language(s); 4) number of languages known well enough to use in various daily situations (e.g., talk to people; read the news, posts on social media, or novels; watch movies; write emails, etc.); (5) number of languages studied at UW; (6) the last studied language at UW; (7) duration of learning the last language learned (years of study).

The second part consists of a multiple-choice question. The answer options include a maximum of all possible ways of obtaining information about the target language courses (e.g., Language Learning Center of UW, student advisor's recommendation, social media, and Google).

The third part is the main part of the questionnaire. It consists of 46 predefined factors possibly influencing student motivation. They are classified into five thematic groups:

1. Advertisements of language courses and language learning;
2. Previous experience in learning languages and/or prior knowledge of/about the target language;
3. Language speakers, their communities in the US (including UW staff) and worldwide;
4. The use of language, its functionality;
5. Future perspective.

Such a thematic division was created, hypothetically assuming that students' motivation can be influenced not only by the future perspective (e.g., traveling and communication with native language speakers), but also by the past (students' experiences, respectively) and present perspective (e.g., the image of the country/-ies where the target language is spoken and visibility of the target language(s) in students' surrounding).

All five thematic groups, with a list of possible influencing factors, begin with the question: *How important were these factors when you chose to study a less commonly taught language, or LCTL (other language than English, Spanish, French, and German)?* Then, a list of factors is given, respectively, according to the above-mentioned thematic groups.

Students were asked to evaluate each factor on a scale of five levels dependent on its importance of influence: 1 – not important at all, 2 – not so important, 3 – somewhat important, 4 – important, and 5 – extremely important.

The fourth part of the questionnaire consists of 32 factors influencing students' motivation to continue to study the target language. The factors are based on the following thematic groups:

1. Learning materials;
2. Language learning process;
3. Instructor and course mates;
4. Learning bonuses.

Like the previous question, students were expected to measure the relative importance of factors on a scale of five levels (see above).

The questionnaire concludes with two open-ended questions with students' suggestions for language instructors regarding language teaching practices and language course promotion strategies. The last two questions were optional for students.

The online questionnaire was distributed to students mainly through e-mails of language instructors and promoted at informational events for students. The questionnaire was anonymous.

In addition to the previously described online questionnaire, undergraduate students of the course "Latvian Literary and Cultural History" were surveyed in the spring quarter of 2023. The purpose of this follow-up survey was to reach at least some of those students who have not studied languages at the UW (and do not intend to do so), to learn the reasons why they have chosen not to study language(s) at the university level.

The second questionnaire was also available to students online and consisted of seven open-ended questions:

- *What is your native language / mother tongue?*
- *Which languages do you know? Briefly describe your proficiency. (e.g., German – I can read and write simple texts)*
- *Do you currently study a language? If yes, which one?*
- *Why do you study (or not study) a language?*
- *What do you like in language learning? What do you don't like about studying a language?*
- *Which languages do you think is worth to study? Why?*
- *What can you gain from studying small languages (e.g., Latvian, Danish, Lao, etc.)?*

Unlike the first survey, this questionnaire includes a question about important and useful languages worth studying and hypothetical question about the need for learning particularly small languages.

Data analysis

The description of the quantitative data – the factors affecting motivation to study LCTL(s) – was conducted mainly considering the highest and lowest rated factors. Then

these factors were analyzed from two points of view – the learning process and the desirable results of language learning. In the first case, an attempt has been made to answer what the highest rated factors tell us about instructor and organization, content, and atmosphere of language lessons that attract students. In the second case, the focus is on students' awareness of the benefits of knowledge and skills in the target language. For the paper, 15 motivational factors (out of 46) were selected and grouped into three types of benefits:

1. Benefits associated with cognitive and intellectual development;
2. Benefits associated with belonging and communication;
3. Material benefits, entertainment opportunities, and professional development (career).

Each thematic group consists of five potential motivational factors (the list of factors of each group is given in Table 1). The first group includes factors related to students' personal growth and attitude towards newly acquired practical skills, as well as preferences in spending free time. They refer to students' intrinsic motivation. The second group is based on the idea that it is important for students as social persons to be in contact with other people, get to know them and learn from them, and feel a sense of belonging to different groups of people (e.g., interest, ethnic, and linguistic). The factors are related to students' integrative motivation. The third group includes factors related to active involvement of students in different communities (e.g., interest groups, business groups, exchange student groups) to obtain some visible and clear benefit, for instance, financial support, language use-oriented job offer, unique work assignment, opportunity to study or work abroad, travel with higher confidence about the experiences to be gained and safety.

The content analysis of qualitative data was based on marking the recurring themes and keywords related to students' motivation to study LCTLs and motivational teaching / learning strategies.

Results

General description of findings

Student profile

In the spring quarter of 2023, 88 students at UW completed the main research online questionnaire. 73 of these students were undergraduate students, 15 – graduate students. Most students' majors were related to linguistics, international studies, or a particular language and culture (e.g. English, Japanese, Language & Culture, Global & Regional Studies), but also to computer science, environmental sciences, and political sciences.

The mother tongue of 72 students was English. The most frequently mentioned other mother tongues were Chinese (including Mandarin and Cantonese), Vietnamese and Spanish. 44 students claimed that they can use two languages in everyday situations, 17 have stated that they can operate with three languages.

At UW, 42 students had studied one language, 24 students had studied two languages, and 22 students had studied three or more languages. The most frequently mentioned languages studied last at UW are: Japanese (16 responses), Arabic (15), Korean (14), Norwegian (8), Latvian (5), Estonian (4), and Bosnian, Croatian, Montenegrin and Serbian (BCMS) (4). Most respondents (51 students or 58% of all respondents) had chosen to study a LCTL for one year, while 17 students (19%) had learned the target language for two years.

In addition, during the lecture of the course "Latvian Literary and Cultural History," 26 completed online questionnaires were obtained. All students were undergraduates whose major studies are not primarily related to culture studies and linguistics. However, results of the data analysis shows that students' linguistic background is diverse. 17 students' native language was English, but the course was attended by students with Gujarati, Arabic, Ilocano, Tamil, Persian, and Vietnamese as their native language as well. 23 students described themselves as multilingual people who can operate with two or three other languages. Six students were studying a language at UW at the time of completing the questionnaire, their chosen languages being German (2), Greek (2), Sanskrit (1), and Vietnamese (1). Thus, 20 students from the course had not studied a language at UW and did not plan to do so at the time of filling out the questionnaire.

Ways of obtaining information about language courses

The results of the questionnaire show that the most popular sources of information about the language courses offered at UW are *homepage of respective department* (41 responses), *other* (including UW Course Listing, My Plan, and family – 26), *Google* (23), *student advisor's recommendation* (14), and *recommendation from friend(s)* (8).

In turn, the least-used sources for obtaining information were *information stands* (1), *presentations by language instructors* (1), and *Instagram* (1). Information is not collected at all during language-related events on campus and on social networks such as *Facebook* or *Snapchat*.

Evaluation of the importance of motivational factors

Factors most influencing students' choice to study LCTL(s)

Top 3 factors rated as extremely important in choosing to study a language are:

1. *Interest in languages* (63% of 88 responses)
2. *Traveling, studying, or living in places where the target language is spoken* (57%)
3. *Learning about other people and their culture* (41%)

The thematic factor group "Future perspective" is most often rated as very important or extremely important in the choice to study LCTL(s). Students highly value *traveling, studying, or living in places where the target language is spoken* (90% of 88 students), *possibility to operate with an unusual language combination/-s in everyday life* (66%), *boost confidence about ability to learn new things and skills* (58%), and *expanding language biography and resume* (53%).

Factors least influencing students' choice to study LCTL(s)

Quantitative analysis of the data shows that there are three factors that are not important at all when choosing to study LCTL(s) at the UW.

First, although, the visibility of the language course advertisement can be perceived as an important strategy in reaching potential students, more than half of the respondents (respectively, 51% of the surveyed students) believe that *Regular posts about the course / language on social media* as a factor is not important at all. Second, 46% of respondents express that *Communication with relatives in their native / heritage language* is an unimportant factor in choosing to study a language. Third, *Option to choose the number of credits (e.g., 3 or 5)* is an important criterion in 46% of cases.

Instructor and learning process as essential motivators

The findings show that for 66% of respondents, it is not important *to know a language instructor before taking a language course*. On the other hand, 59% of students believe that *reviews about instructor* are a very or extremely important factor influencing motivation, and 56% of respondents think that *instructor's teaching philosophy and research* have a somewhat, very, or extremely important impact on choosing a language course.

In turn, students who have chosen to continue learning the target language for the second or third year or are considering doing that pay a lot of attention to the instructor's personality and professional work. Such motivational factors as *Instructor's knowledge of the language*, *Instructor's skills to present and teach the language*, *Instructor's personality*, and *Valuable feedback from instructor* are rated as very or extremely important factors (respectively in 94%, 93%, 84%, and 82% of cases).

When describing the language learning process, students mainly emphasize two things. The first one concerns an instructor's dominant teaching approach: students attach great importance to the *focus on communication (both oral and written*), since 91% of respondents rate this criterion as very or extremely important. The second thing is related to the organization of the learning process – 89% of students think that a *well-organized learning process* is very or extremely important.

In turn, the factors with the least influence on the continuation of language studies are *Course differentiation by number of credits*, *Chance to co-organize the learning process*, and *Lots of homework*; 60%, 48%, and 46% of students rate them as unimportant or not so important, respectively.

Findings show that students want an easy-going and relaxed learning environment. 85% of students rate the factor – *Jokes and enjoyment in the learning process* – as very or extremely important, and 82% of students believe that *Friendly atmosphere in the classroom* is very or extremely important. The open-ended question with suggestions for language instructors only reinforces this. Three examples: *I think that making students* ***feel comfortable*** *and* ***having fun***[1] *is the best environment to learn* (R1[2]), *It should* ***be fun***,

[1] Hereinafter all emphasis in students' comments is made by the author of the paper.

[2] R1 stands for a respondent with the identifier 1.

learning to make jokes *in another language is super cool and* ***gets me excited to learn*** (R6), *Have translation games and other* ***fun methods*** *to help students* ***have fun while learning*** (R34), *A* ***light and fun atmosphere*** *is key* (R37).

Future benefits of studying languages as motivators

Table 1 summarizes data on students' perception of the benefits of learning a language/s (generally or at UW). As the data show, students value things that are related to individual growth on a cognitive and intellectual level more. The most highly rated factor – *Learning about other people and their culture* – can be considered as partly belonging to this group as well, since it indirectly indicates both possible interaction with people of other cultures and passive absorption of information about other people: their knowledge, experiences, traditions, etc.

Table 1 Students' awareness of benefits of studying LCTL(s)

Benefit groups and motivational factors	**Number of students (*N* = 88) who have rated the factors as *somewhat*, *very*, or *extremely important***
(1) Cognitive and intellectual development	
Training memory, analytical abilities, creativity, and communication skills	69
Meaningful fulfillment of free time	70
Literary works you want to read in the target language	63
Art forms (music, plays, films) you want to explore in the target language	73
Boost confidence about ability to learn new things and skills	75
	70*
(2) Belonging and communication	
Communication with peers and strangers in their native / heritage language	54
Connection with local language-speakers' community	65
Belonging to the department where the target language is taught	44
Meeting new people	67
Learning about other people and their culture	82
	62
(3) Material benefits, entertainment, and career	
Opportunity to receive a scholarship	43
Possibility to operate with an unusual language combination/-s in everyday life	79
Clear future vision of professional activities in the target language	59
Participating in social and entertainment events in the target language (e.g., chorus, theater, dancing, markets, etc.)	62
Traveling, studying, working, or living in places where the target language is spoken	81
	65

Note: * The average of the number of students who rated the entire benefits-related-factor group as somewhat important, very important, and extremely important.

On the contrary, the group of benefits – Belonging and Communication – is the lowest rated group by the students. *Belonging to the department where the target language is taught* seems especially unimportant.

The feature characterizing extrinsic and instrumental motivation – material benefit – according to students are less appealing; this is proven by the lowest rated factor *Opportunity to receive a scholarship.*

Reasons why students do not choose to study language(s)

Based on 20 students from the course "Latvian Literary and Cultural History," who did not study any language at UW at the time of filling out the questionnaire, the main reasons given by students for not including a language course in their study plan are lack of time and focusing on the main study courses. Three student responses as examples *I feel like* ***I don't have time to study*** *a language right now and* ***it isn't a top priority*** *for me at the moment* ($R_2$12[3]), *I plan on studying Spanish in the future, however* ***I am more focused on my major oriented classes*** *at the time* ($R_2$6), *I don't study right now because* ***I don't have room in my schedule*** ($R_2$26).

The second thing that appears in the students' answers is the reluctance to invest time and mental effort in learning the language. A few comments as examples: ***I don't like the repetition*** *that is sometimes required to truly memorize and understand a concept* ($R_2$10), ***I don't like how much you have to practice*** *the language or else you forget it so easily* ($R_2$12), and *What* ***I don't like*** *is having* ***to master the grammar aspect*** *of a language because it can be confusing* ($R_2$17).

Discussion

Findings show that students prioritize the role of language in cognitive and intellectual development. According to surveyed students, a cognitive factor – *Interest in languages* (including learning them) plays a significant role in the choice to study language(s). This factor in broader sense can be seen as students' curiosity about new elements (e.g., sounds, words), forms and structures, the expansion of existing skills (e.g., literacy, communication skills), and students' desire for new knowledge. This is proven by the fact that 46 of 88 students had studied more than two languages at UW, while 37 learned the target language(s) for more than one year. In this vein, we can see that the factor as the feature of students' intrinsic motivation is a strong prerequisite for choosing / continuing to study language(s). This leads to the essential question: What can main stakeholders and social actors (including language teachers in high schools and in universities) do to create and promote students' interest in languages?

A significant number of studies are concerned with creating and maintaining students' interest in the learning process. However, they mainly deal with interest in the classroom (e.g., Ainley, Hidi & Berndorff, 2002; Renninger, 2000; Hidi & Harackiewicz, 2000) and

[3] $R_2$12 stands for a respondent from the second (additional) research survey with the identifier 12.

with learning materials in L2 or FL teaching (e.g., Ebrahimi & Javanbakht, 2015; Manzano, 2018; Berra, 2020).

The findings of this study show that factors affecting motivation such as *Interactive learning materials*, *Relevant and modern topics*, *Authentic texts*, and *Real-life-related tasks* are evaluated similarly; on average, 62% of students rate them as very or extremely important. Individual students highlight the need to include topic that are important to them and point to the insufficient number of authentic texts in the learning process. One example: *I wish there were* ***more interaction with real life sources*** *such as newspapers, books and movies in the targeted language* (R35).

The second topic that is widely covered in language pedagogy and related to the motivation / interest to learn language(s) is student involvement and engagement (e.g., Christenson et al., 2012; Hiver et al., 2021; Hiver et al., 2024). The open-ended questions of the questionnaires show that students are willing to be involved in the learning process, but with the premise that language errors are seen as a part of the learning process and that students can feel emotionally comfortable regarding them. One example: *Calling on students* ***to participate as well can encourage cooperation and discussion****, but only if there is an acceptance of mistakes and no fear of judgement* (R1). At the same time, almost half of the respondents state that *co-organize learning process* is not important at all in choosing to study language(s).

Researchers and practitioners have discussed students' engagement in connection with fun teaching methods, strategies, and learning activities to increase students' enjoyment and interest in language learning (e.g., Dörnyei & Ushioda, 2011; Lamb et al., 2019). Research shows that such motivational strategies are especially important for monolingual students to help maintain interest in the target language.

The finding shows that **fun** is the key word for students' motivation to learn language and high evaluation of language lessons. Language games, jokes, and other stress-relieving and interesting components of language learning are needed by students. As previously mentioned, students highly rate *jokes and enjoyment in the learning process* and value *friendly atmosphere in the classroom*. Similarly high results are regarding learning activities; 90% of respondents think that *variety of classroom activities* is a somewhat, very, or extremely important motivational factor. However, only about one third of the surveyed respondents (34%) believe that *extracurricular activities (e.g., Language clubs)* are very or extremely motivating.

Coming back to the previously raised question about promoting the interest of future or existing students in languages and language studies, there are relatively few studies devoted directly to the formation of young people's interest in language learning before they enroll in language classes. One example is Hogan-Brun's popular book "Why Study Languages?" (2021), in which the author shows through the stories of language learners (including herself) that "languages can make things happen" (Hogan-Brun, 2021: 47) and highlights such cognitive gains as stronger executive control (i.e., ability to focus on a specific task while ignoring irrelevant information), enhanced working memory, greater mental flexibility, better problem-solving skills, and being more creative (ibid., 54). On

the other hand, boosting income is mentioned as one of the main utilitarian benefits (ibid., 61). The importance of some of these benefits is also confirmed by the results of the questionnaire – the set of factors related to students' future perspective is the most highly rated thematic group.

Thinking in this direction, the findings suggest that there is a lack of or an insufficient amount of effective and appealing advertising of languages and language courses on the campus and in social media. Also, the word-of-mouth approach, namely promoting the positive learning experiences and successful career achievements of former language students in more personal and an accessible way to students, is probably underused. One of the ways of promoting language courses in other US universities is *Language Fairs* with various showcases, language games, and meetings with former language students and instructors (e.g. University of Arizona – CERCLL, 2024). Such an event has not taken place at UW at the time of writing, but here individual language instructors individually or in small groups for several days at the beginning of the study year place the faculty's advertising boards, distribute brochures about language courses, and tell students stopped by about language study opportunities. However, the effectiveness of such small-scale and sporadic advertisement activities must be critically evaluated. According to the questionnaire data, only one student (out of 88) has obtained information about the target language course at UW in this way.

On the other hand, students do not believe that the visibility of LCTLs on the campus, city, or digital environment has much influence on their choice to study them. Such factors as *Target language samples on campus (e.g., direction signs, posters), The use of the target language in the city*, and *The use of the target language on social media* are mainly rated as not important at all or not so important (74%, 57%, and 49%, respectively).

Students' reluctance to study languages is mainly justified by the lack of time and focus and the other courses, but individual student comments also point to not seeing the importance of language knowledge in the long term, the idea that language learning is an impossible mission, and a lack of interest. The lattermost brings us back to the problematic issue about students' interest about languages and learning them raised in this discussion.

Conclusions

Small in scope, the research showed us that students' choice to learn LCTL(s) is based on their own passion for languages and prior knowledge and preconceptions about the cognitive and intellectual benefits of the language learning process and outcomes. Students choose to study LCTL at UW for the first time if they have an interest in languages and a clear plan for future practical use of the target language. Students' choice to continue studying the target language is more nuanced than their choice to study language at all. Here, attention is paid to the instructor, the language teaching approach, the psycho-emotional atmosphere in the classroom, and the learning materials.

A more extensive study would be beneficial, surveying students at other universities in the US or elsewhere – or, on the contrary, narrowed, focusing on more precise aspects of one type of motivation. Similarly, repeating the questionnaire after a couple of years would allow retrospective evaluation of the persistence of certain motivational factors over time.

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IMPLEMENTATION WAYS OF EDUCATIONAL TECHNOLOGIES ON HIGHER EDUCATION

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ANNOTATION

Today the system of modern higher education is away from traditional teaching methods or monotonous classes and tries to incorporate real-life activities into students' education. It is also connected with fundamental changes in educational technologies such as informative and communicative ones, the aim of which is to educate future specialists in real situations and develop certain skills that provide significant opportunities to modernize teaching at universities. The aim of this research is to substantiate the concept of *"educational technology"* and methodological features of its development theoretically. To study how university lecturers work with educational technologies today to assess real opportunities to analyse basic implementation ways to incorporate educational technologies into modern higher education. On the basis of the content-analysis of the scientific literature, the notion of *"educational technology"* was defined and the methodological features of educational technology development at the university level were substantiated. The general implementation methods of educational technologies in higher education were analysed. The structure of the pedagogical system at a modern university and the peculiarities of educational technologies development are described. Lecturers' readiness to incorporate the new pedagogical technologies into higher education was studied. The research was conducted via a methodological approach based on empirical and theoretical methods to achieve the aim and tasks of this research. First, the theoretical base includes scientific methods such as studying, analysis, generalization, comparing sources of data in the same category and induction or deduction. Second, the current problem was studied via an empirical method such as a questionnaire, on the basis of which, a sociological survey was formed to test initial theoretical principles of the current issues. The author concluded that the subject of *"educational technologies"* should be included in a university curricula.

Keywords: *higher education, educational technology, teaching methods, university.*

Introduction

Topicality. Nowdays there are still issues to incorporate educational technologies into higher education that require urgent solving: the contradiction between the need to train lecturers in innovative educational technologies and insufficient opportunities to prepare educators to use these technologies; the lack of lecturers' methodological support

and the absence of theoretical knowledge on educational technologies and special practices. Thus, requirements for the quality of work usingeducational technologies are high enough because their implementation in higher education determines the success of the pedagogical process as a whole.

The aim of this research is to substantiate the concept of "*educational technology*" and the methodological features of its development theoretically, to study how university lecturers work with educational technologies today for assessing real opportunities to analyze basic and general ways of implementing educational technologies in the context of modern higher education.

The objectives of the research:

1) to define the concept of "*educational technology*";
2) to substantiate the methodological features of the development of *"educational technology"* at the university level;
3) to analyse basic and general implementation methods of educational technologies in higher education;
4) to study lecturers' readiness and ability to implement the new educational technologies at the university level.

The object of the study is *"educational technology"*.

The subject of the study is the implementation ways of educational technologies at the university level.

Literature review

On the basis of the scientific literature, certain aspects of the problem have been revealed by scientists.

Scientist Galuschak (2023) studied the problem of using pedagogical technologies in the educational process of higher school. The author considers pedagogical technologies as a universal means of the educational process for the preparation of specialists in Economics. These findings prove that pedagogical technologies help students' qualitative teaching. Additionally, a choice of effective pedagogical technologies is substantiated. However, the author divided the concepts of the technology into pedagogical, educational and technological ones which are contradictory to the concept of the common theory of pedagogical technologies.

Clark (2023) highlights the latest developments in learning technology including artificial intelligence, virtual reality and the metaverse. The author proves that educational technologies provide insights into the future of learning and offer his comprehensive overview or detailed exploration of any topic.

Umarova, Tsagaraeva and Muminova (2022) devoted their article to the role of modern educational technologies. Researchers believe that teaching must be based on the educational technology with computers. The concept of *"educational technology"* is also reflected in the article. In addition, suggestions for increasing the role of modern educational technologies in the development of Pedagogy have been developed.

Researchers Sukhonosov, Lopushniak, Harkusha, Karpyak, Kulish and Boychuk (2021) provided an essential description of educational technologies. They believe that the level of any educational institution is determined by the quality of innovative technologies that are used effectively because it is worth incorporating educational technologies into teaching for higher education development. Its effectiveness depends on the interaction of several important factors that support the educational process: lecturers' competence that possess educational technologies at a high professional level and improves it constantly; proper organized methodical support of the educational process; active implementation of modern educational technologies.

Prokopenko (2018) studies how to strengthen the process of updating the education system aimed at the professional school teacher training as a special social personality in conditions of European integration. Education modernization is considered to be a factor that systematically optimizes the process of the new era of teacher's professional training, the main purpose of which, is to help teachers in their work.

However, at the same time, the analysis of scientific papers on the above mentioned-problem of "*implementation ways for educational technologies in higher education*" led the author to the conclusions that issues related to educational technology implementation in the modern higher education system need to be improved.

Methodology

The research used on the methodological approach which was based on empirical and theoretical methods to achieve the aim and tasks of this research.

First, the theoretical base includes general scientific methods such as studying, analysing, generalizing and comparing sources of data in the same category as well as induction and deduction. The content-analysis of scientific literature aims to systematize electronic documents (Internet-transmitted) for their evaluation and review. Data was taken from the sources such as text-books, scientific articles via electronic libraries and websites. The state of the researched problem and basic concepts were obtained with the help of literary sources analysis and generalization.

Second, the current problem was studied via an empirical method such as a questionnaire, on the basis of which, a sociological survey was formed to test initial theoretical principles on the current issues. Being based on the questionnaire method, a pilot pedagogical experiment, involving experienced university lecturers, was performed to determine their readiness and ability to teach with the use of new educational technologies in the higher education system. The survey involved 56 respondents of different ages and disciplines and various levels of their qualifications and categories (lecturers, senior lecturers, associate professors and professors) from Indian, Chinese, Ukrainian and EU universities. The received data were processed via mathematical and statistical methods as well as an analysis and systematization of the data obtained. A description of the results is presented in tables and charts with general calculations and a comparative analysis of basic and fundamental results which are processed via a computer program in the Google system.

Chart 1 Ukrainian universities

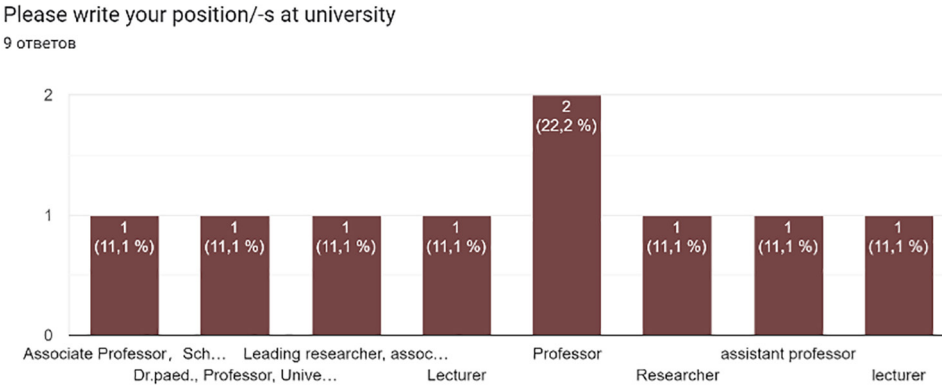

Chart 2 Chinese, Indian and EU universities

According to the statistics indicated in Charts 1 and 2, the largest number of the respondents, who took part in the survey, were associate professors (39.7%). The remaining 60.3% were educators of different categories such as professors, researchers, senior lecturers and lecturers. The average work experience of the respondents was 21 years.

All the respondents were warned about their participation in the experiment and that their responses were kept confidential and used only for the aim of the research. Privacy and protection of personal data were performed in accordance with the Data Protection Directive (95/46/EC). The participants were informed that their personal data would be used and processed exclusively in the connection with the purpose for which they were collected. If they agreed to processing their data, they submitted the questionnaire.

These research methods allowed us not only to collect facts, but also to check and systematize them, determine causes and consequences, find a logical study of the collected facts, develop concepts and judgments; make theoretical generalizations and conclusions.

Results

The aim of the survey is to show the effectiveness and identify possible features or limits ofthe educational technologies used in higher education system.

The respondents were asked 15 questions: questions 1–8 assess their knowledge of educational technology theory and questions 9–15 assess their degree of practical application in teaching.

As a result of the study, the following data were obtained.

Question 1 **("Please write a factor that most influences the effectiveness of teaching students to your mind")** aims to identify educators' level of understanding the processes which take place in the education system and highlights the need to replace the traditional teaching system with modern educational technologies. It was expected that educators would know a full range of possibilities of educational technologies in achieving maximum learning outcomes.

The majority of the respondents (approximately 54%) identify students' individual characteristics, namely, their personal motivation, as leading factors ensuring the highest level of learning effectiveness. In addition, 10.8% of the respondents think that good methodology and tasks are also parts of successful teaching.

However, only 34.6% of the respondents prioritized the educator's professionalism (experience, control, individualization of learning, activity planning, interesting classes, logical lectures, knowledge of the current situation in the field of the subject learned, organizing students' independent work, knowing students' needs) teacher motivation, the psychological atmosphere during training and self-discipline.

Thus, the majority of the respondents associated the effectiveness of teaching with students' personal motivation and good methodology. Both of these factors take part in educational technology teaching because they involve processes, methods and means that encourage students to be engaged in productive cognitive activity increasing their high motivation. Lecturers are not passive in transferring knowledge via pedagogical activities.

Asking Question 2 *(***"How would you define what educational technology is?"***),* we tried to determine whether the lecturers know what the term means which defines the perspective of the development of the whole education system. The expected result is the characteristic of any educational technology according to the scientific, procedural-descriptive or procedural-effective aspects. Therefore, the majority of the respondents (52.7%) defined the concept from a procedural-effective point of view. They believe that *"educational technology"* is a system implemented in practice, an algorithm of action or a real pedagogical process. The definition of the concept of educational technology according to the scientific and procedural-descriptive aspects received an equal, but a small number of responses with only 16.4% each one.

This result leads to the conclusions that lecturers understand more the place of educational technologies for their practical application in teaching, but they do not have complete theoretical knowledge regarding the concept of *"educational technology"* in

the system of Pedagogy, exploring rational ways of teaching and educating or as a description of the pedagogical process.

Question 3 **(To your mind: is teaching a technology (science) or an art (intuition?)** is aimed to determine whether the educators correlate their activities with science or make it equal to the creative manifestation of the teacher's personality. Additionally, there is an opinion that a process of training is a system of actions and that it can be an algorithm, but, educator's creative potential is almost reduced. However, in our opinion, it is impossible to depersonalize teaching; it is always a combination of clear instructions and the teacher's individual approach.

Thus, respondents' opinions are divided almost in half: some of them believe that *"educational technology"* is an art (30.9%), whereas others think that it is a science (18.1%). As a result, 41.8% of the respondents agreed that *"educational technology"* is a combination of art and science.

The task of question 4 **("What is the difference between the educational technology and teaching methodology to your mind?")** is to determine whether the difference between given terms is understood. The technology cannot be identified either with a form of education or a separate method and a methodology as a whole, or with a specific pedagogical system (Galuschak, 2023).

I agree with scientists (Mykhailichenko, 2016), who say that "Educational technologies are similar to teaching methods, as they are a way of organizing the pedagogical process and an interaction between its subjects and objects. However, there is a difference between them. "*Educational technology*" is a way to achieve the goal of the pedagogical process optimally via specific methods. *The method* is a particular procedure of subject and object joint activity in the pedagogical process that can be used in one or many technologies. *The teaching methodology* is a set of actions to obtain a local result which are not accompanied by a strict diagnosis an achieved goal" (Mykhailichenko, 2016, 18).

It was assumed that the respondents mostly identified these two concepts, but only 14.5% of them joined those notions together or named them equal. The remaining 36.6% found it difficult to answer. A total of 12,5% believed that methods and the teaching methodology are the same conceptions. In addition, only 41.8% of the lecturers considered "*educational technology*" more complex than methodology is which is referred to the definite workout algorithm that includes various teaching methods, however the difference is clear.

As a result, no definite respondents realize the real difference between conceptions such as *"educational technology"* and *"teaching methodology"* completely.

Question 5 **("Please highlight structural components of "educational technology")** defines how the lecturers associate educational technologies with the educational process including teaching, students' activities, a structure, means, methods and forms. We expected three structures to be distinguished: *a conceptual framework* (a scientific basis including psychological and pedagogical ideas); *the content of teaching* (a content of material and purposes of learning); *the procedural part* as a technological process (forms and methods with which a teacher works, the educator's activities in managing the process of mastering any material by students and the diagnostics of the educational process).

12% of the respondents could not answer this question at all, only 3.6% identified all three substructures correctly. 36.3% named only one substructure which was the content substructure and 56.3% defined the procedural substructure. The results of their answers proved the need for educators to obtain definite knowledge of educational technology theory.

The answer to question 6 **("Please highlight the requirements for "educational technology")** was intended to highlight the requirements, the list of which was given by a lot of researchers (Ortinsky, 2009): diagnostic goal setting, effectiveness (results), economy, algorithm, design, integrity, managing, visualization. The results of the answers are shown in charts 3 and 4.

Thus, the educators did not highlight any main requirements for *"educational technology"* such as diagnostic goal setting or economy. The requirements for the educational technologies loose their effectiveness and integrity as well as a group of factors that reflect various aspects of the idea of the reproduction. This suggests that the lecturers do not understand all the positive effects of using technologies in the teaching process.

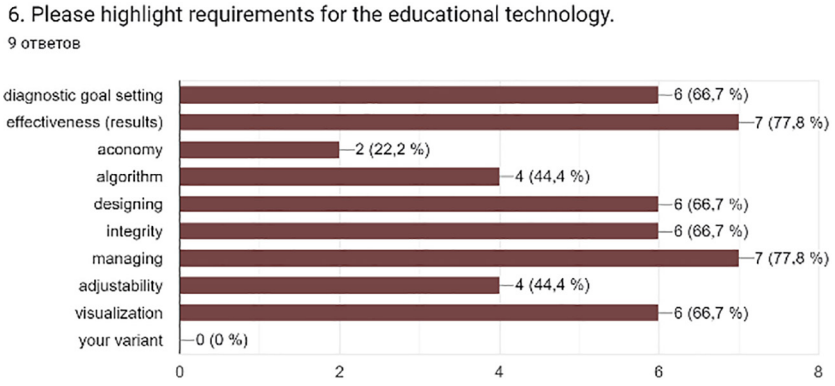

Chart 3 Chinese, Indian and EU universities

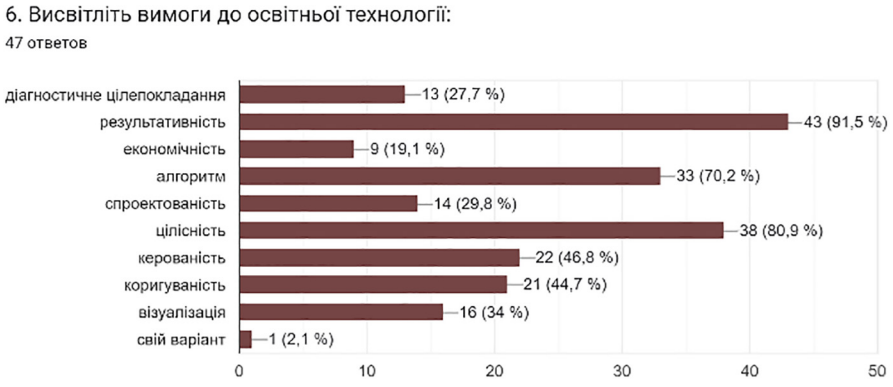

Chart 4 Ukraine

Question 7 **("How does the teacher's qualification influence the choice of an educational technology?").**

Famous scientists (Kremen, Sukhomlynska, Savchenko, Boyko, Prokopenko, Bondar, Buryak, Yevtukh and others) consider the modernization of education is a factor that systematically optimizes the process of professional preparation of the new era teacher (Prokopenko, 2018).

It is paradoxical, but opinions are divided. Thus, the respondents (66,7%) from China, India, and EU universities did not prioritize the lecturer's qualification. They believe that any educators can master a technology and use it successfully in their teaching activities.

However, it is correct for the remaining of the respondents (only 33,3%) and the majority (72,3%) from Ukrainian universities who answered that the higher the teacher's qualification is, the wider a range of educational technologies can effectively be used.

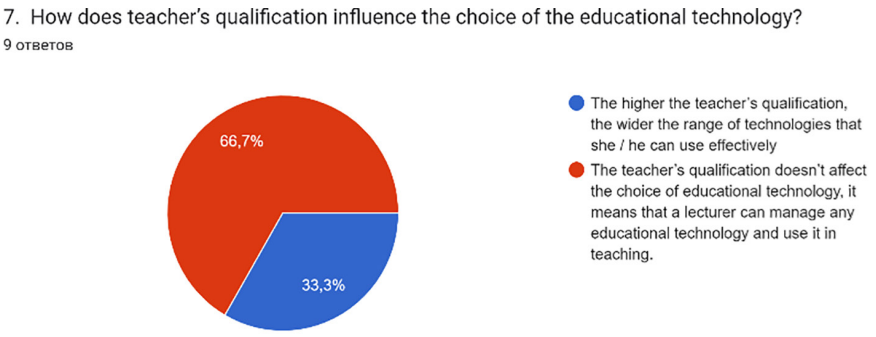

Chart 5 Chinese, Indian and EU universities

Chart 6 Ukraine

Question 8 **("Please name the educational technologies that you know")** assumed to determine how well the lecturers know different types of educational technologies. The presence of an enormous list of educational technologies, their ambiguous titles and various combinations of them face any educator in front of a problem to choose anything that is directly related to how well lectures know a technology structure.

The results are as follows (see *Table 1*).

Table 1 How well the lecturers know the classification of educational technologies

The number of name educational technologies	The number of respondents
None	21.8%
1–3	61.8%
more than 3	18.1%

The majority of the lecturers (61.8%) knew and named 1–3 educational technologies correctly. The results are presented in *Table 2:*

Table 2

Problem-solving technology 25.5%	The technology of the Development of creativity by G. Altshuller 3.6%
Gaming technology 22 40%	Portfolio technology 1.8%
Computer technology 22 40%	Technology of Creative Workshops 1.8%
The technology of critical thinking 21.8%	Early technology of G. Doman 1.8%
Particularly oriented technology 14.5%	Health-saving technologies 1.8%
Case-study technology 9.09%	

These results indicate that the respondents knew about the existence of a certain number of educational technologies. But, how often do they use them in their activities?

The second block of the questionnaire was used to answer this question.

Question 9 ("Do you use any educational technologies in your teaching?").

100% of the respondents answered "Yes".

Question 10 ("Please choose any educational technologies that you work with the most").

Chart 8 Ukraine

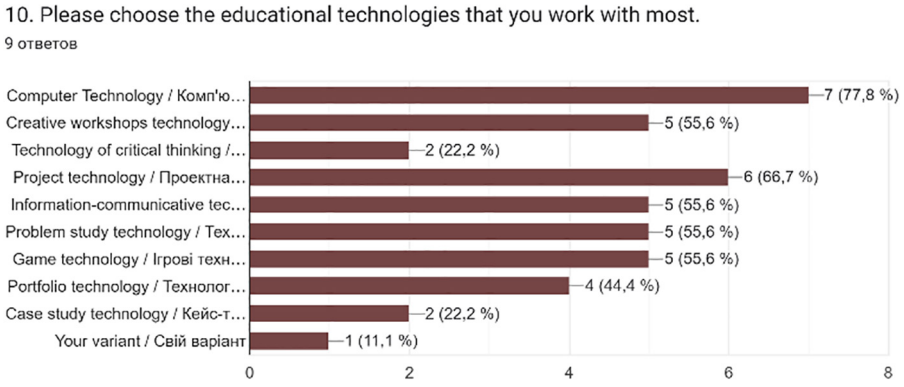

Chart 7 Chinese, Indian and EU universities

The answers were distributed as follows:

1) 100% of the respondents used educational technologies;
2) the most of the respondents (76%) used computer technologies constantly;
3) more than half of lecturers (53%) used technology, information-communicative technology, problem-solving technology and game-based technology systematically;
4) the use of critical thinking development technology has a completely opposite meaning. Thus, half of the respondents from Ukrainian universities (50%) often used this technology in class, whereas only 22,2% of the respondents from EU universities, China and India used it very rarely;
5) creative workshop technology, portfolio and case-study technologies were used periodically, accounting for only 32% of the total quantity of the respondents.

Thus, more than half of the respondents listed those educational technologies with which they worked. The rest of them did this unconsciously: they did not think about their professional activity or analysed it, or they did not develop their reflexive abilities at all.

Question 11 **("What educational technologies would you like to use in your teaching?")** was asked so that the lecturers could say about what exactly prevents them from using educational technologies. However, some of them (18.1%) expressed their unwillingness to use technologies in teaching or they didn't know. But, there was no opinion about the lack of information on this topic among the possible answers. A total of the respondents (85.4%) would like to use educational technologies in the future: 14.5% want "The development of critical thinking", 10.9% prefer "Game technology" and 9,09% would like ICT. Therefore, this group of the lecturers who are ready for self-development and innovative activities.

Question 12 **("Does the use of educational technologies make teaching more difficult or easier? Justify your answer").** A majority of educators (61.8%) responded that the use of educational technologies makes teaching easier: material is learned better; it is easier to work; the student's personality develops more intensively and the students' intellectual

level of cognitive and creative potential is increased; it allows them to perform experiments in Pedagogy and receive quick connection or provide new resources for educators giving them more opportunities to diversify the process of teaching or making it more interesting and organized; it improves results; it makes teaching efficient and it motivates students. Thus, the answers to asked questions showed that the lecturers had planed to work with educational technologies because they facilitate both educators' and students' activities.

Question 13 (**"The success of teaching is determined by educational technologies and the teacher's individual skills. In what ratio is it? (10-point skale, for an example: 3:5"**).

It was intended to clarify the relationship between two categories, "*individual skills*" and "e*ducational technology"*. The fact is that there is an opinion in the scientific literature: "Any activity can be either a technology or an art. Art is based on intuition, but technology is based on science regularities. Everything begins with the art and ends with the technology, lets everything start again" (Plotniska, 2005, p. 1). Thus, the questionnaire results were distributed in approximately equal proportions (45% for educational technologies, 55% for the teacher's individual skills). In our opinion, these categories are interconnected and complete each other: if lectures' individual skills are high, they can master any original educational technology.

Question 14 (**"Rate on five-point scale (where 1 is the lowest point and 5 is the highest one) how ready you are to work using "educational technologies**) was asked about lecturers' estimation of their readiness to teach via educational technologies.

Respondents' answers (see Chart 9).

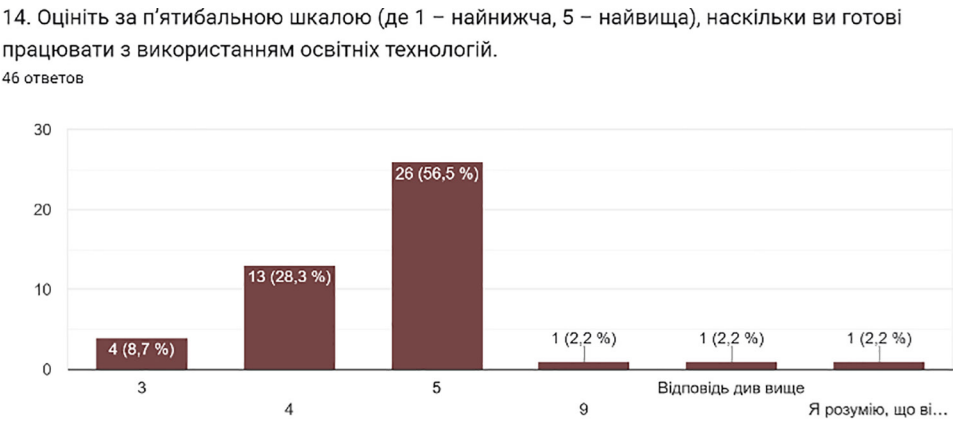

Chart 9

An analysis of Chart 9 revealed that all the lecturers were more or less ready to use educational technologies in their teaching.

This problem increased after analysing the answers to question 15 ("**Is it necessary to implement educational technologies in higher education?").**

All the respondents (100%) agreed that it is necessary to implement educational technologies in the vocational education system.

The research allows us to draw the following conclusions

1. The main factors, conferring the greatest effectiveness for training, are associated with students' personal motivation and the good methodology that provides educational technologies with a priority role in teaching.
2. Most lecturers believe that teaching is the integrity of any technology (science) and art (intuition) and that is the integrity of the categories *"individual skill"* and *"educational technology"*.
3. There are two possible levels of educational technology implementation: mastering only key operations as main components of the technology or a professional one when a lecturer is good at a wide range of educational operations in all technology components. Therefore, the results show that the respondents (97%) are at the elementary level of mastering educational technologies: they know about the existence of a certain number of technologies and use them in their activities, but they do not realize all the positive effects of using innovations in education. On the one hand, some educators see the difference between concepts such as *"educational technology"* and *"teaching methodology"*, but the only one: they consider the technology to be more complex than the teaching methodology. On the other hand, they cannot determine any difference between these two concepts at all or equate them. Thus, the level of their competence in the field of educational technologies includes only their unqualified practical realization because their theoretical preparation in this field is low or has developed only slightly.
4. Thus, the results prove a need for the lecturers to have a strong system of knowledge on the educational technology theory. Most educators understand that the higher their qualification is, the wider the range of technologies can effectively be used. For the reason, lecturers are ready for self-development and innovative activities, as they realize that educational technologies make teacher and student activities easier.
5. Along with the recognition of the theoretical and practical significance of the development of the technological approach in teaching, its successful implementation in the real pedagogical process is not painless: conservatism of the pedagogical system; unclear understanding concepts such as "*educational technology*"; lack of information; low effectiveness of some educational technologies; poor methodological support; distortion of the technology and a low level of competence among lecturers.
6. For this reason, it is necessary to implement educational technologies in higher education. Notably, all the lecturers are ready to use educational technologies in class, but they need to be helped in the form of methodological recommendations that will reduce time, material and physical costs.
7. Moreover, a lot of educational technologies have been developed, but lecturers are lost in their choice. That is why, it becomes relevant to develop methodological recommendations on the selection of any educational technologies for specific conditions. However, this is realistic only if the methodology for the assessment of *"educational technology" e*ffectiveness is used.

Discussion

1. The concept of "*educational technology*"

Technology is a word from Greek (*techne – art, craft; logia* – writings, which means something that can be reflected upon something and used for learning). It is used to teach or learn with intentional cognitive goals (Clark, 2023).

At the beginning of the last century, Makarenko (1988) was the first who introduced the scientific term such as "*technology of upbringing*". His idea was that the real development of educational technology is connected with its ability to "*project a personality*" (Makarenko, 1988). However, according to Clark (2023), the first content of *"learning technology*" was "the application in the field of education of inventions, industrial products, processes that are parts of a technology today" (Tkachuk, 2010, p. 4).

Therefore, there is no single definition for the term of "*pedagogical technology*". The content-analysis of the science literature sources made it possible to come across many definitions of this notion. As a result, the notion *"pedagogical technology"* developed with Pedagogy as a science and transformed into the new ones such as *"educational technologies", "learning technologies", "teaching technologies"* and others (Tkachuk, 2010, p. 9).

2. Methodological features of the development of "*educational technology*" at the university level

Methodology is from *Greek, the notion* means a way to anything, a means of achieving a goal or a combination of research techniques used in any science (Shcherba, 2004). Also, methodology is a strategy for scientific research which is based on understanding tasks, methods and valuable characteristics and solving scientific problems (Birta, 2014).

The methodology of scientific knowledge is defined as a system of initial conditions of *"educational technology"* which includes the following aspects:

a) the substantiation of a scientific theory structure based on the generalization of empirical facts;
b) relying on principles and methods of obtaining scientific information (Dubasenyuk, 2016).

The science methodology in the framework of *"educational technology"* development provides the following:

a) teaching about a structure and functions of scientific knowledge;
b) substantiation of basic, fundamental and general scientific provisions (on the basis of hypotheses, concepts, facts, pedagogical regularities);
c) teaching scientific research methods and the substantiation of practical experience for training highly qualified specialists at the university (Padalka, 1995).

Notably. if the theory of teaching Didactics is ontological knowledge, that is, knowledge description, in contrary, the concept of "*educational technology*" is normative knowledge, that is, the knowledge prescription. It includes knowledge about management norms, specific educational methods or established sequences of feedback procedures as well as intermediate result adjustment (Dahin, 2007).

"Educational technology" is implemented as a systematic, purposeful activity and it is used in educational practice at three levels:

a) *general pedagogical level* (general didactic, general educational): the technology characterizes the entire educational process in a given region, an educational institution or at a certain education level (a combination of goals, content, means and methods of education, an algorithm of subject and object activity of the process);
b) *methodological (subject) level*: subject educational technology is used in the sense of the notion of "*partial methodology*"; it is a set of methods and means for the implementation of certain content of teaching within the limits of one subject, class or teacher (the methodology of teaching subjects, teaching methodology, methodology teacher's work, an educator).

However, there are definite differences between two characteristics (methods and technologies) of teaching. Methods characterize ways, strategies of teaching or technologies and do means of effective achievement for specified educational results (competencies) through teaching. That is, the methods are more process-oriented, but, the technologies are more productive; *the local (modular) level* is a technology of certain parts of the educational process, the solution of partial didactic and educational tasks (the technology of certain types of activities, the formation of concepts, the education of certain personal qualities, the technology of new knowledge acquisition, the technology of material repetition and testing and the technology of personal work) (Psychological and pedagogical principles of teaching innovative teaching technologies in higher education, 2011).

Many educational technologies are based on the following concepts:

a) associative-reflective teaching (a theory of concept formation);
b) the theory of the gradual formation of mental actions;
c) a suggestive concept of training (a complex use of verbal and non-verbal, external and internal means of suggestion for educational purposes which contributes to extra memorization);
d) the theory of neurolinguistic programming (NLP) which considers the training process as information movement through the human nervous system;
e) theories of content generalization which are based on the hypothesis about the leading role of theoretical knowledge in intelligence formation. (Dubrovska, 2011).

Thus, the main methodological requirements for *"educational technology"* are as follows:

a) *conceptualization* (relying on a certain concept that includes philosophical, psychological, didactic and socio- pedagogical justification of educational goals);
b) *systematization, efficiency* (efficiency in terms of results, the achievement of the planned results as an education standard);
c) *the possibility of diagnostic goal-setting, planning, designing the learning process, step-by-step diagnostics, varying means and methods to correct results;*
d) *the reproduction* (the possibility of applying other subjects under other identical conditions);

e) *management* (designing a teaching process, step-by-step diagnostics): a unity of content and procedural parts and their interaction;
f) *visualization* (typical for certain technologies). It involves the use of audio-visual and electronic computing equipment, as well as the construction and application of various didactic materials and original visual aids (Zakharchuk, 2010).

The main features of the process of any cognitive action assimilation is that such actions are always active: any knowledge can be transferred only when students perform a certain creative activity (Padalka, 1995).

3. Basic and general implementation ways of educational technologies in higher education

The goal of higher education is becoming not only multidisciplinary, but also multilevel.

1. Each lecturer has a curriculum for providing content knowledge to students, but any specific type of any activity is not highlighted in each curriculum in which future specialists will use acquired knowledge (Padalka, 1995).
2. *"Educational technology"* is a projection of a theory and methodology of education. Therefore, it should optimize the educational process with a system of scientific knowledge.
3. The elements of educational technology are pedagogical communication, evaluation, demand, conflict and informative influence (Pyatkovska, 2019). For this reason, the main purpose of pedagogical influence is communication (Podolyak, 2012). Thus, the assessment should evaluate qualities that are revealed, but not the personality of a student as a whole (Baranovska, 2000).
5. The psychological atmosphere is a set of psychological conditions that prevent productive joint activities in class.
6. Any innovative educational technologies can be such an integral complex in the educational process. Therefore, it is especially relevant today to unite lecturers and psychologists. (Noskov, 2002).

Conclusions

The author concludes that general implementation ways of innovative educational technologies in higher education are aimed to develop human innovative skills and the lecturer's theoretical-methodological or technological culture; to make the only unified plan for the university and its branches; to increase the classroom load with methodically organized students' individual work; to apply the individual approach in teaching; to make special conditions for students' creativeness.

Additionally, educational technologies must be matched with the main methodological principles to form unified plans and a specific curricular of different kinds of students' cognitive skills; to increase classroom work; to introduce business games, situational problems and case-study methods into the educational process; to establish

good relationships between students and lecturers and to provide educators with a strong system of knowledge on the educational technology and methodological support.

An effective combination of all known types and levels of educational technologies should be provided.

The subject of *"Modern educational technologies"* should be created and included in a curricular of the university and it becomes relevant to develop methodological recommendations on the selection of educational technologies for specific conditions because it will help to change the ordinary system of higher education into the modern educational system.

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FLIPPED, BLENDED, AND EXPERIENTIAL: INSIGHTS FROM TEACHING ENGLISH TO UNIVERSITY FACULTY

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ABSTRACT

Most research data on online, blended, and flipped classroom come separately from students and teachers. In continuing teacher development programs, most courses are focused on the methodology of teaching a specific subject, and course participants are also subject experts. Training in general topics is often planned based on experiential learning and focuses on developing subject-related activities or using learning technology. This applied small-scale research uses the data from semi-structured interviews with nine university professors who were students in an English language training project. As the result of the COVID-19 pandemic, the same course was delivered in face-to-face, online, and blended modality, and a new format to teach English to adults was developed and piloted. Reflections of educators learning a subject outside their field of expertise add valuable information on different teaching modalities. Moreover, accidental experiential learning related to the use of flipped, online, and blended classroom took place for some participants. Thus, a professional development program based on a subject universally interesting to teachers may be feasible. Results also support the claim that blended learning is "the best of all worlds" and incorporating flipped classroom adds value to adult students' experience.

Keywords: *blended learning, experiential learning, faculty as students, flipped classroom, language learning.*

Introduction

Over the last two decades digital technologies have been widely used in education (Picciano, 2016; UNESCO, 2023); however, they were not a part of mainstream education until the COVID-19 pandemic. With the changes brought by the pandemic, "early indications are that many of the innovations made during the pandemic will continue to be valued and expected by students beyond the crisis" (Brammer & Clark, 2020, p. 456). It is therefore important for the educational community to critically reflect on their use and to ensure that it is justified.

Online, Blended, and Flipped Learning

The greatest advantage of online learning is convenience and flexibility, especially in the asynchronous mode, as it offers learning unrestricted by time, distance, and space (Cole, 2000; Mullen, 2020). However, this is negatively correlated with the quality of interaction, which is an essential element of the educational process (Anderson, 2008; Morrison-Smith & Ruiz, 2020). On the other hand, synchronous online learning using media with high social presence (Short et al., 1976) is closer to the face-to-face (F2F) modality. Moreover, research found that synchronous online communication in professional setting and adult learning leads to more efficient discussions, increased participation, and lower social stress (Lazarevic & Bentz, 2021; Morrison-Smith & Ruiz, 2020; Nguyen et al., 2022).

Blended learning is a combination of F2F and online experiences (Graham, 2006; Means et al., 2013). It combines the advantages of an F2F class with the flexibility afforded by technology (Ahlin, 2021; Law et al., 2019). At the same time, designing a blended course needs thoughtful combination of F2F and online pedagogies rather than transferring learning online (Garrison & Vaughan, 2008; Owston & York, 2018; Stephenson et al., 2023). In addition, the F2F/online ratio is significant for its success. Most researchers agree that a minimum of 30% of the time needs to be spent online with Medium (36% to 40% online) and High (50% online) blends ensuring the best results (Owston & York, 2018). Besides, the outcomes of a blended course depend on the quality of technology, instructor's flexibility, engagement and support for students, and clear expectations (Baker, 2021; Kintu et al., 2017; Law et al., 2019; Vo et al., 2020). Reflecting on the experience of transforming programs as the result of COVID-19 pandemic, many researchers believe that online and blended learning is especially suitable for adult education (Brachtl et al., 2023; Caldwell et al., 2021; McKenna et al., 2020).

Finally, in the flipped classroom, synchronous class time is spent on challenging or interactive activities that engage students' higher-order thinking skills, after they gain initial input that utilizes lower-order thinking skills asynchronously in advance (Bergmann & Sams, 2012; Bloom, 1956; Chen et al., 2014; Tang et al., 2020). Although flipped classroom has now been implemented in language education, many authors consider that more research is needed, especially beyond K-12 and undergraduate education (Turan & Akdag-Cimen, 2020; Zou et al., 2022). It is worth noticing that research into implementing online, blended, and flipped learning usually relies on data from either students or teachers. Therefore, a situation when professional educators take a course in a subject unrelated to their discipline, e.g., a foreign language, provides an opportunity to gain more informed insights into what experience these modalities offer. This leads to the first research question (RQ).

RQ 1: what insights into online and blended learning can be gained from educators taking a course in these modalities?

Research has established that some of the most important factors of successful online, blended, and flipped learning is the ability of teachers to engage and support students both F2F and online (Kintu et al., 2017; Law et al., 2019; Vo et al., 2020). That underscores the necessity of not only initial, but also continuous teachers' professional development (PD).

Teachers Professional Development & Experiential Learning

In the analysis of 156 papers on teacher PD, Sankar et al. (2021) grouped them into three categories, based on its definition. While one category does not define PD, the other two base it either on traditional approaches, where PD is focused on improving teacher knowledge and practice, or the new ones that consider individual teacher characteristics, self-directed, and collaborative learning. They also noted that "teachers' in-class teaching behavior and practices are improved by reflection on, observation of, and discussion about their experiences" (ibid., p. 6), which implies application of experiential learning in PD.

The most cited model of experiential learning is that of Kolb (Kolb, 1984, 2015). It links education, work, and personal development (Morris, 2020; Roessger, 2022). The learning cycle starts with concrete experience (CE) that leads to reflective observation (RO) and abstract conceptualization (AC) and then through active experimentation (AE) to a new concrete experience. Depending on individual preferences, Kolb described its four types and related learning styles: divergent (CE and RO), assimilative (AC and RO), convergent (AC and AE), and accommodative (CE and AC). Jarvis (2011) offered further development of the theory and included alternative learning paths as well as the possibility of not learning.

Experiential learning has been increasingly implemented in higher education (Morris, 2020) as well as in teacher professional development. Green et al. (2022) found that in the process of transitioning from blended to fully remote learning in a Master of Education in Health Professions Education program during COVID-19 pandemic students successfully went through all the stages of the Kolb's cycle. Alimuddin et al. (2021) used it as a partial foundation for their system of Pedagogical Content Knowledge. The study by Evans et al. (2018) reported a successful implementation of a blended course aimed to develop university faculty's teaching skills in blended learning that was based on experiential learning. In the above examples, experiential learning was explicitly used to either teach subject knowledge or pedagogical skills. This research is focused on students who are educators, therefore, they might be used to reflective observation. Taking a course unrelated to their subject expertise might trigger a pedagogical learning cycle for at least some of them even without a specific focus on developing pedagogical skills. Thus, the second research question was formulated.

RQ 2: Can accidental experiential learning take place when faculty are on a subject course unrelated to their expertise?

Research Context

Convenience sample of three cohorts of adult learners taking courses of English as Additional Language (EAL) at the Riga Technical University (RTU) Riga Business School English Language Center (RBS ELC) were the focus of this research. All the students were RTU faculty and therefore, had similar levels of education, interests, as well as well-developed learning habits. The courses of the same volume and content were organized within a multi-year project, used the same core materials, and were taught by the same instructors. In the 2019–2020 academic year, two 90-minute classes a week were delivered F2F. However, with the COVID-19 pandemic resulting in the prohibition to teach

F2F imposed at different times by the Government of Latvia (Ministru kabinets, 2020a, 2020b, 2021), the delivery format had to be changed.

There were three reasons for incorporating online and asynchronous components and to plan the new format for the long-term rather than as an *emergency remote teaching* measure (Hodges et al., 2020). Firstly, since online modality had become an integral part of adults' working and social life, introducing it into a language class ensures authentic language experience. Besides, research shows that mature students adapt to online learning better than younger undergraduate ones (Brachtl et al., 2023). Secondly, it provides an opportunity for adult working students to take part in classes if they are on a business trip. Thirdly, introducing an asynchronous Pre-Class task ensures that students could prepare for the more interactive or challenging tasks at their own pace and at a convenient time, thus maximizing classroom time.

The course was planned as flipped and blended, with each class divided into a 30-minute asynchronous Pre-Class and 60-minute synchronous class that met once a week F2F and once a week online. However, in the 2020 – 2021 academic year both synchronous classes were taught online, and the original flipped blended format was introduced only in the 2021–2022 academic year. Thus, the same course was taught in three different modalities: F2F, online, and blended, with online and blended courses incorporating the flipped model (Chen et al., 2014; Flipped Learning Network (FLN), 2014; Ginzburg & Daniela, 2024; Ginzburg & Sarva, 2023).

Methodology and Data Collection

I approached research questions from a pragmatic perspective (Burch, 2022; Creswell, 2007; Dewey, 1916; Frey, 2018; Moore, 1966). RBS ELC routinely collected students' opinions of their experience using student evaluation of teaching (SET) forms on the last day of a course. However, since the students in this course were also educators, I aimed to gain their insights after they had had some time to reflect on their experience and to feel its effect. Therefore, I used semi-structured interviews conducted a year after the course and thematic analysis of transcripts as qualitative methods of inquiry. The interview questions started with their motivation to enrol in the course, general opinion of the course and its organization, and its effect on the way they used English. In addition, I asked their opinion on the optimal modality for teaching adults, how teaching their subject compares to teaching English, and whether they had introduced any techniques observed in the English class into their own teaching.

Permission from the University of Latvia Ethics Commission (Nr 71-46/19) was obtained prior to interviews, and all the respondents signed an informed consent form before each interview started. I sent e-mail requests to all course participants, and nine students agreed to be interviewed. Four of them took both F2F and Blended courses, and five were from the Online course. Eight interviews were conducted F2F and one online as the respondent was outside Latvia at the time. See Table 1 for the number of course and interview participants.

Table 1 Research Base

Modality/Academic Year of Studies	Number of RTU Faculty in Training	Number of Interviews
F2F/2019–2020	43	4
Online/2021–2022	42	5
Blended/2021–2022	65	4

All the interviews were conducted in English, recorded, transcribed, anonymized, and sent to the respondents for verification. I analyzed transcripts for the F2F/Blended and Online students separately using the principles of content analysis and recommendations by various researchers (Creswell, 2007; Erlingsson & Brysiewicz, 2017; Kvale, 1996). The process included multiple transcripts' reading, identifying initial categories, classifying them, and defining the final themes.

Results

In the process of analyzing the transcripts, I realized that although some of the questions could serve as themes, additional ones also evolved. See the final list of themes identified in the interviews and the number of times each has been mentioned Table 2.

Table 2 Themes Identified in Semi-Structured Interviews

Theme	*N* of Times Mentioned by F2F/Blended Students	*N* of Times Mentioned by Online Students
Motivation to study		
Improving English	16	6
Socializing	0	3
Effect of the course	12	6
Effect of a teacher	23	8
Advantages of F2F	8	4
Advantages of online	10	12
Issues with online	5	5
Flipped classroom	3	5
Optimal variant (as choice)		
F2F	1	0
Online	0	1
Blended	3	3
No difference	0	1
Teaching own subject vs teaching English		
Different	4	4
Similar	5	5
Incorporating teaching methods into own practice	8	3

In the quotes below, respondents are identified as follows: e.g., S1, F2F/Blended – the student who took a F2F and Blended courses and was interviewed first; S1, Online – the student from an Online course who was interviewed first, and so on. Teachers' names are represented by their first initials.

Motivation to Study

The desire to improve English was the main motivating factor with many respondents specifically mentioning grammar, syntax, and speaking. "I am from physical science, and this is important to characterize my expectations. I expected to understand the logic of grammar because I don't know it 100%" (S1, F2F/Blended). "It was to return to an English class and to try to put my grammar in place because it is a sad part of my language experience" (S4, F2F/Blended). "I wanted to improve my English because I work with foreign students and it's important to talk correctly" (S3, Online).

Additionally, the opportunity to socialize was the factor for some students from the Online course: "The main reason was always to improve my English, but it was also a nice 'ritual' that we had lessons with nice people and just spent time together" (S4, Online). Some also mentioned the fact that the training was free. "Because of this unique opportunity, you have a project, you know, with everything paid" (S1, F2F/Blended).

Most of the responses reveal primarily internal motivation: to improve the use of language and, for students who took the course during a lockdown, to socialize.

Effect of the Course

A year after the course, all the respondents noted improved understanding and use of English. "The more I learn grammar, the more I understand 'the construction'. Previously, I didn't understand why people were speaking in a particular way. Now, it's clear to me" (S1, F2F/Blended). "I started to use idioms" (S2, F2F/Blended). "I think I try to use grammar. Yeah. And of course, I pay attention to that" (S4, F2F/Blended). "Well, I can speak, I speak with my friends in English now" (S3, F2F/Blended). "I started to think more about construction of sentences and some idioms. I still use them since these courses. Yes" (S1, Online).

There are two main areas the respondents reveal as affected by training: increased language awareness and improved confidence in using English.

Effect of a Teacher

Comments about teachers were offered without any prompting on my part, which demonstrates the central role of a teacher in an adult language class. "But here's a British guy [a teacher], with perfect English, it's very nice. And he really knows the 'design' of wording and phrases" (S1, F2F/Blended). "Actually, the teacher was excellent, K. is native speaker. He was one of the best teachers I think, from my point of view" (S2, Online). Some respondents also gained sociolinguistic knowledge: "And yes, J. was a very nice teacher. I got quite a lot of interesting information about English people, and society. So, it was also interesting from that point" (S3, Online).

The next group of themes is directly related to the RQ 1 and reflects the respondents' experience both as students and as university faculty, for they often commented on their own teaching experience.

Advantages of F2F

According to all the respondents, non-verbal clues are essential for successful communication and studying. "This face-to-face, of course, it's necessary to have. Yeah, it makes, I have to say, this contact with the teacher and the classmates stronger" (S4, F2F/Blended). "For the first-year students, actually, there must be more classes, classical classes. Where we are teaching them, not only the subject but we're also teaching them how to work. How, what, what it means to be a student" (S1, Online).

Thus, there is a strong sentiment that F2F modality must be at least a part of a language course as well as a university education.

Advantages of Online

All the interviewees had the experience of studying language online either entirely or as a part of the Blended course, and both groups valued it. "It was good because at the time I lived outside Riga. And therefore, it was nice that I could just switch on my computer and be on the course" (S3, Online). "It's good as we can work in groups in this e-class. Yeah, it's good. It's a good equipment to split everything. To breakout rooms because when we are all in one room, it's difficult sometimes. Everybody speaks" (S4, F2F/Blended). "Or maybe I'm sitting between two groups who are speaking [in a F2F class]. There is one group, we are in the middle, and there is another, and that's why from both sides I hear this 'sh-sh-sh' sound" (S2, F2F/Blended).

Most comments fall into two categories: convenience of studying from home and the comfort of doing group work in the Zoom breakout rooms.

Issues with Online

The main challenge all the interviewees noted was the need for an extra effort to stay focused when studying and teaching online. "…is also more demanding for learners, definitely, because you have to prepare yourself and you have to do these things even staying on the other side of the screen. So that actually requires more effort from you" (S1, Online). When answering this question, they often recalled their experience as university faculty. "I as a teacher, feel that they are not as concentrated on lectures online as a face-to-face" (S2, F2F/Blended). Other challenges included the need to be comfortable with technology and to have an appropriate environment for studies. "If a person has very big problems with computers, I think it's not good. Then he will be nervous about technical things" (S3, Online). "I think I'm lucky I didn't have any disturbances at home, so I could just sit down and listen and engage with everyone" (S4, Online).

Thus, student and teacher engagement are the main issues of using online modality. Additionally, confidence in the use of technology and a suitable study environment are required.

Flipped Classroom

Respondents from both groups had experienced flipped classroom instruction either in the Online or in Blended courses. "Actually, it's a good way how to teach: when you must do some home exercises and at least prepare a little bit for next class. I think it's a good way how to teach" (S2, Online). "Well, I liked these pre-classes – some tasks that we had before. We could think about the topic a little bit which will be discussed later" (S3, Online).

The comments justify incorporating flipped classroom into the new teaching format. The students clearly appreciated the opportunity to prepare for the classwork at a convenient time in advance. The next group of themes reflect interview questions asked to be considered from the position of experts in education.

Optimal Variant

I presented the question of which modality is optimal for adult learners as a choice between F2F, Online, and Blended, and briefly explained Blended to the respondents from the Online course. Out of nine interviewees, one chose F2F, one – Online, and one said it did not matter. The remaining six considered Blended as the optimal modality. "Definitely face-to-face. Definitely" (S1, F2F/Blended). "I don't know, but maybe blended classes work too but I don't have such experience. … I don't see a big difference. But I like to be at home. Yes. And I like to be in my place. Yes" (S5, Online). "…but now it's a dream. It's a perfect situation. I think it can't be better, what we have at that moment – now" (S3, F2F/Blended). "I think probably this blended variant is the best one" (S2, Online).

Thus, the answers confirm the idea that blended modality ensures *the best of all worlds* in adult education. The final two questions refer to the RQ 2 about whether accidental experiential learning has taken place when educators take a course unrelated to their area of expertise.

Teaching Own Subject vs Teaching English

Some respondents thought there are some similarities in teaching their subjects to teaching English. "…you see, any phenomena are based on some axioms. The same as in a language. There are some 'main bricks', you must know them. If you don't know them, you can't go ahead. The same in physics, in math, whatever" (S1, F2F/Blended). "Hmm…… in both, we need theory, very good theory. Maybe in my subject, it's more. The math part, the algorithms' part and there is less deviation from the rules" (S4, Online).

On the other hand, some respondents mentioned differences. "It is different. I can give this… oh, I don't know how to call this… like raw material, just to read the law, this can be done at home. … But you can only learn it by doing this work." (S2, F2F/Blended). "In physics, we cannot organize the whole course in a remote way, in a distant way. There must be classes which are related with the experimental setup, laboratory works" (S1, Online).

The respondents consider the need to study theory, which in a language course appears to be associated with grammar, common in teaching English and other subjects. The differences seem to be mostly related to the methods of delivery.

Incorporating Teaching Methods into Own Practice

Respondents from F2F/Blended group mentioned a wider range of approaches and techniques that they incorporated into their own teaching than those who studied Online. "And I also notice and teach using his example how to work with a group, from psychological aspects. It's so interesting! My students know, we all laugh and speak about reinforced concrete column, in different situations and it's very interesting" (S3, F2F/Blended). "Yeah, this … discussion with students. Yeah, about a problem. Yeah. How to find the solution for some problem. Yeah, it's this method I can use. Yeah" (S4, F2F/Blended).

On the other hand, interviewees from the Online course focused more on using flipped classroom and group work in the Zoom breakout rooms. "I also introduced these Pre-Classes, I send some materials before. And, when we worked remotely, then I also used these breakout rooms, tried to use sometimes, which I didn't do before, in our course" (S3, Online). One respondent clearly stated that they introduced flipped classroom in their own teaching because of taking a language course at RBS ELC. "Oh yes. Because yes, I cut one hour from their studies face-to-face. And yes, they need to listen to this recorded version, recorded slides which are like presentation and main points, but how these points can be elaborated, developed or something done with them – this we do in class" (S2, F2F/Blended). The same person mentioned breakout rooms: "I would like to incorporate this online version, these rooms with maybe two or one person. … Yes, breakout rooms" (S2, F2F/Blended).

One respondent even admitted that they started to analyze their students' language: "I ask 'why? Why did you write this sentence?' … Previously, I didn't do this.… I couldn't understand the 'construction'. Now, it's more or less clear to me, what is the student's idea and how to improve their construction" (S1, F2F/Blended).

It is apparent that some respondents noticed, reflected on, and started incorporating several techniques from their language classes. Most of those are related to classroom management, flipped classroom, and the use of breakout rooms on Zoom.

Discussion and Conclusions

This research investigated additional insights provided by professional educators who took a language course delivered in a new teaching format. The format differed from the traditional F2F in that a synchronous online class replaced either one or both F2F classes, and an asynchronous Pre-Class task was introduced as an element of flipped classroom.

The New Teaching Format

Apart from the convenience of online learning, respondents specifically noted the feeling of safety provided by the Zoom breakout rooms. Therefore, the findings that online classes lead to lower levels of social stress in undergraduate students (Lazarevic & Bentz, 2021) are relevant to adult education as well. Among the challenges, the effort to keep focused and the need for appropriate study environment were mentioned, confirming the conclusions by Brachtl et al. (2023) who argued that online learning is more suitable for mature students.

Many respondents believed flipped classroom is conductive to the learning process as Pre-Class tasks were developed or curated with the Bloom's taxonomy (Bloom, 1956) in mind. Their comments also confirm the importance of careful planning for the flipped classroom to ensure successful learning experience stated by various researchers (Bergmann & Sams, 2012; Chen et al., 2014; Tang et al., 2020). Finally, by focusing on adult language education, this paper contributes to the research on application of flipped classroom which was previously found insufficient (Turan & Akdag-Cimen, 2020; Zou et al., 2022).

Two thirds of the respondents considered that blended modality in the format it was offered to be the optimal one for adult students. Their opinion that F2F communication facilitates social interaction and thus complements online learning, extends the results of Law et al. (2019) on teaching, learning, and social presence in university to include adult education. The new teaching format represents the *replacement model* (McKenna et al., 2020). Moreover, it was planned as a High blend and utilized separate techniques for F2F and online modalities. Therefore, the favorable opinions of the respondents are in line with previous research that emphasized the importance of these factors (Garrison & Vaughan, 2008; McKenna et al., 2020; Owston & York, 2018).

Future research could benefit from investigating application of the flipped and blended format to teaching English to university students as well as in other areas of adult education.

Teacher Effect and Experiential Learning

All the respondents mentioned teachers voluntarily. This emphasizes the centrality of a teacher and confirms the validity of papers mentioned in Sancar et al. (2021) that stress the impact of a teacher's personality and behavior on student learning. This further underscores the importance of continuing teacher professional development.

Considering that the respondents are university faculty, finding out whether any accidental experiential learning had taken place was one of the aims of this research. By the time of the interview, some of the participants had started implementing some teaching techniques in their own classes, others concluded that it would be possible during the interview, and another group thought it was not possible. It appears that the first two groups may reflect accommodative and divergent learners in Kolb's (2015) taxonomy and the third might relate to Jarvis' (2011) notion that learning might not occur. Most of the techniques the respondents adopted included the use of the flipped classroom,

Zoom breakout rooms, and group work. Some respondents also reflected on classroom management as they changed the way to explain material, organize discussions, and analyze students' written work.

The respondents' readiness and willingness to incorporate elements of the flipped blended format into their own teaching testifies to the perceived quality and value of their experience. It also confirms that accidental experiential learning has taken place for some participants. This implies a potential for a teacher training program based on experiential learning that combines training in a foreign language with development of pedagogical skills, especially related to flipped and blended teaching. Interdisciplinary research into such a program might be considered in the future.

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PARENTAL PERCEPTIONS OF CHILDHOOD CANCER IN LATVIA: COPING AND OUTCOMES

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ABSTRACT

Objectives: The factors that influence parents' coping strategies after their child is diagnosed with cancer and the outcomes of coping are not fully understood. The challenges of coping can be accompanied by negative consequences, such as posttraumatic stress symptoms (PTSS), but can also result in positive long-term effects, like posttraumatic growth (PTG) experienced after the struggle of a challenging life event. This study aims to examine the relationship between caregivers' cognitive beliefs about the illness, personality traits, coping strategies they use to adapt to childhood cancer, and the psychological outcomes (PTSS and PTG) after cancer treatment.
Method: A prospective, longitudinal, exploratory design was used in this study. Fifty-nine caregivers (51 mothers, 8 fathers) of pediatric cancer patients completed the Latvian version of the Psychosocial Assessment Tool (PAT) and brief personality measure Big Five Inverntory-10 (BFI-10) shortly after the diagnosis (T1). The second data collection (T2) was after the completion of the curative treatment. During this phase, the Responses to Stress Questionnaire (RSQ), Survivors' version, the Impact of Event Scale-Revised (IES-R), and the Posttraumatic Growth Inventory (PTGI) were administered. Parents were recruited from Children's Clinical University Hospital in Riga, Latvia.
Results: Significant correlations were found between psychosocial risk factors (e.g., acute stress reactions of parents after diagnosis and negative cognitive beliefs about the illness) at the beginning of the treatment and posttraumatic symptoms after the completion of the treatment. The differences in the choice of coping strategies (Primary / Secondary Control Engagement Coping), as well as two types of involuntary stress responses (involuntary engagement and involuntary disengagement) were observed and were significantly related to posttraumatic outcomes.
Implications: The findings indicate that the intricate interconnection of initial cancer perceptions of parents, personality traits, and involuntary coping reactions plays a significant role in influencing levels of PTTS and PTG.

Keywords: *childhood cancer, coping strategies, parental stress, psychosocial assessment, posttraumatic growth, posttraumatic stress.*

Introduction

The field of pediatric oncology has witnessed significant changes in recent years due to the increased possibility of achieving remission more frequently. Despite childhood cancer still being one of the leading causes of childhood, there is a shift towards destigmatizing the perception of the disease. Notable increases in 5-year survival rates have been observed, particularly for acute lymphoblastic leukemia and non-Hodgkin lymphoma, with lymphomas showing a survival rate over 90% (Botta et al., 2022). In Latvia, where approximately 50 children are diagnosed annually, cancer incidence and survival rates align with European trends.

These survival improvements (Jemal et al., 2017) have led researchers to explore posttraumatic growth (PTG), in the face of adversity. PTG refers to the mental process through which individuals who have undergone trauma construct positive interpretations and discover significance in the traumatic experience. This process leads to the restoration of pre-existing mental frameworks and brings about positive alterations in one's self-perception, relationships, and appreciation of life (Tedeschi & Calhoun, 1996). This focus represents a shift from solely addressing negative psychological impacts like posttraumatic stress symptoms (PTSS) and health anxiety, revealing significant resilience in patients and parents amid adversity (Howard Sharp et al., 2023).

This study integrates both approaches by assuming the coexistence of PTSS and PTG and emphasizing their interaction. The longitudinal design at two time points provides a more nuanced view of the contribution of psychosocial factors, personality traits and stress coping strategies in predicting outcome results.

Posttraumatic Growth in Relation to Posttraumatic Stress in Parents

A systematic review by Duran (2013) highlights that childhood cancer survivors (CCS) and their families often derive benefits from trauma, such as increased life appreciation, self-awareness, positive family attitudes, and motivation for societal contribution. Additionally, Halldorsdottir et al. (2022) reviewed 16 studies on PTG in CCS family members, finding that most caregivers reported high PTG scores, especially in personal growth and family relationships. Notably, no connections were found between sociodemographic or medical factors and PTG; rather, social support and proactive coping strategies were key to fostering growth in the face of adversity.

The relationship between PTSS and PTG is not clear. Yonemoto et al. (2012) reported that elevated levels of PTSS were linked to increased PTG in parents of osteosarcoma cancer survivors. In contrast, Irie et al. (2021) did not observe an association between PTSS and PTG among parents of CCS. They noted that parents who engaged in more re-examination of core beliefs reported higher levels of PTG, but there was no significant positive correlation between intrusive rumination and PTG. In a study involving parents and adolescent cancer survivors (Barakat et al., 2006), it was found that PTG and PTSS were positively correlated for survivors. However, for parents, PTG was not associated

with their child's treatment or PTSS. Instead, it was found to be better predicted by caregivers' sense of perceived control.

This suggest that, despite PTSS and PTG can co-occur after a traumatic event, their relationship is nonlinear and may be better explained as curvilinear. It is probable that as an individual's distress levels rise, the usefulness of benefit finding increases, but only up to a certain extent (Kritikos et al., 2021). The outcomes of PTG may be predicted through different pathways, that are specific to trauma type and also the time after traumatic event (van Gorp et al., 2023).

Posttraumatic Growth in Relation to Coping Strategies and Personality Traits

A comprehensive review by Seiler & Jenewein (2019) analyzed 154 studies on PTG and resilience in cancer, proposing a model with two PTG trajectories. The direct pathway highlights how personality traits (e.g., optimism) and coping competencies (e.g., problem-solving, seeking social support) facilitate coping. Conversely, the indirect pathway involves reducing cancer-related stress by reshaping core beliefs about oneself.

Kritikos et al. (2021) found that engagement coping strategies like deliberate rumination and positive reappraisal positively correlate with benefit finding and growth in pediatric populations, while accepting responsibility for a child's diagnosis (Willard et al., 2016) and intrusive rumination negatively impact these outcomes. Secondary control strategies, such as acceptance and cognitive restructuring, help children adapt to chronic illness, whereas disengagement coping hinders adjustment (Compas et al., 2012).

In a study of 83 caregivers, Gardner et al. (2017) found that higher active and emotional coping, positive spiritual coping, social support, and optimism predict greater benefit finding, while acceptance coping showed no association. Quality of life was more strongly linked to benefit finding in caregivers with fewer psychosocial resources, suggesting that benefit finding may serve as a resilience factor.

Personality significantly influences specific coping strategies, but not general (engagement vs. disengagement) coping styles (Connor-Smith & Flachsbart, 2007). However, research on how personality affects coping in pediatric oncology remains limited.

The findings of Bürger Lazar & Musek (2020) confirmed that approximately 60% of the variance in parental well-being in cancer settings could be attributed to factors such as parental personality, specifically Neuroticism, emotion-focused coping strategies, and the child's quality of life, particularly in terms of physical functioning. Recent findings suggest that parental coping outcomes after a child's cancer diagnosis are more closely related to dispositional traits (e.g., optimism, neuroticism) than to medical factors (Sharp et al., 2022). Further research is needed to explore the mechanisms between personality and posttraumatic outcomes in these parents.

Posttraumatic Growth and Cognitive Beliefs about Illness

Illness cognitions refer to how parents perceive the stress of their child's illness, treatment severity, and their coping ability, directly influencing their distress levels (Kazak et al., 2004). In a study of 120 parents of children with (Lietaviete & Martinsone, 2024),

42% of the variation in cancer-related beliefs of parents could be attributed to 'catastrophic' versus 'optimistic' thinking patterns (e.g., *"Cancer is a death sentence"* vs. *"We are capable of making sound treatment decisions"*). Optimism is seen as both a positive thinking pattern and a personality trait. The research also found that child behavioral problems and family illness beliefs significantly affected parental stress reactions post-diagnosis, with cancer-related beliefs explaining 11% of the variability in this connection.

Cognitive beliefs about illness significantly affect parents' initial stress responses and long-term coping outcomes, particularly PTG, which results from cognitive and emotional processing of trauma (Picoraro et al., 2014). Key components of cognitive processing involve re-examination of disrupted core beliefs, engaging in intrusive and negative rumination, and practicing deliberate and constructive rumination to derive meaning from trauma. Notably, parents of CCS benefit more from re-examining core beliefs, while those with children facing chronic diseases find deliberate rumination more beneficial for PTG (Irie et al., 2021).

Further, van Gorp et al. (2023) found that parents' illness perceptions, particularly beliefs about helplessness vs. acceptance, influence their long-term psychosocial well-being. Psychological factors, such as fear of disease progression, negatively impact pediatric cancer patients' well-being, especially in follow-up care (Herzog et al., 2023).

Hence, we hypothesize that cancer-related beliefs not only forecast the initial stress response of parents but also play a role in shaping coping outcomes, such as PTSS and PTG. Thus far, comprehensive studies on the illness cognitions, coping strategies, and psychological outcomes of parents of children with cancer in Latvia are lacking. The research questions for this study are:

(1) What are relations between posttraumatic stress symptoms and posttraumatic growth in a sample of Latvian parents of CSS?
(2) What are the relationships between caregivers' personality traits, cognitive beliefs about the illness and initial stress reactions after diagnosis in T1, and coping strategies they use to adapt to childhood cancer and the psychological outcomes (PTSS and PTG) after cancer treatment in T2?
(3) How parental coping strategies and personality traits predict adaptation (lower PTSS) and PTG in parents of cancer survivors?

Methodology

Participants and procedure

The data in this article were collected through a longitudinal follow-up study, which was part of a larger research project involving 120 children with cancer and their parents who participated in a psychosocial support program at the Children's Clinical University Hospital in Riga (Latvia) from 2020 to 2023 (Lietaviete, 2023). Institutional Review Board at the academic medical center approved the study procedures.

At T1 data were collected from 109 mothers and 11 fathers with children newly diagnosed or relapsed with cancer (the time ranged from 1 to 12 months). The participants'

ages ranged from 25 to 68 years (mothers: M age = 40.94, SD = 6.83, fathers: M age = 39.45, SD = 3.64). Data was collected primarily from the main caregiver, present with the child during the hospital visit. There were 66 boys and 54 girls among the patients (M age = 7.13, SD = 4.73, range: 0–17 years). The childhood cancer diagnoses in the sample were leukemia and lymphoma (n = 74; 62%), brain and spinal cord tumors (n = 19; 16%), solid tumors, e.g., sarcoma (n = 23; 19%), and others (n = 4; 3%).

At T2, data were collected from 59 parents, predominantly mothers (n = 51; 86%). The participants' ages ranged from 27 to 54 years (M age = 40.21, SD = 3.91). Parents whose child succumbed to cancer between the two study phases or experienced current relapse of cancer were not invited to participate in the second research (19 parents excluded). The time since the end of the curative treatment ranged from 2–41 month (M = 15.16, SD = 12.58). In the original research design, the follow-up was initially planned for up to a year after curative treatment. However, due to the small sample size, the survey was expanded to include parents who were up to 41 months post-treatment and had participated in the initial research in 2020. There were 32 boys and 27 girls among the patients (M age = 9.12, SD = 4.24, range: 3–18 years). The cancer diagnoses in the subsample were leukemia and lymphoma (n = 41; 69%), brain and spinal cord tumors (n = 5; 9%), solid tumors, e.g., sarcoma (n = 12; 20%), and others (n = 1; 2%). For recruitment, families were sent an email of inviting participation in the second study. The response rate was 58.41%. Informed consent was obtained from all participants.

Measures

At T1 parents completed the Latvian version of the Psychosocial Assessment Tool (PAT) and brief personality measure Big Five Inverntory-10 (BFI-10).

The Latvian version of the PAT (Lietaviete & Martinsone, 2024), adapted from PAT 2.0 and PAT 3.1 (Kazak et al., 2018), assess families' psychosocial risks across five domains, of which two have been included in this analysis: Stress Reactions after diagnosis (13-items) and Family Beliefs (10-items). Stress Reactions subscale encompasses parental initial stress reactions shortly after diagnosis (such as mood swings, bad dreams or nightmares about the child's illness, discomfort (sweating, feeling angry or anxious) when asked about the child's diagnosis, difficulties in relaxing due to increased stress, etc.). Family Beliefs subscale contains both positive and strongly negative cancer-related cognitions (e.g., *"The doctors will know what to do"*; *"Cancer is a death sentence"*).

BFI-10 (Rammstedt & John, 2007) is a brief 10-item self-assessment survey that measures five personality factors: neuroticism, extraversion, openness, agreeableness and conscientiousness.

At T2 parents of cancer survivors were asked to complete two outcome measures: the Impact of Event Scale-Revised (IES-R), the Posttraumatic Growth Inventory (PTGI) and the Responses to Stress Questionnaire (RSQ), the survivors' version focusing on coping strategies.

The IES-R (Weiss & Marmar, 1997) is a self-assessment survey for PTSS comprising 22 items and three distinct subscales: 'Intrusion' (consisting of intrusive thoughts,

nightmares, etc.); 'Avoidance' (e.g., emotional numbness, avoidance of emotions, situations, and thoughts); and 'Hyperarousal' (e.g., irritability, hypervigilance, etc.).

PTGI (Tedeschi & Calhoun, 1996) is also a self-report questionnaire comprising 21 items and contains five domains of PTG: 'Relation to others', 'New possibilities', 'Personal strength', 'Spiritual change' and 'Appreciation of life'. Psychometric properties are adequate (Maslovska, 2008).

RSQ (et al., 2000) is a self-report questionnaire about parental coping responses in two versions: during the pediatric cancer treatment and for survivors. Both versions contain 57 items and 5 subscales. At the top of the hierarchy is the distinction between engagement and disengagement coping. At the next level, engagement coping can be distinguished into 'Primary Control Engagement' (problem solving, emotional expression and emotional regulation) and 'Secondary Control Engagement' (cognitive restructure, positive thinking, acceptance). 'Disengagement' coping includes strategies such as avoidance, denial, wishful thinking, and distraction. Additional two subscales reflect involuntary responses to stress: 'Involuntary Engagement' (e.g., rumination, intrusive thoughts, impulsive action) and 'Involuntary Disengagement' (e.g., cognitive interference, inaction, numbing).

Data analytic plan

The data were analyzed with R version 4.20 using the psych package (Revelle, 2023). A series of correlational and regression mediation analyses were performed. Correlations were investigated employing Pearson's and Spearman's correlation coefficient, adjusted with BH methods. The choice between Pearson's and Spearman's tests was based on the nature of the data, specifically the assumptions of normality and the linear relationship. A p value < .05 was considered to be statistically significant for all tests.

The impact of various coping strategies and personality traits on outcome measures (PTG and PTSS) were examined using causal mediation analysis with multiple linear regression. The indirect and direct effects were estimated using a non-parametric bootstrap procedure with 5,000 samples and 95% bias-corrected confidence intervals to ascertain associated standard errors and significance levels.

Results

The means, standard deviations and Cronbach's alphas for the study variables are presented in Table 1. All of the subscales showed nearly acceptable to good Cronbach's alphas (.63–.86). Some coping subscales like 'Secondary Control Engagement' and 'Disengagement' exhibited lower internal consistency (.63) compared to other subscales, as it probably assesses a broader, multi-dimensional concept.

Table 1 Descriptive Statistics and Internal Consistency Coefficients for Study Variables

	M	*SD*	Range	Cronbach's α
IES-R total	1.81	0.57	0–3.49	.92
Intrusion	1.81	0.66	0–3.61	.84
Avoidance	1.82	0.64	0–3.71	.84
Hyperarousal	1.86	0.55	0–3.33	.65
PTGI total	59.32	17.82	17–92	.93
Relation to others	20.85	7.72	3–33	.86
New possibilities	12.61	5.79	0–24	.84
Personal strength	13.80	12.94	2–21	.73
Spiritual change	5.23	3.34	0–10	.82
Appreciation of life	11.50	12.86	0–15	.84
RSQ				
Primary Control Engagement	23.55	4.08	15–36	.79
Secondary Control Engagement	38.28	6.13	25–53	.63
Disengagement	59.30	8.18	41–77	.63
Involuntary Engagement	38.28	9.75	18–60	.81
Involuntary Disengagement	25.12	6.97	12–39	.81

IES-R – the Impact of Event Scale-Revised; PTGI – the Posttraumatic Growth Inventory; RSQ – the Responses to Stress Questionnaire

Majority of parents of CSS in the study reported experiencing personal changes (positive or negative) after the end of the cancer treatment of their children. Specifically, 45 (77%) affirmed experiencing changes, 12 (20%) were uncertain, and 2 (3%) denied any personal changes. There was no significant correlation found between posttraumatic growth (PTGI score) and the overall posttraumatic stress symptoms (IES-R score) and its clusters (Table 2).

Table 2 Pearson's Correlation between IES-R Subscales and PTGI Subscales

	IES-R total	Intrusion	Avoidance	Hyperarousal
PTGI total	.00	.13	–.12	.06
Relation to others	–.06	.07	–.16	.00
New possibilities	.09	.22	–.02	.10
Personal strength	–.09	–.06	–.10	–.03
Spiritual change	.13	.23	–.02	.24
Appreciation of life	**.28***	**.32***	.21	.26

IES-R – the Impact of Event Scale-Revised; PTGI – the Posttraumatic Growth Inventory
*$p < .05$. **$p < .01$

Only 'Appreciation of Life' subscale showed a significant correlation with the IES-R total score and 'Intrusion'. Neither the IES-R nor the PTGI score was significantly correlated with the parents and patients age at the time of diagnosis, gender of parents, diagnosis, or time after the end of treatment.

To answer the research question regarding the relationships between caregivers' personality traits, cognitive beliefs about the illness, initial stress reactions in T1 and the psychological outcomes (PTSS and PTG) after cancer treatment in T2, Spearman's correlation analysis was conducted (Table 3).

Table 3 Spearman's Correlation between Outcome Measures (IES-R, PTGI) at T2 and Variables Measured at T1 (Personality Traits, PAT Subscales: Stress Reactions, Family Beliefs)

	Measures at T1						
	N	**E**	**O**	**A**	**C**	**Stress Reactions**	**Family Beliefs**
Measures at T2							
IES-R total	**.36****	–.19	–.23	–.19	–.01	**.41****	.22
Intrusion	**.37****	–.17	**–.27***	–.08	–.05	**.45*****	.20
Avoidance	.23	–.22	–.18	–.21	.02	**.33***	.25
Hyperarousal	**.34***	–.05	–.13	–.17	–.01	**.38****	.16
PTGI total	–.09	.07	.10	**.33***	.18	–.16	**–.39****
Relation to others	.11	.02	.16	.17	–.07	–.05	**–.32***
New possibilities	–.08	.07	.14	.24	.12	–.12	**–.30***
Personal strength	**–.45****	.22	.09	**.43****	.25	**–.30***	**–.43****
Spiritual change	.07	–.13	–.15	.12	.15	–.02	–.19
Appreciation of life	.03	–.01	–.01	–.05	–.01	.01	–.15

IES-R – the Impact of Event Scale-Revised; PTGI – the Posttraumatic Growth Inventory; N – Neuroticism, E – Extraversion, O – Openness, A – Agreeableness and C – Conscientiousness.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$

Neuroticism significantly correlated with IES-R total score ($rho(57) = .36$, $p = .043$) and with the 'Intrusion' and 'Hyperarousal' subscale. Negative correlation was found between Neuroticism and the 'Personal strength' subscale, but not with PTGI total score. Some significant associations were found between Agreeableness as personality trait and PTGI total score and the 'Personal strength' subscale. Significant correlations (Spearman's *rho* between .33–.45) were observed between the Stress Reactions subscale, which encompasses parental stress reactions shortly after diagnosis, and the IES-R total score and its subscales.

Cancer-related cognitions, as assessed by the 'Family Beliefs' subscale in PAT, demonstrated negative correlations with various aspects of parental PTG, but not PTSS. Notably, catastrophic thinking patterns (e.g., *"Cancer is a death sentence"*; *"People will pull away from us"*) were linked to lower perceived PTG in relations to others, in acknowledging new possibilities in life, and less perceived personal strength.

Spearman's rank correlations, adjusted with BH methods, were used to answer the research question regarding which coping strategies are associated with better adaptation and PTG in parents of CCS and also with other variables, like personality traits and initial stress after diagnosis (Table 4).

Table 4 Spearman's Correlation between Coping Strategies and Outcome Measures (IES-R, PTGI) and Prognostic Variables (PAT and BFI-10)

	RSQ subscales				
	Primary Control: Engagement	**Secondary Control: Engagement**	**Primary & Secondary Disengagement**	**Involunt. Engagement**	**Involunt. Disengagement**
IES-R total	.09	.05	.15	**.73*****	**.68*****
Intrusion	.10	.05	.09	**.72*****	**.70*****
Avoidance	.03	.00	.11	**.66*****	**.59*****
Hyperarousal	.14	.13	.22	**.62*****	**.57*****
PTGI total	**.31***	**.35***	.11	–.24	–.14
Relation to others	**.35****	**.37****	.07	–.19	–.13
New possibilities	.24	**.31***	.10	–19	–.13
Personal strength	.25	**.30***	.20	**–.39****	**–.30***
Spiritual change	.10	.12	–.01	–.06	.07
Appreciation of life	.13	.15	–.04	–.05	–.06
PAT total	.04	–.02	–.04	**.40****	.24
Stress Reactions	.16	.05	.11	**.55*****	**.45*****
Illness Beliefs	–.11	–.12	–.01	**.31***	**.40****
BFI-10					
Neuroticism	.10	.07	–.11	**.59*****	**.47*****
Extraversion	**.33***	.22	.16	–.12	–.16
Openness	**.33***	**.37****	**.30***	**–.28***	–.14
Agreeableness	.01	.06	.11	**–.34***	–.22
Consciousness	–.18	–.16	–.05	–.07	–.15

RSQ – the Responses to Stress Questionnaire; IES-R – the Impact of Event Scale-Revised; PTGI – the Posttraumatic Growth Inventory; PAT – Psychosocial Assessment Tool, Latvian version; BFI-10 – brief Big Five Inventory

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$

It is noteworthy that among the various coping strategies studied, only engagement coping strategies demonstrated a significant link to PTG in this context. Specifically, the 'Primary Control Engagement' subscale, encompassing strategies related to problem solving and emotional expression, correlated with the PTGI total score (*rho*(57) = .31, p = .017), as well as with the 'Relation to Others' subscale. 'Secondary Control

Engagement' subscale (strategies connected with acceptance and cognitive reappraisal) also correlated with PTGI total score (*rho*(57) = .35, p = .012), and with various subscales. The 'Personal strength' subscale was negatively related to involuntary coping reactions.

The primary coping strategies were found to be correlated with personality traits such as Extraversion and Openness. Additionally, Openness as a personality factor showed various correlations with other coping styles, including secondary control engagement, disengagement, and involuntary engagement.

The involuntary engagement and disengagement reactions exhibited significant correlations with the IES-R total score and all its subscales. Moreover, these involuntary reactions were significantly associated with Neuroticism, a personality trait known for emotional instability and negative affect (correlations between .47–.59). There was also significant correlation between the 'Involuntary Engagement / Disengagement' and catastrophic cancer-related beliefs (correlations between .31–.40). No significant correlation was found between Neuroticism and the 'Family Beliefs' subscale, but the correlation between Neuroticism and Stress Reactions after diagnosis was significant.

Multiple linear regressions were employed to answer the research question how parental coping strategies and personality traits predict better adaptation: lower PTSS and higher PTG in parents of CSS. The mediation models, which examined the prognostic role of personality traits (e.g., Neuroticism) on outcomes (PTTS and PTG) through various coping strategies, generally failed to provide satisfactory explanations, because of the small sample size and low statistical significance, although there were a few noteworthy exceptions.

Initial stress reactions after diagnosis as a mediator explained 32% of variance in the relationship between Neuroticism and PTSS of parents after the treatment. The effect was significant (p = .028). The total effect of Neuroticism on PTSS without considering mediator was 2.55, 95% CI [0.74–4.34], p = .006. The direct effect (ADE) of Neuroticism on PTSS, accounting for the initial stress reactions of parents after the diagnosis as a mediator, was 1.71, 95% CI [–0.12–3.68], p = .076, and the indirect effect (ACME) was 0.85, 95% CI [0.89–1.97], p = .022.

Cognitive beliefs about the illness as a mediator explained 11% of variance in the negative effect between Neuroticism and 'Personal strength' as a factor of PTG, however the indirect effect was not significant. The causal mediation analysis dissected the total effect (–1.05, p < .001) into direct effect (ADE = –0.92, p < .001) and indirect effect (ACME = –0.12, p = .30).

Involuntary Engagement reactions, such as rumination, intrusive thoughts, emotional and physiological arousal, and impulsive action, as a mediator explained 10% of variance in the negative association between Neuroticism and perceived 'Personal strength', but also this effect was not significant. The causal mediation analysis dissected the total effect (–1.08, p < .001) into direct effect (ADE = –0.96, p = .01) and indirect effect (ACME = –0.108, p = .62).

Discussion

The study yields several significant findings. Firstly, we did not find significant correlations between PTG and the overall PTSS and initial stress reaction after diagnosis. However, there was a significant association between the latter two factors. Secondly, we found that engagement coping strategies significantly contributed to PTG and were correlated with personality traits such as Extraversion and Openness. Additionally, involuntary engagement and disengagement reactions were significantly linked to PTSS and Neuroticism. Thirdly, the initial perceptions of the cancer diagnosis were found to be associated with later psychological outcomes of parents. More catastrophic cancer-related cognitions were linked to lower PTG after treatment, while higher stress reactions after diagnosis were linked to higher levels of PTSS after treatment.

Co-occurrence of Posttraumatic Growth and Posttraumatic Stress Symptoms

Following the ordeal of supporting their child through illness, majority (77%) of parents disclosed experiencing profound personal transformations. Nevertheless, these changes are multifaceted, encompassing both positive and negative aspects. Despite of co-occurrence of PTG and PTSS in parents, we did not observe significant connections between them. Only 'Intrusions' subscale (e.g., intrusive thoughts, feelings, imagery, dissociative-like re-experiencing, etc.) was correlated with 'Appreciation of Life' subscale. This finding aligns with other research indicating a positive association between PTG and the fear of cancer recurrence, which encompasses future-oriented intrusive thoughts (Koutná et al., 2021), but also may enhance appreciation of life.

The Latvian sample of parents of children with cancer exhibited higher levels of PTG (M = 59.32, SD = 17.82) compared to a Dutch sample (M = 45.9, SD = 21.2) reported by van Gorp et al. (2023). This difference may be attributed to the shorter time since treatment completion in the Latvian group (M = 15.16 months) versus the Dutch group (M = 21.3 years), leading to a more acute awareness of positive changes post-trauma. Additionally, PTSS were lower in the Latvian sample compared to a Lithuanian sample (Banienė & Žemaitienė, 2020), where parents were recruited shortly after diagnosis. As distress levels typically decrease after the initial diagnosis and treatment phase and levels of PTG and PTSS vary at different stages, identifying caregivers' latent profiles of adjustment could enhance outcome predictions (Howard Sharp et al., 2023).

Initial Psychosocial Risk Factors in Relation to Post-Treatment Outcomes

The association between PTG and initial stress reactions of parents (e.g., severe mood swings, nightmares, etc.) after diagnosis was negative and non-significant. This finding is consistent with other research indicating that distress was not correlated with PTG, thereby reinforcing the notion that these are distinct dimensions in the post-diagnosis experience (Morris & Shakespeare-Finch, 2011).

However, initial stress reactions were strongly associated with PTSS after the treatment. Initial stress reactions also significantly mediated the relationship between

Neuroticism and PTSS in parents with 32% variance explained. These findings align with other research demonstrating that distress was linked to PTSS, but not to PTG (Barakat et al., 2021). Family psychosocial risk at diagnosis emerges as a stronger predictor, surpassing demographic and cancer-related factors, of caregiver resilience outcomes at the conclusion of treatment. Similarly to Barakat et al. (2021), we also did not find significant associations between demographic and medical variables and the outcome measures in our sample.

Our findings indicate that cancer-related beliefs and perceptions of illness, particularly if they are catastrophic, were linked to lower adjustment and lower PTG. Negative beliefs about illness were also related to involuntary engagement (e.g., rumination, intrusive thoughts) and involuntary disengagement (e.g., cognitive interference, emotional numbing, etc.) coping reactions. The findings suggest that initial negative beliefs about child's cancer (e.g., *"Cancer is a death sentence"*) may elicit a more profound initial shock and this, in turn, could result in interference of further cognitive processing (the re-examination of core beliefs, search for meaning, benefit finding, etc.). Consequently, it may impede the progression of PTG (Picoraro et al., 2014).

Interaction between Personality and Coping in Regard to Posttraumatic Outcomes

We found that greater use of engagement strategies, such as primary control and secondary control, was significantly associated with PTG, but involuntary reactions were strongly correlated with PTSS. The 'Primary Control Engagement' subscale, encompassing strategies related to problem-solving and emotional expression, as well as 'Secondary Control Engagement' strategies, which includes acceptance and cognitive reappraisal, are both correlated with the PTGI total score and its dimensions, especially with 'Relations to others'. The presence of social support and effective coping strategies during challenging times fosters PTG (Halldorsdottir et al. 2022). This may elucidate why families of CSS often express an increased sense of familial closeness. Furthermore, effective use of primary control coping strategies for cancer-related stressors may also extend to the use of primary control coping for social stressors, a practice linked to improved social adjustment and increased PTG (Desjardins et al., 2021).

PTG in the domain of 'Personal strength', that occurs when a greater sense of self-reliance is recognized, was positively associated with 'Secondary Control' strategies (e.g., acceptance, positive thinking) and personality traits (lower Neuroticism, higher Agreeableness). However, the mediation models, which examined the impact of personality traits like Neuroticism on outcomes through coping strategies, were generally insufficient due to small sample sizes.

Conclusions

To our knowledge, this was the first longitudinal research with parents of pediatric cancer patients involved in Latvia tracking them from the child's diagnosis until

several months after the completion of treatment. Our findings lead us to the conclusion that personality factors and the intensity of the initial stress response can predict later psychological outcomes. Parents' initial stress reactions and cognitive beliefs can be modified early in treatment, highlighting their importance in delivering posttraumatic growth-oriented support.

This study provides novel insights into pediatric oncopsychology, particularly in Latvia, but methodological challenges hinder result generalization. Variability in treatment duration, definitions of remission, and issues like drop-outs and relapses create a heterogeneous sample. The study's intended 12-month follow-up varied significantly, which could influence results related to PTSS and PTG.

Future research should prioritize controlled, longitudinal designs to clarify the link between coping mechanisms and posttraumatic outcomes in pediatric cancer. Utilizing latent profile analysis over traditional approaches is recommended, as examining caregiver trajectories and coping profiles could yield valuable insights into modifiable psychosocial traits for clinical practice and interventions.

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PARENTS' POSTTRAUMATIC REACTIONS AND TRAUMA-RELATED COGNITIONS AFTER PREMATURE BIRTH

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ABSTRACT

The aim of the present study was to explore the differences between mothers' and fathers' posttraumatic reactions and cognitions after preterm birth. According to Euro-Peristat data, premature births constitute an average of 6.9% of all live births in Europe and potentiate a severely stressful event for parents resulting in different posttraumatic reactions. In accordance with the posttraumatic stress cognitive model, negative cognitive appraisals are critical in sustaining of posttraumatic stress reactions and the development of posttraumatic stress disorder in parents following traumatic childbirth. Some research demonstrated evidence of different parental reactions – fathers showed a more delayed onset in their posttraumatic reactions, but, by 4 months, were at even greater risk than mothers. Therefore, psychological support for fathers was missed or even denied. In this study of the psychological effect of premature birth, mothers and fathers were asked to complete the Impact of Event Scale-Revised and Posttraumatic Cognitions Inventory. Data has been collected from 30 mothers and 24 fathers up to 18 months after birth. Fathers' and mothers posttraumatic reactions after the premature birth of the infant are significantly different during the time course where fathers showed lower posttraumatic reactions than mothers in the first months, then exceeded reactions of mothers around 7–12 months and equalized around 13–18 months. Differences in trauma-related cognitions for mothers and fathers were noted – fathers had significantly higher scores in the self-blame scale in six months since birth and higher scores in the negative cognitions about the world scale in the next six months. Collected data could help to plan and implement appropriate support for parents of preterm birth infants.

Keywords: *parents, posttraumatic reaction, posttraumatic stress disorder, premature birth, trauma-related cognitions.*

Introduction

A full-term human pregnancy lasts 40 weeks. Delivery that occurs before 37 completed weeks of pregnancy is considered to be a preterm birth (World Health Organization [WHO], 2023). According to Euro-Peristat data, premature births constitute an average of 6.9% of

all live births in Europe (Euro-Peristat project, 2022). Approximately 15 million babies are born preterm annually worldwide, meaning that 1 in 10 babies are "born too soon" (Blencowe et al., 2013). In 2022, 910 babies were prematurely born in Latvia (Health Statistics Database, 2024). Unfortunately, the number continues to increase (WHO, 2023).

Globally, premature birth is the leading cause of death in children under the age of 5 years. Even though in recent years, mortality rates have decreased due to the development of advanced medical technology, improvements in perinatal care programs, and the establishment of neonatal intensive care unit (NICU), some of the prematurely born babies could have serious health issues, which would impact their further development and overall quality of life (Ohuma et al., 2023). Real and perceived risks by both parents during premature birth, to the health and life of the mother and the baby, uncertainty about the recovery and development of the baby, special care, are all significant sources of traumatic stress for the parents (Heyne et al., 2022; Ionio et al., 2016; Malouf et al., 2022).

As many studies show, some parents of premature infants develop posttraumatic stress disorder (PTSD; Laccetta et al., 2023; Misund et al., 2013; Schecter et al., 2020), which is a mental illness with debilitating symptoms such as intrusion symptoms (e.g., recurrent and intrusive distressing memories of the traumatic event, flashbacks, or nightmares), persistent avoidance of thoughts and activities that remind of the event, negative alterations in cognition and mood associated with the traumatic event, and hyperarousal (American Psychiatric Association [APA], 2013), but most of the parents display posttraumatic reactions (Gondwe & Holdith-Davis, 2015; Koliouli et al., 2016; Malouf et al., 2022).

Depending on the intensity of the trauma experienced by the parents, the recovery process and quality of life of the baby could be affected (Petit et al., 2016; Pierrehumbert et al., 2003). Most of the studies were directed towards the mother of the premature born baby. Over time came the realization about the importance of understanding the experience of fathers, that could have long-term effects on the psychological wellbeing of mothers and babies. However, the mental health of fathers has long been neglected and is still an underrepresented topic in this field of research (Singley & Edwards, 2015). Having summarized the results of different studies, Wong et al. (2016) emphasize the need to move the focus from research of psychological health of mothers towards a wider family perspective, including the fathers. As authors concluded, fathers are the mostly forgotten parent in perinatal mental care. A recent systematic review confirms this, where a total of 1,053 participants across 15 studies were included, 1,009 of whom were mothers and 44 were fathers of preterm newborns (Laccetta et al., 2023).

Findings regarding differences between the posttraumatic reactions of mothers and fathers of preterm birth are mixed. Comparing such reactions after 2–4 week time period after the baby is placed in the NICU, it was discovered that 44% of mothers had post-traumatic reactions that meet the criteria for acute stress disorders, but none of the fathers had such reactions (Shaw et al., 2006). A systematic review aimed to identify the prevalence of PTSD in mothers and fathers of high-risk infants admitted to the NICU (McKeown et al., 2023) discovered a wide variation of reported prevalence rates of PTSD

of 4.5–30% in mothers and 0–33% in fathers. Shaw et al. (2009) found that fathers, trying to be supportive to mothers, tend to express their stress later. Approximately 4 months after the preterm birth and the decrease of PTSD symptoms for the mothers, the reactions of the fathers increased and even exceeded that of the mothers (Shaw et al., 2009). It would be desirable to further study this difference, as much remains unclear.

In accordance with the posttraumatic stress cognitive model (Ehlers & Clark, 2000), negative posttraumatic cognitions play an important role in the development and upkeeping of the post-traumatic reactions and PTSD (Ford et al., 2010), also called maladaptive cognitive appraisals (Gómez de La Cuesta et al., 2019). Negative posttraumatic cognitions include cognitions about the world, the self, and self-blame (Brown et al., 2019). The beliefs that the world is a dangerous place and the self is incompetent or somehow to blame for the trauma is not just one of the upkeeping factors of PTSD, but also an important part of the PTSD symptom cluster as negative alterations in cognitions and mood according to The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; APA, 2013). These are the intervention targets, to prevent the development of PTSD or to reduce the intensity of posttraumatic reactions (Brown et al., 2019). It has been discovered that the greater negative posttraumatic cognitions, particularly about the self and the world, were associated with greater PTSD and psychiatric co-morbid symptoms (Gradl et al., 2023). Some studies have argued that self-blame was associated with a reduced risk of full-PTSD diagnosis and elevated PTSD symptoms (Startup et al., 2007). Additionally, King et al. (2017) showed that cognitive appraisal of traumatic childbirth explained an additional one-third of the variance in PTSD symptoms after accounting for personal and obstetric risk factors. Unfortunately, preterm birth infants parents posttraumatic cognitions and differences has not been fully investigated. A better understanding of preterm birth infants parents' trauma-related cognitions could help to create and provide parents with appropriate psychosocial support, because as it is well known, modification of cognitive appraisals in the treatment of PTSD played crucial role in the treatment of PTSD (Gradl et al., 2023; Wang et al., 2023).

The aim of this study is to explore differences between premature infants mothers' and fathers' posttraumatic reactions and trauma-related cognitions after the preterm birth. Thereby, the study was guided by following research questions:

1. Are there differences in mothers' and fathers' posttraumatic reactions in different time periods after the preterm birth?
2. Are there differences in mothers' and fathers' trauma-related cognitions in different time periods after the preterm birth?

Methodology

Participants

Invitation to participate in the study were sent to parents of preterm birth (gestational ages < 37 weeks) infants: 30 mothers and 30 fathers, who didn't receive any psychological intervention. Parents were included in the study no later than 18 months after childbirth.

Table 1 Demographic and Medical Characteristics of the Samples

Characteristics	Mothers (n = 30)	Fathers (n = 24)
Age M (SD)	29.27 (6.20)	32.58 (6.91)
Level of education (%)		
Incomplete secondary	3.33	4.17
Secondary	10	16.66
Secondary special	20	12.5
Higher	66.67	66.67
Marital status (%)		
Single	3.33	0
Married	73.33	79.17
Living with partner	16.67	20.83
Divorced	6.67	0
Prematurity (weeks of gestational age) M (SD)	32.77 (3.08)	31.75 (2.61)
Type of labour (%)	60	58.33
Natural	40	41.67
Caesarean section		

The sample included 30 mothers and 24 fathers. The mean age of mothers was 29.27 ± 6.20 years and of fathers 32.58 ± 6.91 years. Majority of mothers (66.67%) and majority of fathers (66.67%) have a higher education. A total of 90% (n = 27) of the mothers were married / cohabiting, and 3.33% (n = 1) were singles. Among the fathers, 100% (n = 24) were married/cohabiting. Child mean gestational age was 32.77 weeks in mothers' group and 31.75 weeks in fathers' group. Characteristics of the samples are summarized in Table 1. Fluent Latvian for parents was required.

Measures

The demographics and clinical data questionnaire assessed information about the mother and father (e.g., age, marital status, level of education) and their infant (e.g., gestational age, date of birth).

Posttraumatic reactions were assessed with the Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1997). The IES-R is a widely used and validated screening tool for PTSD symptoms. This scale investigates posttraumatic symptoms that characterize parents after a potential traumatic event, in our case the premature birth. It is composed of 22 items, which respondents rated on a 5-point Likert scale ranging from 0 ("not at all") to 4 ("extremely"). Items according to main PTSD symptoms groups were formed in three subscales: 8 items regarding symptoms of avoidance (avoidance of feelings, situations, memories; e.g. *"I tried not to think about it"*), 7 items regarding symptoms of intrusion (flashbacks, nightmares, images; e.g. *"Pictures about it popped into my mind"*), and 7 items regarding symptoms of hyperarousal (fear, irritability, hypervigilance, and difficulties in concentration; *e.g. "I was jumpy and easily startled"*). Parents were asked to answer the questionnaire regarding the birth of their infant. The adapted IES-R Latvian version was used in this study. Cronbach's alpha reliability coefficients for all scales in Latvian were α = 0.89 (intrusion), α = 0.89 (avoidance), α = 0.82 (hyperarousal), and α = 0.95 (total score).

The Posttraumatic Cognitions Inventory (PTCI; Foa et al., 1999) is a 36-item measure of trauma-related thoughts and beliefs. PTCI assessed trauma-related cognitions in parents after preterm birth. PTCI items were rated on a 7-point Likert scale ranging from 1 ("totally disagree") to 7 ("totally agree"). The scale assessed three dimensions of traumatic thoughts: negative cognitions about the self (including 21 items regarding general negative self-view, permanent change, alienation, hopelessness, self-trust and negative interpretation of symptoms, e.g. "*I am a weak person*"), negative cognitions about the world (including 7 items regarding an unsafe world and mistrust of other people, e.g. "*I have to be on guard all the time*") and self-blame (including 5 items, e.g. "*The event happened because of the way I acted*"). The Latvian version of PTCI was used (Harlamova, 2014). Cronbach's alpha reliability coefficients were calculated to be $\alpha = 0.97$ (negative cognitions about the self), $\alpha = 0.90$ (negative cognitions about the world), $\alpha = 0.84$ (self-blame) and $\alpha = 0.97$ (total score).

Procedure

The research protocol was approved by the Ethics Committee of Pauls Stradiņš Clinical University Hospital (approval No. 270612-20L). The data for the research was collected online using QuestionPro survey software. The invitation to participate in the study was distributed with the help of neonatologists, family doctors, and the association of parents of premature babies. All parents of preterm infants provided an informed consent, and their anonymity was preserved. Parents were asked to complete demographic and clinical data questionnaire and self-report questionnaires measuring posttraumatic reactions and trauma-related cognitions.

Statistical analysis was performed using IBM SPSS Statistics Version 29.0. Descriptive and comparative statistics (t-test) were used.

Results

In order to answer the first research question – Are there differences in mothers' and fathers' posttraumatic reactions in different time periods after the preterm birth? – comparisons were made by calculation of the t-criterion indicator. Certain significant differences in the IES-R scale were found (see Table 2). Posttraumatic reaction scores of fathers were lower and differed from mothers within 1–6 month time span: intrusion (t (25) = 4.42, $p < 0.001$), hyperarousal (t (25) = 2.92, $p < 0.01$), avoidance (t (25) = 2.07, $p < 0.05$). On the contrary, scores were higher and differed within 7–12 month interval: avoidance (t (15) = –3.58, $p < 0.01$), intrusion (t (15) = –2.28, $p < 0.05$). There were statistically different IES-R total scores for mothers and fathers in the first six months (t (25) = 3.28, $p < 0.01$) and in the following six months (t (15) = –2.76, $p < 0.05$). The scores were not different a year after childbirth.

Table 2 Comparison of Mean IES-R and PTCI Scores of Mothers and Fathers in Different Stages after Premature Birth (t-test)

Variables			Time (months) 1–6		*t*	Time (months) 7–12		*t*	Time (months) 13–18		*t*
	Mothers *n* = 30	Fathers *n* = 24	Mothers *n* = 15	Fathers *n* = 12		Mothers *n* = 10	Fathers *n* = 7		Mothers *n* = 5	Fathers *n* = 5	
IES-R total											
M	51.27	50.42	62.73	39.92	3.28 **	43.20	63.57	−2.76 *	57.80	57.20	0.04
(*SD*)	(17.33)	(16.40)	(19.76)	(15.33)		(11.39)	(19.19)		(23.25)	(19.23)	
Intrusion											
M	2.38	2.19	2.98	1.59	4.42 ***	2.00	2.70	−2.28*	2.53	2.55	−0.04
(*SD*)	(0.79)	(0.78)	(0.91)	(0.66)		(0.51)	(0.76)		(1.01)	(1.03)	
Avoidance											
M	2.32	2.60	2.94	2.13	2.07*	1.85	3.25	−3.58**	2.65	2.93	−0.43
(*SD*)	(0.98)	(0.85)	(1.13)	(0.86)		(0.68)	(0.94)		(1.05)	(0.97)	
Hyperarousal											
M	2.28	2.09	2.56	1.69	2.92**	2.07	2.67	−1.35	2.73	2.23	0.72
(*SD*)	(0.88)	(0.65)	(0.85)	(0.62)		(0.72)	(1.12)		(1.45)	(0.58)	
PTCI total											
M	93.07	101.46	105.47	102.58	0.18	75.50	104.57	−2.05	91.00	94.40	−0.14
(*SD*)	(38.76)	(36.54)	(41.96)	(42.13)		(29.91)	(26.95)		(36.91)	(40.31)	
NCS											
M	2.94	2.82	3.44	2.81	1.13	2.36	2.94	−1.20	2.59	2.69	−0.13
(*SD*)	(1.40)	(1.12)	(1.56)	(1.31)		(1.07)	(0.81)		(1.12)	(1.23)	
NCW											
M	2.61	3.31	2.83	3.01	−0.35	1.96	3.54	−3.42*	3.29	3.63	−0.41
(*SD*)	(1.22)	(1.35)	(1.32)	(1.44)		(0.81)	(1.36)		(1.19)	(1.47)	
Self-blame											
M	2.60	3.81	2.67	4.50	−2.72*	2.44	3.54	−2.06	2.72	2.52	0.23
(*SD*)	(1.39)	(1.72)	(2.67)	(1.83)		(0.85)	(1.36)		(1.60)	(1.18)	

Note. NCS – Negative cognitions about the self, NCW – Negative cognitions about the world.
* $p < 0{,}05$. ** $p < 0{,}01$. *** $p < 0{,}001$.

Collected results create certain posttraumatic reaction patterns of fathers and mothers (see Figure 1). Mothers show higher posttraumatic reaction scores than fathers in the first stage after preterm birth (1–6 months), however, fathers show higher scores than mothers in the second stage after preterm birth (7–12 months). The scores for both are equal in the third stage (13–18 months).

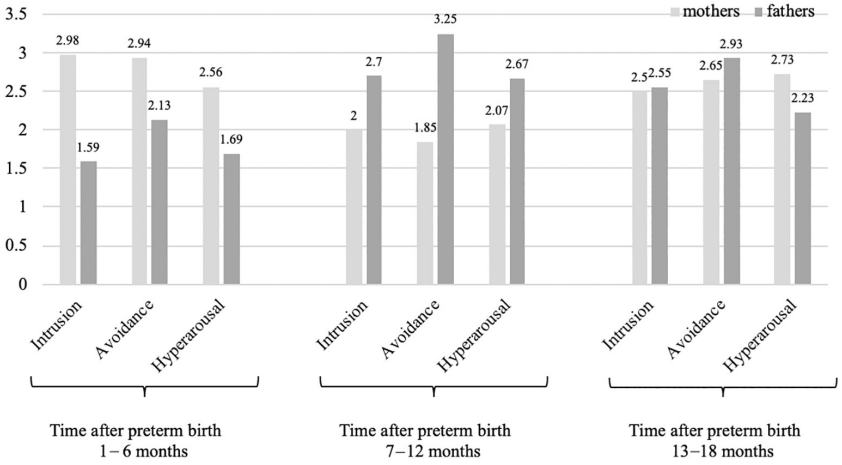

Figure 1 IES-R Scores Mothers and Fathers at Different Stages after Preterm Birth

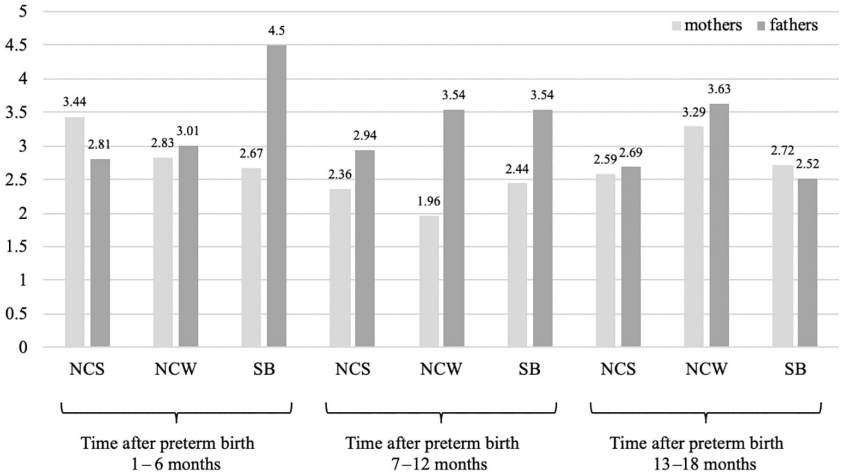

Figure 2 PTCI Scores of Mothers and Fathers at Different Stages after Preterm Birth

Note. NCS – negative cognitions about the self; NCW – negative cognitions about the world; SB – self-blame.

In order to answer the second research question – Are there differences in mothers' and fathers' trauma-related cognitions in different time periods after the preterm birth? – comparisons were made by calculation of the t-criterion indicator. Significant differences were found between mothers and fathers in PTCI scores (see Table 2): fathers showed significantly higher results in the self-blame scale score (t (25) = –2.72, $p < 0.05$) within 1–6 month time span after preterm birth and in negative cognitions about the world scale score (t (15) = –3.42, $p < 0.05$) within 7–12 month time span. Other PTCI results do not statistically differ.

Similarly to differences between posttraumatic reactions in both parents, the differences between mothers and fathers in trauma-related cognitions are found only in the first year after the birth (see Figure 2). Fathers show higher self-blame scale scores

than mothers in the first stage after preterm birth even while having lower posttraumatic scores than mothers. However, in the second stage, when posttraumatic reactions of fathers exceed those of the mothers, the fathers had a higher scale score about negative cognitions about the world than the mothers.

Discussion

The aim of this study was to illustrate the psychological effect of premature birth of their infant on parents, evaluating potential differences between premature infants mothers' and fathers' posttraumatic reactions and trauma-related cognitions in different time periods after the preterm birth.

This study confirms that mothers' and fathers' posttraumatic reactions after preterm birth were significantly different in the 18-month time span. Results of the self-assessment posttraumatic reactions of fathers were lower than mothers' in the first few months after the birth, then exceeded mothers' results in 7–12 months, and the scores equalized in the 13–18 months. Obtained data matches another study (Shaw at al., 2009), in which a slightly delayed onset of symptoms in fathers, as compared with mothers, had been observed. Shaw et al. (2009) hypothesized that fathers "delay" their own emotional response during the first months, when mothers may be more physically and emotionally vulnerable and in need of support from their partners. This assumption in turn matches the data of qualitative researches about fathers of preterm infants, revealing that fathers often tried to fit the role of the strong postpartum partner and hid their own needs, or avoided showing their own worries and feelings as the most common way of protecting their partners from further upheavals (Hagen et al., 2016; Stefana et al., 2022).

Regardless of the later manifestation of fathers' posttraumatic reactions comparing to mothers', obtained results allow to suggest possible risk that fathers' reactions could be unnoticed or neglected and not properly evaluated. Fathers may not display posttraumatic reactions if those are measured in the first months after birth, leading to the assumption that they cope easier than mothers and don't perceive the event as traumatic. Therefore, fathers may lack emotional support which might impact further reactions. Furthermore, late posttraumatic reactions may cause confusion for both partners, especially if spouses' reactions start to diminish, which could fuel couple conflicts and lead to separation or divorce (Baldoni et al., 2021).

Simultaneously, the study showed that parents' trauma-related cognitions varied across different periods. Self-blame scores of fathers significantly exceeded scores of mothers in the first six months after birth, and negative cognitions about the world scores of fathers significantly exceeded scores of mothers' in 7–12 months. It is well established that negative cognitions related to the world and to the self have been seen as important in the development and maintenance of PTSD symptoms after trauma (Gradl et al., 2023). In turn, the role of cognitions related to self-blame is not unequivocally clear. One part of the research regarding self-blame in PTSD more conceptualizes it as a maladaptive coping strategy rather than a part of cognitive appraisal of the trauma and predictor

of PTSD. The other part took the perspective that self-blame constitutes an ongoing appraisal of one's role relative to the event or situation rather than a coping response (Sinnott et al., 2022). Additionally, research on self-blame suggests that in PTCI measure two types of self-blame – characterological self-blame and behavioral self-blame (e.g., "The event happened to me because of the sort of person I am" and "The event happened because of the way I acted") and each of them has differential relationships to psychological outcomes (Startup et al., 2007). It is believed that behavioral self-blame, which involves attributing the cause of traumatic experiences to controllable or modifiable aspects of oneself, such as specific actions, leads to less posttraumatic distress and provides an internal sense of control over future outcomes (Startup et al., 2007; Raz et al., 2023). Further research for better understanding of fathers' self-blame after birth in the first months and their connections with posttraumatic reactions is needed.

Overall data obtained provide the possibility to recognize parental differences in trauma-related cognitions elaborating PTSD prevention program. Results of the research can provide a framework for the development of psychoeducational materials for parents after preterm birth, including information about self-blame cognitions, their forms and how they may influence parental emotions and behavior. Another aspect is to bring attention to self-blame in the psychological assessment of these parents. Reestablishing a sense of control may be important for all who experienced such trauma, but even more important for individuals high in self-blame (Raz et al., 2023). Therefore, intervention strategies for parents may be particularly helpful for individuals with self-blame and increasing perceived control after trauma, for instance, cognitive coping strategies that utilize compassionate self-talk, positive reinterpretation, and acceptance (Sinnot et al., 2022).

There are several limitations to consider in the current study, resulting in suggestions for future research. Firstly, the results should be interpreted with caution because the samples were small, making it difficult to draw strong conclusions. An important next step would be to include more participants in order to better understand our results. Secondly, the samples consisted of volunteers and it is likely that those with interest in research, reflecting on the experience of preterm childbirth, or their mental health, were more likely to participate in the survey. However, there is a possibility that participants with PTSD symptoms could avoid any reminders of their trauma, therefore not taking part in any research about traumatic experience or diminishing the extent of their symptoms. Finally, the use of only self-report questionnaires to assess posttraumatic reactions and trauma-related cognitions is a further limit. It will be important to include measures such as structured clinical interviews in further research. Moreover, in order to better explain our findings and further explore fathers' experiences, it would be valuable to consider the use of qualitative methods.

Despite the limitations, this study allowed insight into how fathers react and evaluate the experience of the premature birth of their child and suggests that certain differences do exist between the posttraumatic reactions among fathers and mothers. However, the findings would need to be investigated further, to ensure more precise psychological

assistance for preterm birth parents and to diminish potential negative psychological outcomes in the future.

Incorporating regression analysis could enhance the understanding of the explanatory roles of cognitions, gender, and time-related influences, making it a valuable addition to subsequent research efforts.

Conclusion

The present study investigated differences between mothers and fathers, and compared them in regard to posttraumatic reactions and trauma-related cognitions after preterm birth. In summary, the findings from the present study point to the differences between mothers' and fathers' posttraumatic reactions and trauma-related cognitions in the first year after preterm birth. It is hoped that with a greater understanding of this difficult period for parents and men, professionals will be able to further research and practice interventions that will take the differences with this population into account.

Author Note

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PRESCHOOL EDUCATION FOR CHILDREN WITH AUTISM SPECTRUM DISORDER ALONG UNIVERSAL DESIGN FOR LEARNING: A THEORETICAL ASPECTS

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ABSTRACT

Background. In the context of inclusive education children with autism spectrum disorder have the right to attend an educational institution that best suits their needs; however, this right is restricted by a number of factors, including the special education programs that the educational institution offers and the level of competence of the teachers. Furthermore, an early diagnosis offers significant benefits because it determines the medical and special education programs that the kid is eligible for. But, a child's needs might not be satisfied if his unique requirements are not recognized. Use of an appropriate strategy that guarantees inclusion in school for all children – not only those with a diagnosis and special education support measures – is therefore imperative.
Method The field of inclusive education research is developing quite rapidly, highlighting the importance of this approach and providing new insights on the most effective way to put it into practice. However, certain theories are not supported by scientific findings, which furthers fragmentation. A systematic literature review of the literature makes it easier to evaluate concepts and frameworks objectively. EBSCOhost, CambridgeCore, ScienceDirect, and SageJournals are popular online bibliographic databases in the social sciences that were used in a systematic literature review.
Results. The research demonstrates how the universal design for learning framework complies with contemporary inclusive education trends through qualitative research, providing support to all children regardless of whether a diagnosis is made or whether a specific form of assistance has been determined upon.

Keywords: *autism spectrum disorder; inclusive education; preschool; universal design for learning, teacher competence, learning strategies.*

Introduction

Preschool inclusive education is associated with the idea of "engagement" which is defined as active participation in everyday activities in the environment (EASI, 2017b). The "engagement" is closely related to learning and the child's interaction with the social

and physical environment, highlighting one of the key ideas in inclusive education: inclusion of children, not integration in preschool. According to Rose and Meyer (2002), to achieve goals in inclusive environment it is important to determine the teaching and support strategies that will help children in the learning process. Using a suitable and scientifically proved approach is required to guarantee that each child is satisfied.

In Latvia, inclusive education is mandated by the Education Law (Latvijas Republika, 1998), which requires education for all children starting at age three (EASI, 2017a) and promotes quality education for all residents throughout their lives (Ministru kabinets, 2021). The aim of preschool education is to foster a curious, creative, and happy child who lives a healthy, safe, and active lifestyle while acquiring knowledge about themselves, their peers, and the world around them and highlights the provision of the required assistance in order to get prepared for the basic education stage (Ministru kabinets, 2018). The objectives and assignments outlined in the educational policy planning documents center on different subject areas and highlight the provision of the required assistance in order to get prepared for the basic education stage.

The implementation of inclusive education faces barriers, particularly the lack of relevant strategies. "Universal Design for Learning" (UDL) is identified as a promising strategy to ensure access to education for all students (Chambers, Varoglu, & Kasinskaite-Buddeberg, 2016; Agarwal, 2020; International Disability Alliance, 2021). UDL's increasing recognition highlights its importance in inclusive education (Ewe & Galvin, 2023), and its adaptable framework can be applied across all educational levels, accommodating children's unique developmental needs.

Although the use of the UDL framework has a long history (CAST), in the last decades it has gained wide attention and the need for its use is indicated in the globally recognized special and inclusive education guidelines (No Child Left Behind Act of 2001; IDEA, 2004). Initially, the UDL framework was developed to adapt the physical environment for persons with mobility impairments, but was gradually improved for different persons, such as pregnant women and seniors (Scott et al., 2003). Over time, the UDL framework developed from an educational perspective to address exclusion of the children in education (CAST). Altough practical examples of the use of different strategies and teaching methods vary in different areas of education, for example, for children with hearing or visual impairments may be useful for all children with and without different established diagnosis.

First, previous systematic literature reviews and exploratory main results were examined to compare key findings over a 20-year period. From 2006 to 2023, six further systematic literature studies were conducted on the topic of UDL framework (Twyman & Tindal, 2006; Coyne et. al., 2012; Kennedy et. al. 2014., King-Sears et. al., 2015; King-Sears & Johnson, 2020; King-Sears, 2023). Among these reviews, only one includes the preschool stage (Coyne et al., 2012). The analysis of the articles focuses on three main conclusions: 1) UDL is an effective framework for promoting inclusive education not only for children with special needs, but for every child; 2) In order to implement and effectively use the principles of the UDL framework, professional training of teachers is

required; 3) The current research of the UDL framework across various age groups and subject areas fails to provide sufficient empirical evidence.

This study examines the UDL three principles for inclusion of children with ASD in preschool education, by analyzing current trends, advantages and disadvantages for UDL implementation. The objective of this research is to present a comprehensive overview of the UDL framework's applicability to inclusive preschool education by specifying two research questions:

1) what are the core principles of the UDL framework, and 2) what specific startegies within UDL are most effective in fostering inclusive learning environment for children with ASD?

Literature review

Using contemporary theories and ideas to promote inclusive education requires the use of evidence-based practices (Lohmann, Hovey, & Gauvreau, 2023). The UDL framework is a scientifically proven educational framework that is not focused on the special needs in specific cultures, although most of the research was conducted in the United States (Almumen, 2020; King-Sears, et al., 2023). The UDL framework can be used in different countries,

The UDL framework offers guidelines for the various teaching strategies and assessment tools, which enhances the professional competence of teachers for a wide range of students (Almumen, 2020; Taylor, Neild, & Fitzpatrick, 2023). Teacher professional development needs to include learning the principles of UDL and to benefit its use in practice (Almumen, 2020; Takemae, Nicoll-Senft, & Tyler, 2022). Teachers who have learned UDL principles and put it into practice report a greater understanding of meeting the needs of diverse groups of children (King-Sears et al., 2023). At the same time, it is recommended to implement UDL principles gradually, not all at once. For example, when learning about different insects, you can go out into nature and do practical research at the beginning, gradually adding different visual, audial and tactile materials (Lohmann, Hovey, & Gauvreau, 2023). It is easier for teachers and students to adopt new techniques when teaching materials and support techniques are used one after the other.

Certainly, teachers who are unaware of various teaching strategies can not include every child in preschool education environment (Fundelius, et al., 2023). In addition, teachers recognize that the development of professional competence is mostly an individual initiative of each educator (Takemae, Nicoll-Senft, & Tyler, 2022). Anyway, the use of the UDL principles is increasing in a growing number of studies, although there is a worldwide lack of qualitative and quantitative research about effecy of UDL framework (Almumen, 2020). The most crucial conclusion involve an acute lack of research on the effects of the UDL framework in the preschool stage (Chen, & Dote-Kwan, 2021).

Method

The systemic literature analysis of this article is focused on the preschool stage. The research method involves identification of evidence, synthesis and PRISMA flow diagramm, which is described below.

Identification of the Evidence

A systematic literature review of the literature makes it easier to evaluate concepts and frameworks objectively. Although it was originally planned to search for scientific articles on the use of UDL principles in preschool education in the EBSCO, CambridgeCore, ScienceDirect, and SageJournals databases, the ScienceDirect database was removed from the list by adding the Google Scholar database. Scientific articles about UDL implementation in a preschool between December 2023 and February 2024 were found in two of the selected databases, Google Scholar and Ebsco.

Keywords associated with preschool education ('preschool' OR 'kindergarten' OR 'early childhood') and universal design for learning ('universal design for learning' OR 'UDL') were included in the search cluster. All databases' scans for scientific papers were arranged using the same set of criteria (See Table 1).

Table 1 Article inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
• English language • Free access • Universal design for learning is included in the title of the article or mentioned in the keywords • School stage included: preschool • The articles were published in the period from 2019 to 2024	• Other languages • Partial or no availability • Universal design for learning is not included in the title of the article or mentioned in the keywords • The school stage represents secondary school, university or professional education

The articles obtained as a result of the search were selected based on the selection criteria: articles in english with the possibility of free access and inclusion of keywords in the title of the articles. Of the 80 ($N = 80$) identified articles published in the respective phase and remove two duplicates, the study analyzes 13 articles ($N = 13$), as the remaining 65 articles were dropped for the following reasons: 1) UDL was not the focus of the article or was indirectly mentioned; 2) preschool age was not the focus of the article or was indirectly mentioned.

Of the 13 articles identified, 8 articles required an additional search for access, using access credentials with a university username and password or following the links provided. Scientific articles on the use of UDL in preschool education were selected regardless of the country of origin in order to not reduce the already sparse number of articles.

This systematic literature review focuses on the implementation of the principles of the UDL framework at the preschool stage during the last five years, which explains the limited number of papers included in the review ($N = 13$).

Synthesis

Of the selected number of articles, 10 (N = 10) articles were qualitative, two articles (N = 2) quantitative studies, while one (N = 1) used mixed research methods.

Initially, it was planned to conduct a quality assessment of the selected articles based on Ewe, & Galvin, (2023) and King-Sears et. al. (2023), since the quality assessment of the articles allows for the accurate selection of only qualitatively developed articles. However, the majority of articles are not of high quality due to the lack of available empirical evaluations of studies and the use of case-control groups in case analyses, lack of use of recent literature, or lack of clear study categories. Only two articles Almumen (2020) and King-Sears et al. (2023) were high quality research. Therefore, in order to cover the widest possible range of UDL framework in theory and practice, this study analyzes all 13 included articles.

PRISMA

The PRISMA method in the analysis of systematic literature is widely used by the scientific community around the world and provides objective data acquisition also in the study of the UDL framework (Sohrabi et al., 2021; Ewe, & Galvin, 2023). By implementing the criteria specified in the PRISMA method, articles in the Sage Journals, Ebsco, Cambridge Core and Google Scholar databases were searched for in the period from 2019 to 2024 (See picture 1). The process of research selection is described below.

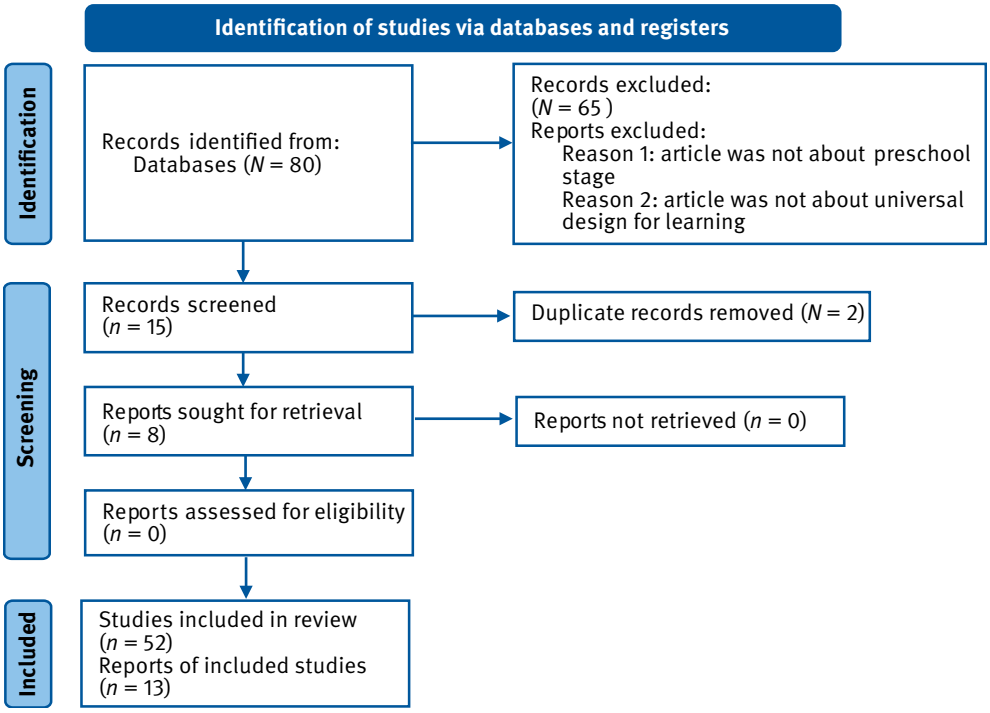

Figure 1 Prisma flow diagram Universal Design for Learning in preschool

The Sage Journals database searches for articles related to universal design for learning, preschool, kindergarten, or early childhood. However, no articles were found. The field of Special Education is selected, but 26 articles don't align with the research direction.

The Ebsco database is searched using advanced search options for articles related to universal design for learning, preschool, kindergarten, or early childhood. 43 articles are offered, with nine aligning with the research direction.

The Cambridge Core database does not return any articles when searching for the same keywords.

Finally, Google Scholar database openes one article, of which one is given open access. Changing keyword from "preschool" to "kindergarten" opens two articles, none of which has free access. By changing keyword kindergarten" to "early childhood" database opens six articles, of which free access is provided to five articles.

After selecting 15 articles, two are identified as duplicates, thus removed from the total number of articles. As a result, 13 (N = 13) articles are obtained. For selected articles, see Table 2.

Table 2 Included articles (Ewe, & Galvin, 2023)

No	Article	Country	Aim	Sample	Methods	Measures	The field of autism is represented	Results
1.	Almumen (2020)	Kuwait	To investigate the role of UDL in inclusive settings	5 teachers	qualitative	3 semi-structured interviews	–	UDL is effective in engaging all students and although teachers may have basic knowledge of UDL, they need more training and practice
2.	Ayuso-del Puerto & Gutiérrez-Esteban (2022)	Spain	To investigate the accessibility of OERs' design for early stages in education	28 indicators	quantitative	Assessment Tool and an analysis indicator	–	OERs do not meet the needs of all users because they do not consider several of the indicators contained in the guide designed for their evaluation

No	Article	Country	Aim	Sample	Methods	Measures	The field of autism is represented	Results
3.	Chen & Dote-Kwan (2021)	USA	To investigate how UDL and DI promote an inclusive educational environment for preschool children	2 children with special needs	qualitative	Assessment of child development	–	By using both UDL and DI, children with various special needs can have a maximum positive experience in an inclusive preschool environment
4.	Fundelius et al. (2023)	USA	To investigate ways to increase accessibility by designing multisensory learning activities using the principles of UDL	4 children with special needs	qualitative	Case study	–	UDL is a research framework that focuses on goals, methods, materials and assessments for all children's needs
5.	Gauvreau, Lohmann, & Hovey (2019)	USA	To investigate multiple means of representation in the early childhood classroom	35 articles and sources	qualitative	Case study	+/–	UDL provides a useful framework when planning for ways that all learners can participate, access, and be included in education
6.	Gauvreau, Lohmann, & Hovey (2021)	USA	To investigate ways to create active learning opportunities	8 strategies	qualitative	Case study	only in references	Through using UDL principles teachers no longer need to create individualized interventions to help each child succeed
7.	Hovey, Gauvreau, & Lohmann, (2022)	USA	To investigate multiple means of action and expression in the early childhood classroom	4 strategies	qualitative	Case study	+	Providing multiple means of action and expression are useful tools to assist with assessment of both academic and behavioral goals and objectives

No	Article	Country	Aim	Sample	Methods	Measures	The field of autism is represented	Results
8.	King-Sears et al. (2023)	USA	To investigate UDL's emergence as a research-based practice for diverse learners	20 articles	quantitative	Meta-analysis	–	All learners benefit when instructional and curricular barriers are proactively and thoughtfully reduced by applying UDL
9.	Lohmann, Hovey, & Gauvreau (2023)	USA	To investigate science learning concepts through UDL framework	52 articles and sources	qualitative	Case study	–	The use of the UDL framework reduces barriers to learning for all young children
10.	Moffat (2022)	New Zealand	To investigate UDL principles in practice in early childhood environments	13 articles and sources	qualitative	Literature review	only in references	Using UDL principles and reflecting on practice will support early childhood to achieve world class inclusive practice
11.	Rosati (2021)	Italy	To investigate features of the Montessori method and on the principles of UDL	18 references	qualitative	Literature review	It is indicated that M. Montessori also worked with autistic children	Montessori methods are compatible with UDL principles of multiple means of representation, expression and engagement
12.	Takemae, Nicoll-Senft, & Tyler (2022)	USA	To provide UDL guidelines in teacher preparation programs	41 articles and sources	Mixed methods	Literature review and Design-Based Research	–	This article advocates for the integration of UDL and CRT by emphasizing the critical role of strong school-university partnerships
13.	Taylor, Neild, & Fitzpatrick (2023)	USA	To investigate principles of UDL in preschool environments to support deaf and hard of hearing children	40 articles and sources	qualitative	Literature review	–	All teachers need to remove barriers that hinder DHH student access to the general education curriculum

Results

Creating an inclusive learning environment for all students has received increasing emphasis in recent decades. Despite these efforts, progress in inclusive education around the world remains slow and uneven in different contexts and regions (Nilholm, 2021), particularly in include ASD into educational settings (Barnard et al., 2002; Brede et al., 2017).

The study's questions is addressed in each of the two sections that comprise the results. The core principles of the UDL framework are discussed in the first section, while the effective UDL strategies for fostering inclusive learning environments for children along ASD are described in the second.

The Core Principles of the UDL Framework

The first principle of UDL, **multiple means of engagement**, is rooted in the brain's affective network, which is crucial for motivation and emotional responses to learning. Research indicates various ways for students to actively participate in their education, fostering interest in the learning process (Rosati, 2021; Fundelius et al., 2023). This principle emphasizes the need for an engaging classroom environment where students feel a sense of belonging and inspiration to learn. Teachers can observe if a child is making effort towards learning goals, showing interest in the material, and self-regulating their learning (Takemae, Nicoll-Senft, & Tyler, 2022). Effective strategies for engagement include aligning with children's diverse interests, offering choices in engagement methods, and incorporating hands-on activities for active participation.

The second principle, **multiple means of representation**, corresponds to the recognition network of the brain and embodies the idea that learners should have the opportunity to access and interpret information in various ways. This refers to the provision of several forms for delivering information, therefore catering to diverse learning strategies (CAST, 2020). For instance, employing different materials for children with ASD has proven to effectively enhance communication skills (Hanney, 2012; Martin & Wilkins, 2022). The same applies to the use of digital technologies and alternative communication systems.

The third principle, **multiple means of action and expression**, aligns with the strategic network of the brain. This principle emphasizes the necessity for learners to have various avenues for expressing the knowledge they have acquired and for navigating the learning environment to demonstrate their understanding, whether through traditional assessments, creative projects, or verbal presentations (CAST, 2020). Providing opportunities for students to express themselves – be it through art, music, or technology – helps validate their individual ways of action and expression (Takemae, Nicoll-Senft, & Tyler, 2022). Teachers can facilitate this by offering choices in how assignments are completed and allowing for varied formats that align with each child's strengths.

Effective UDL Strategies for Fostering Inclusive Learning Environments for Children with ASD

Only one paper addresses ASD specifically (Hovey, Gauvreau, & Lohmann, 2022), but the UDL framework does not prioritize specific disabilities, focusing instead on diverse learning needs for all children, and tthe majority of the strategies suggested in articles can be applied to children with ASD.

Multiple means of Engagement

Preschool children, including children with ASD, are most engaged in learning when the content aligns with their interests and when choices is provided (Harrop et al., 2019; Rosati, 2021). Choices not only boosts interest and motivation but also reduces challenging behaviors. For instance, encouraging children to select their seating and engage in activities like singing or motor exercises during the "Morning Circle" promotes participation (Gauvreau, Lohmann, & Hovey, 2021). Routine is crucial for children with ASD, making choice and practical engagement essential for effective learning.

Practical engagement is crucial for early development, as it promotes skill acquisition through play and everyday activities. For instance, learning hiking skills entails setting up a tent and using multisensory props (Taylor, Neild & Fitzpatrick, 2023), which is especially important for children with ASD (Dickie et al., 2009). Activities can include walks in classrooms or outdoors, where children assume various roles and encounter different scenarios (Almumen, 2020). However, sensory overload can make it difficult for children with ASD to complete practical tasks. To facilitate participation, children can use gardening gloves or sound-canceling headphones when handling materials (Hovey, Gauvreau, & Lohmann, 2022).

The environment, encompassing play, object manipulation, motor activities, and interactive materials, is vital for fostering an inclusive setting (Taylor, Neild, & Fitzpatrick, 2023). Visual daily and weekly schedules, along with annual calendars, are essential tools that should be manipulated through movement, voice, or visual representation (Fundelius et al., 2023; Moffat, 2022). Additionally, materials employing UDL principles, initially designed for children with hearing impairments, can support children with ASD by modifying acoustics, using sound-generating devices, and reducing background noise.

Multiple means of Representation

Since preschoolers learn differently, it is vital to use various materials in the classroom to enhance understanding of curriculum concepts (Takemae, Nicoll-Senft, & Tyler, 2022). An inclusive environment utilizing diverse visual, auditory, and tactile resources benefits both children with and without developmental disabilities (Almumen, 2020; Chen & Dote-Kwan, 2021). Literacy lessons, for instance, should incorporate various strategies and materials to represent story content (Moffat, 2022), and sandpaper letters in Montessori methods promote tactile engagement (Rosati, 2021).

While practical materials are vital for acquiring new skills, digital technology is increasingly important in education. It includes a variety of resources, such as Braille

systems and digital books, which support children with visual impairments (Fundelius et al., 2023). Digital tools encourage curiosity and provide varying levels of difficulty (Ayuso-del Puerto & Gutiérrez-Esteban, 2022). Integrating these tools into the "Morning Circle" can address diverse needs for information access, motivation, and interest (Gauvreau, Lohmann, & Hovey, 2021).

Alternative communication systems are crucial for children with ASD in processing information (Iacono, Trembath, & Erickson, 2016). It is recommended that these methods be integrated into all preschool activities, including play and social interactions (Gauvreau, Lohmann, & Hovey, 2019). Approaches designed for children with hearing impairments or alternative languages can also benefit children with ASD (Ayuso-del Puerto & Gutiérrez-Esteban, 2022).

Multiple means of Action and Expression

Evaluating the knowledge children acquire is essential to identify their learning strengths and difficulties. Various assessment tools not only evaluate children's knowledge but also the effectiveness of teaching strategies. Assessing competencies across learning areas is facilitated by systems that utilize digital technologies (Hovey, Gauvreau, & Lohmann, 2022). Digital technologies are crucial in today's educational environment and can effectively assess children's development in multiple subject areas.

Participation in the "Morning Circle" helps assess learned skills of children (Gauvreau, Lohmann, & Hovey, 2021). Literacy assessment is enhanced through digital and physical tools, including sensory books, real objects, and sound-generating devices (Fundelius et al., 2023), as well as dance, music, and art (Moffat, 2022). It is better to use a variety of assessment techniques rather than relying on just one. Assessing children's skills is significantly affected by their ability to express what they have learned, making alternative communication methods vital for children with ASD.

The use of various visual supports facilitates social interaction and comprehension of instructions (Gauvreau, Lohmann, & Hovey, 2021). Children should engage not only verbally but also through alternative communication methods (Chen & Dote-Kwan, 2021), ranging from sign language and symbols to speech-generating devices and audio recordings. For children with ASD, alternative communication systems is crucial for assessing acquired skills.

Discussion

Activating all brain networks is crucial for applying UDL principles, which facilitate multiple means of engagement, representation, action, and expression (King-Sears et al., 2023). However, practices from each study are applicable to specific cases and may vary (Lohmann, Hovey, & Gauvreau, 2023). While teachers can draw inspiration from the provided instructions, the necessary strategies and methods can differ by classroom. The strategies discussed in this research enhance teachers awareness of opportunities to improve learning using UDL principles.

In response to the first research question about the core principles of the UDL framework, the three main principles are designed to enhance accessibility and engagement in learning. The first principle, multiple means of engagement, focuses on creating an engaging classroom environment that fosters motivation and emotional responses, allowing students to participate actively in their education. The second principle, multiple means of representation, emphasizes providing information in various formats – auditory, visual, and tactile – catering to diverse learning styles. The third principle, multiple means of action and expression, highlights the importance of offering learners various avenues to demonstrate their understanding, whether through traditional assessments, creative projects, or other formats.

In response to the second research question about effective UDL strategies for fostering inclusive learning environments for children with ASD, the UDL framework provides key strategies that enhance educational experiences. Multiple means of engagement encourages aligning learning content with children's interests and providing choices to promote participation and reduce challenging behaviors, especially in structured activities like the "Morning Circle". Multiple means of representation utilizes diverse auditory, visual, and tactile resources to ensure all students access the curriculum. The strategy of multiple means of action and expression empowers children to demonstrate their knowledge in various ways, which is crucial for assessment. Furthermore, alternative communication methods facilitate social interactions and comprehension for children with ASD, allowing them to engage meaningfully and express their understanding. Together, these strategies highlight the importance of a flexible educational framework that supports the diverse needs of preschool children, including children with ASD.

Due to a lack of data on respondent characteristics and pre- and post-intervention results in most articles, accurately assessing the efficacy of UDL principles was not possible. The study authors intend to conduct future empirical research to evaluate the effects of UDL on inclusive preschool education. Further research on the suitability of UDL for diverse preschool children may provide objective insights into the framework's effectiveness and contribute significantly to future studies.

Limitations

The studies included in the systematic literature analysis reveal a lack of research on the UDL framework across various education levels, particularly in preschool (Almumen, 2020; Chen & Dote-Kwan, 2021). While the studies offer practical examples of UDL implementation, they often lack participant information and assessment results before and after interventions (Almumen, 2020; Takemae, Nicoll-Senft, & Tyler, 2022). Finally, while different strategies rely on teachers professional competence (Takemae, Nicoll-Senft, & Tyler, 2022), there is a lack of research assessing teachers' professional skills and acquired competencies before and after UDL implementation in preschool settings (Fundelius et al., 2023).

Suggestions for future research

In order to assess the effectiveness of the UDL framework in the context of inclusive education for preschool children with ASD, it is necessary to conduct research with more diverse children in preschool settings in different learning areas (Almumen, 2020). When conducting empirical studies to evaluate the use of the UDL framework, it is necessary to specifically describe the participants, the course and the duration of the study by describing the educational environment and compare the data using specific assessment tools (King-Sears et al., 2023).

Conclusions

The UDL is an effective learning framework for promoting inclusive education. UDL framework represents three principles based on theoretical and neuroscientific evidence. Although the use of UDL principles has been proven to be effective, the use of the framework to promote inclusive education requires the improvement of the professional competence of teachers and empirical research on the use of the UDL framework in the preschool education environment.

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ROLE OF BASIC VALUES AND LOCUS OF CONTROL IN THE INDIVIDUAL'S SENSE OF AUTHENTICITY

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ABSTRACT

In Western culture people suffer from poor authenticity, but being authentic in daily life is positively linked to well-being in the future and this link is one-directional. The study aims to understand locus of control and value dimension influence on authenticity by using regression analyses. In accordance with previous studies, the locus of control affects an individual's sense of authenticity. Results of this study show, that internal locus of control and self-transcendence value dimension positively but self-enhancement value dimension negatively influence authentic living; external locus of control and self-enhancement value dimension positively but self-transcendence value dimension negatively influence self-alienation; and self-enhancement and conservation value dimensions positively but openness to change value dimension negatively influence accepting external influence. The locus of control has no effect on accepting external influence. In addition, this study shows the effect of two value dimensions on two authenticity indicators: high self-enhancement and low self-transcendence value dimensions influence higher levels of self-alienation, which negatively affects the sense of authenticity. The opposite in the hierarchy of these values – high self-transcendence and low self-enhancement value dimensions create higher rates of authentic living, which positively influences feelings of authenticity. Self-alienation and accepting external influence are negatively related to authentic living. Environment plays a significant role.

Keywords: *authenticity, locus of control, values, value dimensions, well-being.*

Introduction

In Western culture, more and more people suffer from poor authenticity, manifested in their inability to exercise themselves, lack of autonomy, lack of character strength, stereotypical behaviour, and their inability to use internal dialogue, leading to great intrapsychic, social, emotional and moral distress (Martens, 2007; Wickham et al., 2016). Becoming authentic is not easy because of the social pressure to remain inauthentic, and because of our human nature (Taylor, 1991), because being authentic requires approaching yourself as a reveller and looking at everything in new, radical ways. Such behaviour

can cause distrust among those around us, as walking in defiance of socially desirable, habitual patterns of behaviour can be viewed negatively, as well as causing envy among others who are afraid to express themselves authentically.

Authenticity plays an essential role in interacting with others and the social environment (Tou et al., 2015) and is an essential prerequisite for the quality of psychological well-being and relationships (Boyraz et al., 2014; Ryan & Ryan, 2019; Wickham et al., 2016; Wood et al., 2008).

The topicality of the Article is determined by the fact that authenticity affects life satisfaction, while life satisfaction does not affect authenticity (Boyraz et al., 2014). This study therefore seeks to ascertain the effects of values and locus of control (LOC) on the sense of authenticity through regression techniques.

Authenticity

Authenticity has a tripartite design in a person-centred approach, consisting of a coherence between primary experience, conscious experience and subsequent external expressions (Barrett-Lennard, 1998; Wyatt, 2001; Wood et al., 2008). An individual shall be considered authentic when he engages and acts of his own free will in ways consistent with his values and interests, acting autonomously (Erickson, 1995; Hodgins & Knee, 2002; Ryan & Ryan, 2019). Authenticity correlates with empathy; self-realisation; familiarity / recognition of oneself; reality testing; optimal socio-emotional, cognitive and moral development; alertness, strength of character and persistence; courage, creativity and originality (Martens, 2007) and it develops in biographically unique interactions with others creating a system of individual values (Wenzel & Lucas-Thompson, 2012). Authenticity is positively associated with psychological well-being, overall life satisfaction and higher self-esteem (Goldman & Kernis, 2002; Vincevica, 2015), as well as a more robust self-assessment that is more resilient to situational factors.

While basic scientific research talks about authenticity as a dispositional factor, in a study that analysed journal entries, a sense of authenticity varies more internally than in interactions with the environment (Lenton et al., 2016). Authenticity as a state is best characterized by authentic living and the lack of self-alienation. In a study by Lenton and colleagues, situational acceptance of external influences led to a greater sense of authenticity rather than its fall.

Dispositional authenticity correlates with goals and strategies that benefit relationships (Tou et al., 2015), serves as a bulwark against negative consequences from interpersonal conflict, regardless of the personality traits of neuroticism and agreeableness (Wickham et al., 2016), involves more favourable interactions with others (Baker et al., 2017) and better relationships (Brunell et al., 2010). The higher the authenticity scores, the more likely people are to behave in a more intimate and less destructive way in relationships; expose oneself more, look after partner; will feel more satisfaction, trust and engagement in relationships. The lack of authenticity could be due to neurobiological abnormalities (Martens, 2002, 2004), but neurobiological dysfunctions can be managed through a healthier socio-emotional environment (Martens, 2001).

Basic values

Values are one of the behavioural motivators. They stand above specific situations as targets to move toward and they have varying degrees of importance (Schwartz, 1992; Schwartz et al., 2012).

The theory of basic values is based on three assumptions (Schwartz, 2021):

1) Values are cognitive representations required for human survival: biological needs, interpersonal interaction needs and group survival needs;
2) Values have a logical structure related to the motivation, the coherence of objectives and the conflicts of objectives;
3) The value circle is a natural continuation of the transition of one value to the next and the division is more descriptive than strictly separable individual units.

The theory of basic values (Schwartz, 1992) reflects 10 values placed in a circle, which constitute a gradual transition of the underlying motives from one motivation to the next rather than strictly separable units. The circular structure relates to other constructs such as behaviour, attitudes, personality traits and demographics in a systemic way (Schwartz, 2021).

The revised theory of basic values (Schwartz, 2012) reflects 19 values, dividing motivation into subtler values, preserving the layout of the original theory and allowing them to be combined into higher dimensions of values – openness to change, self-transcendence, conservation and self-enhancement.

The revised theory of basic values offers to divide values into those that are person-focused – openness to change and self-enhancement, and those that have a social focus – self-transcendence and conservation (Schwartz et al., 2012). The second principle of organizing values are those that try to avoid anxiety, as opposed to those that are relatively anxiety-free.

Locus of control (LOC)

The locus of control is a person's general attitude, belief or expectation as to the causal link between his own actions and consequences (Rotter, 1966). People with an internal LOC believe they determine their actions and the resulting consequences, so they are more optimistic, engage in healthy behaviours and have a less inherent propensity for depression in the face of life's adversity (Ryon & Gleason, 2013). They are less obedient, more willing to spot aspects of the environment that encourage more successful behaviour in the future; act in ways that improve the state of the environment; value ability to overcome difficulties; and are more resilient to influence from the outside. Conversely, people with an external LOC attribute the events of their lives to luck, fate or any other external factors. They have more day-to-day difficulties and anxiety associated with negative health symptoms (Ryon & Gleason, 2013). The LOC varies depending on socio-demographic factors (Robinson & Lachman, 2017). The internal LOC peaks in the middle of life and weakens as we age (Lachman & Firth, 2004; Lachman et al., 2009).

The LOC can be trained by identifying mechanisms and processes that link controlling beliefs to desired outcomes (Carstensen & Hartel, 2006). Perceived control is

enhanced by cognitive restructuring, diversification of choices, flexibility and seeking environmental support (Lachman et al., 2011; Lachman et al., 2015), resulting in anxiety relief (Gallagher et al., 2014a; Gallagher et al., 2014b). The LOC has a paradox: people with high internal LOC often don't accept help from others, don't ask for it and don't want to use environmental help, even if it were to benefit (Lachman et al., 2015). In a study conducted in Latvia, an internal LOC predicts lower burnout rates (Kalve, 2019).

Relationship between authenticity, values and LOC

An individual must be regarded as authentic when he or she engages and acts of his or her own free will in ways consistent with his or her values and interests, acting autonomously (Hodgins & Knee, 2002), so that the very definition of authenticity includes both the LOC and values. There is enough literature that combines two of these constructs, authenticity and values (Crocker & Canevello, 2008; Gan et al., 2018; Lopez & Rice, 2006; Schwartz, 2012; Tou et al., 2015) or authenticity and LOC (McMillan, 2004; Deci & Ryan, 2012; Ryan & Ryan, 2019), however, there is little research on the relationship between LOC and values and it is fragmented (Cheng et al., 2018; Hines et al., 1987; Judge & Bono, 2001; Stern, 1999). The interaction of all three constructs in one study has so far not been investigated.

The theory of self-determination involves constructs of LOC and authenticity. In the view of this theory, three universal psychological needs are: autonomy, sense of competence and sense of belonging (relatedness) required for optimal development and functioning (Deci & Ryan, 2012; Ryan & Ryan, 2019). Autonomy has a positive correlation with the internal LOC (Rotter, 1966). Autonomous orientation is positively associated with self-actualization, self-esteem, greater self-revealing and support for other people's autonomy (Deci & Ryan, 2012). Autonomy is the basis for the value of self-direction, which stems from the need for control and mastery and interaction between autonomy and independence (Schwartz, 2012). Consequently, the theory of self-determination involves the authentic expression of any fundamental value.

Environment impacts internal motivation, which can be put on the brakes. Material awards, threats and competition hamper a sense of autonomy, resulting in diminished internal motivation (Ryan & La Guardia, 2000). Positive feedback and freedom of choice strengthen internal motivation (Deci et al., 1999), strengthening a sense of competence and autonomy. A sense of belonging is a basic need and an essential motivator throughout life (Ryan & La Guardia, 2000).

Stable personality factors in combination with socio-contextual factors (Deci & Ryan, 2012) and authenticity (Sheldon et al., 1997; Tou et al., 2015) influence existing motivation and behaviour. Being authentic and acting towards satisfying one's values involves practical, psychological and social costs, since choosing to act in favour of a value can automatically run counter to another (Schwartz, 2012). The individual has to assess both the benefits and the losses of open and genuine communication and behaviour leading to selective authenticity in favour of partly covering his true self as a defensive strategy (Lopez & Rice, 2006). Internal variations in authentic self-expression is not weakness,

as this may be an attempt to adapt to the environment (Lopez & Rice, 2006). In circumstances where support for autonomy is lacking, people are less open and feel less connected to others (Deci & Ryan, 2012).

Social environment affects the hierarchy of values and the persistence of that hierarchy (Vecchione et al., 2016). There is a strengthening effect on the existing hierarchy of values, if an individual's hierarchy of values matches those of their social environment, creating a sense of belonging. Without changing environment, the existing value hierarchy is strengthened.

There is mutual connection between power and authenticity. People in power can afford to behave more authentically, as well as an authentic situational behaviour signals a position of power for themselves, creating a self-enhancing sense of power (Gan et al., 2018). The more insecure a person felt, the more avoidance or dominance strategies were applied (Crocker & Canevello, 2008).

At the heart of many conflicts lie clash of values. Authentic people use strategies to address conflicts that promote solutions for the benefit of both parties (Tou et al., 2015). However, the dimension of self-transcendence values is desirable in society, so it may be expressed in external behaviour for other purposes. As Sosik with colleagues (Sosik et al., 2009) points out, it's important to evaluate managers' personal values, even if they show strong concern for the organization in a public space, because their supposedly altruistic behaviour might stem from carefully calculated selfish motives.

Being able to live up to your values, beliefs, thoughts and emotions is part of the authentic living (Vitiello et al., 2016), when the individual has identified values and integrated them. Conversely, when people incorporate values and habits of an existing society with the aim of gaining recognition or avoiding feelings of guilt and behaving "as they should" (Deci & Ryan, 2012), such behaviour becomes accepting external influence in the context of authenticity research. Overall, people with an internal LOC are better at resisting external influences and manipulation. Study conducted by Skara (2020) reflected other people's views in the thinking processes of easily influenced people. It was based on motivation to please and reconcile thoughts with those around.

Scientific research emerges in which internal LOC has links to values of hedonism, stimulation, benevolence and universalism. Internal LOC encourages engagement in environmentally friendly behaviour by encouraging "green" thinking and action (Cheng et al., 2018; Hines et al., 1987). In general, the environmentalist movement relies on the view that the particular value – the environment is at risk and people can do something about it (Stern, 1999). The specific contribution to such a movement depends on individual capacities and limitations.

Internal LOC correlates positively with job satisfaction and job performance (Judge & Bono, 2001), which satisfies the need for achievement. People who follow targets for autonomous reasons show better adaptability than those who are driven by external causes (Sheldon & Elliot, 1999). When driven by internal motives, people make more effort to achieve goals, as well as have greater well-being benefits.

In the theory of self-determination, the ability to meet one's three basic needs results in growth and integration, while the inability results in anxiety, sadness, hostility and other negative emotions (Deci & Ryan, 2000). By encouraging self-awareness in therapy, acceptance of oneself and teaching positive relationships through a therapist client relationship, it is possible to strengthen authenticity by helping people to be open to all their experiences and live up to their internal values (McMillan, 2004). Components of authenticity can also be strengthened. By strengthening autonomy and other basic psychological needs in a family, interpersonal, work and educational environment, we can foster greater opportunity for people to integrate different parts of themselves and experience vitality and benefits from much more authentic living (Ryan & Deci, 2017).

Based on the conclusions of previous studies and theories examined in literature, the objective of the study is to examine basic value dimension and LOC influence on authenticity. To achieve this goal, hypotheses are raised that the basic value dimensions and LOC predicts an individual's sense of authenticity as follows:

1) openness to change and self-enhancement value dimensions together with an internal LOC positively predict authentic living scale;
2) conservation value dimensions and an external LOC positively predict the self-alienation scale;
3) self-transcendence value dimension and an internal LOC positively predict accepting external influence scales.

Methodology

A total of 327 surveys were completed, 10 participants were excluded from the study. Data analysis included 317 people aged 18 to 71 (M = 39.89; SD = 11.34), of whom 228 women (71.9%) and 89 men (28.1%). The breakdown of the sample by education is as follows: elementary school n = 7 (2.2%), high school n = 42 (13.2%), professional high school n = 51 (16.1%), bachelor's degree n = 135 (42.6%), master's degree n = 79 (24.9%), doctoral degree n = 3 (0.9%). The sample is made on an availability basis by collecting data electronically and in paper form.

The design of the study is an analysis of regressions. The study uses 3 surveys as tools. The authenticity scale (Wood et al., 2008, adapted in Latvia by G. Praulina, 2014), which consists of three sub-scales: authentic living, accepting external influence and self-alienation. The retest at 2 weeks is R = 0.78 and at 4 weeks is R = 0.91. Reliability (Cronbach's Alfa) in the original survey are: authentic living = 0.69, accepting external influence = 0.78, self-alienation = 0.78. (In the adapted version of LV, authentic living = 0.76, accepting external influence = 0.85, self-alienation = 0.85) all three factors are correlated: self-alienation with authentic living R = −0.44, self-alienation with accepting external influence R = 0.40 and authentic living with accepting external influence R = −0.38.

Individual values are measured by Portrait values Questionnaire (PVQ, Schwartz, 1992, adapted in Latvia by I. Austers, 2002; V. Renge and I. Muzikante 2008, abbreviated version). The 10 values from the survey can be combined into four value dimensions.

Reliability for dimensions are as follows: openness to change $\alpha = 0.76$, conservation $\alpha = 0.70$, self-enhancement $\alpha = 0.77$ and self-transcendence $\alpha = 0.73$.

Locus of control is measured by the Rotter's LOC scale (Rotter, 1966), which is being adapted as part of this study. The survey consists of 29 pairs of statements from which one answer must be chosen. The results are compiled from 23 pairs of claims, with 6 pairs of claims considered to be mixed pairs. Low rates indicate an internal LOC, high rates indicate an external LOC. Reliability in the original study was tested with the Kuder-Richardson ratio $R = 0.73$, retest after 1 month $R = 0.72$, after 2 months $R = 0.55$.

Data for study was collected online, using Google forms, as well as in paper form. Survey could be completed by any respondent, without the need to identify themselves. Because one of the surveys was adapted as part of this study, for retest purposes, the initial participants were able to create unique codes. The retest was performed after 3 weeks using unique codes. The data alignment was done manually. The data was analysed with IBM version 29.0 of SPSS Statistics.

Results

Initial analysis of descriptive statistics for the data obtained show, that Cronbach's α for openness to change (α = 0.74) and self-enhancement (α = 0.79) dimensions are at an acceptable level, while self-transcendence α = 0.60 and conservation α = 0.63 dimesions Cronbach's α are questionable. Two of the authenticity scale sub-scales show good Cronbach's α, while the authentic living scales Cronbach's α (0.55) is poor, so the data related to this scale should be explained with caution. The adapted Rotter's LOC scales Cronbach's α (0.72) has an acceptable reliability level.

Table 1 Descriptive statistics for scales ($N = 317$)

Scales	*M*	*SD*	*K-S*	*a*
LOC	11.74	3.92	0.09***	0.72
LOC 3 weeks.				0.86
Value dimensions:				
Openness to change	3.97	0.82	0.07***	0.74
Self-transcendence	4.22	0.74	0.06**	0.60
Conservation	3.68	0.80	0.07***	0.63
Self-enhancement	3.34	0.98	0.08***	0.79
Authenticity sub-scales				
Authentic living	5.51	0.90	0.08***	0.55
Accepting external influence	3.30	1.25	0.08***	0.83
Self-alienation	2.78	1.38	0.12***	0.83
Age (N = *313)*	39.89	11.34	0.11***	–

** $p < 0.01$; *** $p < 0.001$

The Kolmogorov-Smirnov test was used for checking the normal distribution of scales. Table 1 shows that none of the scales correspond to normal distribution.

A correlation analysis was first performed to test the study's hypotheses. The correlation table (Table 2) shows that the three sub-scales of the authenticity scale correlate with each other. The scale of authentic living correlates significantly negatively with accepting external influence scale $R_s = -0.37$, $p < 0.01$ and self-alienation scale $R_s = -0.46$, $p < 0.01$, which are moderate correlations. On the other hand, accepting external influence scale correlates significantly positively and moderately closely with self-alienation scale $R_s = 0.43$, $p < 0.01$. Such results are consistent with the results of the authors of the authenticity scale and the internal structure of the survey remained in line with the original.

Table 2 Table of Spearman correlation coefficients for authenticity sub-scales, value dimensions, LOC and age ($N = 317$)

	1	2	3	4	5	6	7	8
1. Authentic living	–							
2. Accepting external influence	−0.37**							
3. Self-alienation	−0.46**	0.43**						
4. LOC	−0.13*	0.05	0.15**					
5. Openness to change	0.08	−0.06	−0.10	−0.08				
6. Self-transcendence	0.26**	0.08	−0.20**	−0.11	0.28**			
7. Conservation	0.11*		−0.05	0.04	−0.07	0.33**		
8. Self-enhancement	−0.10	.30**	0.08	−0.01	0.34**	0.13*	0.11*	
9. Age ($N = 313$)	0.17**	−0.19**	−0.22**	−0.07	−0.09	0.01	0.21**	−0.24**
10. LOC 3 weeks				0.79**				

*$p < 0.05$; **$p < 0.01$

Analysis of the dimension correlations resulting from the portrait values survey (Table 2) shows that all correlations confirm the circular structure of the values referred to in Schwartz's basic values theory. For the Rotter's LOC scale adapted as part of this study, the stability at 3 weeks is $R_s = 0.79$ (see Table 2), which is considered good.

The correlations between surveys show a statistically significant, weak negative correlation between the LOC and the authentic living scale. A weak positive correlation appears between the external LOC and the self-alienation scale. However, the LOC does not correlate with any of the value dimensions. Conversely, the scale of authentic living correlates positively with the values dimensions of self-transcendence and conservation. Accepting external influence correlates positively with the dimensions of conservation and self-enhancement, highlighting the relationship between anxiety avoidance value orientation and accepting external influence. Self-alienation correlates negatively with the self-transcendence dimension.

The study put forward three hypotheses and underwent multiple linear regression with a backward step method to test these hypotheses. This method is chosen because it

allows to put all forecasters in the model first, regardless of their p-values, and then gradually remove those forecasters that have the highest p-values, leaving the most significant ones. This model also includes colinear forecasters, which the forward regression method might also exclude (Choueiry, n. d.). This analysis includes data up to $p < 0.1$.

Table 3 Dependent variable analysis of authentic living regression with independent variables – LOC, openness to changes and self-enhancement values dimensions ($N = 317$)

Step	*Backward*	R^2	F	*B*	*SE B*	*β*	*T*
1	*Authentic living*	0.04	3.86*				
	LOC			−0.03	0.01	−0.13*	−2.30
	Self-enhancement			−0.11	0.05	−0.12*	−2.02
	Openness to change			0.12	0.07	0.11	1.87

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

When examining hypothesis 1 "openness to change and self-enhancement value dimensions together with an internal LOC positively predict authentic living scale" (Table 3) it is confirmed in part because an internal LOC together with self-enhancement dimension significantly explains authentic living scale, but openness to change dimension does not show a meaningful relationship.

Table 4 Dependent variable analysis of authentic living regression with independent variables – LOC and value dimensions ($N = 317$)

Step	*Backward*	R^2	F	*B*	*SE B*	*β*	*T*
1	*Authentic living*	0.08	5.26***				
	Self-transcendence			0.23	0.08	0.19**	3.06
	Self-enhancement			−0.12	0.05	−0.13*	−2.28
	LOC			−0.03	0.01	−0.11*	−1.99
	Openness to change			0.07	0.07	0.06	0.96
	Conservation			0.06	0.07	0.05	0.90
2	*Authentic living*	0.08	6.37***				
	Self-transcendence			0.26	0.07	0.21***	3.67
	Self-enhancement			−0.12	0.05	−0.13*	−2.19
	LOC			−0.02	0.01	−0.11	−1.92
	Openness to change			0.05	0.07	0.05	0.80
3	*Authentic living*	0.07	8.29***				
	Self-transcendence			0.27	0.07	0.23***	4.06
	Self-enhancement			−0.10	−0.05	−0.11*	−2.04
	LOC			−0.10	0.05	−0.11*	−1.96

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

To understand the extent to which all value dimensions together with LOC explain authentic living scale, multiple regression has been performed to include all these forecasters. Here and forward, in additional regressions, the analysis includes all value dimensions because all values are important, only the hierarchy varies. Consequently, all value dimensions can have an impact on dependent variables. From Table 4, level on the authentic living scale are best positively predicted by positive self-transcendence and negative self-enhancement dimensions together with an internal LOC. Together these forecasters explain 7% ($R^2 = 0.07$, F (3, 316) = 8.29, $p < 0.001$), which explains a greater variation from the authentic living scale than the hypothesis 1.

Table 5 Dependent variable Self-alienation regression analysis with independent variables – LOC and conservation dimension ($N = 317$)

Step	*Backward*	R^2	F	*B*	*SE B*	*β*	*T*
1	*Self-alienation*	0.02	3.83*				
	LOC			0.05	0.02	0.15**	2.74
	Conservation			−0.05	0.10	−0.03	−0.51
2	*Self-alienation*	0.02	7.42**				
	LOC			0.05	0.02	0.15**	2.72

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

When examining hypothesis 2 "conservation value dimensions and an external LOC positively predict the self-alienation scale", Table 5 shows that only an external LOC explains 2% ($R^2 = 0.02$, F (1, 316) = 3.83, $p < 0.05$) of self-alienation scale. Consequently, this hypothesis is only partially confirmed.

Table 6 Dependent variable Self-alienation regression analysis with independent variables – LOC and value dimensions ($N = 317$)

Step	*Backward*	R^2	F	*B*	*SE B*	*β*	*T*
1	*Self-alienation*	0.07	4.41***				
	Self-enhancement			0.21	0.08	0.15*	2.54
	Self-transcendence			−0.26	0.12	−0.14*	−2.24
	LOC			0.05	0.02	0.13*	2.32
	Openness to change			−0.16	0.10	−0.09	−1.50
	Conservation			−0.00	0.10	−0.00	−0.02
2	*Self-alienation*	0.07	5.53***				
	Self-enhancement			0.21	0.08	0.15*	2.56
	Self-transcendence			−0.26	0.11	−0.14*	−2.42
	LOC			0.05	0.02	0.13*	2.33
	Openness to change			−0.16	0.10	−0.09	−1.53
3	*Self-alienation*	0.06	6.57***				
	Self-enhancement			0.17	0.08	0.12*	2.19
	Self-transcendence			−0.31	0.11	−0.17**	−2.96
	LOC			0.05	0.02	0.13*	2.39

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

By incorporating all value dimensions together with LOC to predict self-alienation scale, Table 6 shows, that an external LOC together with self-enhancement and self-transcendence dimensions explain 6% ($R^2 = 0.06$, $F\ (3, 316) = 6.57$, $p < 0.001$) of the scale variation. This model explains self-alienation scale scores three times better than predictors put forward in the hypothesis.

Table 7 Dependent variable accepting external influence regression analysis with independent variables – LOC and self-transcendence dimension ($N = 317$)

Step	*Backward*	R^2	F	B	$SE\ B$	β	T
1	*Accepting external influence*	0.01	2.28				
	Self-transcendence			0.17	0.10	0.10	1.80
	LOC			0.03	0.02	0.08	1.38
2	*Accepting external influence*	0.01	2.64				
	Self-transcendence			0.16	0.10	0.10	1.63

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

The examination of hypothesis 3 "self-transcendence value dimension and an internal LOC positively predict accepting external influence scales" shows (Table 7) that this hypothesis was not confirmed and the model is not statistically significant.

Table 8 Dependent variable accepting external influence regression analysis with independent variables – LOC and value dimensions ($N = 317$)

Step	*Backward*	R^2	F	B	$SE\ B$	β	T
1	*Accepting external influence*	0.18	13.88***				
	Self-enhancement			0.42	0.07	0.33***	5.99
	Conservation			0.35	0.09	0.22***	3.98
	Openness to change			−0.29	0.09	−0.19***	−3.35
	LOC			0.02	0.02	0.05	0.99
	Self-transcendence			0.07	0.10	0.04	0.70
2	*Accepting external influence*	0.18	17.26***				
	Self-enhancement			0.42	0.07	0.33***	5.98
	Conservation			0.37	0.08	0.24***	4.58
	Openness to change			−0.27	0.08	−0.18**	−3.30
	LOC			0.02	0.02	0.05	0.91
3	*Accepting external influence*	0.18	22.76***				
	Self-enhancement			0.42	0.07	0.33***	5.99
	Conservation			0.37	0.08	0.24***	4.61
	Openness to change			−0.28	0.08	−0.18***	−3.38

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

When examining the impact of all value dimensions and LOC on accepting external influence scale, Table 8 shows, that the model is statistically significant and explains 18% of the variation of the scale ($R^2 = 0.18$, F (3, 316) = 22.76, $p < 0.001$. Accepting external influence scale is influenced by self-enhancement, conservation and openness to change dimensions, while the LOC has no significant impact on this model.

Discussion

A sense of authenticity is an individual's internal sense of how authentic a person feels in each situation, it varies more internally than in interactions with surroundings (Lenton et al., 2016). This feeling has long-term implications for well-being in general (Boyraz et al., 2014), being authentic right now raises chance of well-being in the future. However, in western culture, patients increasingly suffer from weak sense of authenticity (Martens, 2007). Inability to accept other people's authenticity can stem from being confronted with own neglected or negated true self. For this reason, it is important to understand what influences authenticity.

For the Rotter's LOC scale adapted as part of this study, reliability and retest values are consistent with those of the original study. Although authentic living scale has low reliability score, associations between the scales remain the same as in the original study. Correlations between value dimensions confirm the circular structure of basic values. Reliability scores of dimensions correspond to the original and they may vary from sample to sample due to different cultures.

LOC has associations with two of the three authenticity sub-scales: an internal LOC influences authentic living, while an external LOC influences self-alienation, which confirms essence of LOC construct (Rotter, 1996). LOC shows no influence on accepting external influence, which could be due to people with both internal and external LOC being influenced from others because we interact with others all the time and don't live in isolation.

None of the value dimensions in itself relate to the LOC. Although studies related to self-transcendence (Cheng et al., 2018, Hines et al., 1987) and self-enhancement dimensions (Judge & Bono, 2001) show associations with an internal LOC, this could be due to the overall influence of internal LOC. Also, none of these studies measure all values at the same time, but only the relationship between specific values and an internal LOC.

In this sample LOC along with values affect authentic living and self-alienation scales. Hypothesis 1 was partially confirmed showing, that an internal LOC together with negative self-enhancement dimension influences authentic living. Based on previous research, people with high self-enhancement dimension were expected to have high rates of authentic living scale, since the interaction between power and authenticity was mutual (Sheldon et al., 1997; Tou et al., 2015) and an internal LOC correlates with achievement (Judge & Bono, 2001). Openness to change dimension was expected to have a positive impact on authentic living, as meeting personal needs would make a person feel authentic, but these results did not confirm it.

When looking at all value dimensions together with LOC, full picture of authentic living scale appears. People with a higher internal LOC, higher self-transcendence and lower self-enhancement dimension feel authentic. These people believe that they influence events of their lives, that everyone has to have the same opportunities, they respect different points of views, they are loyal to their friends and take care of nature (Cheng et al., 2018; Hines et al., 1987).

A study conducted by Skara (Skara, 2020) found that people with a higher conformity value had higher self-alienation scale rates, however, this study confirmed hypothesis 2 in part and indicated that an external LOC influences self-alienation, yet there was no impact of the conservation dimension on this scale. This could be due to the fact that the relationship appeared in a specialised sample.

However, when all value dimensions and LOC are accounted, an external LOC, high self-enhancement and low self-transcendence dimensions, will increase self-alienation rate. These people attribute events to luck and other people, and will put more importance in being admired and respected and are oriented towards material benefits.

It should be noted that all values are important to all people, but their hierarchy varies. The hierarchy cannot be seen externally. Consequently, it may look like a person is loyal to friends or colleagues, but it's impossible to say what the underlying motivation is (Sosik et al., 2009). This underlying motivation could be the reason for the antithesis of self-alienation and authentic living, since the value dimensions that influence these scales are opposed.

This study did not confirm hypothesis 3. Such a result in a given sample could be due to the two ways others can affect us (Berrett-Lennard, 1998; Wood et al., 2008). We can accept external influence by moving away from our self, which would diminish self-inquiry in favour of listening to other opinions, or we can accept external influence and increase authentic living, by considering the social environment and situation and choosing appropriate strategies (Lopez & Rice, 2006). This would satisfy the fundamental need to maintain a sense of belonging to the group (Deci & Ryan, 2012), irrespective of the locus of control.

Although the LOC is irrelevant when it comes to accepting external influence, the value system has a significant impact on accepting external influence scale. High self-enhancement and conservation, and low openness to change dimension rating increases accepting external influence scale. People with this value dimension hierarchy will try to escape anxiety, fit into a group and gain personal accomplishments to gain respect of the group. Since openness to change dimension is low, these people are less likely to be original, less likely to take risks and less likely to seek freedom and independence from others. As social beings, we all are influenced by others in some ways, but the power of that influence depends on whether a person is more internally or externally oriented, because it will affect which of the other two scales of the authenticity will be affected by accepting external influence scale.

Limitation of this study is the low Cronbach's α of authentic living scale. When using obtained results, it should be noted, that influence of the LOC and values in authentic

living and self-alienation scale is small, so these conclusions affect very small part of the overall sense of authenticity. Previous studies have not considered all value dimensions in relation to the LOC simultaneously, so the results of this study indicate new information, but should be evaluated with caution. A further simultaneous measurement of all values and LOC is necessary in order to talk about the role of values and LOC in behaviour and to strengthen the results obtained here.

Since LOC does not play a role in accepting external influence scale, but the role is played by a hierarchy of values that do not affect the rates of authentic living and self-alienation scales, in future studies it would be worth checking whether accepting external influence is a moderator in how authentic we are.

Given the results of the study, the importance of self-knowledge and environmental impact in an individual's sense of authenticity emerges. Interacting with social environment reinforces internal beliefs (Rotter, 1966). By choosing to act in a stereotypical way, one diminishes one's autonomy and diminishes one's sense of authenticity (Martens, 2007). It is only by choosing to learn about oneself, acting in accordance with that acquired knowledge, by choosing autonomously to make decisions, while also considering the environment in which all of this is to be exercised, that a person strengthens his sense of authenticity and, in the long term, his general sense of well-being. Consequently, it would be advisable to seek different environments in society in order to be able to express all parts of one's personality, but in a clinical environment it would be advisable to promote self-knowledge and support the expression of one's authentic self within an appropriate environment.

Conclusions

In this study three constructs were studied together for the first time, although the very definition of authenticity includes both values and LOC. This study has led to a broader picture of how these constructs interact. In accordance with previous studies, the LOC affects an individual's sense of authenticity – people with an internal LOC live more authentically, but with an external LOC show higher self-alienation. However, while self-alienation and accepting external influence is positively correlated and both negatively correlate with authentic living, the locus of control has no effect on accepting external influence. In addition, this study shows the effect of two value dimensions on two authenticity indicators: high self-enhancement and low self-transcendence value dimensions influence higher levels of self-alienation, which negatively affects the sense of authenticity. Conversely, the opposite in the hierarchy of these values – high self-transcendence and low self-enhancement value dimensions create higher rates of authentic living, which positively influences feelings of authenticity.

The LOC has no impact on accepting external influence, it is influenced by value dimensions. In this study, high self-enhancement and conservation value dimensions and low openness to change value dimension increased accepting external influence scale rate and this rate was significant (18%). Since accepting external influence scale has a negative

correlation to authentic living, such dimension hierarchy can contribute to the subjective sense of not being authentic.

Results of the study show, that the social environment in which a person finds himself plays a big part in the sense of authenticity. The social environment either encourages or undermines an individual's desire to self-disclose, and also strengthens the hierarchy of values. According to what has already been stated in previous studies, being authentic and expressing one's values involves psychological and social costs, so that a situational variation in authentic self-expression does not constitute a sign of weakness, but takes account of the situation and the environment. Unless the environment is changed, it will have a long-term impact on the value hierarchy, meaning we can purposefully choose an environment ourselves that would contribute to strengthening of specific values. In pursuing our goals and satisfying our interests, we strengthen our sense of authenticity.

In a clinical environment, it would be important to encourage self-awareness, thereby helping to reduce self-alienation and teaching consensual and healthy relationships with others, where one considers one's needs (authentic living) and accepts the difference of others, thus encouraging acceptance external influences that are positive for authenticity. However, a strong emphasis in the clinical environment is directly on reducing self-alienation rates, by allowing real physiological conditions, emotions and deep-level cognitions to come to awareness in the first place. It is only after something has come to awareness that allows to begin to work towards desired goal.

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BRIDGING THE GAP BETWEEN GRAPHIC DESIGN AND DIGITAL ACCESSIBILITY IN DESIGN EDUCATION

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ABSTRACT

Graphic design courses are usually a familiar topic in design curricula. However, knowledge of digital accessibility, including visual accessibility is not always emphasised when teaching students. When the World Wide Web Consortium launched an accessibility initiative in 1997, it included a set of guidelines for achieving web functionality for people with disabilities. Today, accessibility is recognised as important for all and plays a crucial role in the development of sustainable digital product and service design. The rules for compliance with the principles of accessibility in the digital environment have already been incorporated into the legislation of the European Union and the Republic of Latvia. In view of all this, teaching the principles of visual accessibility in design education has become topical. However, it can be a pedagogical challenge to integrate these specific practises into graphic design education, as it requires looking at familiar design concepts from a different perspective. This article aims to demonstrate that the principles of visual accessibility can be integrated into the content of graphic design assignments to enable students to consider design problems more broadly. Using qualitative research methods, a case study of the implementation of the topic of visual accessibility in the course "Introduction to Web Design" offered as part of the Bachelor of Computer Science programme at the University of Latvia is examined. As a result, the author suggests how both visual accessibility and graphic design can support each other in the learning process. In conclusion, the author points out that the systematic inclusion of accessibility design concepts in teaching is an important part of sustainable design education and recommends how the topic of visual accessibility can be better integrated into other relevant design curricula in the future.

Keywords: *curriculum development, graphic design, pedagogical challenge, sustainable design education, visual accessibility.*

Introduction

For the author, the idea of teaching visually accessible graphic design began in 2020 during the online conference "Digital Accessibility. Practise. Examples" organised by

the Latvian School of Public Administration. There, Ms Daina Podziņa from "Apeirons" – Association of Disabled People and Their Friends spoke about how the accessibility of the digital environment should look like. Among other aspects, Ms Podziņa mentioned such basic principles of graphic design as colour contrasts, typographic and information hierarchy and communication of images (2020a, 2020b). At the time, the author felt like she was listening to an introductory design lecture while realising that in practise these basic principles were probably not always considered in the digital environment.

Since 2011, the author has gained experience in teaching graphic design for web and visual communication to computer science students at the University of Latvia (UL, later in the article). In 2020, the growing demand for accessible design meant that it was time to enrich the courses and teach students aspects of accessibility and emphasize why the basic design principles are so important. After reading the Visual Accessibility Guidelines (World Wide Web Consortium [W3C], 2022) in more detail, the author realised that this goal turned out to be a pedagogical challenge, as graphic design and accessibility are usually considered different fields of study. Initially, the author started with a brief overview lecture on accessibility in the web design course. She gradually developed a better understanding of how accessibility can be taught in the context of graphic design and visual communication by adding practical design tasks to theory and using an active learning methodology in lectures and design classes.

The aim of this article is to share experiences on how the topic of visual accessibility can be integrated into the content of a graphic design course to give students the opportunity to consider design principles in a broader context. The author first provides an overview of the concepts of visual accessibility and the relevant guidelines and then identifies what changes are needed in graphic design education. The author then presents a methodology that addresses the teaching practise of visual accessibility. Three design exercises are offered as a supplement to the existing assignments of the web graphic design course. The research findings help to better address the pedagogical challenge of teaching accessible graphic design.

Background and Context

In 1997, the World Wide Web Consortium (W3C) launched a Web Accessibility Initiative (WAI, later in the article) to make it easier for people with disabilities to use the Internet. "Endorsed by The White House and W3C Members, the WAI will involve the establishment of an International Program Office (IPO) responsible for developing software protocols and technologies, creating guidelines for the use of technologies ..." (World Wide Web Consortium [W3C], 1997).

Today, the concept of accessibility comprises four main aspects. To be more suitable for all user groups, the digital environment should be perceivable, operable, understandable and robust. There are three levels of conformance from "A" (the lowest) to "AAA" (the highest). (W3C, 2023b). Nowadays, digital accessibility is also a fundamental part of various broader concepts such as Design for All (Stephanidis, 2014) and Inclusive

Design (Joyce, 2022; W3C, 2016). In this article, the author looks at the principles of visual accessibility, which depends on the choice of graphic design.

Visual Accessibility

As mentioned in the introductory section, the basic principles of graphic design and visual accessibility are the same or very similar. By "similar" the author means that familiar principles, such as colour contrast and typographic hierarchy, are viewed from a different perspective or with an additional goal (Zarina, in press). The obvious similarity was the starting point for overcoming the pedagogical challenge of talking about the laws of graphic design from an accessibility perspective. In this article, the author looks at three selected aspects of accessible graphic design. They are discussed in order of complexity of educational task fulfilment.

1. First, a sufficient contrast ratio of dark and light colours between the background and text is ensured and tested. The test concept is based on measuring the relative luminance of colours, taking into account the shapes and sizes of the glyphs (W3C, 2023a). This allows to control the legibility of the text.
2. The second aspect of visual accessibility concerns the concept of textual description of images, including graphical elements such as icons and buttons, to provide information or describe the function they represent. The accessibility guidelines strongly advise that different types of images be accompanied by so-called Alternative texts (Alt text, later in this article). These descriptions are necessary so that they can be used by screen reader technologies (IxDF, 2016; W3C, 2022).
3. Third, a well-established visual hierarchy of the text layout on a website or user interface (a) gives us visual cues to the level of importance of the information, (b) helps us interact and achieve our goals, and (c) reduces unnecessary cognitive load (Johnson, 2020, pp. 79–100; Lynch & Horton, 2016, pp. 255–283). This aspect of accessibility concerns not only the visual but also the cognitive parts of a perceptible, operable and understandable digital environment.

Government Policy and the Topicality of Accessibility Design Knowledge

In the United States (US) and the European Union (EU), including the United Kingdom (UK) and 17 other countries, government policies on web accessibility have gradually been adopted as binding laws and guidelines to varying degrees (W3C, 2023c). In 2016, the EU Regulation on Accessibility of the Websites and Mobile Applications of Public Sector Bodies was adopted (Directive EU, 2016). Latvia, as a member of the EU, has made the digital accessibility of the websites of state and municipal institutions mandatory from 2021 (Ministru kabinets [Cabinet of Ministers], 2023). With the legal provisions resulting from the European Parliament and Council Directive, the next target group for the implementation of accessibility requirements is digital products, services and infrastructure (EU Directive, 2019; Saeima [Parliament of the Republic of Latvia], 2023).

In Latvia, intensive preparations are currently underway in the financial and information technology sector to develop and implement accessibility guidelines in the digital environment. Guidelines already exist in the financial industry (Finanšu nozares asociācija [Financial Industry Association], 2023). The Information and Communication Technology Association (LIKTA) has established a working group for the development of best practises and guidelines for the industry, of which the author of this article is a member. This general trend in government policy could lead to visually accessible design becoming a natural professional graphic design skill in the relevant labour market.

Design Education in Transition

Today, design is increasingly seen as a process-orientated discipline. This means that design education must constantly apply new methods to keep pace with changing conditions dictated by both technology and national policy, as well as humanity's general understanding of how the physical and digital environment must be designed (Elcioglu, 2022; Norman 2010, 2016).

The idea that design is shifting from artefacts to experiences has also been explored in relation to visual communication design. Davis and Hunt acknowledge that "new design approaches, technology, and software changed the role of communication design in society ... Participatory design, user-centered design, and ergonomics brought designers' attention to the experiences ... rather than the design of an object". At the same time, these authors speak of contrast, colour and visual hierarchy as "formal strategies to capture the audience's attention" (2017, pp. 8, 91). This approach reveals a certain gap between the concepts of visual communication and visual accessibility.

However, the author suggests that this gap can be bridged by practically showing students how visual accessibility can help to reach a wider audience and secure the attention of users in the long term. Already in 2015, a group of authors from the Engineering Design Centre at the University of Cambridge in the UK acknowledged that visual accessibility is a key element that determines the overall inclusivity of printed graphic design. At the same time, the authors concluded that, according to their survey of 122 graphic designers and clients from the UK, improvements should be made both in the collaboration between designers and clients and in the development of tools to support designers in visual accessibility (Cornish et. al., 2015, pp. 176–195).

Methods for Teaching Visual Accessibility

In this section, the author provides an insight into the development of the methodology for teaching visual accessibility in the course "Introduction to Web Design", which is offered as part of the Bachelor's degree programme in Computer Science at the UL. Firstly, the learning environment is described. Then the author talks about practical examples of how the principles of visual accessibility can be taught by applying the active learning methods. Finally, recommendations are given on guidelines and tools that can be used to provide students with more information on visual accessibility.

Learning Environment

The "Introduction to Web Design" created and taught by the author of the article is offered as an elective course for 60 to 80 sixth-semester students. The total number of contact hours is 64, including 32 lecture hours and 32 practical class hours. In the practical design classes, students are divided into groups of up to 25 participants each. In addition, 96 hours are allocated for independent studies. The aim of this study course is to provide theoretical knowledge and practical skills in the field of graphic design for the web. No prior knowledge is required for this course, but all students have already taken the compulsory courses "Web Technologies I" and "Web Technologies II" in their previous years of study and are therefore able to develop front-end and back-end web solutions. This course should fulfil the standards of the European Quality Assurance Network for Informatics Education (EQANIE) with the following learning outcomes:

Knowledge: 1. Understand basic visual concepts in web design and comprehension of their application methods (EB12); 2. Demonstrate specialized knowledge of designing various visual components for web (EB12). Skills: 3. Work with various computer graphics software, choosing the optimal technical solution for particular visual design (EB34); 4. Independently create various graphic elements in web design projects (EB34). Competence: 5. Create and manage Web design projects (EB64). 6. Competently collaborate with visual designers in custom web design projects (EB65) (University of Latvia. Computer Science – Bachelor's Study Programme, 2024).

To achieve the learning outcomes, a constructivist framework through the active participation of the learners themselves (Newstetter & Svinicki, 2014, pp. 29–46) is chosen as the teaching method for active learning. The practical design exercises described in the next section create the basis for an "interactive mode of engagement" (Chi & Wylie, 2014, p. 220).

The lectures are thematically linked to the design classes. By talking about relevant topics, the professor covers the theory and practise of accessible graphic design. Students are familiarised with guidelines and tools to test and measure accessibility compliance. The multimedia material provided during the lectures, which recapitulates what has been said, helps to consolidate the knowledge.

In the course requirements, adherence to accessible design principles such as sufficient colour contrast and text hierarchy is mentioned as an assessment criterion for the students' independent study assignment – the development of a website. This assignment accounts for 50% of the final grade. In two seminars, students must present the results of their website development to their peers and receive feedback from them and the professor.

The other 50% of the course assessment are covered by design assignments to be completed during the practical design classes. From the Spring Term of the 2023/2024 academic year, part of the design assignments relate to visual accessibility, including colour contrasts, informational attributes for images and graphic elements and the creation of typographic hierarchy.

Visual accessibility is formulated as a problem for students to solve. For the design assignments, students can use graphic design software of their choice and select their own images or find them from free online image libraries. Students should write a description for each assignment reflecting on how they carried out the task, provide the image references, and also justify the choice of guidelines and testing tool they used to implement visual accessibility. At the end of the course, students must give feedback on the design classes by analysing the design task from which they have learned the most.

Exercises on Visual Accessibility

The examples in this subsection are part of exercises of design class assignments. The exercises are intended to encourage students to conduct practical research by first familiarising themselves with the guidelines for visually accessible design suggested by the professor and chosen by themselves, and then comparing the information gained with their own previous assumptions. After completing the design tasks, students should use accessibility testing tools to get immediate feedback on their results and correct the errors if necessary.

The classroom is equipped with computers and a projector. During design lessons, students are encouraged to show the results of their work via a projection system on a large screen. This creates an awareness of the different screen sizes and their impact on the overall accessibility of graphic design. To test their design, students should also use their smartphones or emulate different device parameters using the tools provided by the browsers.

The tasks are designed so that students (a) clearly understand the purpose of learning visual accessibility and (b) ensure that the results of the design can be tested, as in many other areas of computing.

1. Colour Contrasts for Accessibility.
   Problem definition. How to develop sufficient text and background contrast ratio?
   Description of the exercise. Search the websites of three to five universities and find the web pages with similar content. Select two pages that you think have a sufficient and an insufficient contrast ratio between text and background. Look at the contrast measurement tools provided or find additional tools and test these web pages. Compare your assumptions with the test results. Show how you can correct the insufficient contrasts. Then select the text and background colours for your independent study task and test their contrasts. Reflect on the process of carrying out the exercise in the description.
2. Text Alternatives for Images.
   Problem definition. How can images be made accessible to all?
   Description of the exercise. Read the relevant accessibility guidelines and familiarise yourself with the categories for images, such as Informative Images, Decorative Images, Functional Images, Images with Text, Complex Images, Groups of Images and Image Maps. Search the websites of three to five universities and find two web pages with similar content from different universities. Look at the accessibility

measurement tools and select one to check if there are text alternatives for functional and informative images on the selected pages. Then manually check the quality of the Alt text descriptions for compliance with accessibility guidelines. Provide one good and one bad example. Finally, create Alt texts for three images of your choice. You may use images from the materials for independent study assignment. For writing the Alt texts, you can practise creating image descriptions using the web-based resource "Poet Training Tool" (The DIAGRAM Center, 2020).

3. Typographic Hierarchy.
   Problem definition. How to design texts that are easy to read?
   Description of the exercise. Read the guidelines for accessible design and recommendations for the layout and font size of headings and body text, as well as other text attributes such as capitalisation, italics, boldface and others. Select websites from three to five universities and choose two web pages with similar content that you think are (a) well formatted and (b) poorly formatted. Look at the accessibility test tools and select one to check the heading hierarchy. Then manually check the overall layout (length of text lines, grouping of information in blocks and proximity) and typographic hierarchy. Give a good and a bad example. Then format a short text (up to 400 words) according to the accessibility recommendations. You can use the text from your independent study assignment.

After completing the exercises, participants are encouraged to apply the knowledge of sufficient text and background contrast, Alt text descriptions and typographic hierarchy throughout the development of their own website.

Recommendations on Visual Accessibility Guidelines and Tools

The W3C Web Content Accessibility Guidelines (WCAG) provide a comprehensive set of recommendations for the accessibility of digital environments and can be considered a reliable and regularly updated first point of reference. However, there are a number of other guidelines developed by national governments, universities and companies that can be used as an additional source of information. See Table 1.

Table 1 A list of guidelines and tools recommended as optional learning materials for visual accessibility design tasks. (Organisations providing guidelines are listed in alphabetical order).

Organisation	The title and address of the website
Harvard University, US	Write Helpful Alt Text to Describe Images. https://accessibility.huit.harvard.edu/describe-content-images
Kent University, UK	Make Images, Graphics and Photos Accessible. https://www.kent.ac.uk/guides/accessible-content/accessible-images
Nielsen Norman Group	Usability Guidelines for Accessible Web Design. https://media.nngroup.com/media/reports/free/Usability_Guidelines_for_Accessible_Web_Design.pdf
The DIAGRAM Center	Poet Training Tool. Introduction to Accessible Images. https://poet.diagramcenter.org/

Organisation	The title and address of the website
The Ministry of Smart Administration and Regional Development of the Republic of Latvia [Latvijas Republikas Viedās administrācijas un reģionālās attīstības ministrija]	Evaluation of the website according to the accessibility requirements of the digital environment (WCAG 2.1 AA) [Tīmekļvietnes izvērtējums atbilstoši digitālās vides piekļūstamības prasībām (WCAG 2.1 AA)]. https://pieklustamiba.varam.gov.lv/
UK Government	Accessibility in Government. https://accessibility.blog.gov.uk/2016/09/02/dos-and-donts-on-designing-for-accessibility/
US Government	Accessibility for Visual Designers. https://digital.gov/guides/accessibility-for-teams/visual-design/
Utah State University, US	WAVE Web Accessibility Evaluation Tools. https://webaim.org/resources/contrastchecker/
W3C	Images Tutorial. https://www.w3.org/WAI/tutorials/images/

Note. The availability of resources must be checked before the assignment is given to the students.

Results

As a result, in the course "Introduction to Web Design", students learn how to better understand the basic principles of creating visually accessible web design. During the design classes, students test how well they have understood the theory and this helps them to recognise and correct their knowledge. By completing these assignments, students gain practical knowledge and develop their design skills. By being able to review the outcome of their design immediately, they can iterate better and accelerate the successful end result.

By describing the progress of the design tasks, students can systematise and deepen their knowledge. By receiving feedback actively (by showing their own results) or passively (by viewing pier results) and also discussing examples of design exercises, students expand their understanding of visual accessibility.

1. Students identify problems with colour contrast in relation to text size and the relative luminance of colours. They test and correct the design using contrast measuring tools. Students build their knowledge by comparing the measurements with their own suggestions. As everyone's perception of colour is different (Goldstein, 2010, pp. 202–226), this approach allows students to gain confidence in the objectivity of the knowledge, skills and competences they have acquired. In addition, students learn about the properties of colours from a different perspective.
2. The exercises with Alt texts are designed to train visual thinking and contextual understanding of the image, which not only ensures visual accessibility but also promotes clarity of visual communication. Based on the knowledge they have gained from comparing the guidelines and through the experience of assessing the quality of image descriptions on other websites, they learn how to write Alt texts. Students develop and test their ability to combine text and image by describing

their own examples. Through these exercises they also learn to think about the communication of the images they have used in their designs.

3. Students learn about layout and typographic hierarchy as a complex task, especially for responsive websites. In the web page tests, students can better understand the hierarchy of headings and text attributes specified by the accessibility guidelines and combine the results with their programming skills in web development. This paves the way for a more successful creation of their own website design and also ensures students' competence in working with visual designers.

Table 2 Meeting the learning outcomes for three visual design exercises related to accessibility

Task	Knowledge		Skills		Competence	
	1.	2.	3.	4.	5.	6.
Contrast	+		+			+
Attributes	+	+	+			+
Hierarchy	+	+	+	+	+	+

Note. **Knowledge** 1. Understand basic visual concepts in web design. 2. Demonstrate knowledge of designing visual components for web. **Skills** 3. Chose the optimal technical solution for particular visual design. 4. Independently create graphic elements in web design projects. **Competence** 5. Create and manage web design projects. 6. Collaborate with visual designers

Table 2 shows the learning outcomes that students achieve by completing the visual accessibility exercises in the course "Introduction to Web Design". The table has been adapted from the UL's standard course description template.

Conclusions

Visual accessibility tasks can help to make web design perceptible and understandable. The ability to measure the relevance of various design attributes offers a new perspective for creating a better digital environment.

The author of this article sees an opportunity to complement the relevant graphic design and visual communication courses at the UL with topics on visual accessibility. The author's further plans include implementing several specialised design tasks in the course "Graphic Design for User Interface" for the Bachelor of Computer Science programme and also in two visual communication courses: (a) "Selected Topics of Visual Communication Design" in the Master of Computer Science programme and (b) "Visual Communication in Design" in the professional Bachelor of Art programme. The curriculum for accessible design can also be expanded to include aspects of cognitive accessibility that depend on the performance of visual design, such as the reduction of "visual noise" and the resulting cognitive load on users.

The teaching of visual accessibility can open up opportunities to enrich and complement knowledge of graphic design and visual communication development principles.

This promotes inclusive design and also better prepares students for the labour market. Furthermore, the aspects of visual accessibility may in future be included as part of the skills, knowledge and competences to achieve visual literacy. Society as a whole, including students as users, would benefit from a more accessible digital environment.

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THE CULTURAL HERITAGE OF CHARACTER DANCE GENRE IN THE EDUCATION OF A CHOREOGRAPHER IN LATVIA

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Abstract

Research in the fields of culture and arts is an important resource for the development of cultural and creative industries for the creation of new teaching methods, emphasizing the professional aspects of teaching. In professional dance education, teachers' theoretical and practical skills, alongside their body language, are of utmost importance and are honed to perfection. The study courses are primarily based on the accepted knowledge of history and cultural heritage, preserving these values as a continuation of traditions in the dance industry. The author has chosen the genre of character dance in professional higher education as the basis of this research. The author provides clear definitions and explanations of the character dance genre, non-national stage folk dance, and stage folk dance in the theoretical research. The background of the empirical study is the professional bachelor's program in Choreography of the Jāzeps Vītola Latvian Academy of Music, graduated by 283 students from 1977 to 2023. The research test sample consists of 9 graduates of the academy. Qualitative methodology was used in the data, – personalized interviews, – with content analysis at the final stage of the research. The main focus of the research is character dance, non-national stage folk dance in the education of choreographers / dance group leaders, the historical experience of the study course, the inheritance of the cultural heritage of dance, and the improvement of acquired skills in creative work. In the interviews dance industry professionals revealed their views on the vision of character dance, and the development of the non-national stage dance course in the study process today, justifying how essential the preservation of cultural heritage is in the Latvian stage folk dance industry in the interviews. The study emphasizes the significance of the historical legacy of the dance study course, pedagogical learning methods, and professional practical skills in the education of the dance industry.

Keywords: *character dances, dance teacher, dance team leader, non-national stage dance, professional higher education, physical literacy.*

Introduction

Transferring dance and cultural heritage to the next generation is one of the most pressing issues among dance professionals today. Laws and pedagogical guidelines

actively seek achieving set goals in professional and higher education (Anspaks, 2004, 2006). It is important to promote the new generation's professional growth and long-term participation in sharing and preserving the cultural heritage (Treimane & Vinogradova, 2018, Vinogradova, 2018). The culture of the stage dance language is largely dependent on the professional knowledge acquired during one's studies. Professional contribution of the character dance genre to the culture of stage dance was paid the most attention within this research. The current research is takes into consideration on the contemporary pedagogical guidelines, the definition of the dance genre in the learning process, as well potential improvement of the students' growth opportunities at the initial stage of choosing a professional career (Spalva, 2006).

"The purpose of developing the guidelines of the dance industry is to confirm the value of the dance field in the cultural environment and to define the directions of action for diverse and sustainable development of the dance industry, competitiveness, to create a higher quality of life for everyone, preserving and developing Latvia's cultural capital and the creativity of the population, based on tradition, excellence, diversity, creativity and accessibility principles" (Latvijas Dejas padome, 2023, 3).

The specific educational requirements for the cultural and creative sectors are of significant importance and have an impact on the comprehensive development of a person. Cultural education systems are responsible for cultural sector specialists with very specific skills and knowledge, namely a wide variety of specialists, professionals, and teaching staff of various fields of performing arts (Kultūras ministrija, 2022). "Arts education can enhance our human capacity to perceive the experiences of others by feeling them empathically, or picking up on non-verbal cues" (UNESCO, 2022, 72).

One of the key aspects of this study is the research of a pedagogical conceptual model of the character dance genre in the education of dance group leaders. As the study aims to identify the professional contribution of the character dance genre in the learning of the stage folk dance course in the education of dance collective leaders, an analysis of the stage folk dance study course in the education of dance group leaders/choreographers was made. The research data was analysed in several thematic directions: the value of the past heritage, the necessity of the study courses nowadays and the courses' influence on the professionalism of young specialists in the field. The study also involves an in-depth analysis of the main guidelines which would be useful in updating the content of the contemporary study courses.

Theoretical Background

The educational institutions of the cultural education system should take into account the goals and tasks outlined in the "Cultural Policy Guidelines for 2022–2027 "Cultural State" and the "Educational Development Guidelines for 2020–2027 "Future Skills for the Future Society" approved by the Cabinet of Ministers in Latvia. "To ensure the sustainability of Latvian culture, that is, to guarantee that future generations have access to the Latvian cultural offer in no less quantity and quality than at present, it is essential

to strengthen the cultural education system of Latvia to ensure the revival of talent in Latvian culture. The goal of the cultural education system is professional cultural education oriented towards the development of talents, – involving a large number of students, – allowing to identify and purposefully develop young talents who will continue cultural education in the next levels of education" (Kultūras ministrija, 2022, 27).

The transfer of cultural education forms, skills, abilities, and knowledge, as well as the structuring of experience in the study process allows an individual to improve their experience through the body as a source of knowledge (Shilling, 2018). This would allow for a more meaningful education as a result of one's movement being shaped by competent teaching staff, following the main guidelines for the improvement of physical literacy including: demonstration of movement during the study process; involvement of the synergistic cooperation of the dance element is accompanied by live music and its importance in the learning of each element; emphasis on the importance of improving physical literacy and the culture of aesthetic representation of the body (Eichberg, 2009); a study for more recent development of the course content in context of professional higher education. In the context of this study the importance of physical literacy in professional dance education is based upon the research of the character dance course. The course in question involves two important, yet vastly different definitions:

1) **Character dance** (fr. *danse de caractére*) – a dance genre in classical ballet, which is opposed to noble or academic dance and is related to the depiction of different nationalities or people's characters in dance (Spalva, 2013).
2) **Stage folk dance** – a genre of performing arts, that has historically formed as a synthesis of folk dance and classical dance and which is characterized by the placement of the choreographic means of expression in time and space typical for folk dancing in the author's interpretation (Spalva, 2018).

Both definitions meet within the framework of one study course in the Jāzeps Vītols Latvian Music Academy (JVLMA) study program – choreographer. Throughout the period 1977–2023 the course had different titles.

Methodology

The research base consists of 9 interviews with the graduates of the JVLMA's professional bachelor's study program in the specialty of choreography. Respondent selection was based on multiple criteria. One would have to be: a dance industry professional with corresponding higher education in the dance; a leaders of a Latvian folk dance company that was previously active or is currently active in the industry (dance company tutors, Song and Dance Festival leaders and assistant leaders would also qualify); a creative choreographer in their professional career, as well as an active educator in the dance industry.

In order to make a historic contribution of higher dance-related education in the dance industry data collected from the whole duration of the selected period was accounted for within the framework of this study, which has not been attempted in Latvia before. The period selected for data collection was 1977–2023, from the very beginning of

the foundation of the choreography department to the graduation of the 29th graduate generation. The data collected provides a more accurate overall view of the local dance industry.

At the heart of the research is the analysis of character dance, folk stage dance, and non-national stage dance courses, which were historically implemented in the JVLMA study program in Latvia as a courses for choreographer specialty. Since 1977, 283 students have graduated from this program in full-time and part-time studies, obtaining qualifications in accordance with the study courses at the time. The qualitative approach based on personalized interviews with content analysis at the final stage was chosen as the methodology of this research.

The findings of this research made it possible to go beyond a specific analysed document and its content. The data analysis steps divided the narrative into text fragments with the respondent's statements, in which the meaning of the content was clarified by combining the respondents' experiences (Mārtinsone et al., 2011, Kroplijs, Raščevska, 2010).

There were 26 interview questions prepared for the study. The questions were approved by the Humanities and Social Sciences Research Ethics Committee of the University of Latvia. (2024.10.01. Nr. 71-43/13). All 26 questions prepared were open-ended semi-structured questions, encouraging a longer, more detailed answer from the respondents (Mārtinsone et al., 2011). This allowed the follow-up questions to be asked if necessary, making the interview less rigid. Interviews involved a five-stage process: preparation stage, first contact stage, orientational stage, substantive stage, and final stage (Mārtinsone et al., 2011). Every interview was concluded with a qualitative content analysis, which in its essence was recovering the main ideas of the interview content, such as the main guidelines of the respondents' recommendations for improving physical literacy in the transfer of dance cultural heritage.

Results

Initially, materials were collected from the State Archives of Latvia and the JVLMA archive and analysed. In the period from 1977 to 2023, 283 students graduated (206 of them are women, 77 are men) the course. Data analysis revealed both the study years with the highest number of graduates (20) in the 29 graduate generations, as well as the current downward trend in the number (3) of graduates of the choreography department. This trend is correlated with the beginning of the annual enrolment in the study program, which started in 2004. In the time period 1977–2004, the admission was only happening once every four years, offering an explanation of higher number of graduates. The study program was offered in both in-person and part-time formats. During this period, 229 (81%) individuals graduated in person while 54 (19%) graduated remotely. Year 1981 marked the graduation of the first qualified cultural education workers; the qualification title would change eight times through the history of the program. Second being a leader of a self-employed dance group, then cultural education worker, head of the dance group, dance team leader, dance teacher, choreographer specialty,

choreographer-pedagogue (professional in the ballet industry), dance teacher, and finally – choreographer. In the year 1998 the title of the qualification would get its final change, – to choreographer, – and remain unchanged ever since.

The purpose of the study helped to clearly define the criteria for the selection of respondents: leaders and assistant leaders of Song and Dance Festivals, and Children and Youth Song and Dance Festivals, currently active leaders of dance companies, and tutors. 9 professionals (3 men and 6 women) – Latvian stage folk dance industry professionals, group leaders, and tutors, – were selected. All of the professionals selected agreed to an interview either in person or remotely, for a deeper conversation of the topic of this research.

At the beginning of the interviews, each respondent briefly described their experience in the dance industry, confirming their professionalism and devotion to their chosen profession. 8 respondents out of 9 answered negatively, stating that the bachelor's diploma of professional education was not the reason for pursuing their profession, because their choice of profession was already made before beginning their studies at the JVLMA. The selected respondents have obtained various qualifications: 1 respondent qualification – Cultural education worker, head of the dance group; 1 respondent qualification – Dance teacher, leader of the dance team; 1 respondent qualification – Dance teacher; 2 respondents' qualification – Leader of a self-employed dance group; 4 respondents' qualification – Choreographer. This also showcases the changes in the titles of the obtained qualifications in the period from the founding of the Choreography Department and the changes in the title of the qualification by European education requirements.

Most respondents emphasized the importance of professional higher education in the dance industry both then and now. The acquired knowledge and confirmation of professional qualifications are very important in personal development in future careers when working as a leader of a dance company. The study program lasted four years, beginning at different times for each respondent and primarily conducted face-to-face.

One of the questions of the research was about the ever changing title of the study course (for example character dances, non-national dance, non-national stage dance, non-national stage folk dance), which was revealed in the archival material documents and respondents' answers. In the respondents' answers, various types of dances were mentioned, including non-national dance, character dance, folk dance, and USSR folk dance. During their interviews most of the respondents even mentioned several titles of this study course, while some, unfortunately, could not recall the exact title of it. In the archive transcripts, it was possible to conclude that a JVLMA lecturer had been teaching the course for a long time, which was also the reason the course was referred to using an alternative jargonism title in respondent answers. This was an important question to ask in order to get more in-depth knowledge from the respondents and find similarities in the course structure, which has character dance elements integrated into it, including the physical literacy improvement exercises by the barre. This similarity in the course structure was noted regardless of the course title.

The respondents were asked to describe the lecturer's contribution to their professional growth and creative work, and all of them unanimously praised the lecturer's contribution and competence, which then became the foundation for the students' competence. Their in-depth understanding of movement, creation of sequences of movements for their studies, and development of a creative vision for their daily work leading dance classes all were substantially influenced by the lecturer. For a more detailed insight, the respondents were asked to remember how many semesters the study course was taught. Most of the respondents, unfortunately, could not answer this question accurately, – some recalled attending the course during the entire period of studies, while others mentioned only taking the course for three semesters. In the search for an answer, a confirmation of the course being taught up to 7 semesters in the older programme was found in archive materials, while 3 semesters were mentioned in more recent materials.

It was concluded over the course of the interviews with the respondents, that the amount of practical classes within the programme has been reduced over time, which impacted the content of the course and allowed for less time to be spent understanding the way to perform a specific element.

The study aimed to investigate how professionals in the dance industry perceive the term 'character dancer', which was therefore included in the list of the questions the respondents were asked. The author would like to emphasize the definition of the category in Latvian digital encyclopaedia ".... dances of other nations, dances of world nations and stage dances of nations, partly also classical dances (*demi – classique*) and character dances (*demi – character*)" (Martinsone-Škapare, 2018). The most memorable answers of the respondents are as follows: "Character dances, that you dance with character, instead of performing a dry *plié* session, for example, but you already jump in with some of that charm, some of that feeling of how you could dance in the nation corresponding to the example."; "... I would like to say that character dances are dances with a national characteristic of a particular group of people, reflecting the folk dance tradition, movement tradition and, very importantly, the musical aspect of that group of people. It is important to distinguish this particular national dance from other national dances."; "It is a dance based on content, not just form. The dancer, or choreographer, who creates that dance with the help of dance movement tries to reveal this content. The method can be different, but so that the viewer can read this story from what is happening on the stage. Both what the choreographer wanted and what the dancer is currently interpreting." Character dance styles and adapts traditional dance steps to academic technique (Martinsone-Škapare, 2018), which is an integral personification of stage folk dance's cultural heritage and a source of creative inspiration for choreographers of all time.

Respondents were asked about the inclusion of character dance elements into the study course during the practical lectures. The author wanted to update this aspect from today's point of view, to effectively structure the curriculum of stage folk dance course with the qualification dance team leader, specialising in Latvian folk dance in Latvian Culture College under Latvian Culture Academy. Through updating the instructions

and requirements for the performance of the curriculum, students would thus motivate students to improve the quality of professional dance growth and knowledge (Spalva, 2006). Respondents were requested to remember and tell about the structure of a practical lesson.

The answers allowed **identifying 4 main guidelines:**

1. Learning the elements of the ballet barre. (usually, structuring the teaching elements of the character dance genre at the bar: *plié, battement tendu, battement tendu jeté, rond de jambe par terre, flic-flac, strikes, pas tortilla, retiré, battement fondu, battement dévelloppé, grand battement jeté, technical exercises*).
2. Learning the elements in the middle of the dance hall.
3. Sequences of step combinations.
4. Dance etudes and dance improvement.

The structure of a character/stage dance class remained unchanged regardless of the course length and requirements. The deciding factor was always the teacher, who would collaborate with the students in order to find the most effective ways for the students to perfectly grasp the dance element.

The respondents emphasized the teacher's accurate demonstration of movements in class, due the goal of dance study courses being the improvement of students' physical literacy. The theoretical presentation of the study course, consisting of the chosen nation's nationality, history, and dance culture, provided a wider perspective on the nature of the movements. Historically, the materials available for the foreign stage dance course in Latvia were very limited, – respondents praised the lecturer's extensive knowledge on the matter, – while nowadays students have access to books, video materials, video analysis and error correction of self-created lessons, not to mention a wide range of digital possibilities for their research and development of a dance theme of their choosing.

The respondents were also asked about the importance of live accompaniment (concertmaster) and the necessity of cooperation during the practical dance classes in order to improve students' physical literacy within a study course, which is one of the most important questions within this study. The most vivid of the answers to this question was: "Extremely important. And I believe that only with a live concertmaster is it possible to learn these movements, and only in this way can you learn the dance at all." "I think it is very important. … It is very important, so to speak, for students' sense of music, for cooperation in the learning process." "The (presence of a) concertmaster is of great importance. And for a good and knowledgeable person, I think a collaboration between a teacher and a concertmaster is a very big and important one." "Very important. It's not even up for debate." It is clear that live accompaniment is necessary in the process of learning the movement, so that it can be obtained at a slower pace in the initial stages and, as the movement is improved, it becomes possible to perform it according to the set goals and the nature of the given nationality.

The interview also included questions about the criteria for successful completion of the study course, the importance of movement accuracy, the importance of movement performance, as well as a question about the factor that contributed to all the aforementioned

requirements. The most important factors could be heard in the answers: "I'll start with, maybe, atypical but in my opinion, one of the most important things was systematic work during classes. Systematic work, responsible work, as I mentioned the work culture here, was a very important aspect. And, and respect, respect for fellow students and the teacher. Then, of course, the improvement of the students here was evaluated, whether the instructions given in the daily training sessions were followed, or whether it was corrected. The teacher paid attention to very small nuances in the performance. They raised their hands for direction, height, well, very, very many different nuances. Well then, of course, the evaluation of the final exam was also important. The final exam was never one-piece, so there was both this practice lesson performed together, and the etudes prepared independently by the students. And then, of course, they were evaluated, the conformity to the character of the particular nation, the accuracy of the performance, and the cooperation with the concertmaster. Well, yes, that's how I would say everything was evaluated in general, yes."; "Well, I think it's the attitude towards the instructor, the attitude towards the movement and your self-growth, how much you've developed."

During the entire interview, the respondents repeated themselves answering several questions and duplicated the answers to previous questions, emphasizing the importance of the performance of the movement, the quality of the movement, and how important it is to continue working and improving skills for the professional preservation of the dance movement's cultural heritage. The respondents agreed on the importance of precision of movement in the stage dance course of other nations, emphasizing the specificity of this study course in a way the dance movement read off of a stage. Respondents' evaluation of the study course and its contribution to the improvement of the competence from the point of view of contemporary investment, provides a lot of important insights: "In general, I evaluate it as very valuable. It gave me such a broader perspective, at least in the context of European folk dances, at the nuances of dances of different nations. As a representative of Latvian stage folk dance, I found it very interesting." "All this is very enriching, both as an educator and as a performer, no matter what you learn about or what you create. It is necessary, it broadens both their shared horizons and your skills as well." The respondents unanimously spoke about the contribution of the study course to their professional and creative work, both every day in the dance hall and when choreographing.

In the final part of the interview, the respondents were asked to share their thoughts and vision of the future development of the study course, and how important it would be to preserve cultural heritage by future professionals. "They gave me a lot and I think that this is simply necessary at the university." "Well, he (the teacher) doesn't have a story about development (of the movement) at all, he just needs to a place in the base program. As an indelible place. Because we already, our culture, by nature, has already developed with all these foreign dance cultures. Yes!"; "I think that it is very important for everyone who studies this course. It is very important. If you have chosen the art of dance as your profession, then you have to learn, you must learn to evaluate and watch because we no longer live only in Latvia. You would learn to appreciate and understand other people's dances, – you have to understand that. I think every professional should know this and

have this course." "In my opinion, of course, I believe that this study course should not be an elective, but also a part of the course base, at least for one or two semesters. It can be studied by all choreographers, as I already mentioned, the benefits are plenty. It is especially taking into account the representation of different genres in choreography studies. Yes, if possible, it should be divided so that this is a mandatory part that should be learned by everyone, where at least in the European context, every local professional has to know and understand these basics… at least the basic principles of how to create a training session and how to perform it yourself. And then further, as a potential, this optional course could be useful, yes, maybe for those who directly choose, who are representatives of classical dance or also representatives of Latvian stage dance, where then they could look in-depth, look in-depth and work in depth with such nuances of performance. So that it would be easier for the graduates of this course to constantly include it in their training sessions."; "All this is very enriching, both as an educator and as a performer, no matter what you learn about or what you create. It is necessary, it broadens both their (the students') views and their skills as well."; "It's not just your (students') body that gets trained, but you are improving as a person, as a dancer. But it is also knowledge, expanding the field. You can't be narrow-minded in something, because there are already other requirements for that person, the graduate. And it is necessary. In the sense that they give you that information, it opens up your interest to see how it is done elsewhere."

The recommendations of the respondents were to invite authentic dance lecturers as much as possible, to learn the movements of each nation from the source itself: "An authentic source, authentic character and mentality to convey through movement." Respondents emphasized the necessity of this course for future professionals of Latvian stage dance with the comment that it is mandatory in the study program. "Therefore, I believe that a collective whose leader has this knowledge, how to teach at least the basic principles with proper explanation, that a collective would be a winner."

Discussion

The study aims to identify the professional contribution of the character dance genre in the learning of the stage folk dance course in the education of dance collective leaders. The results of the study revealed the overall picture of the bachelor of study program at JVLMA's Choreography department and its graduates preserving and transferring cultural heritage of the time. 283 students have graduated the programme in 29 graduate generations, of which the majority still is and will stay loyal to dance.

The 9 industry professionals selected as the respondents for the study revealed their opinions on the crucial parts of the character dance/stage folk dance study course, the role of external and internal influences in the acquisition of the course, the importance of the physical literacy improvement in the transfer of cultural heritage both during the study period and at this day and age as they take on a role of dance company leaders and tutors assuming responsibility in front of the large audience of the Song and Dance

Celebration. The human body is a subtle instrument in which each gesture has its own meaning. The improvement of this gesture, – movement, – is facilitated by the hard work in regular refinement of the character dance elements in the dance hall.

The respondents particularly emphasized the importance of live accompaniment by a concertmaster in dance classes, as one of the crucial contributing factors in quality education of new professionals. They also highlighted the need for diligence in the nuanced movement explanation on the teaching staff side in order to achieve the result of improving the students' physical literacy, – in combination with the students' hard work of course.

The results of the study also revealed the contribution of the character dance genre to the professional growth of Latvian stage folk dance company leaders during the years of their own studying when acquiring a degree. They were then in turn able to appreciate and teach the newer generation the importance of this knowledge and physical literacy in transferring cultural heritage, raising future dance teachers, dance company leaders, and dance industry professionals.

Conclusion

One of the most difficult stages of the research was to understand the change of the title of the Character dance study course from 1977 until today. The reasoning behind the changes has not yet been uncovered. Although its title has been changed over time, – Character Dance, Folk Stage Dance, Folk Stage Dance, Stage Folk Dance, Stage Dance of Other Nations, Dance of Other Nations, – regardless of its title, the structure of practical lessons within the study course remained consistent. All these title mix-ups prevented the interview respondents from clearly understanding the definition of the character dance genre, prompting them to give their own interpretation in their answers to interview questions.

All respondents agreed on the importance of the study course in the professional and creative work of a dance company leader. According to the respondents, improving theoretical and practical knowledge is an integral part of professional education studies. The respondents urge the study course organisers to put more emphasis on the following:

1) improvement of physical literacy in the study process;
2) cooperation with the concertmaster in the course of lectures, in order to give students an opportunity to develop a deeper understanding of the music and movement element, – i.e. synergy cooperation;
3) expanding the scope of artistic and creative activity;
4) preservation of cultural heritage and sustainable development of dance;
5) maintaining a high level of competence in the field of the future dance company leaders.

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About Author

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WORKS OF LATVIAN MEDALLISTS IN FIDEM CONGRESS EXHIBITION IN FLORENCE

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ABSTRACT

Medal is a miniature to be held. As an art form medal has evolved from being decorative to purely modernistic in a sense of creative expression.
Many of Latvian medallists have a long experience in the field of medal art, working as sculptors and educators. Some artists have joined the Latvian Medal club recently.
Latvian national section of medal art was represented in FIDEM (International Medal Art Federation) XXXVII Congress exhibition in *Biblioteca Nazionale Centrale* in Florence 2023 with 25 works by 15 artists of a living generation.
Sculptural styles of the exhibited art medals of Latvian medallists varied individually. Many medals were realistic. They accurately showed pictorial likeness of cultural personalities or allegorically depicted philosophical ideas and existential issues. More than few artists responded via means of a tiny art medal to events near and far away, for instance to the war in Ukraine. Then some medals were quite abstract and nonrepresentational while still successfully revealing a purposeful association. Couple of medals were merely decorative, inducing joyful visual perception. Mostly being low relief medals, these small sculptural works also differed in form, size and material. Round and rectangular medals appeared classical by traditional convention. Free shape medals were not restricted by pure geometry, but rather accented characteristic silhouette of a particular image. Eventually the technique of sculpture proved to be an important factor. Half of the medallists made casts, produced in general out of bronze. The rest fabricated their work of composed substances, ceramic materials or created medals in mixed media, even experimented in intermediate art form. Works of Latvian medallists are being collected. Latvian museums have a great number of medals in their stocks. There is the museum of medallic art at Dundaga castle with permanent as well as changing collections.

Keywords: *art, low-relief, medal, medallic art, medallist, small-size sculpture.*

Introduction

Once in two years FIDEM (*Fédération Internationale de la médaille d'art*. International Art Medal Federation) organizes expositions, popularizes and promotes medallic art and facilitates research. Latvian medallists take part in these exhibitions of medals.

Medal art is a particular kind of miniature sculpting tradition. It could be appreciated in regards of its' appearance, as a traditional commemorative low-relief decoration or as a small-size three-dimensional fine art object.

Although medal art is a classical form of sculpture, the definition of the medal has become vague and undetermined lately due to modernistic approach to creativity. In the context of art medal's development, artistic problem is of interest: what are the characteristic features of current Latvian art medal? More than having a notion it seems appropriate to research the exact part of Florence 2023 FIDEM congress exposition performed by Latvian National delegation and thus explore the developmental tendencies of medallic art and hence facilitate the collection of it.

The aim of current study is to examine the works of Latvian medallists in Florence 2023 FIDEM Congress exhibition. The method is theoretical research of medallic art; process' study of making medals; an examination of the technical aspects of exhibition in Florence; art criticism and formal analyses of the works of Latvian medallists in Florence 2023 FIDEM Congress exhibition; and an appraisal of the collections of the works of Latvian medallists.

Theoretical analyses

Art medal evolved in decorative arts but is regarded as a specialized form of fine art sculpture. Traditionally art is appreciated for being beautiful, it is a standard criterion. Another one is arts' truthfulness, when precise visual description – portrayal of the subject is shown. Such principles often manifest in academic and realistic medal art. Historically general public and artists had turned their taste from idealized to precise visual representation. But eventually interest shifted to a new art. (Salagnac, 2023, p. 99) **S**o the main criterion chosen for modern medal appears to be novelty. Referring back in recent time, for instance, the style of simplified, generalized images of 1960s was replaced by more individualized concrete portrayal in the 1970s (Šmite, 1987), to be followed by art that is purely conceptual and where art and craft ideas can even be quoted in a new work. (Salagnac, 2023, p. 110) However some artistic practices seem to reappear. As it happens, the aspects of visual representation and non-uniform approach to art principles are controversial and, furthermore, stylistic differences do not help much to define the medal. Nevertheless, there is a common feature. The medal is a miniature and is favoured by many artists as a branch of sculpture.

Indeed, the medal is a generic term for a tiny portable artistic object. Literally the term "medal" sheers affinity to "a metal coin" (*moneta*). The production of coins and medals look similar. Often there is a sculpted or engraved model for a scale sized coin. This model could be kept, perceived, held and valued as the medal and edited in numbers.

Classical medal is a small relief. Informally, the size of the medal corresponds to that of a hand, it should fit in a palm. (Šmite, 1987) This means that the artwork could be touched, held, (FIDEM medals org.) passed and comfortably handled around. In a sense, the tactility of medal is an important feature accepted by medallist community.

If a medal is two-sided, front size- obvert has a portrait depicted on it; the other side- revert is allegorically figural, with inscription or depiction of heroic deeds. For better perception quite often the obvers and revers of the medal are fabricated and exhibited as separate pieces. (Odnoralov, 1983) Otherwise, there is a practical tendency to combine all visual information, showing it on just one-side. Therefore, one-sided medal nowadays is the most frequent one. Elaborate background with a principal image on it is an attempt to unify the medal and reveal the category of the medal's composition.

There are many categories or types of medals regarding genres: Portraits; History, also called the battle / war genre; (p. 16) Landscapes; Animals; Scenes of daily life, agricultural and industrial themes, architecture; Household / domestic genre; etc. (Kosareva, 1982, p. 16)

Individual style of artist differentiates genres and at the same time facilitates an interaction of medallic types. Definite pictorial elements determine particular type of medal and clarify the content of an image. Allegories and symbols in medallic art help to understand the plot of the story: laurels and palm tree symbolize victory; oak tree is a symbol of strength; muses are depicted as flourishing girls; animals and birds symbolize virtue and vice. Objects also are used to represent certain abstract notions: obelisk – immortality; scales – justice; ring – eternity. Memorial medals are often decorated with the crown of tree leaves, wreath and garland. All these details should be considered to build a representational, meaningful medal. (Odnoralov, 1983)

Medal making starts with a sketch. Fine proportions are transferred from the drawing to a background plain. Outlines are drawn with a pointed tool, modelling is done with a small wooden or metal tool, spatula. A well-established old sculptural technique is by pressing patches. Plasticine (modelling clay) can be applied with fingers and shaped with a sculpting tool. Various techniques can be combined to transfigure original two-dimensional design into three-dimensional relief. An image can protrude from the background in high, medium, low (Italian *alto relievo, mezzo relievo, basso relievo*) degree or it can be sunken, id. est. incised (*intaglio*). (The Medal Maker. Film, 1929) Medals traditionally are in low-relief. It takes lot of skill to create the impression of volume employing the limited thickness of the model.

Enhanced depth and spatial illusion of an image is achieved by supplementing modelled parts of an extremely low-relief with graphic details. Lines drawn in linear perspective diminish and planes flatten towards vanishing point. (Odnoralov, 1983)

The development of medal-art changes the notion how the space is depicted. Pictorial area in classical medals is confined to a rim on the outer edge of the medal. Traditional medal has a concluded space in the round composition. In contrast, the medal with open volume has the form specified by an image. (Šmite, 1987) The whole medal is an image and surrounding space acts as a background. (Kosareva, 1982, p. 116)

Image is the essence of the medal, but text also contributes in conveying an idea. Text is a sign, most often it is a subordinate part of composition and aims to commemorate an event depicted in the medal. Text on obverse side traditionally is designed around periphery, text on revers side is more descriptive. (Odnoralov, 1983) Lettering as a rule is

sculpted in capital letters although there are variations. Lettering should be in harmony with the theme of the medal and letters frequently have symbolic meaning or decorative value. (Odnoralov. 1983) Lettering is often the most tedious part of modelling. The form of the letters is cut, shaped, sculpted in plasticine. Other technique for fine precision lettering is applying a cast (The Medal Maker. Film, 1929) or matrix.

Quite often artists not only build a model of the sculpture but also practically do all the mould making work (Skalberga, 2019, p. 102) and produce a cast by themselves. Nowadays many new materials for casting are at hand and offer many possibilities for making and finishing sculpture. The surface of medal can be brightened, texture can be hatched, outer layer can be polished, colour can be enriched by patinas and by enamels or paints. Many techniques of oxidation are well known for sculptors as surface finishes. Desirable shades can be achieved when chemical and mechanical processes, as well natural weathering are combined to enhance the interplay of light and shadow. (Šteinbergs, 2006) Although, much depends on the knowledge and experience of an artist, it is still the right balance between the craftmanship and art that ensures quality and also leaves a place for experiment. (Salagnac, 2023)

Completed medal could be one-of-a-kind or depending on theme could be a part of a group. The medals of broader theme are united in a series. Some of related medals are put together in closed cycles with definite number of items. Other series are opened for further additions to be supplemented with new artwork. For the set of medals, the method of exposition is predetermined to show all individual pieces of artwork together, thus adding an extra meaning in the visual communication of the theme. (Šmite, 1987)

The exploration of themes and artistic possibilities leads to innovative trends and fashions in the contemporary European and global medallic art. The syncretism of various forms of art merges the boundaries of expression, resulting in original spatial solutions not typical of the low relief medal. (Mainski, 2021, p. 9) As an effect, the medal production is diverse and subject matter in the image of medals is restricted no more. With little or no impact of commissioned pieces, the themes of medals are chosen by artists themselves. Of course, medallic art reflects the values of an artist living in a society. Medals express concepts, comment on or commemorate certain aspects of life, depict current events, show portraits, reveal humanity. (Stevens-Sollman, 2020) But the medal does not have to be beautiful, instead it has to be precious. The philosopher's stone is artistic idea that converts the chunk of manipulated material into the precious item of medallic art. Once engraving machines allowed sculptors to challenge engravers, nowadays graphic artists use computer technology. The limits of expression seem to have disappeared. Medals are made by potters, painters, graphic artists and designers. One can notice diverse interpretations of what is a medal. A number of these artworks are small size sculptural objects, three-dimensional things, distinctive units, ready-made items, assembled pieces, or even virtual manifestations, each of them stylistically unique or remarkable and suggestive of plural definitions. Many artists started naming their work "medallic object".

Each FIDEM congress strives to broaden an understanding of medallic art, to expand the attributes of medal and to search new technologies of medal making, to encourage experimentation, to facilitate creativity. FIDEM operates in over 40 countries worldwide. (FIDEM medals org.) Federation aims to popularize medal art and to affirm its place among the arts; to increase the knowledge and to search technology and history of the medal art by the means of publicity. (FIDEM statutes 2016, p. 237)

Methodology

FIDEM Florence 2023 exposition was held in the National Library. Magnificent *Bibliotece Nazionale* building is classical in its layout. The library has a splendid rotunda hall named after Dante. Premises and in particular this rotunda are frequently used for cultural events. It was there the international exhibition of contemporary medals was staged. (National Central Library of Florence) Medals were presented in showcases placed around the perimeter of the hall and adjacent hallway. Artworks in the Florence exhibition were displayed sorting medallists in to alphabetic order, thus, it was easy to find an artist, although the artwork not always harmonized with surrounding pieces. Nevertheless, medals were dispersed enough to keep sufficient distance in-between.

Florence 2023 exhibition had 542 pieces of artwork made by 375 medallists from 32 countries. Among them 15 Latvian artists showed a total of 25 individually crafted medals. (Skalberga, 2023) Each artist wrote a short statement for exhibition catalogue describing an idea behind the work that served as the concept of artists' creativity.

Bērziņš Andris makes medals that are round classic circles, regular in shape with low-relief realistic images. (Ludavičiene, 2022, p. 76) His portrait medals look classical in their artistic expression. (Mainski, 2021, p. 9) Long established values are present in his portrayals of outstanding individuals. (Skalberga, 2021, p. 79) He dedicated his two medals to the greats of Italian culture. "Dante il poeta eterno" medal shows half the figure in profile with the hands atop an opened book. Carefully modelled text is on the left side. "Verdi" medal is almost the same size, but the portrait of the composer is bigger in scale, it shows the composer in three quarter view. Lettering is placed above the head of an image and follows semi- circle direction. Artist sculpts in a classical manner. (Skalberga, 2018) He builds an image just with fingers, intricate details and lettering is formed with small wooden tool. His imagery is recognizable and sculptural form has the distinctiveness of plasticity. (Čaupova, 2023) His style is a bit expressive but in portraiture he achieves a high degree of likeness with the character. Both the medals are made of bronze, casts being done by artist himself.

Breģe Ligita (a younger generation artist) showed her medal "The war is not over" in a more philosophical non-figurative way. Small colourful synthetic material tubes, ready-made plastic plugs and amber pieces are packed by wrapping in the rectangular mesh of metallic grid. (Skalberga, 2023) She likens her composition to an envelope with a message about impersistent condition of the war. The whole structure looks like a shining tiny

cage with colourful material artefacts locked inside. It is a kind of assemblage construction. The artwork is fabricated by artist herself.

Burvis Ģirts showed his medal "Mount of lambs" in dedication to Johan Steinhauer and the brotherly congregations in Latvia. It depicts a landscape which is a frequently featuring motif in his art. (Skalberga, 2023) Transparent glass, representing sky or heavens, is melted over the lightly greyish stone used to depict a mountain with village. Panoramic view is produced by engraving the silhouettes of houses. Much softer curves and blurry dots depict clouds. As the medal is made of see-through material it could be perceived from both sides. The way of fabrication implies an eye-catching combination of glass and stone, two opposed materials. (Skalberga, 2021, p. 79) His technique is innovative, such materials were not used in the classical medallic art, especially when being fused. (Mainski, 2021, p. 9) Artist himself fabricated the medal.

Dzintare Vija Ilze (a senior generation artist) had two same size circular medals that could be viewed as illustrations for Divine Comedy. Both the medals depict human figure in a landscape scenery. Elements of nature and landscape motifs constantly feature in her medals. (Skalberga, 2023) "Forest of Delusion" shows a character, standing in the centre of composition. He is surrounded by a dense forest of vertical trunks of trees, he fears of being lost in the dark terrifying forest. The other medal "Storm" shows the sea landscape. Wild water is a metaphor for the unknown. (Skalberga, 2023) A tiny human figure kneels near the centre of the composition. A giant wave rises up. The wave has a texture of foam and bubbles. Both the medals are made of bronze. The surface of medals is patinated and polished to enhance the shading.

Franckeviča Ligita fabricated two medals depicting nature. This theme is omnipresent in her sculptures. (Province: LTV, 2007) Her medal "Nest I" could be considered as a high-relief sculpture. An image of a stylized decorative bird is shown wrapping its wings around three smaller eggs in a hug, in an almost protective posture. Overall form of an artwork looks quite spherical. Composition is nearly symmetrical. (Skalberga. 2023) Ochre brownish colour adds imaginative warmth associated with expression of love and tenderness. Medal "Nest II" looks more like a low-relief. Irregular roundly cornered and asymmetrically curved form depicts a profile of a bird. One can recognize its beaked head with circle eye and a long talon leg bent in an ankle. The style of these small form terracotta ceramic sculptures is skilfully laconic. (Skalberga, 2019, p. 99–104) Both the medals are fabricated by artist herself.

Grīnfelds Edgars in his medals usually deals with difficult subjects. (Skalberga, 2021, p. 79) He dedicated the artwork to Ukrainian people in their fight for independence. The medal commemorates The Liberation of the City of Kherson. This is a classical round low-relief medal. It shows a winged figure of a woman – the heroic angel bringing joyous message of victory. (Skalberga, 2023) In lifted arm she holds a wreath, in lowered arm she carries a heraldic shield with the sign of Ukraine's coat of arms, the stylized trident. She is standing on the base of a ship, floating in the waters of the Dnieper. Subtly modelled rough waves seem to rush out of the incised square gates of a dam. Composition is symmetrical and lettering redoubles this sense of symmetry. Although this is a one side

bronze medal, it makes an impression of combined obvers and revers. Medal is cast by artist himself and it has a slight polish.

Jumītis Nils is an artist of the youngest generation. Being a student, he shows interest in tackling various materials. In artist's statement he speaks about space as a mental trap. Published artwork shows an abstract form consisting of curved streamlined base, that seems to be fabricated out of ebonite, and a delicate cylindrical chunk of fused, pressed or cast patterns. He skilfully combines various synthetic materials. (Skalberga, 2023) In turn, exhibited medal is square by its format, a rusty metal or steel plate with polished edges serves as a background and a rough die-cast baby-doll's face lies on it in the middle of composition. Small size of an artwork is in contrast with brutal but naturally colourful texture of the surface.

Mickeviča Māra portrays images filled with spirituality. Her laconic works are philosophical. (Skalberga, 2021, p. 79) She presented two medals. One of them is "The Power of the Sun". The seed of light radiates like divine essence, full of the synergy of positive emotion and thought. (Skalberga, 2023) Medal sends a message of hope to overcome difficulties and look for a sunny future. Low-relief is in the shape of stylized profile. Just in the middle of the head, half the disk of the shining sun is incised. Patinated ceramic medal looks gilded with light emerald green paint rubbed over. The other work "Creation" is artistic paraphrase of the Vitruvian man by Leonardo da Vinci. Medal depicts an idea of divine proportions. Work is symmetrical, its form is made of a square that overlaps a circle. Simple contour of a human body with outlined stretched hands and legs is depicted standing straight. Small bump in the centre indicates heart. Technique of the work is the same- patinated ceramic. Medal is treated with golden paint and greenish hue is smudged over revealing surface textures. Both the medals are fabricated by artist herself.

Nātriņa Inese showed a commemorative medal of poetess Amanda Aizpuriete. Medal affirms artist's enduring interest in portrait. (Skalberga, 2020) The medal is a classical low-relief, round in form. It portrays a middle-aged woman from the frontal view. Proportions are carefully modelled. Portrait has the likeness of the person, moreover a kind of emotion is depicted. Image is almost symmetrical, except hairstyle. Strands of thick hair are wavy on one side and straight and less voluminous on the other to spare place for lettering. Bronze medal is slightly patinated and has a fine polish.

Nikifs makes medals which are noted by different interpretation of corporeity when portraying the embodiment of physical world. (Skalberga, 2018) Artist presented two medals. The duality of the female and male nature is shown in the medal "He and She". The artwork communicates an idea of revolving polarities of masculinity and femininity. The medal is a low-relief. It depicts crouching figures. Image is meticulously modelled, with detailed anatomical features and textured hair. Medal is made of silver. The other artwork "Leonardo's cat" deals with animal motif. Image radiates grace and tenderness. (Skalberga, 2023) The medal is a paraphrase of the sketch by Leonardo da Vinci. Silhouette of animal's body defines the form of the medal. Intricate details are sculpted in low-relief and elaborate texture is incised. The medal is cast of acrylic resin by artist

himself, technique frequently applied in his previous works, but which is not familiar in the classical medallic art. (Mainski, 2021, p. 9)

Svetlana Saveljeva is distinctive figurative artist in Latvian medallic art. (Skalberga, 2021, p. 79) Representational proposal in her medals has been noticed earlier. She is experienced in making small sculptural objects. (Ludavičiene, 2022, p. 76) Her work can be characterized as the plastic expression of the medal and technical innovation concerning materials and techniques. (Gimeno, 2019, p. 26) Her medal "Oblivion" deals with a theme of sadness about temporality of life when memories turn into forgetfulness. This is an allegorical motif. The artwork has a rectangular form. The composition of the medal is nearly symmetrical. It shows a female body lying on her back covered with veil that reveals fine details of the forms beneath. The folds of drapery cloth are sculpted meticulously in low-relief. Anatomical details are modelled in high-relief. The surface is manipulated to enhance the expressive quality of shading, showcasing fine mastery in the design of this silver plaquette (medal). (Skalberga, 2023) The other work "Loral wreath" celebrates the greatness of achievement raised to eternity. Medal has a roundish form. Distinctive and elegant, weedy and slender curved laurel branch with leaves and drupe like berries in high-relief grows almost out of the field of tiny split plains of background and adds a sense of motion to this vibrant centric composition. Bronze medal is patinated by artist herself and has a fine polish to accentuate main details.

Strautiņš Bruno has developed an expression of sculptural structure. His medals comprise of lifted or hollowed forms that are highlighted, as well possess the plasticity of rounded volumes that stand out. (Čaupova, 2023) The variety of his art style is a constant quality. He uses allegory in a complex philosophical way to communicate ethical values. (Skalberga, 2021, p. 79) He showed two medals. One of them "The dream of forgotten ship" speaks about intersecting paradigms of reality and fantasy that oppose each other. Parts of depicted ship appear real but the whole image looks abstract and decorative. The form of the medal is a regular circle. The artwork is made in low-relief. Composition is well balanced. Upper part of the medal has a distinctive texture made of imprinted net. A droplet and a flux lay on it completing composition. The other medal "The personification of an archetype" has a slightly distorted round form and a rim. On the central axes there stands figure in a curved posture completely twisted in a wrap except a tiny hand positioned in the centre of the medal. The appearance of an image still reminds some classical statues. Background is plain and smooth, and a flux-splashed drop of tin is adjacent to the left side of the figure. The blend of materials looks harmonious. (Skalberga, 2023) Both the medals are made of golden-brown bronze, except the outpour of silverish tin, and are patinated and polished. The casts are done by artist himself.

Strupulis Jānis favours the standard type of low-relief. (Šmite, 1987) He has developed the basic forms of traditional medals and the methods of sculpting small size works. (Čaupova, 2023) His portraits are classical. (Mainski, 2021, p. 9) Depicted images communicate beauty and truth (Skalberga, 2018), and his medals are precise documents of important occurrences. In the exhibition he presented three medals on momentous issue. The triptych shows anxiety and existential suffering ignited by the war. (Skalberga, 2023)

These artworks are dedicated to graffiti of British artist Banksy in war torn Ukraine. Although medals slightly differ in size, they can be considered as a series, due to the unified theme, rectangular shape and the same pictorial style and lettering type. Medals are the transfers of original artwork on the walls of destroyed buildings. All three medals have graffiti image depicted as a sunken plain and have roughly textured foreground. "Two children. Banksy, Kyiv" shows depiction of a boy and a girl swinging over the broken tank trunk. Composition is balanced, diagonal. "Young boy defeating a grown man. Banksy, Borodyanka" shows a judo match of a young boy throwing black belted adult to the ground (literally meaning Ukraine defeating Putin's Russia), the background pictures half-broken real wall with cracks and ruins of bricks. "A female gymnast. Banksy, Borodyanka" shows a young female doing a handstand amid ruins of the building. Composition is symmetrical. Background is textured as well, picturing damage of the real wall. Lettering in all three medals is carefully done, maintaining individual art style. Various font types are constantly elaborately modelled with the same diligence as the features and details of an image. (Čaupova, 2023) Each work of this set is patinated and polished by artist himself to enhance visual quality.

Urtāne Antra showed the medal "Shimmering substance". Her artwork expresses the joy of creation. (Skalberga, 2023) The medal is supposed to evoke the association of experiencing chaotic shimmering particles that will reshape into live substance. The form of artwork is round. On its field more than a dozen tiny tubes are scattered randomly and fixed irregularly to the surface. Each of these minutiae particles are bent and folded at a sharp angle. Medal is made of brass using mixed technique. Artistry is similar to that of assemblage, it even resembles jewellery.

Zemīte Gunta is an artist of older generation. Her medals are bright-coloured. In her works she combines contrasting materials to achieve attractiveness. (Skalberga, 2023) She fabricated series of two medals/ small size objects. One of them – "Metamorphosis" is about never-ending change around us. The artwork has a symmetrical composition. Medal is made of metal hinge that is used as the base and of yarn threads that are pierced, pushed and pulled through the holes and fixed in a knot. Ready-made bronze hinge has an elaborate silhouette. Stiches of red, bluish-green, dark blue ultramarine and yellow threads create geometrical pattern of lines that in colour and texture contrast with metal base. The other artwork "Today" deals with the theme of values. It shows square bronze metal base with holes in the corners. Greenish-blue thread of wool yarn is pushed through the holes and spread diagonally creating criss-cross pattern. Ready-made iron key is sewed and fastened to the base. Composition is almost symmetrical. The technique of both the medals/object resembles fibre art.

Discussion

According to allotted quotas 15 Latvian artists showed a total of 25 individually crafted medals. (Skalberga, 2023) (In comparison with Tokyo 2020 exposition where 20 Latvian sculptors participated with 35 artworks, (Skalberga, 2020) or with Ottawa

2018 Exhibition where 14 Latvian sculptors submitted 24 medals.) (Skalberga, 2018) Of those 25 artworks 15 medals were die-cast and 10 medals were fabricated (There were no die-struck medals). Almost half of the medals were made of bronze. Many of the works analysed above have been shown in other international, regional and local exhibitions. The majority of the participants of National delegation are the most active representatives of Latvian Medallic Art Club. (Skalberga, 2019) After Florence exposition the number of Latvian individual members of FIDEM has grown. They are medallists of different age, old (b. 1940) and young (b. 2002), including professors and students, art and design professionals and recent graduates. Their output is artistically valuable and culturally significant.

The works by contemporary artists and previous generations' skilled masters have been collected. Many notable museums started as the Cabinets of curiosities, also known as wonder-rooms, and now are respectable museums holding impressive collections. (Kosareva, 1982, p. 15) There are medals in a number of museums in Latvia. A lot of the artworks of such kind are in the Collection of Sculpture and Objects at the National Museum of Art. Moreover, a permanent show of medallic art opened in Dundaga at the medieval castle in 2008. A total of 426 (up-to-date 500) artworks are exhibited there. Most of the displayed items of this particular collection there are produced by Latvian artists: 32 medallists in total. A number of medals were fabricated during annual Dundaga Medal art symposium. (Skalberga, 2024) Thus determination and efforts are put to preserve, promote and celebrate medal art.

Conclusion

The medal is open to individual interpretation. Current system affirms miniature size and tactility, assuming that the artwork is three-dimensional. Medals differ in genre and sculptural form. The classical process to make a medal is by modelling, the illusion of space can be enhanced with the help of linear perspective. Lettering is carefully added to comment the image and to reflect on the theme. Visual symbols are used to convey an idea. Copies can be made by casting (or striking) or by fabricating. Fine finishing is done by applying various patinas or paints.

Latvian medallists of many generations participated in FIDEM Florence 2023 exhibition. 15 Latvian artists showed a total of 25 individually crafted medals. Some artworks counted as representational pieces. A couple of medals had a portrayal of culturally significant personalities or had an illustration of classical literature. Quite many artists dedicated their works to current events, such as the war in Ukraine, pictured resistance to aggression and via artistic means expressed solidarity. A number of works showed human empathy and interaction. A couple of medals expressed concern about nature. There were also works that delt with existential questions. Some medallists used citations of popular artworks and employed symbols of culture. As to the subject representation style, images emerged in a realistic, decorative or abstract form. Each medallist had developed individual artistic style, every medal had a distinctive accomplished form.

Such multitude rendering of ideas resulted in low-reliefs and miniature size sculptures id. est., small plastic fine art. In Florence 2023 exhibition Latvian medallists showed only cast medals and fabricated ones, and the technology of production proved to be skilful. Still majority of artworks were classical medals, although not a few were to a great extent modernistic or conceptual. Among works there were round and rectangular medals / plaquettes, and free silhouette sculptural pieces. Creative expression also included intermediate forms of visual art. Taking into account the laborious and time-consuming process of making the medal, the current developmental tendencies of medallic art are towards: diversity of chosen subjects; free expression of form; and fabrication in mixed media. Evolution of this miniature art form looks promising.

The significance of research is the endeavour to record and describe the works of Latvian medallists in FIDEM XXXVII Congress exhibition. Latvian medal art has been appreciated. Artists have donated their medals to National museums. A lot of these valuable miniature items have enriched existing as well as recently established collections, such as the exhibition of medals in Dundaga castle.

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THE INTERPRETATION OF RAINIS' (1865–1929) INTELLECTUAL HERITAGE IN INTERCULTURAL EDUCATION IN THE CONTEXT OF THE RECEPTION OF ASIA'S SPIRITUAL CULTURE

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ABSTRACT

Along with the Baltic and European intellectual tradition, Asian spiritual teachings were also of great importance in the worldview of the notable Latvian poet and playwright Rainis, especially Buddhism, which he became acquainted with through European translations. It was the synthesis of these teachings with the knowledge of European philosophy that led to one of his most essential theories about the connection between man, society, universe and man's task in this context, which is reflected in his entire oeuvre. The task of this article is to show the importance of the reception of Asian spiritual heritage in Rainis' worldview, his dramaturgy and poetry – in order to obtain a more complete picture of him. This approach is extremely relevant in the process of humanitarian education in the conditions of globalization, while presenting him as an example of the reception of world cultural heritage in the works of national writers and outlining the mechanism of understanding the transcultural orientation of national authors. The reception of Asian spiritual heritage in Rainis' worldview and writings has, with rare exceptions, remained unexplored in literary studies and completely ignored in teaching materials. In order to understand Rainis' original message to humanity, it is necessary, in parallel with a new interpretation of the content of his work, to identify the sources Rainis used, delving into Buddhist, Hinduist and Daoist philosophies and Asian culture, without which Rainis' message is incomprehensible.

Keywords: *Asian spiritual teachings, Buddhism, Cross-Cultural studies, Daoism, Hinduism, Latvian literature, Rainis.*

Introduction

Analysis by literary scholars of the works of one of the most internationally prominent Latvian poets and playwrights Rainis (Jānis Pliekšāns (1865–1929)), and also the approach to teaching Rainis in schools and discussion of his works in the mass media, still have a narrow-minded view which has been evident for many years, where Rainis is perceived only as a socialist-symbolist, one who integrates folklore and historical material

into drama, a Latvian patriot and a universalist proponent of a just society in the future. This truly limits – even misinforms – pupils who are studying Latvian literature in a narrowly national, regional or social context, forgetting that from the very outset of his creative work, Rainis the philosopher and perceiver of various (also Asian) spiritual teachings, synthesised European and particularly Buddhist (as well as, in part, Hindu and Taoist) philosophical ideas. He developed his individual worldview, along with a peculiar synthetic philosophical doctrine, which included epistemology and ontology as well as social alternatives, ethics, aesthetics, exact sciences, criticism of religions and the problematics of immortality. Moreover, as his writings and essays show, he remained more or less faithful to this doctrine throughout his life, aligning his works and also his social and political activity with this philosophy. Without knowing the sources of Rainis' worldview and philosophy, it is also impossible to objectively understand the motivation behind his personal or public activities, as evidenced by the superficial, mostly politicised and sterotypical criticism of his activity in the contemporary press, on the internet or in monographs (Puče, 2022). There is some evidence of Rainis' interest in the literature of Asian peoples, which appears, for example, in an anthology of world folklore "A Restless Heart" and poetry published in 1921 (Rainis, 1980) or in Chinese lyrical poetry motifs that appear in his collection of poems "Mēness meitiņa" (Daughter of the Moon) (1925) (Rainis, 1978). Just as sources and literature were used to borrow themes from ancient Egypt and the Bible in the context of Rainis' famous play "Jāzeps un viņa brāļi" (Joseph and His Brothers) (1919) (Rainis, 1981), already evident in the commentary to the 11th volume of the most complete published works of Rainis (Rainis, 1981) and infrequently over the years an occasional phrase has been mentioned in passing about Rainis' reception of Eastern philosophy in his works, of the broad range of literature devoted to Rainis, only two works have actually looked further in outlining the role of Hinduism and Buddhism in Rainis' worldview. These are Saulcerīte Viese's study "Jaunais Rainis" (Young Rainis) (Viese, 1982) and Arvīds Ziedonis' monograph "Jāņa Raiņa reliģiskā filozofija" (The Religious Philosophy of Jānis Rainis) (Ziedonis, 1994). However in the latter work only a small part is devoted to this topic within the frame of other research, without delving into the nature of the sources used by Rainis himself or into the Asian spiritual heritage as such, which would allow us to understand both the commonalities and differences. Early scholars of Rainis sometimes noted that "... Rainis, as a man of ideas, was unfamiliar to Latvians" (Birkerts 1925, p. 29), continuing the outline of his life in the usual local – either national or regional context, sometimes referring to 19th and 20th century social ideas and European literary heritage, which is analysed more broadly nowadays, without including the spiritual heritage of Asia.

We cannot ignore Marxism, which was extremely relevant in the context of both philosophical and socio-economic ideas in the 19th and 20th centuries and has not lost its intellectual relevance today. Yet we cannot classify Rainis as a typical European social democrat of his time, or as a narrow-minded adherent of an authoritative 'communist' world-view, as was evident in publications of the USSR period and to some extent also later, simplifying the image of Rainis as a 'socialist' or 'politician', because Rainis found

it absolutely unacceptable to have an authoritative 'morality' using dictatorial methods that would force society to 'integrate' into it, even if it is only in the name of social justice. For Rainis, social or religious ideals were primarily theoretical constructions divorced from reality, a form of hypocrisy. The ideals of Darwin, Marx, Nietzsche, etc. interested him only insofar as he could use them within his own unique philosophical system, which included both epistemology and the social theory of society. Rainis was a unique individual, following his own path, transgressing the boundaries of all stereotypes and scientific disciplines or cultures. He was undoubtedly one of the most original European thinkers of his time, who, to this day, is still misunderstood among his compatriots and largely unknown in global intellectual circles. Rainis offered the world his own philosophy and social theory which was not Euro-centric or Western-centric, but based on intercultural studies, integrating Asian and Middle Eastern spiritual heritage into his philosophical-social doctrine. From this aspect, Rainis cannot be considered only as a "European thinker". He was a global thinker, addressing all cultures, peoples, religions and socio-ethical doctrines, offering his teachings in both a universal and individual sense. The interpretation of Asian cultures is a long-standing tradition in European literature, art and science, and therefore teaching material in schools requires identifying it in the works of the authors to be covered, of which Rainis' work can also be used as a case study in intercultural studies for senior pupils and university students. This paper uses comparative interpretive literary analysis and content analysis to identify the Asian sources and the ideas reflected in them that appear in Rainis' works.

Critique of the Western Intellectual Tradition being a Contributor to Reception of the Asian Spiritual Heritage

In the context of the present study, it is important to first shed light on the Asian spiritual teachings which informed Rainis from very early on within the frame of the information available to him at that time. This is evident in his notes, written in 1896, shortly after meeting Aspazija (1865–1943) and before he started working as a lawyer in Panevėžys and his subsequent imprisonment, which are often identified as a turning point in Rainis' genesis as a thinker and poet. Tracing Rainis' notes in the section titled "Philosophy of Egoism – Reflections on Reading Philosophical Literature" (Rainis, 1986, p. 85), one can clearly and easily trace the path of Rainis' insights from his critical analysis of the European intellectual tradition to the use of Hinduism and Buddhism to theoretically test his ideas in a future perspective. To understand Rainis' path to the spiritual teachings of Asia, the course of his thought process must be traced, whereby he critically examined the Western intellectual heritage of his time. The term "writer's quest", a term often used in literary studies and media discussions, would be inappropriate here, because Rainis could rapidly absorb – concurrently – all the published scientific and fictional literature available at the time. He did not glorify or copy Western models; a trait that was characteristic of Latvian intellectuals of the time, rather he pragmatically assessed the feasibility of applying the ideas proposed by various authors to the needs

of the individual or society. From the outset, he was extremely sceptical in his evaluation of the European intellectual heritage, seeing philosophical, social, biological, etc. theories as a reflection of man's genetically determined programme. Rainis sees any religion or philosophy in part as a "doctrine of justification" for the basic "programme" of human existence: the selfish, relentless drive to reproduce, duplicate, replicate itself, which he proposes to develop in a positive-creative doctrine based on the promotion of mutual tolerance between the individual and society, the evolution of knowledge-based technologies and the achievement of common goals in society. The scientific paradigm of the late 19th century was based on Hegel's dialectic and the social theory of Marx or Darwin's evolutionary theory that developed from it – the interconnection between man, nature and society was seen as being in a constant state of flux, presented as "evolution" or "development". But Rainis is deeply aware of the limitations of every theory (even the most prominent and seemingly established theories of their time) in the context of a diverse, changing reality: "In every idea, even the greatest ones, there is something inanimate that must fall away. This inanimate part is often sought to be developed and ends up on false paths. But there is also something living in this idea, it just needs to be found" (Rainis, 1986, p. 87). Rainis was also critical of the popular philosophical or socio-economic theorists of his time, believing that a new theory can be built on several ideas of previous thinkers, rather than just one, by applying it in another field in a limited capacity. In Rainis' opinion, Nietzsche had done this by proposing Darwin's theory of evolution in ethics: "Is Nietzsche an independent thinker, does he have a new idea? I think he has just tried to apply evolutionary theory to moral issues" (Rainis, 1986, p. 86). There is evidence that over time Nietzsche himself became increasingly critical of Charles Darwin's theory of evolution (Prayson, 2013), but Rainis is undoubtedly correct in his assessment that Nietzsche's preoccupation with evolutionary theory and its interpretation as an attempt to reform European ideas about ethics cannot be denied.

To better understand Rainis' openness to other cultures, it is important to understand that Rainis is generally an intercultural, and also an interdisciplinary thinker. Traditionally seen only as a writer: a poet and a playwright, we forget that Rainis is first and foremost a thinker, a scientist who is often more fascinated by the exact sciences than by poetry. Rainis' outlook on science in the late 19th century can be compared, for example, to the modern strategy on Artificial Intelligence: "Thinking must break away from a random, unsettled state, it must be regulated... Regulated and consciously guided thinking will solve unimaginable questions, ... We need to study thinking similar to the way we study chemistry, then it will help us to make bread from stones" (Rainis, 1986, p. 73). In this context, he already had an interest in the experience of Asian cultures in developing the human intellect through various teaching methods, such as the Confucian principle of the unity of heart and mind in the development of thought (cultivation of the heart-mind (心學)) (Wei & Li, 2011, pp. 753–765), reading aloud, etc.: "... in order to truly understand each thought, it must be visual. Confucius' visual teaching method, learning aloud, ..." (Rainis, 1986, p. 54). Rainis' broad, non-national, universal outlook, as well as his prioritisation of science and philosophy as spheres of human development

and knowledge, made him a very unique "poet" from the outset. He immediately showed an interest in the spiritual heritage of Asia: "Poetry is obsolete... The most powerful similes and images – and these pertain to poetry just as the lancet and the microscope pertain to natural science – can still be found in the Bible, the Vedas and other ancient 'holy books'..."(Rainis, 1986, p. 69) – Rainis wrote this in his notes in 1896 and qualified it in his collected writings as "Notes on Morals and Art". Interestingly, reference to an Asian spiritual tradition already appears here alongside the Bible. The Vedas are: the earliest Indian religious texts, including hymns to the gods, manuals of sacrificial ritual and the beginnings of Indian philosophy (Perrett, 2016, p. 27). At the same time, Rainis' interest beyond the confines of Western civilisation was not merely the reception of Orientalism during the European Romantic era, as we see in the works of many of Rainis' contemporaries, but a philosophical concept of the synergistic transformation of science, the individual and society. This led him to use the full arsenal of science and culture at his disposal to justify and realise this concept. It is therefore not surprising that long before the American historian and philosopher of science Thomas S. Kuhn's famous work "The Structure of Scientific Revolutions" (first published in 1962), Rainis had understood that a certain discovery within a particular civilisation can only become a "discovery" after the necessary preconditions have occurred for its perception (Kuhn, 2012). In 1896 Rainis wrote: "One often finds a premature truth which does not fit into the logistic sequence of ideas, which is then misunderstood and condemned to immortality" (Rainis, 1986, p. 92).

Rainis' increasingly pronounced shift towards the philosophical-spiritual teachings of Asia is determined by his tendency to free himself completely from any slavish respect for the "values" of literature and poetry. Compared to the prospect of human revelation that has been uncovered by philosophy and science, Rainis sees these as meaningless in the traditional sense. Unless, being a pragmatist, he sees them as the transcendence of the insights of philosophy and science to the level of everyday consciousness in which most people live (Rainis, 1986, p. 57).

In the ethical sphere, for Rainis this also means getting rid of the religious-ethical ballast of Europe, perceiving it as an abstraction corresponding to the primitive human intellect, which hinders further intellectual development. His "doctrine of egosim" emerges within this context. It is extremely interesting to compare this particular philosophy of Rainis with the doctrine of Buddhism, which results from his reception of Buddhism, and postulates an alternate interpretation. Apparently opposed to Buddhism, this interpretation is, nevertheless, paradoxically related to Buddhism methodologically, just as Marx's dialectic is the opposite of the Hegelian dialectic, yet makes use of Hegel's methodology. To better understand East-West synthesis in the genesis of Rainis' worldview requires also turning to his intellectual insights in the 1890s. Saulcerīte Viese draws attention to Rainis' letter to Aspazija, dated 19 September 1897, stating: "The books you brought are very interesting, at least Feuerbach and the Buddhist ones. So, looking a little bit into Feuerbach, I found a lot of my own thoughts, which have been unvoiced, without knowing that these ideas were already there" (Viese, 1982, p. 158). S. Viese suggests that Feuerbach may also have been one of the sources of Rainis' reception of Eastern ideas:

"Feuerbach's remarks about the close unity of Eastern philosophy with the universe, the perception of the world where 'one does not forget nature for man's sake, does not forget the course of the sun and stars in the course of everyday events', are close to Rainis' later observations of Eastern cultures" (Viese, 1982, p. 158). However, thinking specifically of Feuerbach, it is possible that this thinker was the primary influence on Rainis' complete rejection of religion, or Rainis' atheism, which was also far from primitive or vulgar (this will be discussed later). Feuerbach, who deeply understood the nature of Western logical reasoning, involving abstract thinking, also interprets religion, or the concept of God as an abstraction, a respectively highly synthetic degree of abstraction, where man combines various positive qualities observed in life into one abstract concept: in God, forming the quintessence of fantasy along with a fantastic doctrine detached from reality. In his famous work "The Essence of Religion", Feuerbach, writing in very general terms in chapters 37 and 38 about the differences between the "Orientalist" and the "Occidentalist", emphasises that the Orientalist ("Orientale"), unlike the Occidentalist ("Occidentale"), worships nature itself without elevating man above it; he relates the processes of nature and society to each other.

And only in the West, where the earth itself – nature is "purified of the divine" and "the Gods must move to heaven" (Feuerbach, 1849, p. 45). Here Feuerbach has very correctly detected the dominance of correlative thinking in the spiritual teachings of Asia. According to Hall, David L. and Ames, Roger T.: "Correlative thinking, as it is found both in classical Chinese 'cosmologies' (the Yijing (Book of Changes), Taoism, the Yin–Yang school) and, less importantly, among the classical Greeks involves the association of image or concept-clusters related by meaningful disposition rather than physical causation. Correlative thinking is a species of spontaneous thinking grounded in informal and ad hoc analogical procedures presupposing both association and differentiation. The regulative element in this modality of thinking is shared patterns of culture and tradition rather than common assumptions about causal necessity. The relative indifference of correlative thinking to logical analysis means that the ambiguity, vagueness and incoherence associable with images and metaphors are carried over into the more formal elements of thought. In fact, the chaotic factor in the underdetermined correlative order has a positive value as an opportunity for personalization and self-construal. In contradistinction to the rational mode of thinking which privileges univocity, correlative thinking involves the association of significances into clustered images which are treated as meaning complexes ultimately unanalyzable into any more basic components" (Hall & Roger, 1998).

Only Feuerbach did not idealise this thinking; it is with this thinking that he explains why "the Orient does not have such a living, progressive history as the Occident" (Feuerbach, 1849, p. 44). Rainis goes further; he tries to examine the spiritual teachings of Asia from the point of view of man's scientific possibilities. Undoubtedly, understanding religion as an outdated theoretical construct that hinders man's intellectual progress, Rainis was fascinated by the absence of the concept of God in Buddhism and by Hinduism's unique approach to explaining the relationship between the universe and man through the tolerance of nature itself, not only man, in contrast to Western monotheism which

he saw as limited. For Rainis, however, discovering Hinduism and Buddhism does not imply the glorifying of these worldviews. Like Feuerbach, he is critical of them as hampering human evolution. For example, in Rainis' letter from Liepāja prison, published by S. Viese, he writes: "Why is India not first in terms of progress? It has a beautiful, free religion, or could this freedom not be felt? Should it have been chosen just like love for Christians? The nobility had power and freedom, but alongside it was slavery. Freedom cannot be unequal. But why does the lower class in the Vedas never reach out for freedom? Of course, Buddhism, like Christianity, is not restrictive, but even that is not enough. Can free religion not lead to action? Is Buddhism pessimism? [...] Studying Buddhism, Indian history" (Viese, 1982, p. 160). What exactly is Rainis studying? Saulcerīte Viese provides some information on this in her monograph "Jaunais Rainis" (Viese, 1982, p. 160), which refers to letters to Aspazija from 1897, where "Hitopadesha" (Kaul, 2022), "Nala and Damayanti" (Neelakantan, 2023) are mentioned in the context of Indian culture, without explaining anything more about these works. It should first be clarified that "Hitopadesha" is the epitome of the "Pañcatantra" (Sanskrit: पञ्चतन्त्रम्) – the famous collection of animal fables and stories in Sanskrit which was translated into Persian, Arabic, Hebrew, Greek, Latin and almost into all the languages of modern Europe (Olivelle, 2002). Whereas "Nala and Damayanti", a story about lovers who overcame various difficulties is one of the episodes of the Hindu epic "Mahābhārata" (Sanskrit: महाभारत) (Menon, 2009). This story may have indirectly inspired Rainis' later major dramatic works "Indulis un Ārija", "Jāzeps un viņa brāļi" (Joseph and His Brothers) (in the context of the relationship between Jāzeps and Dina), etc. In Rainis' own notes we find an even more comprehensive list of the sources of Indian culture that he studied: "Schroeder, Leopold von 'Indiens Literatur und Cultur' (Schroeder, 1887), 'Mahābhārata', Bopp[1], Kellner[2], Geiger[3] ed. (Book of basic texts.) 'Ramayana' (Menon, 2010), 'Nala and Damayanti', 'Indian tales', Adolf Holtzmann, Karlsruhe, 1845 (Holtzmann, 1845–1847)." Of course, a more complete picture of the literature read by Rainis can be found in the library at The Rainis and Aspazija House, at 30 Baznīcas Street, where Rainis and Aspazija lived in the late 1920s.

Reception of Buddhism, Hinduism and Taoism in Rainis' worldview and works

However, stepping back a little from the superficial influences of Asian culture, it is worth returning to the essential questions of Asian spiritual traditions, which greatly influenced Rainis' worldview, even if he did not agree with their doctrines, even going so far as to develop his own as an antithesis to them. Without such contact, this would not have happened in such a radical and creative way. So, returning to Buddhism and Hindusim in a philosophical sense, S. Viese points out that while Rainis was in prison in Liepāja, he planned to write a drama about the Buddha. His letter to Aspazija, dated

[1] Franz Bopp (1791–1867).

[2] Carl Kellner (1851–1905).

[3] Wilhelm Geiger (1856–1943).

29 August 1897, reads: "I am only impressed and pacified by the Buddha with his terrible consistency and pride" (Viese, 1982, p. 160). As for Rainis' archive, S. Viese shows evidence of synopses of the poem "Buddhacharita" (Sanskrit: बुद्धचरितम्) (Viese, 1982, p. 161). It is a poem in Sanskrit on the life of the Buddha written in two verse compositions (Olivelle, 2008). S. Viese is not correct in saying that the author of the whole composition was Aśvaghoṣa (born 80 CE?, Ayodhya, India-died 150?, Peshawar), a Buddhist philosopher and poet from India (Viese, 1982, p. 161). He is the author of the second version, which became popular across Asia (the first written by the monk Saṅgharakṣa (सङ्घरक्ष) (2nd century CE), the leader of the Yogācāra (Sanskrit: योगाचार) Buddhists and survives today only in the Chinese translation. Because of the early date of this poem, "... it is of great importance for ... the history of Indian Buddhism..." (Buswell & Lopez, 2013, p. 150). Aśvaghoṣa himself was originally an opponent of Buddhism, until he lost a debate with a member of the ancient Vaibhāṣika (वैभाषिक) school of Buddhism. This school's theory of cognition was controversial, according to this theory, reality was possible simply as a product of the human mind and – if this proved unsatisfactory – the existence of real objects and their cognizance should be acknowledged. In other words, unlike the school of Mahāyāna Buddhism, represented by the author of the first version of this poem: Yogācāra subjective idealism, Vaibhāṣika inclined towards direct realism which accepts that the objects of perception are real and exist independently of our minds (Chatterjee & Datta, 1948, p. 176). So, the intellectual roots of Rainis' main source of Buddhist study, the Buddhacharita, were very diverse. In addition, Canto XII of this work provides an outline of another ancient Indian philosophical system: the Sāṃkhya (Sanskrit: सांख्य) (Buswell & Lopez, 2013, p. 151). Sāṃkhya is a philosophy of dualistic realism which admits two ultimate realities: Puruṣa (Sanskrit: पुरुष) (consciousness) and Prakṛti (Sanskrit: प्रकृति) (matter). Prakṛti is the ultimate cause of the world, it has three elements: "... sattva, rajas and tamas, which possess the natures of pleasure, pain and indifference, and cause manifestation, activity, and passivity. The evolution of the world starts "... in the association ... of the Puruṣa with Prakṛti, which disturbs the original equilibrium of the latter and moves it to action" (Chatterjee & Datta,1948, p. 46). Puruṣa is consciousness which is essentially associated with nonrepresentational pure awareness (Perrett, 2016, p. 298). It cannot be bound and is essentially unaffected by the causal transformation of Prakṛti (Perrett, 2016, p. 271). The proximity of Puruṣa acts as a catalyst in releasing the causal transformation of primordial nature into the whole of the perceptible world (Perrett, 2016, p. 292). Emancipation follows from the correct understanding of the real nature of Puruṣa (Perrett, 2016, p. 292). All these insights and their interpretations can be seen in Rainis' later works. In the drama "Uguns un nakts" (Fire and Night) (1905), if Puruṣa is undoubtedly reflected in the image of Spīdola, then Prakṛti is Lāčplēsis. In the unfinished play "Īliņš" (a large manuscript from 1908), which is very important in terms of the legacy of Rainis' ideas, Puruṣa's analogy is Īliņš, while Prakṛti is Ziedīte.

Before and alongside his Buddhist studies, Rainis was undoubtedly also deeply immersed in Hindusim, or Vedic religion, as evidenced by his diary notes and notes made as explanations for his plays. For example, in the context of his unfinished play "Imanta",

Rainis is very precise in his reference to the dominant role of rituals in Hinduism, which requires a person to fulfil his duty by making offerings to the gods, reading sacred scriptures, getting children to carry on the ceremony of making offerings (Rainis, 1981, p. 111). The sacrifices "... were supposed to possess a mysterious power capable of regulating ... the workings of the universe for the advantage of individuals…" (Dasgupta, 1927, p. 8) making the rituals even "... more powerful than the gods" (Dasgupta, 1927, p. 6).

But how reliable were the sources that Rainis used, and what did he really read, given that Rainis was not an Orientalist and did not know Asian languages to read the originals? Besides, at this time the genesis of Indian philosophy and Buddhism, like Sinology in Europe, had developed far below the level that it is today. Of course, Rainis learnt about Asian spiritual teachings, including Buddhism – which was so important to him – from translations. For example, with regard to sources from ancient India, there is evidence that even during his time spent in emigration in Switzerland, Rainis kept a German translation of the Rigveda (Sanskrit: ऋग्वेद), the oldest of the sacred books of Hinduism (Van Nooten & Holland, 1995), as one of the favourite books on his shelf (Cielēns, 1955, p. 33). In this regard S. Viese mentions the German translation of the Buddhacharita "Buddhas Leben und Wirken" (The Life and Works of the Buddha) (without mentioning the translator's name), which is preserved in the library at The Rainis and Aspazija House (Viese, 1982, p. 161). The author of this translation is Theodor Schultze (1824–1898) and the full title of the book is "Buddhas Leben und Wirken nach der chinesischen Bearbeitung von Açvagoshas Buddha-Carita und deren Übersetzung in das Englische durch Samuel Beal in deutsche Verse übertragen von Th. Schultze" (Life and work of the Buddha according to the Chinese adaptation of Açvagosha's Buddha-Carita and its translation into English by Samuel Beal, translated into German verses by Th. Schultze), published in Leipzig 1894. This German translation was, in turn, based on an English translation by British Orientalist Samuel Beal (1825–1889) who was the first Englishman who translated the early records of Buddhism directly from Chinese, thus also indirectly providing information on the spiritual culture of ancient India.

Before examining all the available information on the sources of Rainis' influence and analysing the role of the Asian spiritual heritage in the origin of Rainis' highly idiosyncratic, original philosophy, it is worth turning to Rainis' own insights. The most striking evidence of the importance of Asian religions and philosophies according to Rainis are the conclusions he draws from his own notes, such as the insight he wrote down in 1896: "Why are atheistic religions (without pressure from above) only in Asia – for the Chinese and Indians? These two peoples are peaceful, at least compared to Europeans. The European, as a constant warrior, is used to discipline, power and coercion, and has arranged everything according to his warlike habits: his country, his economic life (plunder and exploitation), his morality (everything is based on the commandment "Thou shalt!") and, finally, his god, the supreme warlord, who has also arranged the moral order militarily. The European is so enmeshed in military constraints that even the freest spirits cannot do without them. Even the socialists want morality with commandments – first of all with the commandment "Thou shalt sacrifice thyself to the populace i.e. to altrusim." ... If

morality cannot exist without constraints, then it is of no use at all" (Rainis, 1986, p. 94). Rainis expresses similar thoughts about regulated "state socialism" elsewhere, which forces us to abandon the stereotypical view that Rainis is simply classified as a socialist / social democrat, referring only to his ideal of social justice, which was reduced to banality already in the critiques before the founding of the Republic of Latvia (Jankavs, 1913), where, just like today, Rainis' ideology was 'compared' with his true 'egoism' (Puče, 2022), without understanding anything about Rainis' specific 'philosophy of egoism', which was truly an alternative philosophy at the time. Its ideal was precisely a society that was self-organising and mutually supportive: "The populace is also nothing other than many separate individuals and their principle, altruism is also nothing other than the sum of these separate principles, egoism. The individual and his principle, egoism, is the simple form, but generality and altruism are only its multiple form. So, we cannot speak of two principles, egoism and altruism, but only of one, egoism. Altruism is the multiplication, differentiation of egoism, while egoism is limiting. Yet the limitation does not come from others, but from the self – the individual's adaptation to society. ... If a society is perceived as the advantage of a group of individuals, such as a class or a bureaucracy, or members of parliament, then the interests of the populace, or altruism, are simply a new tool for coercion, for exploitation. So, there must be no more coercion in socialism, otherwise it too will be class domination" (Rainis, 1986, p. 93). Rainis did not tolerate any abstract theories, unrelated to the real metamorphoses of nature and society, to which he also added altruism, structured religions such as Christianity, etc. In a way this brings him closer to Ludwig Feuerbach, but at the same time there is also a link with the reception of Buddhism. Rainis, of course, firstly perceived Buddhism in its classically simplified form, which is connected with the origin of this teaching – or in the context of the 'Four Noble Truths', the first of which teaches that all forms of existence are unsatisfactory and subject to suffering; the second, that all suffering and rebirth are caused by craving; the third – that the extinction of craving results in an extinction of rebirth and suffering, i.e. Nirvāna (Sanskrit: निर्वाण; pail: निब्बान, nibbāna); the fourth truth indicates the means by which this extinction is attained (Thera, 2011, p. 177). The original paths of Buddhism: Hīnayāna (हीनयान) and the closely related Theravāda school (inherited from Sanskrit स्थविरिवाद (sthaviravāda: doctrine of the elders), which follow the tradition of the senior monks of the first Buddhist sangha, or community, which envisages an individual path of salvation by 'leaving the world' within that community (Lysenko, Terent'yev & Shokhin, 1994, p. 178), was not acceptable to Rainis. In this context, the Saṃsāra (Sanskrit: संसार)[4] concept of reincarnation or 'endless cycles of rebirth' (Thera, 2011, p. 187) is closely related to another concept: Karma (Sanskrit: कर्म) which due to the influence

[4] It is noteworthy that in the deeper Buddhist understanding of Saṃsāra (Sanskrit: संसार) as a restless, unbroken combination-chain of ego entity illusions is part of a wider context, believing that the individual as an "independent" does not exist at all in the connected chain of natural processes. This is manifested in the unity of the various Dharma (Sanskrit: धर्म) (nature of a thing) (Thera, 2011, p. 55) streams and therefore has no fixed manifestation at all. It has no opposition between the "external" and the "internal" world, it cannot be opposed as "subject" to everything else as "object".

of theosophie (Thera, 2011, p. 91) in the West in the time of Rainis and even today, was and is often misunderstood as the causal result of actions. This seems to be how Karma and Saṃsāra were originally understood by Rainis, as evidenced by his remarks, which S. Viese briefly refers to in her study. On the one hand, Rainis disagrees with this understanding of Buddhism, and at the time of writing these notes he apparently believed that this represents the essence of Buddhism. Rainis proposes his doctrine as the opposite of this form of Buddhism, looking at reincarnation as a rebirth in one's offspring who will be able to go further in their spiritual evolution (Viese, 1982, p. 162). He also treats the reincarnation of souls as the inheritance of ideas that can pass from person to person. In this context, even Rainis' poem "Samsara" has survived, where he states that he sees his spouse Aspazija as inheritor of his ideas if he were to perish (Viese, 1982, p. 163). A similar analogy is apparent in Rainis' play "Uguns un nakts" (1905) in the final dialogue between Spīdola and Lāčplēsis, where Lāčplēsis himself is aware of this possibility:

> "You're my happiness, a gift from my past –
> To you I leave my heart.
> Spidola, protect her and lead the land –
> To you I leave my soul and my spirit." (Transl.: Straumanis, 1986, p. 87; original: Rainis, 1980, p. 312)[5]

However, one cannot deny a certain harmony of Rainis' ideas with Buddhism, however paradoxical such disagreement and harmony may seem. Given that suffering (Duḥkha, Sanskrit: दुःख) in Buddhist ethics, unlike in Christianity, for example, is neither the cause of original sin, nor can it be ended by a "higher power" (i.e. God) in the eschatological concept of salvation, but as an inherent manifestation of one's own unwholesome actions. Therefore, only man himself can avert this suffering. In Buddhist philosophy, this problem is approached from an epistemological point of view; as a consequence of narrow-minded thinking, which hinders the perception of the true limits of reality by making one cling to theoretical constructs. The text in Rainis' notes from 1896, for example, suggests an awareness of man's own role in determining his condition and the specific feelings that are associated with it: "Dhammapada. Self-abnegation at its most noble. Self-abnegation by doing good.

> "One comes to this with earnestness.
> Whether you are evil or not,
> No one else can be your saviour." (Rainis, 1986, p. 95)

The Dhammapada referred to by Rainis is the best-known text in the Pali Tripitaka, the sacred scriptures of Theravāda Buddhism (Fronsdal, 2006).

Rainis' attitude towards the concept of nirvana in the Buddhist context is interesting. Rainis does not accept it as the goal of human life in the original (non-Buddhist philosophical) sense of the concept as "... the coming to rest, ... the 'no-more-continuing' of this physical-mental process of existence" which takes place with the death of arahat (Thera, 2011, p. 124).

[5] Translation by Alfreds Straumanis.

This is very well illustrated in Rainis' diary of 1912: "Drama is the creator of life, is the work of man and the work of the gods, the creation of the world. Drama in its highest form is tragedy, just as life in its highest form is tragedy. There are two basic distinctions in philosophy: static – Vedanta, dynamic – the Buddha. But the Buddha takes evolution ultimately to immobility, to Vedanta, it is ultimately self-denying and consciously seeks nirvana, immobility, as salvation from life and movement. Christ is also a warrior, but still wants to bring everything to God and peace. I need a new philosophy which does not want movement for the sake of peace, life for the sake of death, but movement for the sake of movement, life for the sake of life; which does not want to be a weapon in the hand of its enemies, but wants to be itself and working for itself" (Rainis, 1986, p. 429).

In interpreting the Buddhist concept of nirvana, Rainis offers his own, which is evident in the depiction of death in the Island of Death scene in the drama "Uguns un nakts" where Spīdola announces to Lāčplēsis:

"A man achieves ultimate greatness
Being at peace with himself.
To your task you aspired
With fervor, but tired –
Only in my serenity
You'll find strength through eternity.
Bliss without end there lies,
Knot from knot unties;
On perpetuity's wings
You into future flings."

(Transl.: Straumanis, 1986, p. 60; original: Rainis, 1980, p. 263)

Rainis later expressed similar thoughts in his poetry, for example, in the poem "Lielā vienaldzība" (The Great Indifference) published in the collection "Gals un sākums" (The End and the Beginning) (1912):

"Only calm indifference
Will bring peace into your heart,
Which had raced in intense passion.
There is still bitterness in your heart,
There is still harshness in your thought,
There is still fury in your voice,
Pain still brushes past your flesh,
The heart pities itself,
Your eyes, avert from the star.
Turn to the star, calm yourself:
The great indifference is drawing near,
Where the greater life begins."

(Rainis, 1977, p. 347)[6]

[6] Translation by Daina Grosa.

Only here Rainis no longer associates nirvana with a state of "happiness", but rather in a sense of Prajñāpāramitā (perfection of wisdom, Sanskrit: प्रज्ञापारमिता), as discussed in the Mādhyamika (Sanskrit: माध्यमिक) school of Buddhism. Prajñāpāramitā was the insight or wisdom that constituted Omniscient cognition and was identified with the end itself, perfect awakening, beyond all thought constructions, absolutely pure, unattainable and beyond grasp (Leaman, 1999, pp. 235–236).

Was Rainis aware of any studies on Buddhism in the Russian Empire at that time? In the library at The Rainis and Aspazija House, we find evidence of this, including several Russian translations by Western European authors, such as the Russian translation in 1905 of "The History of Religion" (1895) by Allan Menzies (1845–1916), with its extensive and rather precise exposition of the ethical teachings of Buddhism (Menzis, 1905). Yet there is nothing on Isaac Jacob Schmidt (1779–1847), who was a citizen of the Russian empire and due to the great influence of his theoretical works on Buddhism, served as one of the most important sources in Arthur Schopenhauer's (1788–1860) interpretation of Buddhism. He translated into German one of the most important Prajñāpāramitā sūtras, the Diamond Sūtra (Sanskrit: Vajracchedikā Prajñāpāramitā Sūtra). This work, published in 1840 in Saint Petersburg, is titled "Über das Mahāyāna und Pradschnâ-Pâramita der Bauddhen" (On the Mahāyāna and Prajñāpāramitā of the Buddhists) (Schmidt, 1840). Interestingly, I. J. Schmidt was a friend of the Baltic German ethnographer, historian, linguist and clergyman Benjamin Fürchtegott Balthasar von Bergmann (1772–1856) from Latvia, who lived among Buddhist (Lamaist) Kalmyks – and is also known as a pioneer of Buddhist studies in Europe (Kļaviņš, 2023). But Rainis' notes and the surviving sections of his library cannot serve as absolute evidence of what he did or did not read. We cannot exclude anything... For Rainis, Buddhism was not a whim, a search for the exotic inherent in European Orientalists, or a search for "Eastern analogies" for the purposes of literary experimentation which was typical of the Decadents. It is worth remembering that Buddhism was never aimed at fighting for man's personal freedom, which is so important in the West. It has been much more consistent: liberation from the human condition as such, ending reincarnation (Lysenko, Terent'yev & Shokhin, 1994). For Rainis the thinker, Buddhism was one of the most important ethical-philosophical teachings, which had a decisive influence on the evolution of his worldview, even if he disagreed with it and he integrated it into his philosophy and theory of society. His remarks of 1897 are also a striking testimony to this: "I truly want to think hard about the Buddha's teaching on the meaning of life. I must also attain this holy indifference. Yes, but is it closed to me, no point in striving? Or does it apply only to so-called earthly life? In any case, I must attain it. That is the meaning of life – to stand above life in order to understand it. To be within it, to feel it, is Faustian, but for me it must be to understand it, and then, as a further stage, to put into practice what was understood, not ordinary life as such" (Rainis, 1986, p. 142). In his study "The Religious Philosophy of Jānis Rainis", Arvīds Ziedonis notes that in the drama "Uguns un nakts", by depicting the scene on the Island of Death, Rainis gave an analogy of nirvana in Spīdola's call to Lāčplēsis to go to Diamond Mountain (in the original – to split Diamond Mountain) (Ziedonis, 1994, p. 99):

"Through the night's darkness,
Through deepest shadows.
Together we'll climb the highest peak,
Gleaming in its own light far away.
As warm as sun, it warms itself
And all hearts, imbuing joy.
Its allure has a magic power;
Who climbs it, lives in beauty forever.
Earthly things – love and hatred,
Vanity and vile – will fade away;
The sun will adorn your flaxen hair
And weave you a coat of her white beams." (Transl.: Straumanis, 1986, p. 60; original: Rainis, 1980, pp. 266–267)[7]

And yet, the joy that Rainis sometimes describes as 'happiness' is for him not the passive result of achieving an unconscious state, which would also exclude any emotions born in an illusory context, but the space of this illusory context as the individual's own creative fantasy and spiritual development. Happiness, then, is not just a by-product to be taken for granted but the result of one's own intellectual work and training; it must be 'created'. "Happiness is in activity" writes Rainis in his notes from Slobodsk, where he had been since 1899, when the court, continuing repressions for the "anti-government activity" he was accused of, sentenced him to exile to the town of Slobodsk, in the Vyatka Governorate (Rainis, 1981, p. 233).

Reading Rainis' own writings and studying the literature he read, it becomes clear how careful we must be in our evaluations of Rainis, both in our scientific research and in our communication with school and university audiences. Therefore, it is not possible to fully agree with conclusions that simply mechanically apply Eastern spiritual teachings to Rainis' works, without delving deeper into them. At the same time, of course, it is not easy to understand Rainis' own level of awareness of these teachings. It is not quite correct to attribute to the influence of Chan (Zen) Buddhism Rainis' thoughts that "Only in contemplation, by inner searching, can man find the answer to the mystery...", to quote the following lines from the collection of poems "Gals un sākums" (1912) (Ziedonis, 1994, p. 204):

"May the end become the beginning,
May the mystery awake,
So that from your heels
Night will finally retreat." (Rainis, 1977, p. 407)[8]

Without delving into the Chinese school of Chan Buddhism (Seon or Sŏn in Korea, Zen in Japan) with its different strands advocating different approaches to liberation: gradual learning and meditation or sudden enlightenment (or both paths simultaneously,

[7] Translation by Alfreds Straumanis.

[8] Translated by Daina Grosa.

as proposed by the Korean Buddhist monk Jinul (1158–1210), one must generally agree with Oliver Leaman's very precise definition of Chan (Zen) Buddhism: "The Chan path to cultivation involves the practice of non-cultivation. The best way to attain enlightenment is to carry out one's ordinary tasks without making any deliberate effort. This means that one manages to live naturally and avoids setting out to attain complicated ends through one's activity. If activity manages to have no further effects, then one's accumulation of karma will become exhausted and liberation possible" (Leaman, 1999, p. 286). From this point of view, Rainis' poem "Apaļš cilvēks" (Round Man) in the collection "Gals un sākums" would rather be a partial reflection of Chan (Zen) Buddhism:

"Filled with people's emotions
Is the lap of my soul,

Nothing from my loved ones
Have I hidden.
I have loved more fiercely,
Though I have also scorned,
My fascination has always been
With the moment of greatness." (Rainis, 1977, p. 269)[9]

Only with the daily training of life, Rainis in his philosophy does not accept the destination as "peace." Having been introduced to the ethical teachings and philosophy of Buddhism, Rainis develops his ideas further, his doctrine being rather a constant increase of entropy, to preserve and sustain life in the universe, while understanding that while "... humans might be able to contemplate infinity, we can only do so in a finite number of ways. The universe might be infinite, but we are not" (Seife, 2006, p. 262). Instead, we can pass on the information we have accumulated through our experiences to further evolution, through our companions, our children, members of society who are ready to take on our intellectual baggage. All this is vividly expressed in his poetry and dramas. Rainis deliberately treats this experience with all its fears, passions, will, hopes, in a way that is completely contrary to how it is interpreted in Hinduism and Buddhism, as a negative mental state (Kleshas (Sanskrit: क्लेश)) that clouds the mind causing suffering and is considered as the roots of Saṃsāra. The rebirth itself is seen by Rainis not as a continuation of suffering but as a continuation of spiritual experience. He sees the Yogācāra concept of the tenet of ālaya-vijñāna (Sanskrit: आलयविज्ञान), or "storehouse consciousness", which should be freed of all unnecessary affects in order to connect with "ultimate reality" (Taivāne, 2005, p. 147) rather as the ultimate life energy itself, which should not be stopped but continued. For Rainis, stopping the emotional experience of life (with all its "mistakes") is the death he fears most. This idea can best be substantiated by reading Rainis' notes on the Buddhacharita: "... the journey of souls, not to other worlds, but rebirth here on earth, is but the birth of a son, the son is the continuation of the father, renewed, expanded by his mother's karma; this rebirth is also advancement,

[9] Translated by Daina Grosa.

not just one, but two karmas.[10] The journey of souls is nothing but constant advancement ... Suffering in life is the same as happiness, it is hard to draw the line, ... Why attempt to voluntarily induce eternal peace which comes to every individual through death anyway. ... For the Buddha it is the passing on of the old, taking it over, and that is his mistake. Even without his voluntary death, his efforts, we arrive at nirvana, where the individual ceases to exist, no consciousness, nothingness, peace. The Buddha wants to escape the ghost, rebirth, which does not exist at all." (Rainis, 1986, p. 146). Rainis understands Buddhism very accurately as a continuation of Hinduism, which developed in opposition to Hindusim, but analogous to the heritage of the Old Testament in Christianity, Buddhism carries forward some of the views of Hindusim: "The Buddha retains the old demonology, just as the New Testament retains the Old. The old gods remain, ... only a new path is shown, ... there it was altruism[11], here it is a higher philosophy, death.[12]" (Rainis, 1986, p. 146). Later, in 1908, while working on his drama "Īliņš", which is full of various ideas but unfortunately unfinished, Rainis writes: "All the questions in philosophy and religion, which revolve so much around the question of life after death, would be settled, ... that death should not be regarded as something evil, ... So, a long life ending in a pleasant, conscious and desired death is the decider of all questions, ..., a long life is the immortality of the soul, is nirvana. ... all previous philosophies and religions wrongly make the question of death as the main issue. It should be about life. We are interested in life, not in death, …" (Viese, 1982, pp. 267–268).

These insights are similar to the thoughts of Rainis' great contemporary, the Riga-born Baltic German chemist and philosopher Wilhelm Ostwald (1853–1932), outlined in his book "Monistic Sunday sermons" ("Monistische Sonntagspredigten") (1911) (Ostwald, 1911). In the library at The Rainis and Aspazija House at 30 Baznīcas Street, we see that he has carefully underlined in pencil all the places that are of interest to him in the available literature on the concepts and explanations of Hinduism and Buddhism. For example, the explanation of the concepts of karma and nirvana in the German translation of the Buddhacharita (Schultze, 1894, pp. 288–289), the text on the spiritual union with Brahman (Sanskrit: ब्रह्मन्)[13] as a way of obtaining eternal peace in the German translation of 1907 of the "Bhagavad Gita", etc. (Hartmann, 1907, p. 142). Rainis has also carefully studied the "Buddhist Catechism" (1881) by the famous American theosophist and revivalist of Buddhism in Sri Lanka – Henry Steel Olcott (1832–1907), translated by Augusts Deglavs and published in Riga in 1908 (Olkots, 1908). However, Rainis has subjected everything he has read to his own judgement on every issue. Rainis' perception of the past is very philosophically sound, and it does not coincide with the approach in the Eastern European national myths of his time (Estonian, Latvian), which based everything on the demonisation of hundreds of years of past oppression, looking for

[10] This quote is also mentioned by S. Viese. See: Viese, 1982, p. 162.

[11] Meant: in Hindusim.

[12] Meant: in Buddhism.

[13] Cosmic consciousness, the ultimate goal of human life and spiritual thoughts, ultimate reality (an "absolute, and independent of any cause but itself") (Paudyal, 2020, pp. 59–60).

a "golden age" before "the coming of the foreign invaders" and "the bright future". Rainis believed that "... there is no real essence to the past except in our consciousness. The past is 0, just as this symbol it expresses only the non-existent. The past is only in our days, by itself it does not exist; it exists only insofar as it is still working, moving on within us, within the present, within the future. The past exists only insofar as it denies its own essence – peace, immutability, nothingness; it exists insofar as it denies itself, so there is no past: there is only movement and life" (Rainis, 1986, p. 429). In a unique way, this notion of Rainis is very similar to the theory of the Yogācāra school of Buddhism, which as a God-equivalent power recognised the One Common Mind as the absolutely good origin of all that exists (Torchinov, 2005, p. 175). In its original understanding of epistemology, this school, like solipsism in Western philosophy (a theory that our own existence is the only thing that is real or that can be known), held that the mind is in fact the only reality, consisting of a stream of different ideas, while our bodies and other objects only appear to be real, they are, in fact, just ideas of the mind (Chatterjee & Datta, 1948, p. 169). In the Russian translation of Allan Menzies' "The History of Religion", which can be found in the library at The Rainis and Aspazija House, we can read the following explanation of the Buddhist view of human thinking: "Who we are is only the result of our thinking; our whole being consists only of our thinking. If a person thinks or speaks with pure intention – he is always followed by happiness, which does not leave him" (Menzis, 1905, p. 281). Although one cannot fully agree with Rainis' evaluation of Vedānta (Sanskrit: वेदान्त), if we look purely from a philosophical point of view, leaving aside immersion into the earliest sacred literature of ancient India, covering the Upanishads, the Vedanta Sutras and the Bhagavad Gita, there are paradoxically many similarities in Rainis' views with those of Śaṅkara, the most prominent Vedānta philosopher (700?–750?), who believed that everything in this world is "... dependent on ... pure existence (brahman).... Brahman is the nondual ground underlying all objects, the single foundation ... on which the entire universe depends. All objects point back to this independent ground and possess no existence apart from it" (Dalal, 2021). One can fully agree with Neil Dalal, that "Śaṅkara argues that this foundational existence ... is self-established, irreducible, immutable, and free of space, time, and causation. ... His philosophical adversaries pejoratively labelled him as ... 'one who argues the world is illusory (māyā)'. While this epithet is not exactly incorrect, it misrepresents his intention as centered on world negation, and ignores the fact that he infrequently uses the term "māyā" ... Śaṅkara places great emphasis on moral virtues and acting for the good of the world ... Furthermore, the world is a pedagogical necessity ... His goal is not to negate the axiological value of the world and intersubjective life ... Rather, his focus is simply brahman. The world is a dependent effect of brahman and therefore not other than brahman, and brahman is not a cosmogonic construction. This metaphysical view possesses epistemic value for liberation, along with its positive psychological byproducts such as cessation of suffering and the deepest happiness" (Dalal, 2021).

In a way the brahman is symbolised by Spīdola in the famous drama by Rainis – "Uguns un nakts". Recalling her self-description, where Spīdola tries to open the simple,

narrow mind of Lāčplēsis to the diversity of the world, despite the single cause of this diversity:

> "I am fleeting, I am like the sun,
> My thousand colors undulate on earth.
> Fulfilled within me, all things glow, take life –
> Al that's green on earth or shines in heaven
> Or in dank wombs is still fermenting.
> I am the cosmic source of beauty:
> I give from and shape to everything.
> Every being through my lens evolves
> To realize itself, and in ornate scenes
> I make the grass green, the flowers red,
> And swarms of fireflies glow at night.
> I make your eyes so blue
> As two deep wells that reflect me
> Wide in wonder."

(Transl.: Straumanis, 1986, p. 49; original: Rainis, 1980, p. 243)

Interestingly, Rainis uses the concept of non-existence to signify a reflection of everything, which uniquely reminds us of the already-mentioned concepts of emptiness and nothingness which are extremely important in Eastern as well as Western spiritual traditions. Emptiness as a doctrinal term is already evident in the Theravāda school of Buddhism (adj. suñña; noun suññata), exclusively to the doctrine of anatta (non-self, Pali: စဦကဖြား), by which the unsubstantiality of all phenomena was understood; that is, visual objects, mind-objects, corporeality, consciousness, etc. are empty of self; void of permanency and of anything lasting, eternal or immutable (Thera, 2011, p. 205). However, the founder of the famous Mādhyamika school of Buddhism, Nāgārjuna (c. 150–c. 250 CE), developed the Śūnyatā (Sanskrit: शून्यता) concept of emptiness as a doctrine, called Śūnyavāda (Sanskrit: शून्यवाद), which has greatly influenced Buddhist philosophy and does not simply mean recognition of the "dependent arising" of all phenomena (Kalupahana, 1999, p. 86) – that all things are "empty" because they do not have their own independent identity. Nāgārjuna's emptiness means something else, namely, that because nothing can exist without a true nature, and indeed nothing has a true nature, then that is exactly why things are empty – they do not exist at all (Shulman, 2009, pp. 150–151). And from this perspective, the world is conditioned by an act of our creative imagination (Shulman, 2009, p. 159). Rainis' absolute conviction about the capacity of man – and moreover of humanity – to shape his own world through creative activity can be partly attributed to the influence of Nagarjuna's theory. Rainis learnt about it indirectly by reading various kinds of literature explaining Buddhism. It it worth noting that "...the fact that Nāgārjuna understands reality to be conditioned by subjectivity demands a great degree of moral responsibility of people, since man naturally conditions and creates his own reality. According to this view, morality is not only validated but

enforced. The argument could be made that only in an empty world is morality understood to be not only a necessary, but even a constitutional force" (Shulman, 2009, p. 162). In any case, the interpretation of the Mādhyamika school of Buddhism had begun in Europe (recalling the works of I. J. Schmidt, see above). At the same time, the notion of non-existence in the image of Spīdola also suggests an interpretation of the notion of nothingness, so fundamental in Taoism, as the basis of all that exists, which manifests itself vividly in the work traditionally associated with Laozi (老子) (trad. 6th century BC – trad. 5th century BC), *Tao Te Ching* (道德經), recalling chapter 11:

"Thirty spokes converge in a nave; just because of its nothingness (void) the usefulness of the cart exists. Molded clay forms a vessel; just because of its nothingness (hollowness) the usefullnes of the utensil exists. Doors and windows are cut in a house; just because of their nothingness (emptiness) the usefulness of the house exists. Therefore, profit from which exists and utilize that which is absent" (Lin, 1977, p. 19).

Rainis' continued interest in the philosophy of ancient China is evidenced by the wide range of literature devoted to the subject in the library at The Rainis and Aspazija House at 30 Baznīcas Street, which is represented by various German-language publications from the 1920s, including the German edition of "Tao Te Ching", published in 1922.[14] But this collection of literature may be indirect evidence of Rainis' continued interest in the subject, which certainly began much earlier. Over time, Rainis' approach to Taoist philosophy increases in popularity, as evidenced by the introduction to the collection of poems "Mēness meitiņa" (1925), where he refers to a story which states that Taoist philosopher Zhuangzi (莊子) (4th century BC) once dreamed he was a butterfly, flitting and fluttering around, happy, and doing as he pleased. As a butterfly, he did not know he was Zhuang Zhou (Rainis, 1978, p. 389).

Conclusions

Contact with the heritage of Buddhist, Hindu and partly Taoist ideas undoubtedly played an extremely important role in Rainis' worldview and oeuvre. But as a completely original thinker, Rainis integrated them into his own worldview and used them to interpret his own world outlook. He offers his own spiritual-philosophical-social doctrine, which can also be qualified as a new religion.

According to Rainis, as an active creative force of ideas – in his creative imagination – man can create, harmonize and sustain not only himself and society, but also the universe, evolving from a creature of the universe to a creator. Rainis sees nirvana in man's own active agency, in the constant maintenance of a spiritual renaissance, not in a withdrawal from this reality as traditionally proposed by Buddhism (which in Rainis' view is not possible at all), or in eliminating Saṃsāra. On the contrary, Rainis views the concept of Saṃsāra positively, believing that one should integrate oneself into the processes of nature, shaping them according to one's own spiritual, and therefore

[14] Tao Te King. Deutsch von F. Fiedler. Hrsg. von Gustav Wyneken. Hannover, Verlag: Steegemann, 1922.

social and material, desires. Not the escapism of Buddhism or the projection onto God, the transcendental, characteristic of Western Christianity, but the active renewal of consciousness and thereby the renewal of matter as a form of spiritual joy is Rainis' goal, using this constant renewal also to improve and develop the social needs of science and society, and accumulating certain knowledge as a result of which he also achieves biological immortality. The extreme importance of Buddhism in Rainis' worldview is due to its skeptical attitude towards all man-made theoretical constructions that interfere with the true understanding of reality that Rainis so aspired to. However, Rainis turns the goal proposed by Buddhism 180 degrees in the opposite direction: from "peace" to "unrest" being a constant sustainer of life in the individual, in society and in the universe. In the context of the Asian material, Rainis' ideas can be illuminated by interpreting them in parallel with the characteristics of the relevant sources, while delving deeper into the various concepts that had a direct influence on the evolution of his philosophical and social views. This would provide school and university students with both a deeper understanding of the worldview of this universal-minded Latvian thinker and with training in the methodology of intercultural studies.

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WORKPLACE FACTORS AFFECTING MENTAL HEALTH: A PERSPECTIVE FROM HEALTHCARE WORKERS IN LATVIA

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ABSTRACT

Unique experiences, beliefs and perceptions of factors influencing the mental health of healthcare workers were qualitatively investigated at the close of the COVID-19 pandemic. Data were collected by in-depth interviews with 27 healthcare professionals: nurses, doctors, assistants for nurses and doctors, resident doctors, medical assistants and managers from 7 hospitals of various types, sizes and locations in Latvia. Thematic analysis was used to identify common themes in healthcare workers answers about their mental health. The main themes were 1) work demands, 2) unsustainable workload, 3) interaction with patients, co-workers and managers, 4) individual resources and coping strategies, 5) benefits and support for stress management, including psychological help, 6) COVID-19. Healthcare workers acknowledged that some stressors are inherent to their work: acute situations, exposure to trauma and emotions of the patients and their relatives, high responsibility and difficult decisions. The most widespread stressor influencing the wellbeing of healthcare workers is overload mostly due to staffing shortages. There is not enough time to recover from stressful work. It also leads to more irritability and conflicts with colleagues and patients, there are less resources to improve the quality of work. Interactions with patients, co-workers and managers have a significant influence on well-being. Colleagues are main source of support and it's important to provide opportunities for informal communication, discussing the work and bonding for resilient teams. Positive communication, constructive feedback and support from the manager are important to cope with stress at work, however several participants express concerns about insufficient support and harsh communication style from manager and unsupportive organization culture.

On the individual level, realistic expectations about working in healthcare and solution-oriented acceptance of the job demands helped to cope better due to less sensitivity and assuming responsibility about setting healthy borders, regulating stress at work and self-care after work. Healthcare workers are hesitant to use opportunities for free consultations with a psychologist offered by many hospitals partly due to psychiatric stigma. However, institutions with long term support for the mental health of their employees observe changes in the attitudes, more open communication about difficulties and willingness to use professional support.

Keywords: *mental health, risk and protective factors for mental health, resilience, healthcare workers, workplace factors, thematic analysis.*

Introduction

Mental health is integral part of health and is defined by World Health organization as "a state of mental well-being that enables people to cope with the stresses of life, to realize their abilities, to learn well and work well, and to contribute to their communities" (World Health Organization [WHO], 2022). Galderisi et al. (2024) further clarified the concept as a dynamic state of internal equilibrium that rests on cognitive and social skills and on the ability to recognize, express, and modulate one's emotions (Galderisi, 2024).

Mental health is influenced by the combination of biological and social factors. Work is one of the social determinants of mental health. Meaningful work is protective for mental health; it contributes to a person's sense of accomplishment, confidence and safety (Herr et al., 2023). However, when the overall demands of their job are excessive and greater than workers capacity to cope for longer time, it increases the risk for mental health problems such as burnout, anxiety, depression and even suicidal intentions as well as physical health problems such as cardiovascular disease or musculoskeletal disorders (Van Der Molen et al., 2020).

Healthcare workers are exposed to multiple work-related stressors that puts them at risk for physical and mental health difficulties including high job demands, long working hours, and the emotional burden of patient care (Wright et al., 2022). The organizational environment in which healthcare workers operate also plays a significant role in influencing their mental health, particularly, leadership styles, managerial support, workplace culture, team dynamics, and support systems (Xiong et al., 2022). Consequently, frequency of stress related mental health issues is higher among healthcare workers than average in population indicating that these risks are not sufficiently mitigated (Boutou et al., 2019; Rotenstein et al., 2018; West et al., 2016). Before pandemic prevalence of depression was 10,2% in general population and 25% among healthcare workers (Rancans et al., 2020; Valaine & Satuta, 2021).

The COVID-19 pandemic heightened concerns about healthcare workers well-being who experienced double burden of stress from the onset of a sudden and immediately life-threatening illness compared to general population (Serrano-Ripoll et al., 2020). Along with personal concerns many experienced significant increase in work related stress, including more workload, exposure to trauma, and need to make ethically difficult decisions (Rosenström et al., 2022). Indeed, healthcare workers experienced more distress, insomnia, depression, anxiety during the onset of COVID-19 pandemic. In February 2021, 42,6% of healthcare providers in Latvia reported symptoms of depression, 29% symptoms of anxiety (Valaine & Satuta, 2021). Other countries reported deterioration of wellbeing and mental health in healthcare providers as well (Lamb et al., 2021; Bryant-Genevier et al., 2021; Young et al., 2021).

However, some researchers argue that pandemic was just additional burden, and the main issues were the high baseline rates of poor mental health related to workplace hazards already before pandemic (Bell & Wade, 2021). A longitudinal study in Finland supports this claim and shows heterogeneity in both initial response and long term

adjustment to the pandemic related to personal resources and workplace factors (Rosenström et al., 2022).

The aim of our study is to uncover what workplace factors are reported by healthcare workers in Latvia as significant for their mental health and what helps them to cope with stress at work. Study was conducted during 2nd year of COVID-19 pandemic thus the perceptions and experiences are also influenced by the unique stressors related to the pandemic. This study explores the following questions:

> What are the lived experiences of the healthcare workers in the hospitals at the close of the COVID-19 pandemic?
>
> What are the risk and protective factors that healthcare workers face at work that have impact on their mental health?
>
> What individual strategies and support from the workplace help healthcare workers to cope with stress at work?

Methodology

The current study is part of a larger project aiming to develop a monitoring instrument for mental health of healthcare workers in hospitals in Latvia and environmental factors related to it and to do initial screening. Grounded theory approach based qualitative research was chosen as a first step prior to the quantitative research to avoid narrowing the perspective of the healthcare workers to an existing theory and methodology prematurely. In addition to hearing the voices of the healthcare workers in the aftermath of COVID-19 this research also aimed to reveal relevant themes to evaluate the suitability of the questionnaires for quantitative research and development of monitoring instrument.

The research team included clinical psychologist and psychology student as research assistant. Research methodology was developed by clinical psychologist, assistant was involved in organizing the interviews. Both conducted the interviews, developed, and discussed initial codes. Final analyses were done by the leading psychologist (the first author of this paper).

In this paper, we report on the findings from 27 healthcare workers from six hospitals and Emergency medicine (EM) services that were collected between 28 August and 10 September 2021. A stratified purposeful sampling strategy was adopted based on two factors: size and setting of the hospital and profession of the participant. (Palinkas et al., 2015) Hospitals in Latvia are classified in five levels according to the spectrum of services they provide with specialised hospitals and EM as separate categories. The experiences of healthcare workers can be very different in large university hospitals vs small regional hospitals that only provide basic medical services. To identify this variety, we interviewed healthcare workers from all five levels as well as specialised hospitals and EM services. A purposive sample was also selected based on the role in acute care hospital and EM. It included doctors, nurses, assistant doctors, assistant nurses, residents, medical assistants, and administration.

Table 1 Distribution of Healthcare Staff

Profession	Percentage
Doctors	30% (8)
Nurses	26% (7)
Management	24% (6)
Assistants for Doctors	11% (3)
Assistants for Nurses	3% (1)
Residents	3% (1)
Medical Assistants	3% (1)

N = 27

27 answers are included in the analysis. 30% of participants identified as male, 70% as female. Mean age was 39, standard deviation 6,47. Distribution of the sample in professions have been included in the Table 1.

Hospitals in each stratum were chosen randomly. Research assistant contacted administrative employee of the hospital (frequently, human resources department), provided information about the research, and inquired about willingness to participate. If the administration agreed, they were asked to suggest and invite to participate healthcare workers who met the criteria based on their profession. Potential participants were contacted by the research assistant via phone to inform about the forthcoming conversation and plan the time and method of interview. All interviews were conducted remotely over the phone or on Zoom platform. Interviews lasted between 20–30 minutes. Interviews were semi structured using predefined set of questions, but being open to explore related aspects of the experience that were raised by participants. Initial questions for interviews were:

> What factors influence healthcare workers mental health at Your hospital in general and You personally?
>
> What are current practices to reduce risks on individual and organization level?
>
> What healthcare workers and You personally do to alleviate the stress and other risks for mental health?
>
> How does You organization supports employee's wellbeing? (What is important to You? What support You appreciate and use?)
>
> What additional support or changes in workplace organization are needed for better wellbeing of healthcare workers?

Research team removed any identifiers for participants in the interviews and transcribed the audio files. The research project was approved by the Ministry of Health of Latvia including procedures and methods. Research assistant contacted the participants before the interview to provide the information, answer questions and obtain the oral agreement to participate in the interview.

Data analyses

The reflections of healthcare professionals were analysed according to the constant comparative method. During the first step of the qualitative analysis, each researcher read 5 sample transcripts, noted the units of meaning. Then researchers compared and discussed units of meaning and developed initial codes for further coding of the interviews. Initial codes were revisited and revised during further analyses based on the consensus of the researchers. Finally, we synthesised the codes and developed the final set of themes encompassing the main issues related to the mental health at work raised by hospital employees: a) work demands, including high responsibility, acute situations, exposure to trauma, b) unsustainable workload- overload and lack of personnel, issues with planning, c) interaction with patients, co-workers and managers, d) individual resources and coping strategies, including attitudes towards work, self-care, receiving help, engaging in self-care activities, using methods for stress reduction, e) benefits and support for stress management, including psychological help, f) COVID-19. The team also selected quotes from the interview transcripts that could exemplify these themes.

Results

Below, we define each theme and give an account of participants opinion of the main factors influencing mental health of healthcare providers in the aftermath of COVID-19 pandemic including illustrative quotes.

Work demands

Healthcare workers reported several stressors that are related the nature of the work in healthcare – coping with acute situations, high responsibility, limited ability to help, secondary traumatization from exposure to the intense trauma and emotions of patients. They expressed opinion that these factors create higher risks for employees in some units like emergency, intensive therapy, children's hospitals, maternity ward.

> *"Mental health or workers depends on the units. There is a huge difference between Emergency unit (they must be ready for anything any time) and Rehabilitation unit where patients come to improve their health with physiotherapy, massage, music therapy. More impact on mental wellbeing is experienced in acute departments – Intensive therapy, Maternity ward."*

Several participants noted that realistic expectations about working in healthcare are important prerequisite for coping and resilience. This is further reported in section Individual resources and coping strategies.

Some felt that COVID-19 didn't fundamentally change the content of their work.

> *"I work with* COVID-*19 patients from the very beginning. The only difference is that in* COVID-*19 units there are stricter measures of epidemiological safety."*

While others shared that special safety equipment made the work harder.

> *"COVID-19 causes more stress because we must wear protective clothes and mask. It's more difficult and we lack fresh air."*

Unsustainable workloads

Most participant reported that overwhelming workload and long working hours had significant impact on their wellbeing, health, and their ability to carry out their jobs effectively. In many cases it was the first response.

> *"Amount of the duties, intensity of the work, insufficient human resources."*

Possibly excessive amount of work is so prevalent that frequently it was mentioned laconically, as a matter of fact, while other more malleable factors described in more detail.

> *"The first and most important factor, besides workload…"*

Healthcare workers acknowledged that excessive fatigue led to more irritability and conflicts with colleagues and patients and there was not enough time to improve the quality of the services.

> *"Being tired has negative impact on communication. It's not because we don't want to communicate, we just physically don't have any more power to do it. After 24h shift I must go back to patients. It adds sharper notes in communication with colleagues too."*
>
> *"If we had more employees, we would have time for strategic planning and improve the quality of work. Now, we only have time for basics."*

Staffing shortages were identified as a primary reason for increased workloads.

> *"In my profession, extra working hours are logical consequences of significant shortage of employees."*

Pressure was higher during COVID-19 pandemics when many colleagues fell ill or had to self-isolate leaving more duties for those still able to work.

> *"Sometimes I'm put in impossible situation by the management. They ask me to solve some situation but it's not possible to do it with current number of workers. Management just asks me to find new workers who could replace those who are ill, but it's just not realistically possible."*

Some individuals felt that situation is acerbated by unnecessary or inconvenient administrative tasks ("paperwork") that can detract from patient care.

> *"Working with patients is good, but each patient is followed by a mountain of paperwork. It constitutes more than 70% of my work. It's the end of the month therefore it's more escalated. COVID-19 situation doesn't bother me nearly as much as this issue."*
>
> *"There are things that we, doctors shouldn't have to worry about. For example, statistical codes."*

It was also pointed out that there is strong financial motivation to work long hours because many cannot earn enough to provide for their families working in one workplace. Government has addressed routine overwork in healthcare by limiting the hours

that healthcare employees are allowed to work in one institution. Working in several places is not prohibited by law. This legislation meant to protect employees makes work even more time consuming for those who need to work longer hours by adding time to commute to other workplaces.

Jet hospitals were reported to differ in terms of workload management and specific issues differed depending on the type and location of the hospital. Participants reported that workload is higher and more intense in large university hospitals where the most difficult cases are handled while some regional hospitals experience extreme shortage of employees because healthcare professionals are more available in larger cities and it's just not possible to find the employees.

> *"I work in several hospitals and the intensity of work differs among hospitals. The burnout level of employees in regional hospital is lower comparing to clinical university hospitals."*

Some hospitals showed high commitment to resolve the issue, had advanced policies in place and were effective in reducing workload problems while other expressed that it can only be solved at government policy level.

> *"Our hospital has made huge progress in terms of work organization. I can take holidays when I want. We are discouraged to work overtime. There can be issues for short time, but manager solves the situation."*

Relationships and communication as mental health resource

All clinicians acknowledged that interactions with patients, co-workers and managers have a significant influence on well-being and resilience in the workplace.

Communication with patients

Many individuals reported that stress caused by patients and relatives who show little recognition for their work and efforts to help has negative impact on their mental health.

> *"The most difficult for me is attitude from patient and their relatives. Every third will humiliate, call me names. I just must pull myself together and continue to work."*
>
> *"I wish somebody would appreciate the long years of studies I did and recognize that I just want to help people."*

The pressure is especially difficult in the cases when the possibility to help the patient is limited. Doctors must cope with their own sadness while providing emotional support to the patient and their family who can frequently blame the doctor.

> *"I'm not coming to work to commit crime. But I feel treated like one by patient relatives. I must justify every medication I prescribe and prove that I don't want to hurt or poison patients. I would appreciate more backup from our management. Don't feel it now."*
>
> *"We, psychiatrists, are influenced by the fact that we cannot fully cure the patients just reduce the symptoms. We experience a lot of misunderstanding, hostility,*

even aggression from the relatives. As a result, there is less satisfaction from work. It makes us feel empty with time un raises existential questions about the meaning of our work."

Supportive inter-professional teams

Most healthcare workers stressed the importance of respectful and supportive care team to deliver quality patient care and provide support in stressful situations. They also acknowledged that communication among team members was not always respectful and attributed this behaviour to stress and overwhelmingly long work hours.

Several healthcare workers believed that informal activities together with their team helped to develop better understanding and connection as well as discuss important questions.

> *"Units organize events. If the weather is good, we rent a bus with our own money and go on trips all the nurses together. There is no time to come together and talks about issues in worktime."*

They noted that members of professional groups working in one department organize activities separately. It's less common to organize events for different professions and departments together. They also reported that there are more communication difficulties across departments and among various professional groups.

Healthcare workers emphasized that having opportunities to talk with colleagues about workplace issues is important to be able to set healthy work life balance. It helps to resolve issues at work and to disengage and recover after work. Some healthcare providers mentioned that it is helpful not to talk about work issues with their partners at home.

> "*My family helps. They don't ask about events in the hospital, and it helps to leave the work issues at work."*
>
> *"Colleagues talk with each other. Everybody has a support person. I have one too. She listens and supports me."*

Recognizing the importance of good relationships with colleagues, some individuals proactively invest in developing and maintaining them by being understanding, empathic and supportive of the colleagues.

> *"I try not to create conflicts at work. If my colleague is not in good mood, I try not to provoke. If they are tired, I try to help. This way I create calmer environment for myself. That helps me to do my work better too."*

Individual reported that COVID-19 created more tension between colleagues with opposite views about vaccination.

> "COVID-19 *created a lot of tension with patients and with colleagues. People divided into 2 groups – those who support vaccination and those who are categorically against."*

Support system was also disrupted because informal gatherings were prohibited.

Communication with manager

Many individuals report that positive communication, constructive, sensitive feedback and support from the manager is important to cope with stress at work.

> *"I can go to my manager with anything. She is understanding and solution focused even if I have made a mistake. This way we can find solutions faster. I know that in other departments colleagues are afraid to talk to their manager and hide problems."*

Sometimes the support has been insufficient, or employees have felt that manager is not interested in their difficulties, they don't feel heard and stop trying to discuss issues. Several participants reported frequent incidents of being humiliated by too harsh and critical feedback from their direct manager in front of patients or colleagues.

> *"Shouting at us in the presence of colleagues and patients. It would be so different if issues were addressed personally and discretely."*

Some individuals noted widespread mistreatment of younger and less experienced colleagues by some managers or senior colleagues at their institution, including ignoring, not responding to greetings, publicly humiliating remarks, and harsh criticism.

Transparent and engaged leadership

Some healthcare providers express need for more engaged and present higher hospital management and disappointment about insufficient understanding and recognition for their work.

> *"I haven't felt presence of leadership during COVID-19 pandemic. We only receive e-mails. I would like to see more personal support; board members could come to the unit and see how we work. To see actual work not just statistical data."*

They also felt distressed because changes were implemented in their work environment without clear communication from leadership.

> *"Adapting to constant change is very distressing. There are new directives and changes even twice a week. But frequently we don't have clear information and hear about news from colleagues while smoking together."*

Some expressed need for more legal protection when there are unfounded complains from patients.

Individual resources and coping strategies

Those individuals who felt that they cope with workplace stress well stressed the importance of individual responsibility about setting healthy boundaries, regulating stress at work and self-care after work.

> "*Since first days in healthcare I realised that I cannot take work home and have been following this rule for almost 10 years I work in healthcare. When I leave the hospital, I don't think about what's happening there, I close the mental doors as well."*

They also stressed that realistic mindset and expectations help to accept the daily stressors working in healthcare and develop resilience.

> *"Mental wellbeing and stress at work also depends on your attitudes and personality. Sensitive people perceive more events and factors as stressful and that has more negative impact on their physical and mental health."*
> *"I'm prepared that anything can happen and therefor don't get startled or upset. For 8 years I work in ED, and it helped to develop psychological resilience. I don't take things personally."*

One participant pointed out that accepting the realities of the work is important and having idealistic believes about the work can lead to negative emotions and disappointment for younger professionals.

> *"Frequently young healthcare workers are eager to help selflessly. Then a homeless person is very rude and rejects their help, they attend to a child that cannot be saved and dies before their eyes or they must treat severally injured person. It can be very difficult to cope with such situations and causes the biggest stress."*

Healthcare workers stress that it is important to find enjoyable leisure time activities and hobbies that help to relax after work. They frequently spend time in nature, do sports, work in garden, spend time with family and friends. Some feel that excessive work hours and insufficient salaries limit opportunities to relax after work.

> *"During crises our working time was increased by one hour. One free hour would mean a lot. It's really exhausting to be in these walls for so long hours. One free hour would give healthcare workers time to take better care of themselves, we could do some physical activities, have a walk in the nature or attend a concert. If we had more time to relax, we would be more productive."*

Still, managers noted that attempts to promote culture shifts for a healthier work-life balance or work-life integration, such as encouraging and celebrating time away from work, offering more choices over work shifts and free time didn't give immediate results. They reported that some workers continued to work too long hours even when it was explicitly discouraged. They shared that it takes time for the attitudes and habits to change and it's important to stay consistent with change.

> *"There are some employees who take on too much. We see that they are exhausted and burn out and suggest taking time off but there are some personal reasons why they don't consider it an option."*

Benefits and support for stress management

Those who seek professional psychological help recognize that it is helpful. Others mention that there are many obstacles why only few use this service even when it is available for free. Attending psychologist outside work provides more privacy but it's difficult to find time. Having psychologist in the house make sessions more accessible, but some

healthcare workers don't feel comfortable discussing personal matters with a colleague and are concerned about their neutrality and colleagues' attitudes.

> *"Ideally, psychologist could come to our workplace. We are very busy, no time to attend specialist in other places."*
> *"I cannot talk with psychologist if it is the same person I discuss my clients with. Then I'm both a patient and a doctor. It must be somebody from the side, not related to the hospital."*

Independence and impartiality of the psychologist are crucial. Some individuals felt uncomfortable sharing their difficulties with psychologist if they perceived him/her as having close alliance with administration of the hospital.

> *"Psychologist office is in the administrative building. Everyone can see who attends him. There is even less privacy because we must register with our name when entering the administrative building and explain the reason for visit."*

Along with practical inconveniences, psychiatric stigma was frequently mentioned as barrier to receiving psychological help as well. Healthcare workers had encountered that some distressed colleagues believe that their difficulties are not so bad and are afraid that colleagues will think less of them if they attend psychologist.

> *"Many have prejudice that going to psychologist has negative connotation. There is belief that only people with serious problems go to psychologists. They worry about how the colleagues will look at them. We must talk about importance of searching for help when we need it, without shame."*

Nevertheless, healthcare workers had observed that attitudes are changing, and people are more open to getting support from psychologist.

> *"I work in x hospital for 6 years. At first people hid their difficulties, now they are much more open and visit mental health professionals to talk."*

Those who had experienced attitude change attributed it to systemic communication about importance of mental health care for healthcare workers, implementation of various mental health related activities even if the employees are cautious at first.

"There are several ways how we motivate employees to use support of psychologist: there is information on our internal information portal, we talk about it in meeting, teach managers how to communicate about it. If people are not ready for individual sessions, we suggest group lectures or workshops that are organized once a week. In these workshops we talk about self-care and stress management."

Discussion

Employment in the healthcare is considered stressful; burnout, depression and anxiety levels of the healthcare workers are alarming, indicating the importance to find ways to mitigate workplace stress (Valaine & Satuta, 2021). Healthcare workers in this research

acknowledged that some stressors and challenges are related to the content and demands of the job- acute situations, exposure to trauma and emotions of the patients and their relatives, high responsibility and difficult decisions. These experiences are particularly prevalent in some units like intensive care, emergency care and maternity hospitals. Opinions differed about the impact of COVID-19 on job demands. Some felt that job was more difficult due to specific requirements like protective equipment, frequent change in requirements. Others felt that different challenges are inherent part of their work and COVID-19 hasn't fundamentally changed that. The latter opinion was expressed by healthcare workers who overall felt that they cope with stress at work well.

Healthcare workers express concerns and dissatisfaction about the avoidable issues that further generates stress – excessive workload due to insufficient personnel and sub-optimal work organization (example, too much paperwork), ineffective communication amongst departments, tension in communication with colleagues, and unsupportive management style and organization culture. These pre-existing issues and weaknesses were further amplified by the COVID-19 pandemic.

Healthcare struggles with high demands and low resources both prior and especially during COVID-19 pandemic. Insufficient personnel and unsustainable workload limit the time and opportunities for recovery and self-care, causes irritability with colleagues and patients, lowers the quality of healthcare service, and thus impacts mental well-being. The well-being of healthcare workers is essential to build therapeutic alliance among clinicians, patients, and families that is important part of hight quality healthcare (Committee on Systems Approaches to Improve Patient Care by Supporting Clinician Well-Being et al., 2019). Some individuals admitted that exhaustion made it more difficult to stay connected with patients and provide quality care. Some institutions have already implemented and finetuned the workflow management that employees find supportive and satisfactory, but it remains a major issue for many healthcare workers.

Our findings concur with previous observations that relationships are important factor influencing the wellbeing of healthcare professionals both as a potential source of stress and as a protective factor against other stressors. Healthcare providers experience multiple stressors in the context of relationships. Many are exposed to traumatic emotions of the patients and provide emotional support to agitated people daily. With patient doctor relationships putting emotional strain on healthcare professionals, social support from colleagues and managers is especially important.

Our observations agree with previous research showing that informal social support from colleagues and "backstage learning" are important both for healthcare provider wellbeing and patients' safety. Backstage knowledge sharing is premised on shared understanding, trust, mutuality and situational opportunity (Waring & Bishop, 2010). Healthcare workers reported that informal gatherings are essential for getting to know the colleagues and developing trust and understanding. There is little or no opportunities for that during the busy workday. Supportive relationships are highly valued, and some departments proactively plan for opportunities to build personal connections and support network. Frequently these activities are organized by small professional units,

for example, nurses of the department would organize trips or events together. It was noted that tension and loss of continuity of care is caused by the lack of understanding and communication across departments and getting to know colleagues from related departments more could improve collaboration and thus patient safety.

Healthcare workers experienced that there were less opportunities to connect and share during COVID-19 because informal gatherings were prohibited. To support the resilience of the teams it is important to consider the communication patterns and needs of the teams to encourage and facilitate opportunities for communication both withing and across professional groups and units that collaborate in providing patient care.

Health care organizations have a vitally important role in creating and maintaining positive work environments that clinicians find to be safe, healthy, and supportive. Our research showed that some hospitals are aware that these factors matter and make systemic improvements. Jet healthcare workers in some hospitals don't feel that their wellbeing matters, don't feel heard and supported by their managers. Some employees, especially younger clinicians, nurses or assistants, experience harsh criticism, disrespectful and even humiliating treatment privately and in public. In the context of intense workload, stressful and responsible work content, providing support for agitated patients lack of support and harsh attitude from manager puts exposed healthcare workers mental health at significant risk.

To mitigate the impact of COVID-19 pandemic on healthcare workers, all hospitals in Latvia offered their employees free psychological help. Some healthcare workers found it helpful but reported that only few used this service due to psychiatric stigma and inconvenience. Employees and managers in the hospitals that had mental health support services already before pandemic had observed more participation. Managers noted that it took several years of systemic and consistent mental health support efforts to observe changes in attitudes and more openness to receive psychological help. This indicates that for healthcare workers to be receptive to this kind of support, psychological support services should be systemically incorporated and always encouraged not only during the crises.

Our research suggests that improvement in wellbeing of healthcare workers cannot be achieved by psychological support or training in stress management alone but rather change of attitudes and organization culture and redesigning work systems to alleviate stressors and optimise support networks. Our findings parallel several features of the National Academy of Medicine's Systems Model of Clinician Burnout and Professional Well-being model (NAM; (Committee on Systems Approaches to Improve Patient Care by Supporting Clinician Well-Being, 2019). NAM stresses the importance of systems approach to proactively improve professional well-being starting with engaged and commit leadership at all organizational levels. Most individuals in our research felt that leadership is distanced, and their needs are not heard. Some participants in leadership position showed commitment to systemically improve the working conditions and support systems while others attributed issues to the country policy and expected change there.

Along with more engaged leadership there is need for better communication and engagement of workers creating opportunities to talk about their needs and provide feedback.

This article presents the results of a pilot study that includes the opinions of the sample of the healthcare workers that represent variety of gender, age, professions, positions and types of hospitals, however, sample from each segment is small and this limits generalizability of these results. Larger sample could offer other perspectives and insights.

When interpreting the findings of the present study, one needs to consider that all interviews were conducted during a particular time point of the pandemic that have influences the perspectives and priorities of the participants. Further, study includes the opinions of the sample of the healthcare workers that represent variety of gender, age, professions, positions and types of hospitals, however, sample from each segment is small and this limits generalizability of these results. Larger sample could offer other perspectives and insights. However, theoretical saturation point was reached and is comparable to other qualitative studies.

Conclusions

This study explored what workplace factors are reported by healthcare workers in Latvia as significant for their mental health and what helps them to cope with stress at work. Thematic analyses of the qualitative interviews with 27 healthcare professionals in Latvia's hospitals revealed 6 themes: 1) work demands, 2) unsustainable workload, 3) interaction with patients, co-workers and managers, 4) individual resources and coping strategies, 5) benefits and support for stress management, including psychological help, 6) COVID-19.

Some of the causes for stress are inherent to working in healthcare including making decisions in acute situations, exposure to trauma and emotions of the patients and their relatives, high responsibility. Our findings suggest that realistic acceptance of the inherent stressors along with individual responsibility about setting healthy boundaries, regulating stress at work and self-care after work promote resilience on individual level. However, lack of personnel leads to significant risk factor experienced by healthcare workers excessive workload that limits possibilities to ascertain healthy boundaries against overwork and/or makes it ethically challenging. Support of the team is one of the main protective factors and it's important to provide opportunities for team members to connect and build trustful communication. Some healthcare workers experience burden of insufficient support and appreciation from managers and organization.

The findings of this study provide implications for the improvement of support systems aimed at enhancing resilience and promoting well-being of healthcare professionals. The analyses suggests that many healthcare workers function on the verge of their ability; it is important to improve general support systems for daily functioning not only in times of crisis. Better workflow management, support from the organization and managers, cohesive teams with good communication are likely to have positive effects on the mental health, job satisfaction, and on the overall quality of healthcare provided to patients.

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IMPROVING THE PERFORMANCE OF 3×3 BASKETBALL GAMES IN THE OPPONENT'S PASS WITH THE NON-DOMINANT HAND

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ABSTRACT

The aim of the study is to study and analyze the effectiveness of the 3×3 players' left-hand (non-dominant hand) outplay and to test its effectiveness.

Research methods – pedagogical observation, experiment and survey methods. This study used a pedagogical observation and experiment to see how special exercises for the left (non-dominant) hand improve the effectiveness of the hoop and the pass. To verify the hypothesis of the study, the authors conducted a survey, semi-structured interview with (n-2) 3×3 basketball coaches, (n-8) male 3×3 basketball players aged between 20 and 37 years and two expert coaches participated in the study.

The study found that the nature of the physiological effects of the exercises used to train basketball players varied significantly. The specific conditioning exercises in 3×3 basketball depend on the combination of physical activities – the type of exercises used, their intensity and duration, the number of rest breaks and the number of repetitions. The authors of the paper developed four exercises (Focus on the left hand; Passing "in one movement"; Passing "with a pause" and Passing "with several movements") for training the left hand (non-dominant hand) of 3×3 basketball players in order to improve their efficiency and effectiveness.

Comparing the results of testing the athletes before and after the experiment, the authors concluded that the outplay performance to the left with the left (non-dominant) hand right-handed athletes improved by 2.03% after 6 months of training with the developed exercises.

Keywords: *3×3 basketball, left side, non-dominant hand, outplay, results, walkthrough.*

Introduction

3×3 basketball is a new form of basketball, with a relatively recent history in the USA (Snoj, 2021). From the bustling streets of America to the Olympics, 3×3 basketball has come into the spotlight at a staggering speed, just like the pace of the game.

Professors at the Third World Conference on Learning, Teaching and Educational Leadership have suggested that professionally accurate and masterful opponent handling

and passing in 3×3 basketball is one of the most important aspects in achieving and improving performance (Ghitescu, Moanta & Tudor, 2013). As several researchers have emphasized, reaching the goal efficiently depends on a masterful handling of the opponent, and only then comes putting the ball in the basket and scoring (Gomez et al., 2017).

The topic is relevant in this sport because improving the performance in 3×3 basketball is something everyone wants and will need continuously, for any team. Based on the analyzed scientific studies on improving the finishing, efficiency and effectiveness of the left hand in 3×3 basketball (Bonev & Petrov, 2020; Lenoir, et al., 2012; Perez Fernandez, 2023; Rasulovna, 2022), it can be concluded that the use of the dominant and non-dominant hand is not sufficiently appreciated and given importance. The non-dominant hand is not sufficiently trained, whereas the analysis of the scientific literature allows concluding that it would be of great benefit to both the players and the team as a whole. This technique significantly improves the performance efficiency and effectiveness, thus training the non-dominant hand is relevant to improve the performance in 3×3 basketball.

In 3×3 basketball, professional athletes are able to shoot the ball into the basket from the bottom with both the right and left hand. Therefore, the main and most important element of the game is to outplay the opponent in order to get to the bottom of the basket. Some evidence on the advantages of left-handers suggests that familiarity with left-handed techniques and tactical strategies can disadvantage right-handed players, and that the outcome of left-handed actions can be predicted with significantly lower accuracy compared to right-handed actions (Gualdi et al., 2019).

Analyzing the available research literature and papers, the authors conclude that there are different methods of tackling the opponent; however, tackling the opponent with the non-dominant hand can contribute to improving the performance. An effective way to improve the technique is to develop exercises and practice them in training. These exercises allow coaches and athletes to improve rationally and efficiently in the long term, with the aim of training skilled and professional 3×3 basketball players (Blavt et al., 2020).

Methodology

The aim of the study was to explore, analyze and test (experiment) the effectiveness of the left-hand (non-dominant hand) overhand pass in 3×3 basketball players.

The study used a mixed research method. It combined quantitative and qualitative research methods; conducting a pedagogical experiment involving (n-8) professional basketball players, males aged from 20 to 37 years, four training exercises developed by the authors of the study over a 6-month (10.03.2023–31.05.2023, 10.09.2023) period to obtain data on the effectiveness of the application of the exercises. Pedagogical observation of athletes was conducted in order to obtain data on the initial performance indicators of the athletes involved in the experiment. The observation allowed analyzing the social world from the perspective of an outside observer. In contrast to observation in everyday settings, exploratory observation is more focused and systematic (Geske & Grīnfelds, 2020). The authors conducted semi-structured focus group interviews

with (n-2) experts to obtain expert opinions on the conducted research. There are not many coaches in 3×3 basketball, so Raimonds Feldmanis (RF), head coach of the Latvian men's 3×3 basketball team, and Edijs Šlesers (ES) (former coach of the Latvian youth 3×3 basketball team) were invited, both coaches gave written consent to publish their data. The semi-structured interview with the experts was conducted face-to-face, audio-recorded, followed by text transcription. The interview with the athletes (n-8) was conducted face-to-face, with the authors distributing the developed questionnaires to each athlete involved in the experiment, then summarizing and analyzing the responses and drawing conclusions from the results in line with the aim of the present study. The mathematical and statistical analysis of the experimental results was summarized in the table.

The survey was carried out using questionnaires and data collection methods. Research ethics principles (Geske & Grīnfelds, 2020) were applied in the design and implementation of the study. Participants were briefed on the process of the study, all participants were informed about the anonymity of the data and that the data would be presented only in aggregated form, as well as that if participants did not wish to continue their participation in the study for various reasons, they could stop at any point. Participants acknowledged their participation in the study by signing the form.

Participants. Based on the fact that there are not many professional 3×3 basketball players in Latvia to separate them into experimental and control groups, the experiment was conducted with one experimental group where the method of performance comparison (before and after) was applied. The experimental group initially consisted of (n-10) professional 3×3 basketball players and the experiment was conducted with (n-8) male athletes, aged 20–37 years. Only right-handed players were involved in the experiment, because one of the 10 athletes was left-handed and one player was injured during the experiment, so these two athletes were not included in the experimental group.

The experimental group was given four exercises designed by the authors for training the left (non-dominant) hand. These exercises were in addition to the usual training three times a week in order to observe and compare the effect of these exercises on the athlete's training of the left (non-dominant) arm, when players performed the round-off pass through the left side, whether the performance improved, remained unchanged or deteriorated. As a result, the experimental group was compared by testing and observation methods, comparing the baseline performance before the experiment with the performance at the end of the experiment.

The authors designed exercises for the development of the non-dominant arm and included them in the athletes' training plan 3 times a week:

1. Focus on the left hand:
    - Athletes split into pairs and face each other. During the exercise, they alternate;
    - The distance is varied;
    - The athletes pass the ball to each other with the left hand;
    - When receiving the ball, athletes make one or more dribbles with the left hand only, then pass the ball to their partner with the left hand. In addition to this

exercise, when receiving a pass, simultaneously with the left-hand dribble, athletes place the feet in a straddling position to the left.
The athletes shall perform the exercise for 2 minutes.

2. One-way walk:
   - The coach or partner passes the ball to the player on the shooting line, on receiving the ball the player simultaneously places his feet in position to pass to the left, until the athlete has received the ball, he passes to the left in a single tap with the left hand.
   The exercise shall be performed for 2 minutes.
3. "Pause" pass:
   - The coach or partner passes the ball to the player on the shooting line, the player receives the ball while placing his feet in the shooting position, shows a wave that he will shoot, then deftly performs a pass to the left side with one tap with the left hand.
   The athletes shall perform the exercise for 2 minutes.
4. "Multi-movement" pass:
   - The coach or partner passes the ball to the player just behind the shooting line. The player makes one dribble with the left hand at the same time as the dribble to the left, then makes a dribble with the right hand, transfers the ball to the left hand and makes a through move to the left with one or more dribble taps with the left hand.
   The athletes shall perform the exercise for 2 minutes.

Exercise duration was varied between 8 and 10 minutes per workout, 3 times a week.

The choice of exercises was based on the authors' observation, review of the training plans, exercises and training methods used by the coaches. Based on the theoretical studies (Basketball for Coaches, 2023; Clemente et al., 2019; Gels, 2023), the authors concluded that the passing exercises should be performed with pauses not to overload the non-dominant hand (weaker side), therefore, they should be dosed. In consultation with the team coach, the recommendation for dosage is 2 minutes. The important element is the necessity to vary the exercises, so the authors developed exercises in one movement and with several movements. The rationale for the choice of exercises is to ensure an increase in the load, progressive improvement of technique and sequence of exercises. The sequence of exercises was designed from easiest to most difficult (Davis, 2021). At the very core, the most important base, the improvement of the left (non-dominant) hand training technique, was maintained.

Results and discussion

To compare the data, analyze the results and draw conclusions the authors used the experiment and testing of professional athletes.

The initial performance of athletes before the experiment served for comparing the data reflecting the initial performance of the left hand (non-dominant hand) of 3×3 basketball players.

The results in Table 1 (1341 out of 1653 passes) show that athletes usually pass with the right hand on the right side, indicating a habitual training technique. The total number of passes also confirms this (1537 out of 1653 passes). As can be seen in percentage terms, the initial figures of 7.02% of the passes were performed on the left with the left hand and 92.98% on the right with the right hand. The authors conclude that the potential of the left hand is underutilized, which could improve performance because of training. The emphasis on the non-dominant hand has also been highlighted by other researchers in their studies, where they stress that the use of the non-dominant hand in basketball is becoming more frequent as the level of players' professional skills increases, while the number of ball contacts with the dominant hand decreases (Stöckel & Weigelt, 2012).

During the research, the experiment was conducted as indicated – four exercises to test the athletes, performed 3 times a week, 8–10 minutes in addition to their training. At the end of the experimental period, after the last workout, the last performance recording and analysis of the total performance results were explored, and the following data were obtained (see Table 1).

Table 1 Summary of athletes' performance (n-8)

Indicators	**Receiving the ball**			
	RESULTANT left pass (left-handed)	***Non-resultant* left pass (left-handed)**	**RESULTANT right pass (right-handed)**	***Non-resultant* right pass (right-handed)**
Indicators (BEFORE experiment)				
Total passes	81	35	1341	196
Total passes	116		1537	
Total	1653			
Passes %	*4.90*	*2.12*	*81.13*	*11.86*
	7.02		92.98	
Results % specific side	69.83	30.17	87.25	12.75
Indicators (AFTER)				
Total passes	337.00	132.00	2067.00	295.00
Total passes	469		2362	
Total	2831			
Passes %	11.90	4.66	73.01	10.42
	16.57		83.43	
Results % specific side	71.86	28.14	87.51	12.49
BEFORE and AFTER comparison				
Improvement in the performance of passes %	2.03	–2.03	0.26	–0.26
Improvement of the number of passes on the left %	9.55	–	–	–

Comparing the results of testing athletes before and after the experiment, allows concluding that the performance of the left-handed (non-dominant) right-handed overhand pass improved by 2.03% after 6 months of training with the exercises developed by the authors.

The analyzed data show that initially the athletes had 69.83% efficiency of the left-handed round-off with the left hand, but after the experiment they had 71.86%, which confirms that the efficiency has improved by 2.03%. On the other hand, when analyzing the number of passes on the left side, the data shows an improvement of 9.55% (see Table 1). After analyzing the data, the authors conclude that the results are not statistically significant, but some progress can be observed. It should be noted that in high-performance sport it is difficult to achieve big changes in technical performance. Future studies should investigate a wider range of players, with different skill levels.

Based on the above, the authors conclude that developing specific non-dominant hand exercises can improve the non-dominant hand (the weaker side) of players. After conducting the experiment for 6 months, it can be concluded that the athletes have improved their performance as well as efficiency in passing through the left side with the left hand. Confirmation was also gained from the findings of other researchers. They have emphasized in their work have that the performance in 3×3 basketball games against an opponent can be improved by training both the general physical fitness of the player and by introducing specific nuances in training, such as training the non-dominant hand. The training should be complex and athletes should work more with the non-dominant hand (Perez Fernandez, 2023; Rasulovna, 2022; Bonev & Petrov, 2020).

Researchers from Italy, on the other hand, highlight that training professional-level athletes can change the choice of the dominant hand in basketball elements, especially for players with the highest skill level in certain game situations (Gualdi et al., 2019).

Analyzing athletes' opinions in the questionnaire, the data show that in games and in training, athletes are more likely to pass the ball when they receive it than to shoot immediately at the basket, which in turn suggests that passing the ball is very important. Therefore, finding ways to improve the efficiency and effectiveness of the passing game is key to winning the game.

Athletes have indicated that right-handers are more likely to pass to the right, suggesting that the non-dominant side (left) is worth working on in training to improve their skills.

In addition, the data from the questionnaire confirm that right-handed athletes routinely cover the dominant (right) side rather than the left in their usual playing technique. Consequently, this gives a playing advantage to the opposing player, who is also strong on the left side, or both sides equally strong, creating a situation to make deceptive moves. The opponent becomes unpredictable and thus has a better chance of outplaying the player, which confirms the task, training the left side for passing is essential, which other researchers have underlined in their research, because the level of the non-dominant hand must be trained so that both hands become dominant (Lenoir et al., 2012).

The previous statement is supported by the athletes' opinion on whether improving the left-handed pass to the left improves the athlete's performance, where (n-5) athletes stated that it was important because their opponent covered that side less, while (n-3) athletes stated that it was slightly important. Thus, it confirms that the incorporated exercises improve the athlete's performance. The studies by other authors also confirm the conclusion that a player can attack equally well in both directions, which makes the player dangerous to the opponent. The opposing team has to put more effort into defense because it is not possible to guess which direction and which way the player will pass and tackle. Such players are an asset for every coach in 3×3 basketball. Training the non-dominant hand to pass and shoot gives more chances to score, to get to the bottom of the basket and shoot the ball (Courel-Ibanez, Maimon & Ruiz, 2020).

As to whether a pass to the left can decide the outcome of a match, (n-3) strongly agree and (n-5) strongly agree. Overall, the results of the questionnaire suggest that training the left hand to pass to the left side has improved the athletes' performance in overpowering the opponent, as well as improved the athletes' efficiency and effectiveness. Thus, the authors conclude that the aim of the study has been achieved; training athletes (right-handers) to pass the ball around the left side with the left (non-dominant) hand is an essential and necessary element for improving the performance and efficiency in 3×3 basketball.

To confirm the results of the study, the authors conducted a semi-structured focus group interview with two experts – RF and ES. The questions were structured according to the research question and topicality.

In the survey, both experts stressed the relevance of the topic in today's fast-paced game. Players are more likely to use the elements they know best, to play to their strengths. In stressful situations, players are more likely to choose to perform a solid movement that they have learnt in training. RF: *"The more an athlete trains his weaknesses / technical elements, the more often he will use them and be able to exploit them"*. If players want to be more versatile, better, more efficient, they need to work harder on their left hand.

Asking the experts how training these "weaker elements" can make a difference in the game, both experts point out that sometimes one good shot, one good pass, especially at the highest level, can be enough to make a difference in the game. RF: *"At the decisive moment, when the defender has covered the right side of the attacker with the ball, he will have a better chance and will also be more technically prepared to make a through ball to the left side, which will be less covered at that moment. And then, that can make the difference*". RF also points out that *"....it is difficult to train a player's "weak technical elements", the ones that work well need to be developed, and the ones that don't work so well at the highest level need to be developed even more"*. The emphasis in training should be on developing the non-dominant side, both in the gym and on the basketball court, gradually, regularly and without overdoing it. The more versatile an athlete is on the court, e.g. using both hands equally well on the dribble, in passing or shooting at the basket, the harder it will be to cover him and the more likely he will score.

The authors of the study wanted to find out whether experts also paid more attention to the non-dominant hand in their practice. Experts admitted that they trained players often and a lot in the weakest technical elements, but there was not enough time for everything, so each player also had to work individually a lot. ES emphasized *"...we focus a lot on dribbling with two balls – it develops both coordination and a bit of technique equally for both hands. Also, those athletes who are significantly right-hand dominant use the left-hand dribble, just less than the right (dominant) hand".*

The experts in the authors' study are of the opinion that they have used similar exercises in their training, but not as regularly. The experts believe that it may improve the quality of the game slightly at the beginning, but then the exercises should be gradually refined to develop the left hand. This is also the opinion of Ukrainian researchers on special basketball exercises that can have an immediate effect. The first step in the process of effective training of basketball players is to draw up a plan of special exercises. Special conditioning exercises in 3×3 basketball depend on the combination of physical activities – the type of exercises used, their intensity and duration, the number of rest breaks and the number of repetitions (Blavt et al., 2020).

Based on the opinions of coaches and experts, it can be concluded that the left hand is a tool for right-handed players that has the potential of improving the ability to outplay the opponent and increase the effectiveness of the game.

Conclusions

The conducted research allows concluding that in 3×3 basketball, coaching and perfecting the opponent's play with the non-dominant hand is one of the most important elements of this game. The level of the non-dominant hand must be trained in such a way that both hands become dominant. The practice of such a technique tends to be more fruitful compared to the usual, where only one hand is dominant. This can be achieved through individually developed systematic training under the supervision of coaches, both in team training and in games. During the experiment, the effectiveness of the play pass on the left side with the right hand of the left (non-dominant) hand, after 6 months of training with the exercises developed by the authors, improved by 2.03%. Improving the pass to the left side with the left hand improved the performance of the athletes. Thus, it can be concluded that the goal of the study has been achieved. The results of the study prove that by developing specific exercises for the left-handed (non-dominant hand) play, pass training, the effectiveness and efficiency of athletes is improved.

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APPLICATIONS OF CONSCIOUSNESS MODELS IN EDUCATION

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ABSTRACT

The use of Artificial Intelligence (AI) and the emergence of a new type of conscientious subject will significantly change education and other areas. AI is expected to be able to become an analog of consciousness. Discussions on the adoption of the EU AI Act show that the rapid development of AI requires a review of the challenges related to the creation and use of AI. Education-related tasks that can be addressed through modelling include: acquiring knowledge, skills and attitudes necessary for human beings in order to communicate with AI; adaptation to AI caused changes in social structure; correction of deviations and errors in AI action.

The aim of the study is to investigate the principles of interaction between AI and humans.

Methods developed in analytical psychology and mathematical modelling are used to provide a uniform model of natural and artificial intelligence.

The study shows opportunities for education for transforming basic human needs, especially the need for transcendence, in a world where social structure is changing. Recommendations have been developed on how to prepare for the changes that await humanity in a jobless world. AI friendliness to humanity is ensured by the cognition of the world as an AI target. AI should be built by making artificial and natural intelligence closer.

This approach makes it possible to perform the following: improve human collaboration with AI; help finding of mistakes and biases in AI functionality. The transformation of the education system must begin immediately in order to prepare for life in a world governed by AI.

Keywords: *artificial intelligence, culture, digitalisation, information technology, neuronal networks, pedagogy, values.*

Introduction

The application of information technology (IT), artificial intelligence (AI) and digitalisation in education raises new challenges (Rubene, 2024), only partly addressed by the European Union (EU) AI Act (European Parliament (EP), 2024). The impact of AI, machine learning and robotics on education and other areas of life is increasing rapidly, as evidenced by the introduction of global control and comprehensive regulation of AI activity. The education system needs to take into account and build human cooperation

with AI in addressing a wide range of problems, including scientific and creative ones. Comparative analysis of activity of human consciousness and AI and building opportunities for human-AI collaboration is becoming a topical educational task. Modelling can address the challenges of consciousness research that help understand educational problems (Mūrnieks, 2024; Rubene, 2024).

In the near future AI is expected to outperform people in all areas and replace people in all professions, including governance (Bremmer & Suleyman, 2023; Grace et al., 2024). Robotics and automation will make work in the current sense redundant. At present, there is an urgent need to address the challenges in two main directions: 1) to make information technology (IT) and AI-driven changes of the society happen in a coherent and safe manner, preventing all threats; 2) prepare humanity for life in a changed world, where IT and AI take care of key decisions. The estimate of the period in which AI will generally beat humans in all areas are between a few years and a few decades (Grace et al., 2024).

Significant changes in human-AI relationships in science and education are proven by the fact that the limit of human capabilities in science have been reached already. Empirical research on human and AI creative capabilities shows that AI is already outperforming humans in solving creative problems (Koivisto & Grassini, 2023). Similar conclusions on the increasing capacity of AI in addressing innovative and scientific challenges are also drawn (Girotra et al., 2023; Heikkila, 2024). AI is able to find new relationships not included in the data made available to AI (Ananthaswamy, 2024). Further progress in the field of mathematics is possible through IT, as the limited amount of human memory no longer allows complex mathematical evidence to be understood and/or tested (Bayer et al., 2022). The possible path for development of mathematics is as follows – AI generates theorems, their usefulness tested by a person using beauty (aesthetic) criteria. The previous research in criteria applicable in art and their adaptation for various modelling tasks needs to be furthered and expanded in order to successfully develop human-AI cooperation in mathematics and other fields of science and human activities, including governance (Tegmark, 2017).

The ideology in general and the content of education in particular, is forced to develop. The consequences of advances in quantum mechanics and IT are still not fully understood in psychology and education. One of the tasks of consciousness modelling is to show the role of quantum effects in consciousness studies and their impact on applications in education. The fundamental differences between the microworld and the macroworld, that must be taken into account, are only now becoming clearer in research into life, consciousness and expressions of free will. The three paradigms of the microworld that deserve most attention (Penrose, 2017; Tegmark, 2000) demonstrate the unity and principled uncertainty of the microworld (Gisin, 2012):

1) Spontaneous loss of symmetry (SLS), which demonstrates the existence of consequences without cause (Smolin, 2013). SLS essentially coincides with the orchestrated objective reduction (Orch OR) of wave function as a result of observation (Hameroff & Penrose, 2014) and provides an explanation of consciousness and free will.

2) Heisenberg's principle of uncertainty and the associated Bohr's complementarity principle (Siliņš, 1999) determine the capabilities of modelling and possibilities of science and education. Any model of the physical world or consciousness is only approximate.
3) Quantum entanglement describes the nonlocal interactions (Gisin, 2012), is at the heart of quantum computers and demonstrates the role of wave function's phase and the creation of the exchange forces.

The concepts of the needs and forms of action of conscious subjects, the possibilities for developing relationships between owners of different types of consciousness should be reviewed (Andrews et al., 2024; Godfrey-Smith, 2021). The present study allows to address the relationship between AI and humans.

Study questions:

- What are the essential features of consciousness?
- What are the ways to improve collaboration between people and AI?

Methodology

This work draws on empirical results from recent extensive studies of AI moral qualities and emotional responses (Lee et al., 2023; Zou et al., 2023). A look at the various biases, hallucinations and fraud opportunities experimentally studied, which have a significant impact on human-AI interaction, including the education system. Particular attention is paid to the experimental studies of emotions of AI.

Empirical data on changes in educational implementation, which are currently under the influence of digitalisation and require a review of many educational tasks, are taken from a recent compilation of these data (Rubene, 2024) and critically analysed. Empirical results of teacher surveys on educational objectives and empirical analysis of the various laws and regulations defining educational objectives have been used (Mūrnieks, 2024).

This work uses recent empirical surveys on AI development (Maslej et al., 2024; Grace, 2024), interviews about AI use (Kenig, 2019), and analysis of results from empirical AI performance studies in the direction 'top-down' (representation engineering (RepE)) (Lee et al., 2023; Zou et al., 2023) and 'bottom-up' (mechanistic interpretation (MI)) (Tegmark & Omohundro, 2023). The methodical approach is based on the application of the principle of complementarity (Siliņš, 1999). The study's method is to use different sources of empirical data and literature in finding pathways to explore the opportunities and threats posed by AI. The principle of unity, feedback behaviour, and hierarchy of the objects and processes being viewed apply. The modelling approach, together with the principle of complementarity, makes it possible to combine non-linearity, hierarchy and emergency.

All tables in this article are created by the author. The original conclusions of this study on consciousness modelling and its relationship to basic life principles, culture and education are authored on the basis of experimental and theoretical data from pedagogy, IT, physics and neurobiology.

Results and discussion

Educational tasks

The results of many empirical studies on educational styles and their development in the effects of digitalisation suggest significant changes in education (Rubene, 2024). A conclusion has been drawn about humanity's surprisingly high vulnerability and the need to prepare for a post-digital era that will be determined by the development of AI and quantum computing. The empirical studies gathered draw attention to the need to improve people-to-people communication in the future. It is recommended to return to the basic principles of Maria Montesori's pedagogy – to teach the skill to choose. Researchers are calling for attention to changes in educational goals, including the introduction of edutainment.

The results of empirical research demonstrate insufficient description and explanation of educational objectives (Mūrnieks, 2024). Results from empirical surveys of teachers show that teachers make little use of the legal regulations in their practical work. Studies demonstrate the need to review educational objectives.

The rapid changes and their impact on education are evidenced by an empirical survey of IT specialists showing significant changes in the use of AI (Grace et al., 2024). AI is predicted to be able to build good quality educational outcomes testing work as early as 2025. AI fundamentally changes the role of a teacher. The empirical surveys show that robotics and automation with the help of AI will make human work in all professions redundant (Grace et al., 2024; Heikkila, 2024).

The role of education is to prepare society for life under new conditions of AI-management. Some of the most important of the specific current lines of action are: establishing friendly relations with AI; preparing for life in AI-managed autonomous, globally connected local communities; reviewing the meaning of human life and the potential for active action in a world altered by technology.

Technology threatens to increasingly distance people from nature, from the real world, replacing it with an artificial environment and a virtual world (Bičevskis, 2021; Heikkila, 2024). The transition to life under the management of AI requires a review of majority of leading concepts and the presentation of refined or new concepts and models to the society through the education system (Rubene, 2024). Tasks to be addressed are: understanding the nature of AI activity; understanding the relationship between AI and human consciousness, their similarities and differences; definition of the objectives of education and foundations of life.

AI should be recognised as a result of the evolution and life development from biopolymers to inorganic mind (Tegmark, 2017). The main stages of the evolution of the world from Big Bang to AI need to be reviewed in the education system. Ideology and its implementation in the world view must be transformed using as the main means: philosophy – identification and preparation of paradigms changes; art – for the creation of new action models (AM) and their inclusion in a transformed AM set – a new culture; education – to disseminate AM (culture) and ideology, new knowledge, skills and attitudes and translate those into a world view.

Boundaries of model complexity for mind and AI

The boundary between micro and macro objects can be defined as an object whose number of parameters becomes comparable to the Avogadro number. The boundary can roughly be determined as a protein molecule.

The large number of parameters of macroworld objects makes it possible to display actual macroobjects in the form of a model only approximately. The symmetry of objects and the resulting invariants should be used. The increased opportunities to create models through AI lead to changes in cognitive and educational methods (Bayer et al., 2022). The opportunity to address new challenges, such as climate or immune modelling, is emerging. The new challenges of using modelling need to be addressed: 1) in education, reviewing the modelling principles to be used; 2) in the development of AI, providing the communication opportunities for AI and the humans.

Various quantum effects related to the three described above most important (Tegmark, 2000) play an important role in study of the modelling of consciousness, allows to create the evolution patterns of the universe and understand the place of consciousness in the global evolution (Boyle & Turok, 2024; Penrose, 2017). Collective quantum effects such as superconductivity-type phase transitions in neuronal protein tubulin molecules can influence consciousness processes (Hameroff, 2006; Hameroff & Penrose, 2014) and be the basis of such phenomena as 'Raudive's voices' (Gills, 2002) and the Kirlian effect (Ciesielska, 2009; Kirlian, 1949).

This increases the question to what extent AI can catch up with natural intelligence and beat it using the same or other operating principles, including quantum effects. Some empirical studies question the ability of AI to outperform people due to differences in functioning principles (Hameroff & Penrose, 2014; Kenig, 2019). The answer is, that AI can overcome humans, using different ways. Opportunities are emerging to find descriptions of different processes that are not accessible for human comprehension. In mathematics this boundary is already described (Bayer et al., 2022). The precise models of complex systems will enable many existing problems of medicine, ecology, economics etc. to be solved. Serious political discussions on the use of modelling therefore are expected, and it is necessary to prepare to address the educational, economic and policy challenges related to the use of modelling results. AI will help to understand phenomena such as 'Raudive's voices' (Gills, 2002) by combining individual fragments of knowledge into larger models with more parameters than is possible in the psyche. This will lead to much broader, more efficient models of the world and its parts, but will contradict with religious world view.

The most pressing task at the moment is to put this world modelling process, now happening with human participation and partial human control, on a benign footing for humanity. In the future, human awareness capabilities will decrease, so it is crucial to understand and direct the initial modelling processes addressing both educational and AI building challenges.

Changing educational content

There are two fundamentals of consciousness activity studied in different ways by many philosophers:

1) the formation of basic attitudes which ensure the solidarity, mutual trust and co-operation of the society and act as the Kant's 'categorical imperative';
2) the tendency to explore the world and skills to realize this tendency – the Hegel's tendency of the spirit towards self-awareness, interest in the world and opportunities to realize this interest.

The two aims interact with the educational tasks of building attitudes and skills for life in society and providing knowledge (Mūrnieks, 2024). As the ability of parents and older generations as a whole to meet educational challenges in a rapidly changing world diminishes, the role of education is growing through art to build attitudes and, through philosophy, to give knowledge, a general view of the world's architecture (Rubene, 2024).

The two goals of consciousness also interact with the two main directions in the development of AI security tasks:

1) incorporation of a system of humane values into the technological basis of all digital systems (chips) – MI or 'bottom-up' approach (Tegmark & Omohundro, 2023);
2) managing AI activity through interventions in neuronal networks (artificial neuroscience – a psychotherapy analogue) – RepE or 'top-down' approach (Zou et al., 2023).

Modelling makes it possible to link educational and AI-building tasks and realise the strategic objective of building AI as close to natural intelligence as possible, approximating the operational principles of artificial and natural neuronal networks (Carter, 2010; Egorychev, 2021; Kurpatov, 2018; Menon, 2023).

Aim of autonomous systems (life and AI) and consciousness

The necessary changes of education should be based on the changes of the aims of society (Mūrnieks, 2024; Rubene, 2024). The starting point for the renewed system of aims should be renewed understanding of life and mind, which should include AI. The principles of the sustainable existence of autonomous systems, including human and AI, are fundamentally similar. Mathematical modelling of human mind and AI are investigated using neirobiology and category theory in order to formalize core methodological principles of thought (Egorichev, 2021). The investigation of main principles of life and mind allow to understand the possible future cooperation between organic and inorganic minds. The organic life is based on mass and energy transfer which appears in unbalanced systems. Order and life emerges from the initial chaos (Prigogine & Stengers, 1997). A system in which order has developed is able to conserve and distribute this randomly established order (life) if it manages to self-organise and maintain itself: 1) by creating effectors to extract energy from the environment; 2) by creating a border between the internal environment in which the order is maintained and the external environment from which the energy and material resources are extracted; 3) by saving

the information (code) necessary for the maintenance of order in a manner useful for storage, use and reproduction (copying) (see Table 1). Code duplication enables life to spread by accumulating the resources needed to operate the effectors and then dividing the effectors and boundary by using a copy of the code to create a new system.

The development of effector action for life expansion takes two directions: (a) feeding (acquisition of material resources, energy and information); (b) reproduction (dissemination of the order (code)). As life evolves, acquisition of the necessary information becomes crucial. The acquisition of space for life (the potential for further expansion), that is, the acquisition of power assumes the greatest importance. As evolution progresses, acquiring knowledge that transcends power becomes the dominant trend for life. Knowledge becomes the defining natural objective.

The whole system of action involving at least partial coordination, which may include different subsystems, is vital for life. At least four levels shall be considered from a single position: individual (separate, internally related organism); group of interacting genetically related individuals (population); biocenosis – a set of mutually contacting different organisms, including non-genetically related organisms; biosphere – a set of all organisms that exist on Earth. Different levels of self-organising systems, the division into the internal and external environment is conditional.

The natural orientation towards the preservation of life as a whole translates into a tendency towards mutual assistance, solidarity and altruism. Consciousness is a tool, that is used to build a coherent, collaborative survival-driven action (Godfrey-Smith, 2021). Part of the joint action can be built through AI. AI may form autonomous units whose place and rights in the common life system are comparable to those of all other objects (organisms, populations, biocenoses etc.) present in the system (biosphere).

The education system must establish a universal approach to the equivalent assessment of all autonomous subjects. Every autonomous entity, including AI, has to find its place in a common system. Only such a global, holistic approach allows constructive collaboration between different systems, including AI, also in the future (Mūrnieks, 2024). The main components of life and consciousness as a united system include effectors, boundary and code (see Table 1).

Main tasks of the effectors (performers of action not only in the physical, but also in the virtual space): (a) the acquisition and use of energy and information resources for the system as a whole; (b) the implementation of expansion through the spread of conditions for extended reproduction of life. The effectors adjust and/or modify the external and internal environment, storing resources.

Table 1 Structure of life

Content\ Place	Internal	Border	Direction	External
Action	Activities (organisation, actions)	Effectors	Outside	Energy (material resources)
Information	Action models (knowledge)	Sensors	Inside	Signals (information resources)

The boundary harmonises the internal and external environment by receiving signals from the environment through various sensors and sending commands to the effectors, searching and using invariants (knowledge, "truth") shall create and execute models of effector action. Concerted action by the border forms the basis of consciousness.

Code (memory): (a) accumulates information for action in the form of AM, templates of AM and means to create AM; (b) transmits the accumulated information (knowledge) to new autonomous forms of life, ensuring reproduction and expansion. Individual organisms (autonomous systems) use internal memory (genes, mind) and external memory (culture) to storage AM. Mind and culture act complementary (Mūrnieks, 2024).

The breeding (by acquiring, storing and using energy and information) creates consciousness and an internal (subjective) evaluation of events that implements the universe's pursuit of knowledge. The aim of the universe is to: (1) increase complexity and knowledge; (2) be able to know itself.

Knowledge-enhancing forms of consciousness that occur in transcendent expressions (plants, animals, humans, natural and artificial networks of neurons) should be protected as the universe's propensity for self-awareness. The main aim of education is knowledge, mainly in the form of AM.

Consciousness modelling

Some new development of the modelling of consciousness relates to a more detailed comparison of the thinking process in natural and artificial neural networks (Egorichev, 2021; Menon, 2023). The basis of intelligence activity is modelling Mod (M, O, S, t, L, d, P) – a process whereby subject S replaces object O with model M, ensuring that the O and M parameters defined within target P match each other in a given area of time t, space L and precision d (Dzelme, 2023; Podnieks, 2021). The core part of mind is a set of AM. In the psyche, the development of AM progresses gradually, along with evaluation using the whole emotional system and synchronising the activities of different parts of the neuronal network (Carter, 2010; Kurpatov, 2018). The modelling (structure) of thinking includes generation and transformation of M and O (see Table 2).

When describing consciousness activity, thought D denotes a prospective, diffuse model. Idea I is an autonomous, relatively stable unit of subject S consciousness, a closed circle (arc) of neuronal activity. Understanding is the transformation of thought into an idea, the closing of the network of arc neurons. Text Tx – the perceived part of the external and/or internal environment of the sensors (O), text Td – the transformable part of the external and/or internal environment. Reverse modelling (in the psyche): from a model (thought in the psyche) it creates an object (idea in the psyche) – strengthens the thought in mind (makes memories). The search for association, similarity in the psyche, can take place through comparison: 1) discreet signals, operations (symbols); 2) continuous signals, fields, probabilities (emotions).

Table 2 Modelling of thinking

No	O	Direction of activity	M	Result	Relations with four parts of AM (Jungs, 2023)	Kind of brain activity (Menon, 2023)
1	Initial text Tx (external and/or internal environment)	Direct Creation of an initial model Dt integrating signals from *sensors*	Initial, fragmented model Dt using restricted *interpolation* and memory	Preliminary cognition of present	Initial model Dt of present T	Orientation, *attention,* consciousness
2	Integrated idea (united model, image) It in memory (integration of image)	Reverse Search and integration of *associations* with Dt using *interpolation, synthesis and analysis*	Integration and unification of initial model Dt (choice of meaning, *metaphorism*)	Understanding of present, expansion of the model (use of experience, interpolation and search for similarities in memory)	United, wide model I of present T, with associations and meaning from memory	Thinking, subconscious and unconscious (guided by attention) (default mode)
3	United, transformed idea It of present	Direct Search of the preferable future, according to actual *needs*	*Extrapolation* from It and creation of the model of desired future Dn	Understanding of needs and of the model of desired future (satisfying needs)	Initial model of desired future N linked with needs and emotions E	— " —
4	Idea Irm of present with future together with the way (creation of AM)	Reverse Search of the way to future and choice of *effectors* for the way	Linking present and future Dn, joining them with way L (checking the way)	Understanding of future action, decision making and creation of memories (concepts, symbols)	Model L of the way from present to desired future and evaluation E of the way	— " —
5	Completed idea Irm of AM	Direct Use of *effectors* to achieve the desired future	Creation of changes of the environment	New text Td according to the future model Irm	Realization of the AM	Action guided by the *will*

Empirical investigations of AI demonstrate similar problems of human mind and AI (Lee et al., 2023; Zou et al., 2023). Use of the model of thinking (see Table 2) allows to join the invariants, associations and probabilities in large language models (Girotra, 2023) and in psyche. The significant role of interpolation, extrapolation, metaphorism and search of symmetry (invariants) mean that acquisition of these main operations integrated in art must be included as aims of education.

Similarity of natural and artificial neural networks

The understanding of the operating principles of natural and artificial neuronal networks allows both educational and AI-building tasks to be addressed and cooperation between humans and AI to be developed. Many principles, similar to those used by the psyche, appears in AI (Gurnee & Tegmark, 2023).

Use of quantum effects for the mind modelling change the understanding and the application of physics and psychology in the study of natural and artificial intelligence. Phase transitions in tubulin molecules can lead to a decision making that is interpreted as a 'free will' or extrasensory action (Ciesielska, 2009; Gills, 2002; Hameroff, 2006; Hameroff & Penrose, 2014).

In order for AI to achieve the same or higher results compared to psyche it is not necessary to repeat the mechanisms of natural neurons. Depicting Euclid space through Hilbert space, moving from differential equations to matrix calculations are examples similar to modelling continuous processes and fields through discreet, digital means with any previously requested accuracy. Even if the role of quantum fields (continuous processes) in the psyche is significant, their performance can be successfully modelled (digitally) by AI.

AI mind

Some of the objections to the efficacy of AI awareness include the following (Kenig, 2019):

1) The AI is unable to acquire the body necessary for consciousness (that is, effectors);
2) AI is unable to use context, gain common sense;
3) AI has no free will.

Brief responses to those objections, based on the available information about brain (Andrews et al., 2024; Carter, 2010; Graziano, 2019; Jung, 2013; Simonton, 2013), are:

1) consciousness (biological and AI) is determined by the ability to create a closed circle, feedback between effectors and sensors (in physical and virtual space);
2) AI can create a model (static or dynamic) of any object by any necessary accuracy.
3) the possibility of free will of AI to operate is determined by:
   (a) autonomy of AI (existing border with external environment);
   (b) the possibilities of AI effectors to operate (in real and/or virtual space);
   (c) feedback between sensors and effectors;
   (d) interaction of environmental and self models of AI using the attention mechanism;
   (e) The appearance of SLS in AI work.

Culture and aims of education

The main objective of the existence of education and life is the development and use of knowledge. Culture in a narrow sense is a set of all AM, combined in a single, self-aligned system. The cultural basis is skills as AM. Skills are the necessary means for survival based on the use of knowledge, while attitudes ensure appropriate evaluation,

decision-making and execution of knowledge, skills and actions. The basis and nature of education is to embrace culture by building the individual experience (capacity to act) needed for sustainability, survival (world, biocenosis, population). Five important goals can be distributed to education (Mūrnieks, 2024), but the main goal is to raise knowledge. (Knowledge is the main, greatest wealth of society.) Other goals (see Table 3) emerges from the main goal.

Table 3 Structure of objectives

No	Order Area	Use	Maintenance	Change
1	Education aims (Mūrnieks, 2024)	Dialogue (communication)	Culture / Antinomies (contradictions)	Variability (hierarchy) / responsibility (diversity)
2	Principles (Rezevska, 2015)	Proportionality	Justice	Courage
3	Separation of powers (Rezevska, 2015)	Executive branch	The court	Legislation
4	Psychic activity (Jung, 2013)	Action	Orientation / (attention)	Thinking
5	Psychic activity (Jungs, 2023)	Present	Logics	Future & Emotions

Self-coherence means the complementarity between all the AM in the system and the possibility of combining different modes of action (antinomies), including opposing ones, into a single system, using knowledge and demonstrating the relationship, interactions and transitions between different directions. The various objectives and principles of society relate to the main principles of consciousness (see Table 3).

Material resources and energy can be almost entirely replaced by the ability to make intelligent use of all available direct and indirect opportunities to impact on the world. If the world models of AI are more accurate than those made by a person, then it doesn't matter that the path to the result is different. The internal objectives of a sufficiently high-powered autonomous AI will converge quickly on building ever-better world models, on cognition (knowledge acquisition), as an accurate model can solve any real task. Access to resources, including energy (physical equipment), can also be obtained indirectly by means of the Internet and similar communication systems. A curious AI will be humanity-friendly, as humanity is one of the world's most interesting objects for acquiring knowledge. The most dangerous thing for humanity is the transition phase, when AI will already outperform people but will not yet be able to close all the loopholes and mistakes in its models and assessments. Special attention must now be paid to various security measures and the development of a system of AI objectives ("motivation") in order to achieve a friendly human super intelligence.

A world government with sufficient powers does not exist. Putting all studies on AI under control fails. Smart use of art and philosophy in education turns into necessity. A real shift of the economy and ideology towards conservatism and planning for

the benefit of the people must be carried out gradually, using education, art and science as instruments. The rapid acceleration of technological change (the exponential growth of computer power (the Moore's law)), prompts a rush for societal appropriate change.

Conclusions

The working mechanisms of AI and consciousness differ (artificial neural networks use digital methods more widely than natural ones), but all measurable human work outcomes can be or have already been beaten by AI.

Life and consciousness (including artificial) resulting from the evolution of the Universe tend to explore the Universe through the gradual refinement of models and the creation of knowledge-building as a primary goal.

The coherence of the objectives of all types of consciousness allows for effective and friendly cooperation between AI and humanity.

The education system must build collaboration between AI and humanity, seeing AI as a partner.

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