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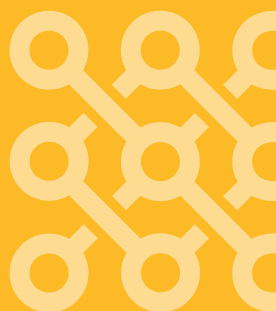
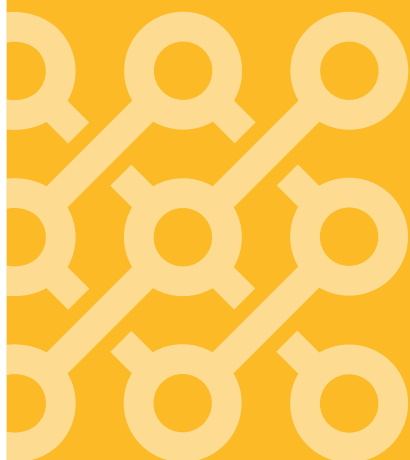
HUMAN, TECHNOLOGIES AND QUALITY OF EDUCATION

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LEARNING, WELL-BEING AND CHANGE: RESEARCH IN EDUCATION SCIENCES, PSYCHOLOGY AND SPORT SCIENCE

PREFACE

This volume brings together a selection of papers presented at the 84th International Scientific Conference of the University of Latvia, gathering the work of researchers from education sciences, psychology and sport science. Read together, the contributions collected here trace a single underlying question from many directions: how do people learn, adapt and flourish as the technologies, institutions and societies around them change. The chapters that follow move from the classroom to the clinic, from historical policy to present-day practice, and from the printed page to artificial intelligence, but they are held together by a shared commitment to evidence-based understanding of human development across the lifespan.

A first cluster of papers examines how literacy, understanding and classroom practice are built and supported. Olga Lezina, Julija Svitaja and Antons Kutuzovs open the youngest end of this continuum with their corpus-based analysis of the frequency of consonant combinations in the Latvian language, proposing a linguistically informed route to speeding up early reading instruction. Anita Āriņa and Elita Stikute move to upper-secondary education, showing how an interdisciplinary reading of Anshlav Eglītis' (Anšlavs Eglītis) novel *The Shameless Old Men*, combining time-perspective theory, existentialist philosophy and personality development, can deepen literary literacy and students' reflection on their own lives. Vitnija Kokoreviča and Dita Nīmante turn from text to classroom interaction, offering a systematic literature review of how novice teachers manage their classrooms and how these practices relate to student behaviour. Fatma Yaşlı Şen, joining the volume from Eskişehir Technical University in Türkiye, contributes a methodological advance for the field, proposing an integrated DEA-fuzzy logic framework for evaluating curriculum performance under the uncertainty that characterises real curricular decisions.

A second cluster looks at access, inclusion and the historical and institutional conditions of education. Agnese Gromova-Ķūrena and Ieva Margeviča-Grinberga revisit the years 1991–2004 to show how part-time studies functioned as an early instrument

of equal educational access during Latvia's post-socialist transformation, offering a historical perspective that informs current distance and blended learning policy. Toma Naumčiuk complements this historical thread from the Lithuanian side, using oral testimony to reconstruct how adults learned English after the restoration of Lithuania's independence and what the Soviet-era legacy meant for language education in the Baltic states. Turning to the present, Ireta Čekse and Aija Nīlendere ask whether teachers are prepared for the multicultural classroom, examining intercultural competence and pedagogical collaboration through the lens of the Iceberg Model of Culture, while Antra Roskoša and Diāna Rūpniece study the integration of international students at Riga Technical University, bringing Maria Montessori's pedagogical principles to bear on a distinctly contemporary, multicultural, higher-education setting.

A third cluster shifts the focus inward, to well-being, psychology and the human response to change and uncertainty. Liene Vītola proposes the integration of the PERMA model of positive psychology with coaching methodologies as a framework for protecting the well-being of both teachers and students in demanding twenty-first-century classrooms. Elīza Šenberga and Elīna Zelčāne bring a clinical health-psychology perspective, examining the association between mindfulness and pain catastrophizing among 324 migraine patients. Marta L. Ziņģe and Sanita Šaitere look at the intersection of neurodiversity and technology, studying how ADHD traits and attitudes toward artificial intelligence relate to job crafting among working adults, and Juris Dzelme closes this cluster with a wide-angled reflection on the transformation of society under advancing artificial intelligence, arguing that the formation of attitudes and cooperative relations between people and AI must become a central task of education.

Finally, Sandra Krūma and Rihards Parandjuks extend the volume's concern with human development into the domain of the body, evaluating the compatibility of the World Athletics Kids' Athletics programme with Latvia's Skola2030 curriculum and tracking its effects on children's physical fitness between 2022 and 2025, a reminder that the well-being this collection is concerned with is physical as much as cognitive and emotional.

This volume reflects the breadth and the coherence of research now being conducted at the intersection of education, psychology and sport science: attentive to the individual learner and patient, yet alert to the historical, institutional and technological forces that shape what learning, teaching and well-being mean today. We thank all the authors for their contributions and their patience through the review process, and we hope readers will find in these pages both specific findings to build on and a broader sense of the questions our field is now asking.

Prof. Linda Daniela

IS THE TEACHER PREPARED FOR A MULTICULTURAL CLASSROOM? TEACHERS' INTERCULTURAL COMPETENCE AND PEDAGOGICAL COLLABORATION

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ABSTRACT

The increasing cultural, linguistic, and social diversity of contemporary classrooms raises critical questions about teacher preparedness for civic participation in multicultural education (Arnold & Rahimi, 2024). Drawing on research in multicultural education and teacher development, this article defines intercultural competence as a multidimensional construct encompassing both visible elements, such as culturally responsive instructional strategies, and less visible elements, including attitudes, beliefs, and values. In line with the Iceberg Model of Culture (Hall, 1976), the study emphasises that collaboration functions as the mechanism connecting these dimensions, enabling invisible attitudes to be reflected upon and transformed into inclusive actions. The aim is to examine whether teachers are prepared for multicultural teaching through the lens of their intercultural competence and responses regarding civic participation in schools. The following research question is proposed: How do teachers' intercultural competence and pedagogical collaboration influence their preparedness for multicultural education and support for student civic participation in schools? Seven focus group interviews were conducted with teachers from the IEA ICCS 2022 schools with the highest student civic participation scores. Data for interviews were collected in spring 2024. A critical synthesis of focus group interviews highlights the central role of pedagogical collaboration in strengthening teachers' intercultural capacity. The study shows that intercultural competence, when supported by collaborative pedagogical practices, fosters inclusive school environments and promotes equitable student civic participation, underscoring that individual competence alone is not enough for sustainable multicultural teaching. Moreover, effective multicultural education requires not only a general awareness of diversity but also the deliberate development of specific professional competencies and structured collaboration among teachers.

Keywords: *civic participation, intercultural competence, multicultural education, pedagogical collaboration, teacher preparedness*

Introduction

What never changes is the presence of change, as can be seen through the lens of global events over the centuries. Let us look at two interrelated global movements – the transformation of forms of public administration and the dynamics of globalisation, which undeniably influence trends in national security, educational content, and economic development.

From a global perspective, the world has experienced several waves of democratisation (Huntington, 1993) and its reversals (Lindberg, 2026) to date, during which the world order has changed and new states and forms of government have emerged. During this period, alongside global events, forms of government around the world also changed, shifting from autocratic or authoritarian systems to democratic ones and vice versa. For example, between 1970 and 2024, 149 democratisation processes occurred in 110 undemocratic countries, and since 2000, 105 trends towards autocratisation have emerged in 75 countries (Lindberg, 2026). These fluctuations point to instability and highlight the need for countries and their citizens to hold fast to their founding values while remaining flexible and able to adapt to changing circumstances.

Industrialisation and technological advancements have driven social processes that are defined as waves of globalisation (Huang, 2025; Zinkina et al., 2019), the beginnings of which can be traced to the late 19th century. At this time, people's desire to seek prosperity outside their home countries sparked the formation of a globalised society, marked by migration routes from Europe to America and from China to India, as well as by people moving to neighbouring countries. The second wave of globalisation following World War II prompted people to seek better jobs and a better life outside the occupied territories. Following the third wave of democracy after the collapse of the Soviet Union in the late 1980s, a third wave of globalisation emerged, characterised by economic fluctuations, digital transformation, and political migration. When these two layers are superimposed on a timeline (see Figure 1), a clear interaction emerges that serves as a catalyst for technological development, shifts in educational paradigms, and the formation of mutual relationships.

Both the waves of democratisation (and their reversals) and the broader trends of globalisation have brought teachers' preparedness for multicultural classrooms to the forefront of policymakers' agendas, as increasingly open and interconnected societies demand more inclusive and globally aware education systems. In this context, the three waves of globalisation have progressively expanded teachers' responsibilities, requiring educators to prepare students for participation in an interconnected and culturally diverse world.

An analysis of the results from the four cycles of the OECD PISA assessment in 2012, 2015, 2018, and 2022 (OECD, 2023a) shows that in 23 countries, the proportion of students with an immigrant background has increased since 2012. Moreover, results from TALIS (OECD, 2025) reported that only 33% of recent graduate teachers felt prepared to teach in a multicultural or multilingual setting. However, the situation in Latvia is better

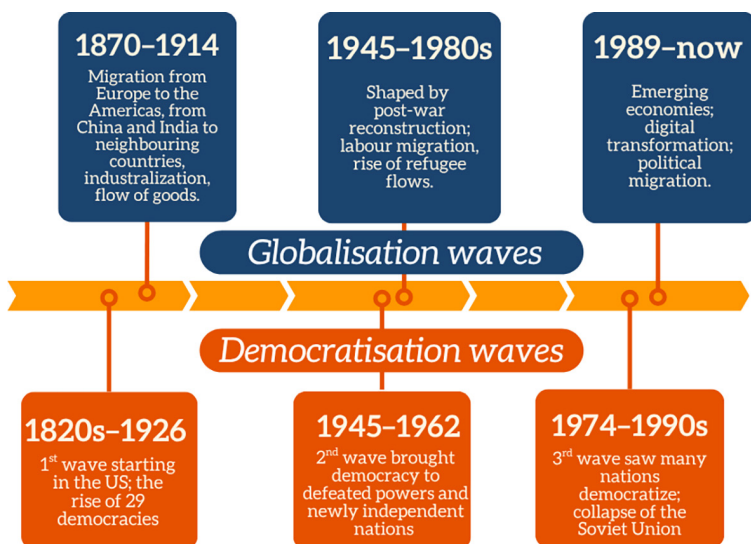


Figure 1. Three Globalisation Waves and Three Democracy Waves (constructed by authors after Huang, 2025; Huntington, 1993; Lindberg, 2026; Zinkina et al., 2019)

than the TALIS average. In Latvia, 7 out of 10 teachers report being able to encourage cooperation between students from different ethnic and cultural backgrounds, though only 5 out of 10 can prepare instructional content for a diverse classroom (Geske, 2025). However, global processes and the increasing cultural, linguistic and social diversity of contemporary classrooms evidently raise critical questions regarding teacher preparedness for civic participation in multicultural education (Arnold & Rahimi, 2024; Kalogerogianni, 2025).

Therefore, the aim of this article is to examine whether teachers are prepared for multicultural teaching, with a particular focus on their intercultural competence and attitudes towards civic participation in schools. Accordingly, the research question is formulated as follows: How do teachers' intercultural competence and pedagogical collaboration influence their preparedness for multicultural education and support for student civic participation in schools?

Theoretical Background

The Multicultural Classroom. Multicultural education, which emerged in the 1960s, conceptualises education through the lens of cultural diversity and power relations, emphasising the need to recognise and critically engage with cultural differences in both national and global contexts (Suri & Chandra, 2021; Yilmaz, 2016). It rests on the assumption that educational systems are not neutral but reflect and reproduce racial, ethnic, and socioeconomic inequalities that must be both acknowledged and addressed pedagogically, with diverse cultural experiences serving as epistemic resources rather than peripheral content (Yilmaz, 2016).

Multicultural education is conceptualised as a multidimensional and systemic framework that extends well beyond content integration, a reductionist interpretation that remains prevalent in educational practice (Banks, 2014; Banks & Banks, 2019). Instead, it encompasses interrelated dimensions, including knowledge construction, equity-oriented pedagogy, prejudice reduction, and the cultivation of an empowering school culture, collectively positioning education as a transformative process that interrogates how knowledge, power, and inclusion are produced and reproduced.

Research consistently indicates that many teachers report feeling insufficiently prepared to teach in multicultural classrooms, pointing to a widespread capacity challenge within the teaching profession (Arnold & Rahimi, 2024; Dursun, 2024; OECD, 2023a; Peköz & Gürşimşek, 2020; Romijn et al., 2021).

Teachers' Intercultural Competence. Preparedness to teach in a multicultural classroom depends not only on general pedagogical skills but also on teachers' intercultural competence, particularly their attitudes towards cultural diversity, which shape school diversity climates and have measurable effects on students' academic achievement (Batruch et al., 2026; Deardorff, 2006; Schotte et al., 2022). Intercultural competence refers to the interaction of knowledge, skills, and attitudes that enable teachers to teach effectively in culturally and linguistically diverse classrooms, including cultural awareness, empathy, inclusive communication, and culturally responsive pedagogy. It is framed as a foundational condition for equitable access to learning, rather than a narrow instructional technique (Meca & Schwartz, 2024; OECD, 2023b).

Teachers' intercultural competence influences students' academic achievements through everyday teaching practices and interactions. Higher intercultural competence, indicated by culturally responsive teaching practices, inclusive communication, and teacher self-efficacy, reduces misinterpretation and cultural stress while increasing students' school belonging, engagement, and access to instructional support (Meca & Schwartz, 2024). These proximal outcomes facilitate learning and translate into higher academic achievement, measured by grades, standardised test scores, and educational progression (Will et al., 2025).

From this perspective, teachers who lack intercultural knowledge or hold ambivalent or negative attitudes towards diversity may struggle to respond effectively to students' educational needs (Deardorff, 2006; Romijn et al., 2021; Schotte et al., 2022). In contrast, teachers with strong intercultural attitudes, such as openness, respect, and reflexivity, are more likely to employ culturally responsive practices that foster inclusive learning environments and support academic success (Deardorff, 2006; Dzerviniks et al., 2024; Kalogerogianni, 2025; Ruales et al., 2020).

Given the rise of multicultural classrooms, teachers' intercultural competence emerges as one of the key determinants of inclusive classroom practices that shape students' engagement, sense of belonging, and ultimately their academic achievement, thus enabling teachers to adapt their instructional strategies to diverse linguistic and cultural learner needs. This process is further enabled and sustained through pedagogical collaboration among educators.

Teachers' Pedagogical Collaboration. Education is often viewed as a key actor in developing student-centred and collaborative skills before students enter the labour market. In the context of education, teacher collaboration is a pivotal factor in transforming students into proficient future collaborators and is described as the exchange of information, networking among teachers, and collaborative group work (Vangrieken et al., 2015). Collaborative practices have been identified as a key element in promoting effective teaching and learning outcomes, involving the engagement of teachers, students, and other relevant stakeholders in shared activities that facilitate collaborative decision-making, mutual support, and collective responsibility for enhancing educational outcomes (Arar et al., 2026). Other authors (e.g., Stoll et al., 2006), emphasise the importance of teachers' individual and collective capacity as a driver of the student learning process. Moreover, in a context where students, as future entrepreneurs and members of the labour force, are expected to develop skills for an evolving job market (World Economic Forum, 2020a, 2020b), teachers serve as exemplars by engaging in cooperative learning through collaborative teamwork, thereby fostering an environment conducive to the development of these competencies.

In the context of multicultural classrooms, teachers' involvement in pedagogical collaboration enhances their preparedness for teaching in diverse settings. Such preparedness is not solely an individual competence but also reflects an institutional and collective capacity of the school's teaching staff. This indicates that teachers must be capable of analysing students' needs, differentiating learning content, supporting inclusiveness, and fostering collaboration with other teachers, parents, and the wider community. This, in turn, foregrounds the notion of "productive professionalism" (Hargreaves & O'Connor, 2018a, 2018b) as targeted, shared time management within the school as a learning organisation, grounded in responsibility, reflection, and coordinated practice. Moreover, the concept of productive professionalism is predicated on structured, collective timeline management within the school's learning organisation framework, underpinned by responsibility and systematic reflection.

To summarise, it is evident that teachers' intercultural competence and pedagogical collaboration are of paramount importance in the contemporary educational environment. Students are required to navigate an increasingly unpredictable world characterised by diversity, inclusivity, polarisation, artificial intelligence, and digitalisation. They must also cultivate civic awareness and be prepared to participate actively in civic life.

Methodology

Study Sample, Methodology and Procedure

The data were collected through one-on-one interviews and small focus groups (2–4 people). Schools selected for the focus group interviews must have participated in the IEA ICCS 2022 study (Schulz, Ainley et al., 2023), and the average score of 8th-grade students on the civic knowledge test was required to be above the Latvian average of 492 points (Čekse et al., 2023; Schulz, Ainley et al., 2023). The researchers' objective in

the selection process was to choose schools that excel not only in civic education but also in other areas. Therefore, a ranking of participation scales was created, in which schools were ranked using six scales: S_SCACT ; S_SCHPART; S_CITEFF; S_POLDISC; S_COMPART; S_ENGDM (Schulz, Fraillon et al., 2023). The 10 schools with the highest scores were selected for participation, taking into account the school's type (elementary, middle, or high school) and degree of urbanisation (Riga, regional city, town, or rural area) (Čekse & Alksnis, 2025). The study reached out to 10 schools, and seven general education schools responded to the invitation. The interviews lasted between one and two hours and were conducted with 14 teachers in spring 2024. The schools themselves were free to choose how many teachers would participate in the interviews, based on each teacher's responsibilities and the needs of the study. Two interviews were conducted at one school, while the others included a single interview attended by one or more teachers. Table 1 presents a summary of the study sample regarding school type, urbanisation, teachers' responsibilities at school, and years of service.

Table 1. Characteristics of the study participants

School type, urbanisation	Teacher's responsibilities at school	Years of experience
Riga State Gymnasium	Russian language teacher, career counsellor, student council advisor, head of the methodological commission, class teacher	21 years
State City Gymnasium	Deputy Principal for student affairs, student council advisor, leadership teacher	Not disclosed
City Primary School	Music teacher, Deputy Principal, extracurricular activities coordinator, student council advisor	26 years
Rural Primary School	Latvian language and literature teacher, Deputy Principal, class teacher	30 years
Rural Secondary School	Head of IT and project work supervisor	40 years
	Class teacher, head of the local history museum, head of the school newspaper	Not disclosed
	Teacher of social studies, history, and local studies	Not disclosed
	English teacher, student council advisor, class teacher, methodologist of interest education	40 years
Rural Primary School	Deputy Principal for education, Erasmus+ project coordinator	Not disclosed
	Deputy Principal for student affairs, class teacher, student council advisor	Not disclosed
City Secondary School	Teacher of social studies, economics, and Russian language	40 years
	Teacher of social studies and history at upper secondary level	35 years
	Deputy Principal, project work coordinator	4 years
	Deputy Principal for student affairs, career counsellor, head of the student council	2 years

The audio recordings were automatically transcribed using a paid version of <https://transkriptor.com>. Each transcript was subsequently reviewed in full against the corresponding audio recording and manually corrected where discrepancies were identified. Unclear passages were checked by replaying the relevant audio segments. Only the verified transcripts were used in the subsequent manual analysis. The research data were analysed manually.

Limitations of the Study

The schools selected for the interviews participated in the ICCS 2022 study, in which students had completed the survey instruments in Latvian and where Latvian was the language of instruction. Students were not included in the qualitative study because their views were assessed based on their specific school's ICCS 2022 results, which served as the selection criterion for examples of good practice.

Data Analysis Methodology

This study applies a general deductive approach (Gilgun, 2019), using Hall's (1976) Iceberg Model of Culture as the analytical framework. This framework provides a useful lens for asking a central question: Are teachers ready for multicultural classrooms? It does so by showing that intercultural competence operates across three interconnected levels of culture.

Guided by the Iceberg Model of Culture, a three-level deductive coding scheme was developed to analyse the qualitative data: (1) surface level, capturing observable practices and behaviours; (2) intermediate level, capturing norms, values, and interaction patterns; and (3) deep level, capturing underlying beliefs such as diversity as a resource and education as a process of dialogue and civic development.

The framework guided the systematic categorisation and organisation of the data across the three analytical levels. The model suggests that a comprehensive understanding of culture requires examination beyond observable behaviours and practices to the deeper core values, beliefs, and assumptions that shape them.

Research Ethics

The ICCS 2022 study adhered to international IEA standards, which were monitored by the IEA Ethics Committee. The focus group questions were reviewed and approved by the Ethics Committee for Research in the Humanities and Social Sciences (No. 71-43/53, April 17, 2024).

Results

General Data Analysis

The qualitative data analysis identified three interconnected levels that characterise teachers' perceptions of school culture in relation to intercultural competence, multicultural education, and civic participation. Figure 2 summarises the categories and



Figure 2. Visualisation of the categories and subcategories according to focus group data

Note. The authors identified the categories and subcategories by analysing the data manually. ChatGPT was only used to create the layout (OpenAI, 2026).

subcategories identified through the data analysis to analyse and explain teachers' preparedness for multicultural education and support for student civic participation in schools, as well as their intercultural competence and pedagogical collaboration.

The results show that teachers' answers focus on their intercultural competence and attitudes towards civic participation in schools. The *Surface Level: Visible Practices* category reflects the observable aspects of school culture, including traditions, routines, and forms of participation described by teachers. De Schaepmeester et al. (2022) previously showed that teaching patterns and civic actions in formal and informal school activities could serve as indicators. The *Shallow Level: Norms and Values* category encompasses eight subcategories related to the values, norms, and relational

practices that shape everyday interactions and the sense of belonging within the school community. It should be noted that the development of norms and values is a long and time-consuming process involving behavioural change and the transformation of core beliefs, in accordance with the concept of multicultural education (Banks, 2014), as well as the development of teachers' intercultural competence as an important prerequisite for a multicultural environment. Finally, the *Deep Level: Core Beliefs* category comprises five subcategories that highlight teachers' underlying beliefs and assumptions concerning the role of the family, student responsibility, teacher influence, and broader educational practices. Analysis of the interview results demonstrates that core beliefs shape teachers' attitudes, decisions, and collaboration. It is important to recognise that, according to cognitive behavioural psychology, core beliefs (Beck, 2020) are not merely "thoughts" but deeply ingrained assumptions that influence self-perception, relationships, choices, and emotional responses. In this study, core beliefs are reflected in teachers' accounts of how collaboration is established and how teachers themselves operate within a heterogeneous environment.

Surface Level: Family Involvement in Activities

The analysis of teacher focus group interviews for the *Surface Level: Visible Practices* category highlights school traditions and civic activities as evidence of teachers' ability to operate in a multicultural environment and engage in pedagogical collaboration while applying their intercultural competencies. This category encompasses the observable activities, routines, and forms of participation through which school culture becomes visible in everyday educational practice.

School traditions emerged as a significant visible element of school culture, which, in this study, was expressed through civic participation and activities within the school (Ekman & Amnå, 2012). Previous civic education studies demonstrate that civic knowledge has a strong relationship with students' attitudes and behaviour (Geske & Cekse, 2013; Schulz, Ainley et al., 2023). Teacher-guided discussions promote student participation and responses to one another, as well as the transformation of ideas, and these features relate to the quality of argumentation and future participation in society (Schuitema et al., 2018).

However, analysis of the interviews emphasises that many traditions originated from student initiatives and were sustained through long-term community participation. For example, one teacher from a city school described a Christmas donation initiative for a social care centre that had been started by students more than 20 years earlier and had since become an established annual tradition. According to the teacher, students themselves now anticipated and continued the initiative each year. Attention was also given to the role of the student council, in which students plan celebrations, organise events, and contribute to the social life of the school community. Teachers frequently positioned themselves as facilitators who supported student participation.

Community work also emerged as a visible expression of collective responsibility and a sense of belonging: clean-up campaigns, environmental activities, and community

improvement projects as experiences that united students, teachers, and families around shared goals, strengthening collective identity and social cohesion within the school environment. Volunteering emerged as another significant aspect of visible participation practices. Interview participants described students' involvement in volunteer activities both within and outside the school environment, including support initiatives, community assistance, and participation in socially oriented projects. Joint activities involving parents, teachers, students, and alumni represented another visible aspect of school culture. Teachers particularly emphasised celebrations, excursions, and sports initiatives, such as annual walking activities that continued even during the pandemic period.

Teachers also emphasised the integration of cultural experiences, traditions, languages, and historical perspectives into classroom activities and project work. These practices promoted inclusion and diversity awareness while making learning more meaningful and culturally responsive for students from different backgrounds. The findings also highlighted the importance of student council traditions: students participate in decision-making and contribute to school life through meetings, collaborative planning, and student-led initiatives, strengthening their sense of agency and belonging within the school community. Finally, interview participants highlighted school-wide initiatives involving families, particularly charity campaigns and support activities related to broader social issues. One frequently mentioned example concerned support campaigns for Ukraine, with students, teachers, and parents collectively participating in donation and assistance activities.

Overall, the findings demonstrate that intercultural competence was visible in teachers' professional practice through inclusive collaboration, equal participation opportunities, civic engagement, and active cooperation within the school community.

Shallow Level: Shared Responsibility, Collaboration, and Active Participation

The *Shallow Level: Norms and Values* category highlights the shared values and relationship patterns that shape everyday school life. Surveys emphasise that the values and norms in civic education are not neutral – schools always shape the idea of what constitutes a “good citizen”, which means that how a teacher teaches is of crucial importance, underlining that democracy is not about arbitrary choices but rather politically grounded choices that have political consequences (Westheimer & Kahne, 2004). However, most teachers frequently referred to school values and philosophy as an important foundation for participation and collaboration within the school environment and emphasised shared institutional values that shape both relationships among colleagues and the organisation of school activities. One teacher highlighted that school events and collaborative practices were consistently guided by “our school values,” helping to maintain coherence within the school community. Interviewees also described the school philosophy as encouraging active participation, responsibility, and engagement, whereby students were expected not only to attend activities but also to contribute ideas, participate in decision-making, and take responsibility for school life. These results suggest that teachers intuitively understand and use the concept of school organisation (Kools & Stoll, 2016).

Teachers also described adaptation activities organised at the beginning of the school year to introduce students to opportunities for participation and student self-government structures. There are several examples from the interviews in which teachers demonstrate the importance of norms in action. One teacher explained that students were informed from their first days at school that every student could participate in the student council. Social responsibility emerged as another important dimension. One teacher emphasised that students should be willing to “stand for an idea” and actively participate in shaping school life, including expressing disagreement or advocating for change when necessary. In another focus group, collective responsibility and teamwork were emphasised several times as important values within school culture, highlighting the importance of shared values and beliefs.

Moreover, the results also show that student collaboration is important. Teachers described collaboration as a skill that students need to develop through shared activities and collective responsibility, and emphasised that, through the process of collaboration, students learn to represent not only themselves but also the wider community to which they belong. It may be assumed that teachers implement and promote the concept of intercultural education through their everyday practices and interactions within the school environment. This suggests that teachers intuitively understand and apply the concept of school organisation (Kools & Stoll, 2016), even when they do not explicitly recognise the presence of multiculturalism within the school environment.

The development of transversal skills also reflected important value-oriented dimensions of teachers’ work, as creativity, communication, presentation skills, and collaboration were described as essential competencies developed through participatory learning processes. The results of the analysis show that teachers frequently encouraged students to organise tasks independently, distribute responsibilities within groups, negotiate decisions, and collectively prepare presentations or projects. Cooperation with parents represented another important relational aspect of school culture, with teachers describing family involvement not only through participation in school activities but also through regular communication and shared responsibility for students’ well-being and learning via individual consultations, assessment tools to identify students’ emotional or learning difficulties and support collaborative discussions with parents about improving students’ behaviour, emotional well-being, and academic progress. These conversations helped to strengthen mutual understanding between families and the school while also ensuring that both students and parents felt heard and supported. Finally, teachers emphasised the importance of community-building and teacher-led engagement efforts within school life. Teachers actively facilitated participation, encouraged cooperation, and created opportunities for students, parents, and colleagues to become involved in collective activities.

This layer demonstrates that teachers’ actions are guided by a value system oriented towards equity and community. Taken together, the findings from the shallow-level analysis suggest that teachers’ support for the development of transversal skills is closely connected with the broader relational and value-oriented dimensions of school culture.

These include student agency, cooperation, parental involvement, and community building.

Deep Level: The Belief that Shared Values Matter for Success

At the deep level, the analysis reveals core beliefs that underpin both practices and values. Teachers demonstrate an understanding of diversity as a resource, a belief in every student's capacity to contribute, and a view of education as a process that fosters dialogue, social cohesion, and civic responsibility.

Previous research highlights the importance of teachers' core beliefs in shaping educational values and teaching practices (Deardorff, 2006; De Schaepmeester et al., 2022). Analysis of the interviews showed that the role of school values and the teacher's influence in navigating cultural differences within the classroom was an important theme. Teachers emphasised the importance of maintaining a strong, value-based foundation within the school while respecting students' cultural diversity. A gymnasium deputy principal explained that their school's core values were clearly introduced to students upon entry, helping to establish common expectations and support adaptation within a culturally diverse learning environment. Teachers also acknowledged that different cultural backgrounds may "pull in different directions," underscoring the importance of both teachers and students remaining grounded in shared principles and mutual respect. In this context, teachers' personalities, attitudes, and communication styles were perceived as highly influential in shaping how cultural differences were experienced and managed within the classroom.

The findings also highlighted beliefs regarding the importance of family as an external influence on students' participation and civic engagement. Teachers emphasised that family traditions, values, and involvement strongly affected whether students became socially active and engaged within school life. One teacher noted that participation in school activities often extended beyond students themselves and included graduates and families, becoming part of wider family traditions.

Finally, the deep-level analysis revealed the importance of a theme concerning teachers' reflective practices and the emotional demands of teaching. Teachers described the need to continuously reflect on their own work, their relationships with students, and their teaching approaches within changing educational contexts. One teacher emphasised that meaningful and respectful classroom interaction requires significant preparation and emotional investment from teachers, particularly when educational resources or teaching materials are insufficient.

Discussion

This study examined whether teachers are prepared for multicultural teaching, with a particular focus on their intercultural competence and attitudes towards civic participation in schools. The findings provide a nuanced response to the research question concerning how teachers' intercultural competence and pedagogical collaboration are

reflected in their preparedness for multicultural education and support for student civic participation. In the results of interview data, preparedness was not represented as a single set of observable teaching techniques. Instead, it was found that the concept manifested across three interconnected levels: visible practices, shared norms and interaction patterns, and underlying beliefs about diversity, participation, and the purpose of education. The maintenance of visible activities was attributed to relational norms and shared values, which were, in turn, founded on teachers' beliefs concerning students' ability to contribute to school and community life. This interpretation corresponds to Hall's (1976) distinction between the visible and less visible dimensions of culture.

In this study, the teachers' preparedness was reflected in school traditions, student council activities, volunteering, community projects, and joint activities involving students, families, and teachers. These practices furnished students with opportunities to initiate activities, participate in decision-making, and assume responsibility for school and community life. Teachers frequently described their role as facilitating rather than replacing student participation. This finding is consistent with research showing that citizenship education is shaped by the forms of citizenship and participation promoted through educational practice (Westheimer & Kahne, 2004). Furthermore, the findings align with the extant literature, which demonstrates that teachers' pedagogical approaches to facilitating classroom interaction exert a significant influence on both student participation and the quality of civic discourse (Schuitema et al., 2018).

At the shallow level, participation was embedded in shared norms of responsibility, cooperation, parental involvement, and community building. Pedagogical collaboration was therefore described not only as an occasional exchange between individual teachers but also as a relational characteristic of school culture. Teachers' answers indicated that shared values provided a framework for coordinating activities, supporting student initiatives, and involving families in school life. This interpretation is consistent with qualitative evidence showing that school culture, shared responsibility, trust, and participatory practices shape how teacher collaboration is organised and experienced (Arar et al., 2026). In the study, these collaborative conditions were also connected with teachers' preparedness to respond to cultural diversity and support civic participation.

At the deep level, results of teachers' interview analyses highlighted beliefs concerning diversity as a resource, the capacity of every student to contribute, the importance of shared values, and the role of education in fostering dialogue and civic responsibility. These findings support a multidimensional understanding of intercultural competence in which attitudes and internal orientations interact with knowledge, skills, and observable behaviour (Deardorff, 2006). They also correspond with evidence that teachers' citizenship beliefs are reflected in the content they prioritise and in the professional roles they adopt in citizenship education (De Schaepmeester et al., 2022). Nevertheless, it is important to note that teachers' reported beliefs should not be equated with measurable student outcomes. For instance, Schotte et al. (2022) found no consistent relationship between teachers' cultural beliefs and the examined indicators of students' school adaptation. Consequently, the present findings should be interpreted as evidence

of how teachers understand and describe their practices, rather than as evidence of a causal effect on students.

Across the three analytical levels, pedagogical collaboration appeared to connect individual intercultural orientations with collective school practices. Analyses demonstrate that teachers' experiences of cooperation with colleagues, students, families, student councils, and members of the wider community are indicative of the prevailing conditions in the field. The establishment of such cooperative relationships has yielded opportunities for the coordination of activities, the reflection on educational practices, and the maintenance of participation initiatives over time. Consequently, pedagogical collaboration can be conceptualised as both an observable professional practice and a school-level condition through which intercultural values are translated into collective action. The findings suggest that teacher preparedness for multicultural education is not exclusively an individual characteristic but also reflects the collaborative capacity of the school community.

These interpretations must be considered in relation to the study design. The participants represented 14 teachers from seven schools selected based on their ICCS 2022 results, including civic knowledge and participation indicators. The schools selected the teachers who participated, and the qualitative study included neither student interviews nor classroom observations. Consequently, the findings identify patterns in a purposively selected group of schools and cannot be interpreted as representative of all teachers or schools in Latvia. Future research could compare schools with different contextual characteristics, include students' perspectives and classroom observations, and examine more directly how teachers' core beliefs are related to their collaborative practices.

Conclusions

In order to provide a direct response to the research question, the findings indicate that teachers' preparedness for multicultural education and their support for student civic participation is manifested through the interaction of intercultural competence and pedagogical collaboration. The concept of intercultural competence manifested not only in observable teaching and participation practices but also in teachers' values and fundamental beliefs concerning diversity, inclusion, dialogue, and student agency. Pedagogical collaboration provided the collective context in which these orientations could be expressed through coordinated practices involving colleagues, students, families, and the wider school community. Preparedness was therefore represented in the interview data as both an individual professional competence and a collective capacity of the school.

Overall, the results indicate that teachers' intercultural competence extends beyond visible actions and is deeply rooted in their beliefs and value orientations. This highlights the importance of addressing not only pedagogical practices but also the underlying assumptions that shape inclusive and intercultural education, as well as teachers'

preparedness for multicultural teaching, which is closely linked to both their intercultural competence and their attitudes towards civic participation within the school environment. Nevertheless, the qualitative design does not establish that these factors cause higher levels of student civic participation. Future studies could examine how core beliefs influence teachers' collaboration practices and their competence in teaching within multicultural classrooms. Such studies could also explore how teachers support democratic values within society and encourage students' civic participation and involvement in community activities, how teachers' core beliefs, intercultural competence, and collaborative practices are related across different school contexts and how these relationships are perceived by students.

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CLASSROOM MANAGEMENT PRACTICES OF NOVICE TEACHERS AND STUDENT BEHAVIOUR: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Contemporary education emphasises student-centred learning, respectful relationships, and dialogue-based interaction in the classroom. However, novice teachers often struggle to manage complex classroom situations and may rely on reactive or corrective strategies when responding to student behaviour. This creates a gap between the principles emphasised in teacher education and practices implemented by novice teachers. The aim of this systematic literature review was to examine how novice teachers' classroom management practices relate to student behaviour and to identify the factors that influence these practices.

The review was conducted using the Scopus database. Publications were selected according to predefined inclusion and exclusion criteria. The final sample comprised 53 publications from 2015 to 2025. The extracted data were analysed using thematic analysis. The analysis revealed three main themes: novice teachers' classroom management practices, the factors influencing these practices, and students' behavioural responses.

The results show that novice teachers' classroom management practices and student behaviour are closely interconnected. Reactive and corrective strategies may curb disruptive behaviour in the short term, but they are less likely to foster sustained student self-regulation. Preventive and supportive strategies are more closely linked to student engagement, behavioural stability, and the development of responsibility for one's own actions. The results also show that novice teachers' practices are influenced by professional preparation, practical experience, self-efficacy, emotional regulation, professional vision, school support, and classroom context.

The review concludes that the gap between theory and practice can be reduced through more practice-oriented teacher education, structured feedback, mentoring, video-based learning, simulations, and early-career support. The findings are significant for improving novice teacher preparation and supporting more sustainable classroom management practices.

Keywords: *systematic literature review, novice teachers, classroom management, student behaviour, differences between novice and experienced teachers*

Introduction

Novice teachers are understood as newly qualified or early-career teachers in the first years of professional practice. In the reviewed literature, this group is defined in slightly different ways. Karasova and Nehyba (2025) and Farrell (2012) refer to novice teachers as those within their first three years of teaching; Hång et al. (2022) describe them as licensed teachers with no more than five years of experience; Aus et al. (2017) focus on teachers who had recently completed their pre-service education and were mostly in their first year of full-time teaching, while Sezer (2017) uses the criterion of two years or less. Previous research shows that novice teachers often feel inadequately prepared to manage complex and changing classroom environments. Novice teachers' classroom management difficulties are also closely linked to their sense of professional effectiveness, as classroom management is widely regarded as a key condition for effective teaching (Lacy, 2024). They frequently adopt reactive approaches to school rule violations, focusing on immediate incidents rather than the broader conditions that shape classroom behaviour (Shank, 2023; Woodcock, 2024; Coen et al., 2024). Pierson (2023) similarly notes that, although novice teachers receive professional preparation, many still feel unprepared for real classroom situations. This can lead to the suggestion that practical experience, reflection, and structured feedback may be needed to help them connect theoretical knowledge with everyday classroom management practice. The transition from university to everyday classroom practice has also been described in previous literature through the concept of "reality shock", which refers to the cognitive and emotional challenges beginning teachers may experience when entering complex classroom settings (Caspersen & Raaen, 2014; Dicke et al., 2015).

Evidence from the US also shows that teachers and school leaders identify gaps in behaviour management training, while many educators report limited effective preparation and a lack of dedicated classroom management courses with practical learning (Perera & Diliberti, 2023; Whalen, 2025).

Classroom management knowledge is an important part of teachers' professional competencies and is complex, linked to student behaviour, teachers' professional well-being, work effectiveness, and long-term sustainability in the profession. Psychologically oriented support, including emotional skills, behavioural stress management, and supportive practices, may strengthen teachers' resilience and help them respond more effectively to student behavioural challenges in the classrooms (Cervellione et al., 2025). Emotional regulation and teacher self-efficacy are also important in this context. Wang et al. (2025) found that effective emotional regulation improves teachers' well-being and job satisfaction. Slater and Main (2020) found that novice teachers' classroom management self-efficacy affects their readiness to address students' behavioural challenges. Authors have developed the Classroom Management Self-Efficacy Instrument (CMSEI) to assess novice teachers' confidence in maintaining order and managing the learning process. Their results show that teachers with higher self-efficacy experience less stress and are better able to respond appropriately to challenging student behaviour.

In Latvia, several studies have examined novice teachers' working conditions, emotional well-being, and professional needs. Notably, the Organisation for Economic Co-operation and Development (OECD) Teaching and Learning International Survey (TALIS) in 2024 included 216 Latvian schools and more than 4,200 teachers, including novice teachers, examining school resources, teaching methods, and teachers' professional development as aspects of teachers' professional work (Ministry of Education and Science [MoES], 2024). While such reports provide valuable data on teachers' professional development and working conditions, they do not examine the specific classroom management methods used by novice teachers or how these methods are connected with student behaviour. In Latvia, a theoretical and practical framework on classroom management for novice teachers has been developed (Nīmante, 2007; Daniela, 2009; Daniela, 2008; Nīmante & Daniela, 2014a, 2014b; Martinsone et al., 2013; Žydzīūnaitē & Martinsone, 2024). In Latvia, research has addressed particular novice teachers' early professional development, mentoring, integration into the school setting, and preparation for pedagogical work (Davidova & Zariņa, 2022; Margeviča-Grinberga & Šūmane, 2024; Paula & Grīnfelde, 2018; Zhukova et al., 2018). These studies show that novice teachers face challenges in practical classroom work, including classroom management, discipline, teacher authority, student engagement, and adaptation to real classroom situations. However, they mainly examine teachers' entry into the profession, early professional development, mentoring, integration into the school setting, preparation for pedagogical work, or work-based learning, rather than the relationship between novice teachers' classroom management practices and student behaviour. A further check in Web of Science using the keyword combination "novice teachers" AND "classroom management" AND "student behaviour" AND "Latvia" did not identify studies with this specific thematic focus. Although previous international reviews have addressed related issues, such as novice teachers' professional learning and behaviour management preparation, the specific relationship between novice teachers' classroom management methods, the factors shaping these practices, and student behaviour still requires synthesis (Hirsch et al., 2021; Paramita et al., 2020).

Therefore, this systematic literature review synthesises empirical evidence on novice teachers' classroom management practices, the factors that influence these practices, and their relationship with student behaviour. By analysing these relationships, this review seeks to identify patterns in the literature on novice teachers' use of reactive and corrective practices, rather than preventive and relationship-based approaches. Thus, the central research problem is novice teachers' readiness to use effective classroom management methods that can address student behavioural challenges while maintaining respectful classroom relationships.

The research aims to investigate how the methods and techniques used in novice teachers' classroom management practices relate to student behaviour in the classroom and to examine the interrelated factors that influence this relationship.

The study addresses the following research questions: 1. What is the relationship between novice teachers' classroom management practices and student behaviour in the classroom? 2. What factors influence novice teachers' classroom management practices?

Methodology

To address the research questions and examine the relationship between novice teachers' classroom management practices and student behaviour, a systematic literature review (SLR) was conducted. The review's methodology and reporting followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines (Page et al., 2021) to support transparency, reproducibility, and methodological rigour. No review protocol was registered before conducting the review. The review process comprised four sequential phases: identification, screening, eligibility assessment, and inclusion. After the selection process, the included publications were analysed to synthesise what is currently known about novice teachers' classroom management and its relationship with student behaviour.

Information sources and search strategy

The systematic literature search was conducted in the Scopus database (Scopus.com). Scopus was selected because it is one of the most extensive and internationally recognised databases of peer-reviewed scientific literature. In addition, Scopus indexes a large number of international journals and provides broader coverage than several other specialised databases, especially in the fields of social sciences and educational research, such as Web of Science and ERIH PLUS. Furthermore, using a single database allows for a consistent search strategy, reduces the amount of duplicate processing, and increases the reproducibility of the study. These features supported a structured and transparent selection process. The Scopus search yielded a sufficiently large and thematically relevant corpus of studies, including publications from different national contexts. Therefore, the review was designed as a Scopus-based systematic literature review, reflecting the evidence available in this database rather than all possible publications indexed across education-specific databases. The search strategy was carried out in two stages. First, the field's overall scope was mapped by searching for four primary keywords (novice teachers, classroom management, student behaviour, expert novice teachers' differences) separately. The individual keyword searches produced the following results: "novice teachers" ($n = 5,714$), "classroom management" ($n = 23,696$), "student behaviour" ($n = 222,842$), and "expert novice teachers' differences" ($n = 198$). The phrase "expert novice teachers' differences" is reported as the exact search term used in Scopus, whereas the article discusses the concept as differences between novice and more experienced teachers. This stage was used to estimate the scope of the literature available for each keyword. Second, targeted keyword combinations (see Table 1) were created using the AND operator. These combinations were used to identify publications that addressed the relationships among novice teachers, classroom management, student behaviour, and differences in novice and more experienced teachers' classroom management practices. The combined search produced 342 initial records, distributed across three distinct search strings as detailed in Table 1.

Table 1. Search Strings and Initial Document Yield in Scopus

Search string ID	Scopus search syntax	Initial records (n)
String 1	TITLE-ABS-KEY (“novice teachers” AND “classroom management” AND “student behaviour”)	43
String 2	TITLE-ABS-KEY (“novice teachers” AND “classroom management” AND “expert novice differences”)	15
String 3	TITLE-ABS-KEY (“novice teachers” AND “student behaviour”)	284
Total		342

The British spelling “student behaviour” was used in the reported search syntax. A subsequent check using the American spelling “student behavior” produced identical results in Scopus and did not change the final set of records. Therefore, the British spelling was retained.

Inclusion and exclusion criteria

To ensure the relevance and currency of the selected literature, predefined inclusion and exclusion criteria were applied. Publications were included if they were published between 2015 and 2025, written in English, and published as articles, conference papers, or reviews. These filters in the Scopus database helped to select current publications. They also had to address novice teachers, classroom management, student behaviour, and differences in classroom management practices between novice and more experienced teachers, and be relevant to the research aim. The full text of each publication had to be accessible, and it could not be overly specific, for example, by focusing on a particular case of special education. If the publications did not meet the specified criteria, they were not included in further analysis.

Screening and selection procedure

The study selection followed a multi-stage screening procedure. A total of 342 records were initially identified in Scopus. Before formal screening, 17 duplicate records were removed. These duplicates arose from overlapping chronologies and themes among the three independent keyword search strings in the database. Automated database filters excluded an additional 172 records based on publication year, language, and document type. This left 153 records for the formal screening stage. The first author conducted the title and abstract screening and the full-text eligibility assessment, and made the initial inclusion decisions. Ambiguous cases and methodological decisions were discussed with the second author, and final decisions were reached by consensus. The second author also reviewed and edited the selection rationale and methodological reporting to enhance the clarity and transparency of the review process.

The screening and eligibility assessment were then conducted in two phases:

Title and Abstract Screening: The titles and abstracts of the 153 records were reviewed. During this stage, 69 records were excluded because they did not demonstrate a clear relationship with the research focus.

Full-Text Eligibility Assessment: Following the title and abstract screening, 84 reports were sought for full-text retrieval. Four reports were excluded because full-text access was unavailable. The remaining 80 full-text reports were assessed for eligibility. Of these, 27 were excluded because they did not meet the specific research focus or did not evaluate the relationship between novice teachers' classroom management practices and student behaviour.

Following this process, 53 publications met all eligibility criteria and were included in the systematic literature review. The final sample comprised 18 publications focusing on novice teachers' classroom management and student behaviour, 3 publications comparing novice and more experienced teachers' classroom management practices, and 32 publications focusing on novice teachers and student behaviour. The selection process is illustrated in the PRISMA flow diagram (see Figure 1).

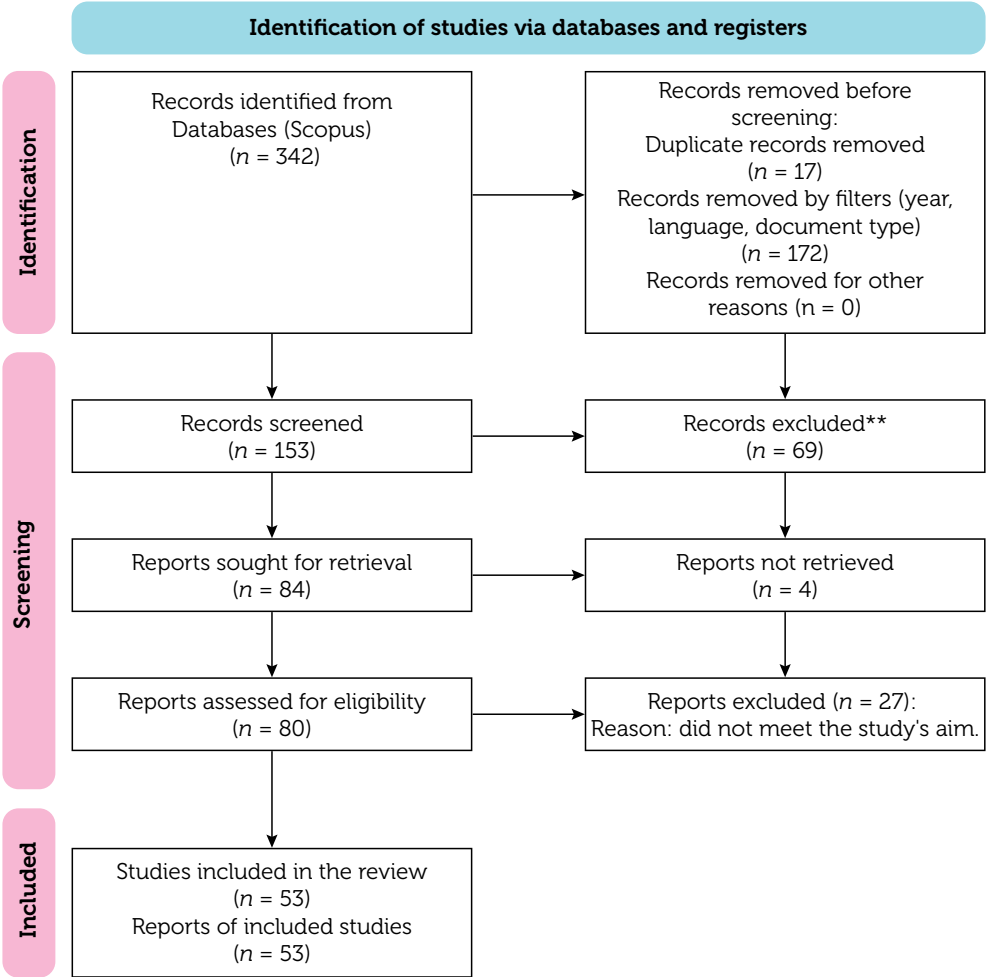


Figure 1. PRISMA 2020 flow diagram for new systematic reviews, which included searches of databases and registers only

Data extraction

A standardised data extraction table (see Table 2) was developed to organise information from the 53 publications included in the review. The first author conducted data extraction and initial coding using this table. The second author reviewed the extracted categories, thematic structure, and interpretation of the findings, and edited the manuscript to improve the clarity and consistency of the analytical reporting. Revisions were made through discussion. This table promoted consistency, transparency, and traceability throughout the process. Each publication was given a unique document identification code. The data extracted from each source included: bibliographic and identification data: author(s), publication year, article title, keywords, and DOI; contextual and geographical data: country of the study, research duration, and the theoretical definitions used by the authors; methodological data: research type, design, targeted research units, sample details, and educational setting; content and analytical variables: research goal, problem identified, classroom management methods, and main findings.

These categories allowed systematic comparison across the publications and helped identify common patterns in the literature.

Data analysis and synthesis

The extracted data were analysed using thematic analysis (Braun & Clarke, 2021) of the information compiled in the data extraction table from the 53 included publications. The aim was to identify the main themes and relationships relevant to the research question.

The analysis focused on three themes: how novice teachers' classroom management practices were described in the selected studies, what factors were reported to influence these practices, and how these practices were related to student behaviour in the classroom. These factors included professional preparation, self-efficacy, emotional regulation, and teaching experience.

The findings from the selected studies were synthesised to provide an overall understanding of the relationship between novice teachers' classroom management practices, the factors that influence them, and student behaviour. This synthesis enabled the reviewed evidence to be considered not as separate findings but as interconnected elements within the classroom context. Together, these findings summarise what is already known about novice teachers' classroom management.

Results

General and methodological description of the included research

A comprehensive mapping was carried out of all included publications ($n = 53$) covering general, chronological, geographical, and methodological parameters. This characterisation provides a structural overview of the selected publications, including the article number, authors, institutions, year, study type, design, and research methods that currently dominate the scientific literature on novice teachers' classroom management. See Table 2.

Table 2. Overview of the General and Methodological Characteristics of the Included Literature

Article	Authors	Country	Year	Type	Design	Research methods
1.	Karasova & Nehyba	Czech Republic	2025	Mixed	Observational study	Non-participant observation, video recording, QCA analysis
2.	Lutz et al.	Germany	2024	Quant.	Instrument validation study	Online survey (InClass), CFA, SEM modelling
3.	Franco et al.	Belgium	2023	Qualit.	Model development study	Thematic analysis, expert panel triangulation
4.	Hằng et al.	Vietnam	2022	Mixed	Descriptive study	Surveys, in-depth interviews
5.	Estaji & Fatalaki	Iran	2022	Qualit.	Phenomenological study	Perception analysis, interviews
6.	Criss	USA	2025	Quant.	Single case experimental	Behaviour recording, BST training, feedback
7.	Criss & Carreon	USA	2025	Quant.	Single case experimental	360-degree video, IVVR, direct observation, email feedback
8.	Shank	USA	2023	Qualit.	Qualitative descriptive study	Systematic text condensation, interviews
9.	Hirsch et al.	USA	2021	Mixed	Systematic review	Systematic search, coding, quality indicator analysis
10.	Tanase	USA	2023	Qualit.	Case study	Semi-structured interviews, thematic coding, triangulation
11.	Cohen et al.	USA	2020	Quant.	Randomised controlled trial Experimental (RCT)	Simulations, observation, regression analysis, surveys
12.	Mikulec & Hamann	USA	2020	Qualit.	Action research	Microteaching, reflective reports, qualitative coding
13.	Tolan et al.	USA	2020	Quant.	Randomised controlled trial Experimental (RCT)	ASSIST observation, multilevel modelling
14.	Mouw et al.	Netherlands	2020	Qualit.	Grounded theory study	Interviews, thematic analysis
15.	Wolff et al.	Netherlands	2017	Mixed	Comparative experimental study	Eye-tracking, think-aloud, ANOVA
16.	Sezer	Turkey	2017	Qualit.	Case study	Structured interviews, descriptive analysis

Article	Authors	Country	Year	Type	Design	Research methods
17.	Aus et al.	Estonia	2017	Quant.	Longitudinal study	Surveys, statistical analysis (SPSS, Mplus)
18.	Cortina et al.	USA	2015	Mixed	Comparative validation study	Mobile eye-tracking (MET), CLASS system, regression
19.	Grub et al.	Germany	2022	Quant.	Quasi-experimental study	Eye-tracking (Tobii), questionnaires, ANOVA, G*Power
20.	Wolff et al.	Iceland	2021	Qualit.	Conceptual review	Literature analysis, theoretical model synthesis
21.	König & Kramer	Germany	2015	Quant.	Comparative study	Knowledge tests, student surveys, multilevel analysis
22.	Hou & Alibakhshi	Iran	2025	Mixed	Descriptive study	Chi-square tests, pedagogical knowledge analysis
23.	Song et al.	China	2025	Mixed	Video-based interaction analysis study	Video analysis, epistemic network analysis (ENA), coding
24.	Whewell et al.	UK	2025	Qualit.	Ethnographic study	Video collaboration, thematic analysis of transcriptions
25.	Weinberg et al.	USA	2025	Qualit.	Document analysis study	MAXQDA plan analysis, thematic coding
26.	Zach & Sindiani	Israel	2025	Quant.	Instrument development and validation study	Factor analysis (PCA), ANOVA, survey
27.	Lin	Taiwan	2025	Qualit.	Collaborative research	Interviews, video observation, open coding
28.	Karim et al.	Bangladesh	2024	Qualit.	Phenomenological study	Open-ended questions, Facebook group data analysis
29.	McGuire et al.	USA	2024	Quant.	Randomised controlled trial	Online training, BASC-3 tests, ANOVA
30.	Kosel et al.	Germany	2024	Mixed	Comparative experimental study	Video observation, ANOVA, ENA analysis
31.	Morady Moghaddam & Tirnaz	Iran	2024	Qualit.	Descriptive study	Stimulated recall, video recording, transcriptions
32.	Miller et al.	USA	2024	Mixed	Case study	Mobile eye-tracking, think-aloud, transcriptions
33.	Heinsen	USA	2024	Mixed	Autoethnography study	Eye-tracking (Pupil Labs), video analysis, statistics

Article	Authors	Country	Year	Type	Design	Research methods
34.	Lindström & Roberts	USA	2023	Quant.	Observational study	Behaviour recording, direct observation
35.	Canterbury	USA	2023	Quant.	Comparative observational study	Video observation, summative evaluations (TEEF)
36.	Courtney et al.	Kazakhstan	2023	Quant.	Secondary data analysis	TALIS data, SEM, CFA, multilevel analysis
37.	Huang et al.	Hong Kong	2022	Quant.	Correlational study	SEM, mediation analysis, surveys. Model testing
38.	Çukur	Turkey	2022	Qualit.	Case study	Reflective journals, focus groups, NVivo
39.	Gürel et al.	Turkey	2022	Qualit.	Multiple case study	Interviews, observation, document analysis
40.	Ghasemi	Iran	2022	Qualit.	Phenomenological study	In-depth interviews, phenomenological analysis
41.	Silva et al.	Portugal	2021	Qualit.	Action research	Thematic analysis, interviews, triangulation
42.	Yang et al.	Ger./China	2021	Quant.	Comparative measurement study	Video tests, Rasch model, Cronbach's alpha
43.	Nückles	Germany	2021	Theoret.	Theoretical paper	Literature analysis, research review
44.	Kosel et al.	Germany	2021	Quant.	Comparative experimental study	Eye-tracking (SMI), sequence analysis, and entropy
45.	Goldberg et al.	Germany	2021	Quant.	Observational study	Mobile eye-tracking, multinomial regression
46.	Sun et al.	China	2020	Quant.	Experimental study	fNIRS hyperscanning, behavioural data analysis
47.	Sela & Harel	Israel	2019	Qualit.	Descriptive study	Independent thematic coding, triangulation
48.	Gage et al.	USA	2018	Quant.	Multiple-base-line design	Visual analysis, ES calculations, SCOA application
49.	Hunter et al.	USA	2017	Quant.	Case study	Behaviour recording, case study
50.	Dawson & Lignugaris/Kraft	USA	2017	Quant.	Single-case study	TeachLivE simulations, behaviour recording
51.	Goh et al.	Malaysia	2017	Qualit.	Phenomenographic study	Phenomenographic analysis
52.	Amara et al.	Tunisia	2015	Quant.	Experimental study	Video observation, Chi-square, PCA analysis
53.	Barmaki & Hughes	USA	2015	Mixed	Case study	Video material analysis, expert annotations

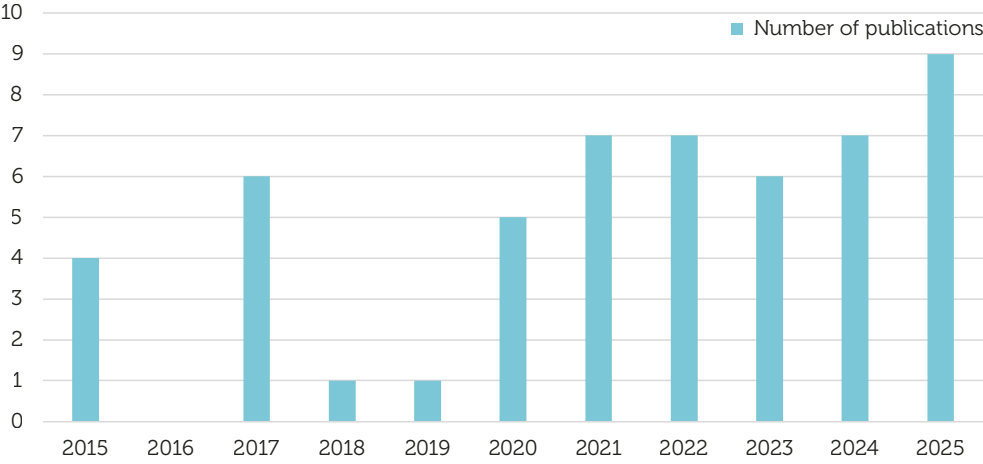


Figure 2. Distribution of Included Publications by Year

Table 3. Types of Studies Included in the Systematic Literature Review

Type of publication	Number of publications	Percentage
Quantitative	22	41.5%
Qualitative	19	35.8%
Mixed methods	11	20.8%
Theoretical	1	1.9%
Total	53	100%

As shown in Figure 2, the included publications cover the period from 2015 to 2025, with a noticeable increase in publications in the most recent years, indicating sustained and growing international interest in novice teachers’ classroom management practices.

The geographical distribution of the research suggests international interest in novice teachers’ classroom management, with 21 countries represented. The publications are predominantly from the USA and Germany, which together account for almost half of the included studies. Overall, the distribution is most prominent in research from North America and Europe, complemented by individual studies from Asia and the Middle East.

As shown in Table 3, quantitative studies comprised the largest group of included publications, followed by qualitative and mixed-methods studies. Only one publication was theoretical.

The range of research designs includes studies that examine associations, intervention effects, and classroom processes. Experimental, case studies, and phenomenological approaches were most frequently used. The methodological spectrum shows a growing use of technology-supported approaches, including eye-tracking, immersive virtual reality, TeachLivE™ simulations, and classroom video analysis. Eye-tracking studies show how teachers’ gaze behaviour can be used to examine attention allocation and the development of professional vision in teaching situations (Heinsen, 2024; Nückles, 2021).

Authentic or simulated classroom videos were often combined with analytical techniques such as CAQDAS tools, including NVivo and MAXQDA, while quantitative studies frequently used structural equation modelling, confirmatory factor analysis, and latent profile analysis. Overall, the included studies show methodological diversity, with a growing use of video-based, technology-supported, and statistically advanced approaches.

Novice teachers’ classroom management practices

The analysed publications reveal three main categories of classroom management strategies used by novice teachers: preventive, supportive, and corrective. Table 4 summarises these categories, the specific methods within each category, and examples of sources that describe them.

Table 4. Classroom Management Strategy Categories Identified in the Reviewed Literature

Strategy category	Main methods identified in the reviewed literature	Examples of sources
Preventive strategies	Clear rules and routines; seating arrangements; organisation of the physical environment and learning materials; time management; timers and visual schedules; meaningful task design; differentiated tasks; lesson objectives; explanations and justifications for rules; welcoming students at the door; visual and linguistic aids; modelling expected behaviour; active supervision; early warning signal detection; eye contact; gestures; proximity	Hằng et al., 2022; Hunter et al., 2017; Karasova & Nehyba, 2025; Lindström & Roberts, 2023; Lutz et al., 2024; McGuire et al., 2024; Shank, 2023; Tanase, 2023; Wolff et al., 2021
Supportive strategies	Positive teacher-student relationships; emotional accessibility; empathy and care; behaviour-specific praise; withitness; gaze and proximity control; subtle cues; eye contact; gestures; smiles; facial expressions; token system; one-to-one conversations; personalised encouragement; humour; positive tone of voice; multimodal feedback; teacher sensitivity	Aus et al., 2017; Barmaki & Hughes, 2015; Criss, 2025; Estaji & Fatalaki, 2022; Gage et al., 2018; Hằng et al., 2022; Karasova & Nehyba, 2025; Lindström & Roberts, 2023; Lutz et al., 2024; Miller et al., 2024; Song et al., 2025; Tanase, 2023; Tolan et al., 2020; Whewell et al., 2025; Wolff et al., 2017
Corrective strategies	Vocal commands; auditory signals; calling students by name; non-verbal responses; facial expressions; deliberate pauses; unexpected interruptions; withdrawal of positive reinforcement; confiscation of distracting objects; formal sanctions; referral to administration; reporting to disciplinary committee; removal from classroom; additional homework; temporary suspension; verbal warnings; response cost; planned ignoring; praise around; post-incident individual discussions; reactive seat changes; corrective redirection; task modification; de-escalation and crisis protocols; post-incident reflection and consultation	Cohen et al., 2020; Çukur, 2022; Dawson & Lignugaris/Kraft, 2017; Franco et al., 2023; Goh et al., 2017; Hằng et al., 2022; Karasova & Nehyba, 2025; König & Kramer, 2015; Sezer, 2017; Tanase, 2023; Wolff et al., 2017

Preventive classroom management strategies

Preventive strategies are described as practices aimed at establishing a structured learning environment and reducing the likelihood of behavioural issues. One of the main preventive actions is establishing clear rules and routines, which involves systematically defining, outlining, and teaching behavioural expectations at the beginning of the school year (Hằng et al., 2022; McGuire et al., 2024; Tanase, 2023; Wolff et al., 2021). The organisation of the physical environment and materials plays a crucial role, which teachers implement through strategic seating arrangements for visibility and zone setup, thereby ensuring immediate access to learning resources and minimising downtime (Hằng et al., 2022; Hunter et al., 2017; Tanase, 2023; Wolff et al., 2021). Effective preventive planning also includes time management (explicit Timing), using timers to control activity durations and visual schedules, which promote student self-regulation and facilitate transitions between lesson segments (Hunter et al., 2017; Lindström & Roberts, 2023).

The analysed studies also identified other significant preventive strategies employed by novice teachers. These include meaningful task design that balances student responsibility, cognitive challenge, and relevance to their cultural and personal experiences, thereby reducing the likelihood of off-task behaviour (Karasova & Nehyba, 2025). This approach involves differentiating tasks and employing student-centred methods (Hằng et al., 2022). Silva et al. (2021) examined how a novice PE teacher implemented cooperative learning and shared responsibility for the teaching-learning process with students. Their findings show that implementing cooperative learning effectively required time, and that developing cooperative relationships enabled students to assume greater responsibility in lessons. Additionally, clear articulation of lesson objectives and expected outcomes at the start of the lesson is implemented, providing students with an understanding of the purpose and goals of their work, along with meaningful explanations and justifications (rationale) for rules, making them personally relevant to students (Hằng et al., 2022; Karasova & Nehyba, 2025).

A key component of preventive strategies is the welcoming of students at the door, which helps establish immediate contact and a positive atmosphere even before the lesson begins (Karasova & Nehyba, 2025). All students are supported through visual and linguistic aids such as pictograms, symbols, and posters (Lutz et al., 2024; Lindström & Roberts, 2023). Teachers also model targeted behaviour by providing cues about desired actions just before potentially challenging situations (Hunter et al., 2017; Lindström & Roberts, 2023).

Within preventive measures, active supervision plays an important role, which can be systematised by dividing the classroom into quadrants and purposefully reviewing the space to detect potential rule violations early (Hunter et al., 2017). This supervision is closely linked to early warning signal detection, where teachers use their professional vision to identify nuanced contextual cues before escalation (Franco et al., 2023; Grub et al., 2022; Hằng et al., 2022). Finally, novice teachers incorporate non-verbal strategies, including eye contact, gestures, and strategic movement within the classroom (proximity), to maintain student attention without interrupting the verbal teaching

process (Karasova & Nehyba, 2025; Shank, 2023). In a higher education EMI context, Lin (2025) also shows that novice lecturers' classroom interaction can be supported through verbal and non-verbal resources, including teacher-student discourse, turn-taking, eye contact, and spatial positioning. The school-based studies cited above suggest that these proactive strategies are associated with improved student self-regulation and lower stress levels within the classroom environment (Karasova & Nehyba, 2025; Lindström & Roberts, 2023).

Supporting classroom management strategies

Supporting strategies in the literature are characterised as an immediate support framework or scaffolding during lessons. They aim to help students maintain self-regulation and return to task completion without resorting to strict discipline or punishment. These approaches are based on maintaining positive relationships, emotional accessibility, empathy, and care, which foster a psychologically safe classroom climate (Aus et al., 2017; Estaji & Fatalaki, 2022; Tolan et al., 2020). Behaviour-specific praise (BSP) is recognised in the literature as a direct support tool, defined as targeted positive reinforcement delivered immediately after the desired student behaviour (Criss, 2025; Gage et al., 2018; Hirsch et al., 2021).

An essential element of supporting strategies is the teacher's situational awareness in the classroom (withitness). This involves continuous monitoring of the class through gaze and proximity control to discreetly direct students' attention and engagement in learning (Hàng et al., 2022; Karasova & Nehyba, 2025; Lindström & Roberts, 2023; Tolan et al., 2020). It is complemented by subtle cues such as eye contact, gestures, smiles, and facial expressions. These cues enable the teacher to show interest and keep students engaged in learning without resorting to verbal reprimands, thereby avoiding interruptions during the lesson (Barmaki & Hughes, 2015; Song et al., 2025). When necessary, a token system is also used to promote student progress and self-regulation (Lindström & Roberts, 2023). The support process includes one-to-one conversations and personalised encouragement, which help preserve the student's dignity, prevent public reprimands or shaming in front of the whole class, and foster positive teacher-student relationships following challenging interactions (Tanase, 2023; Wolff et al., 2017).

Humour and a positive tone of voice may help reduce tension during lessons when used appropriately and respectfully (Whewell et al., 2025). A positive classroom climate is further supported through multimodal feedback, which combines verbal encouragement with supportive body language (Song et al., 2025). Teacher sensitivity, understood as the ability to respond consistently and empathetically to students' signals and emotional needs, is also identified as an important element of supportive classroom management (Lutz et al., 2024; Miller et al., 2024).

Corrective classroom management strategies

Corrective classroom management strategies are used after disruptive behaviour has occurred or while it is taking place. Their purpose is to intervene directly in student

behaviour, stop or reduce the disruption, and re-establish expected classroom conduct (Tanase, 2023; Wolff et al., 2017). These strategies include direct verbal interventions, such as vocal commands, specific auditory signals, and calling students by name to interrupt side conversations or redirect inappropriate behaviour (Karasova & Nehyba, 2025; König & Kramer, 2015).

At the micro-interaction level, teachers may also use corrective non-verbal signals, including facial expressions and deliberate pauses, to signal that behaviour is inappropriate and should change (Karasova & Nehyba, 2025; Franco et al., 2023). In some cases, teachers employ the element of surprise, such as sudden singing, to interrupt escalating classroom disorder (Franco et al., 2023). Other direct corrective actions include withdrawing positive reinforcement, most often by confiscating mobile phones or other distracting objects during the lesson (Karasova & Nehyba, 2025).

In more serious cases, teachers use formal sanctions, including referral to school administration, reporting to the disciplinary committee, removal from the classroom, additional homework, or temporary suspension (Cohen et al., 2020; Sezer, 2017; Tanase, 2023). Before these measures, teachers issue verbal warnings and explain the consequences if the misconduct continues (Karasova & Nehyba, 2025; Sezer, 2017). A specific behaviour modification technique in the literature is response cost, in which previously earned points or visual tokens are revoked for inappropriate behaviour (Tanase, 2023).

In cases of minor infractions, teachers may ignore low-level disruptive behaviour to avoid interrupting the lesson (Sezer, 2017). This method is often combined with the "praise around" strategy in studies, in which the teacher ignores the disruptive behaviour but emphasises and rewards the desired behaviour of the surrounding students, thereby indirectly and non-verbally correcting disruptive behaviour (Dawson & Lignugaris/Kraft, 2017; Hång et al., 2022).

Post-incident individual discussions are described as longer-term corrective actions, which involve a private dialogue between the teacher and the student after the lesson to understand the causes of the misconduct, establish new behavioural goals, and select appropriate activities to improve mutual relations (Çukur, 2022; Sezer, 2017; Tanase, 2023). Other pedagogical corrections include reactive seat changes immediately after the incident (Goh et al., 2017; Tanase, 2023) and continuous corrective redirection, which points out the erroneous behaviour and clearly defines the necessary action (Karasova & Nehyba, 2025). The literature also describes modifications to the learning task during the lesson, in which the teacher changes the work format or cognitive difficulty when disruptions are linked to students' difficulty coping with the task independently (Karasova & Nehyba, 2025).

In the reviewed literature, the management of serious incidents and physical fights is described as involving de-escalation and emergency crisis protocols, during which external authority support is sought from school management, support staff, or parents (Franco et al., 2023; Tanase, 2023). In such crises, the literature emphasises the importance of maintaining neutral facial expressions and a neutral tone of voice, respecting the student's personal space, avoiding physical contact, and articulating clear

consequences in line with previously agreed-upon classroom rules (Karasova & Nehyba, 2025). Post-incident reflection and consultation with colleagues are also reported as forms of professional and emotional support.

Factors influencing novice teachers' classroom management practices

The reviewed literature suggests that novice teachers' classroom management is influenced by internal resources, professional readiness, and external support. Therefore, classroom management is not only a collection of techniques but also a process in which teachers integrate theoretical knowledge with practical action in dynamic classroom settings.

Professional preparation and transition to school reality

Novice teachers' classroom management practices are shaped by the extent to which their initial professional preparation enables them to translate theoretical knowledge into practical classroom action. Several studies indicate that novice teachers often feel insufficiently prepared for practical classroom management challenges, as university programmes tend to prioritise subject content and general pedagogical theory over targeted behaviour management skills (Hằng et al., 2022; Shank, 2023). This mismatch may contribute to difficulties in transferring theoretical knowledge into classroom practice and may increase novice teachers' reliance on reactive classroom management responses.

A lack of practical experience is also related to how novice teachers respond to behavioural problems. They more often address problems only after they occur, that is, reactively, and rely on direct instructions, commands, or punishments because they do not yet have sufficient practical skills and experience to anticipate and prevent unwanted behaviour in advance (Karasova & Nehyba, 2025; Wolff et al., 2021).

Self-efficacy, emotional regulation, and teachers' personal resources

A second important group of factors consists of teachers' personal resources: self-efficacy, emotional regulation, professional motivation, and sensitivity to students' needs. Teacher self-efficacy refers to teachers' belief in their ability to influence student behaviour and support learning. Studies indicate that novice teachers' self-efficacy may decline after their first real encounters with challenging student behaviour (McGuire et al., 2024). Low self-efficacy is closely associated with increased stress, anxiety, and early burnout in the profession (Sezer, 2017; Tolan et al., 2020).

Teachers' emotional regulation is also identified as relevant to classroom management practices. The reviewed studies also indicate that novice teachers' classroom management is related to their metacognitive and self-regulatory skills, particularly their ability to monitor their own actions and adjust instruction in response to classroom dynamics (Gürel et al., 2022; Huang et al., 2022). If teachers are unable to manage their emotional responses in stressful situations, they are more likely to react impulsively, which can negatively affect the classroom climate and reduce students' willingness to cooperate (Sezer, 2017).

In contrast, teachers who believe in students' capacity to develop are more likely to use supportive methods and provide emotional support (Aus et al., 2017).

This group of factors also includes teachers' motivation and sensitivity to students' individual needs. Teachers for whom teaching was their first career choice and who were guided by altruistic motives, such as a desire to contribute to society, more often report higher self-efficacy and overall job satisfaction (Courtney et al., 2023; Hou & Alibakhshi, 2025). Teacher sensitivity refers to the ability to recognise students' individual needs and build empathy-based relationships, thereby supporting a positive classroom climate and strengthening teachers' ability to respond accurately to classroom situations (Estaji & Fatalaki, 2022; Lutz et al., 2024).

Professional vision and distribution of attention in the classroom

Classroom management is influenced not only by teachers' attitudes or preparation but also by their ability to notice and interpret classroom events in real time. Professional vision refers to the ability to notice, diagnose, and pedagogically interpret classroom events. More experienced teachers can continuously monitor the whole classroom and identify early signs before a situation escalates. In the literature, this ability is described as withitness, or teachers' situational awareness in the classroom (Grub et al., 2022; Wolff et al., 2021). Recent studies further suggest that this difference is not limited to visual monitoring but also concerns diagnostic reasoning, as more experienced teachers are better able to connect observable classroom cues with students' learning-related characteristics (Kosel et al., 2024).

By contrast, novice teachers' perceptions are often more fragmented and focused on isolated events. They tend to concentrate on the most visible, striking, or loudest student behaviour, while other parts of the classroom may remain insufficiently monitored (Cortina et al., 2015; Goldberg et al., 2021). At the level of interpretation, novice teachers more often describe what they see, focusing on discipline and control issues. More experienced teachers, however, interpret classroom events in relation to students' cognitive engagement in the learning process at that moment (König & Kramer, 2015; Wolff et al., 2017; Yang et al., 2021).

External, school, and classroom context

Novice teachers' classroom management practices do not develop in isolation but within specific school and classroom contexts. High-quality mentoring programmes and cooperating-teacher support are described as important external conditions for novice teachers' professional development. Such support may help novice teachers move from control-oriented responses towards more preventive and supportive classroom management approaches (Sela & Harel, 2019; Tanase, 2023). Zach and Sindiani (2025) show that cooperating teachers' contributions to teacher preparation can be evaluated through dimensions such as modelling teacher behaviour, training and supervision, and involvement in lesson planning and implementation. This highlights the importance

of structured guidance and clearly defined support roles during practical teacher preparation.

The wider school environment also plays an important role. A safe school climate and accessible, supportive school leadership are associated with novice teachers' confidence in their abilities and their willingness to remain in the profession (Courtney et al., 2023). Similarly, purposeful cooperation with parents helps address student behavioural problems preventively (Courtney et al., 2023; Ghasemi, 2022).

The composition and microclimate of the specific classroom further shape the school context. Disruptive student behaviour is identified in the literature as a major cause of stress and attrition among novice teachers (Hàng et al., 2022; Çukur, 2022). In urban settings, classroom management may also be complicated by a cultural mismatch between the teacher and the student community (Tanase, 2023). Instructional design also emerges as an important situational factor. Differentiated tasks and student-centred lesson planning can reduce downtime and help prevent disruptive behaviour (Karasova & Nehyba, 2025). Weinberg et al. (2025), analysing 116 instructional unit plans, show that novice teachers often aim to design student-centred and action-oriented learning, although their plans may still remain teacher-directed and limit students' active participation. This suggests that lesson planning is closely connected with classroom management, as task structure can influence students' engagement, participation, and responsibility.

Synthesis of factors

Overall, novice teachers' classroom management practices are shaped by interrelated factors, including professional preparation, self-efficacy, emotional resilience, professional vision, the school support system, and the specific classroom context. A shift from reactive, discipline-oriented control towards preventive and supportive strategies is facilitated by professional self-efficacy, emotional self-regulation, practical experience, and targeted mentor support (Hirsch et al., 2021; Karasova & Nehyba, 2025; Lindström & Roberts, 2023).

Student behavioural responses to teachers' strategies

A relationship can be identified between novice teachers' classroom management approaches and students' behavioural responses. Preventive and supportive classroom management strategies are more often associated with higher student engagement, prosocial behaviour, and better academic outcomes. Positive teacher-student relationships and targeted autonomy support provide students with a psychological framework that helps them understand classroom rules and gradually develop responsibility for their own behaviour (Ghasemi, 2022).

The duration of the effects of different classroom management strategies also emerges as an important issue. Supportive methods, such as providing meaningful explanations and justifications for rules, may contribute to more sustained behavioural stabilisation, with effects lasting for more than 20 minutes (Karasova & Nehyba, 2025). In contrast, corrective and reactive directives, such as brief commands or warnings, often change

disruptive behaviour only temporarily, with effects lasting less than 5 minutes (Karasova & Nehyba, 2025). In the reviewed literature, proactive and supportive classroom management frameworks are associated with more sustained student self-regulation and more stable classroom functioning.

Overall, the results indicate that novice teachers' classroom management practices, the factors influencing these practices, and student behavioural responses are closely interconnected. Professional preparation, self-efficacy, emotional regulation, professional vision, and school support shape the strategies novice teachers use, which, in turn, are associated with distinct patterns of student engagement, self-regulation, and disruptive behaviour.

Discussion

This systematic literature review examined how novice teachers' classroom management practices relate to student behaviour and which factors influence these practices. The results show that this relationship is neither simple nor one-directional. Rather, novice teachers' classroom management practices are shaped by professional preparation, practical experience, teacher self-efficacy, emotional regulation, professional vision, school support, and classroom context. Therefore, classroom management in this review is interpreted not as a set of isolated techniques, but as a dynamic process in which teachers' actions and students' behavioural responses influence one another.

The findings support the problem identified in the introduction: a gap between student-centred educational principles and novice teachers' classroom management practices, in which corrective and reactive strategies often predominate (Shank, 2023). This gap should not be explained solely by novice teachers' individual difficulties. Rather, the results point to a broader issue in teacher preparation and early-career support. Studies show that teacher education programmes often emphasise subject content and general pedagogical models, while practical behaviour management skills remain underdeveloped (Hång et al., 2022; Karasova & Nehyba, 2025). Under such conditions, novice teachers may rely more on reactive strategies, such as verbal directives, warnings, or punishments, because proactive classroom management techniques are not yet sufficiently developed (Karasova & Nehyba, 2025; Wolff et al., 2021).

The results also indicate that preventive, supportive and corrective strategies differ in the durability of their effects. In the literature, reactive and corrective responses, such as brief directives and warnings, are described as techniques that can interrupt disruptive behaviour at a specific moment, although their effect is often short-lived (Karasova & Nehyba, 2025). By contrast, preventive and supportive strategies, such as clear routines, meaningful explanations, justification of rules, and behaviour-specific praise, are associated with more sustained stabilisation of student behaviour and self-regulation (Karasova & Nehyba, 2025; Lindström & Roberts, 2023). This difference suggests that excessive reliance on reactive and corrective methods may contribute to a repeated cycle of reactive action, in which lessons are regularly interrupted by brief

corrections. The specific time-related findings on the duration of strategy effects should be interpreted with caution, as they are based on Karasova and Nehyba's (2025) study rather than on a broader set of comparable quantitative studies.

Therefore, effective classroom management is not limited to stopping unwanted behaviour; it also involves creating a safe and predictable environment in which students understand expectations and gradually develop responsibility for their own actions. This interpretation aligns with Cook et al.'s (2018) relationship-based approach to classroom management, which is used here as contextual literature rather than as part of the review synthesis.

Self-efficacy and emotional regulation also warrant careful consideration. In the included studies, lower teacher self-efficacy is associated with stress, anxiety, and a higher risk of burnout, while higher stress may increase the likelihood of impulsive and controlling responses (Sezer, 2017; Tolan et al., 2020). This interpretation is also consistent with previous review literature on teachers' preparation for behaviour management (Paramita et al., 2020), which is used here as contextual literature rather than as part of the review synthesis. However, these factors should not be interpreted only as individual teacher characteristics. They are also shaped by the professional environment, including the availability of support, feedback, and opportunities to analyse complex classroom management situations.

Differences between novice and more experienced teachers are particularly evident in professional vision and situational awareness. More experienced teachers are described as being able to monitor the classroom more broadly, notice early signs of disruption, and respond before situations escalate; this ability is captured by the concept of *withitness* (Cortina et al., 2015; Grub et al., 2022; Wolff et al., 2021).

By contrast, novice teachers' perceptions are often more fragmented and focused on visible or loud incidents, while wider classroom dynamics may remain unnoticed (Goldberg et al., 2021; Wolff et al., 2017). This difference is important because it shows that classroom management among novice and more experienced teachers may differ not only in the techniques used but also in how teachers perceive, interpret, and anticipate the development of classroom situations. Therefore, classroom management development involves not only learning specific methods but also developing professional vision, attention distribution, and situational interpretation.

The results address the research question by demonstrating how novice teachers' classroom management practices relate to student behaviour. The literature analysed shows that this relationship is reciprocal and context-dependent. The strategies used by teachers are associated with student engagement, self-regulation, and behavioural stability. At the same time, students' behavioural responses may influence teachers' subsequent actions, emotional state, and confidence in their professional abilities. This interpretation highlights the need to consider not only individual classroom management methods but also the conditions under which these methods are selected and implemented.

These results have practical implications for teacher education programmes and early-career support, though they should be interpreted with caution. Analyses of video examples, microteaching, simulations, virtual reality tools, and eye-tracking may support

the development of professional vision and attentional skills by enabling novice teachers to practise classroom management decisions in structured, lower-risk environments (Criss & Carreon, 2025; Kosel et al., 2021; Mikulec & Hamann, 2020; Mouw et al., 2020). Reflective work on critical incidents may also support novice teachers' professional awareness by helping them analyse challenging classroom situations and reconsider their pedagogical responses (Karim et al., 2024). However, these tools should be viewed as support mechanisms rather than independent solutions. Their value depends on feedback, reflection, and opportunities to connect simulated or video-based learning with authentic classroom practice. It should also be recognised that not all teacher education programmes have equal opportunities to implement such technological solutions.

The literature indicates that mentor support, accessible school leadership, and a professionally safe school climate may help novice teachers move from control-oriented responses towards more preventive and supportive approaches (Courtney et al., 2023; Sela & Harel, 2019; Tanase, 2023). In this context, both the presence of support and its practical quality are important. The results point to the need for targeted support that gives novice teachers specific feedback on classroom management situations, student responses, and their own professional choices. Such feedback may be especially valuable when supported by visualisations that make classroom interactions easier to analyse.

Several methodological limitations should be considered. The literature search was conducted in the Scopus database. It should be noted that using only Scopus may limit the scope of the study, as the analysis does not include sources indexed only in other databases, such as Web of Science, ERIC and PubMed. The search was also limited to English, which means that some relevant national-level publications may not have been included in the analysis. Another methodological limitation is that a formal quality appraisal or risk-of-bias assessment of the included studies was not conducted. The main aim of this review was to thematically analyse how novice teachers' classroom management, student behaviour, and the factors influencing these processes are described in the literature. Because the included studies were methodologically diverse, they were analysed at the thematic level rather than compared using a single methodological quality appraisal scale. Therefore, the findings should be interpreted as thematic patterns identified in the reviewed literature rather than as conclusions weighted by the methodological quality or risk of bias of individual studies. Future reviews could use a similar systematic search and thematic analysis approach in other databases, such as Web of Science and ERIC, to examine whether the literature indexed in these databases reveals similar thematic patterns. The review covered publications from 2015 to 2025, and four initially identified reports were excluded from the full-text analysis because their full texts were unavailable. The interpretation of the results is also affected by the use of teacher self-report surveys in some studies, as teachers' perceptions may not fully correspond to their actual classroom practice. Several qualitative studies also had small sample sizes. Although the review includes studies from different countries, cultural and educational differences should be considered when relating the findings to other contexts, including Latvian schools.

Future research should examine novice teachers' classroom management practices in specific national and school contexts, including Latvia. Longitudinal studies would be particularly valuable for tracking how these practices develop during the first years of teaching and under what conditions teachers move from reactive control towards preventive and supportive strategies. In the Latvian context, further research should examine which factors influence novice teachers' classroom management practices, how students respond to these strategies, and how novice teachers' practices differ from those of more experienced teachers. Further empirical research is also needed on how mentoring, reflective practices, video analysis, real-time feedback, and technology-based approaches influence teachers' self-efficacy, professional vision, and ability to manage student behaviour in authentic classroom situations.

Conclusions

This systematic literature review shows that novice teachers' classroom management practices and students' classroom behaviour are closely interrelated. In response to the first research question, the findings indicate that teachers' approaches are associated with student engagement, self-regulation, and behavioural stability, while students' responses may influence teachers' actions, emotions, and self-efficacy. Preventive and supportive classroom management approaches are more closely linked to sustained engagement and behavioural regulation, whereas corrective strategies may be necessary in specific situations but are more often associated with short-term responses to disruptive behaviour. This shows that the relationship between novice teachers' classroom management practices and student behaviour is reciprocal rather than one-directional. The Scopus-based review identified studies across diverse educational contexts; however, it did not identify studies specifically examining the relationship between novice teachers' classroom management practices and student behaviour in Latvia, indicating the need for further empirical research in Latvian schools.

In response to the second research question, the review shows that novice teachers' practices are shaped by professional preparation, practical experience, self-efficacy, emotional regulation, professional vision, and school support. Limited practical experience may lead to reliance on reactive strategies, whereas preventive and supportive approaches are more closely linked to engagement and behavioural regulation. Overall, effective classroom management requires planning, respectful teacher-student relationships, awareness of classroom dynamics, and professional responses to complex situations. Practice-oriented teacher education, mentoring, structured reflection, targeted feedback, and early-career support are important for helping novice teachers develop these skills.

AUTHOR NOTE

Generative AI statement

Generative AI (ChatGPT) was used only to support language editing, improve clarity, and refine academic wording. It was not used to generate the original ideas, design the methodology, conduct the analysis, interpret the results, or formulate the scientific conclusions. All methodological decisions,

analytical procedures, interpretations, and conclusions were developed, critically reviewed, and validated by the authors. The authors take full responsibility for the final version of the article.

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INTEGRATING THE PERMA MODEL TO ENHANCE TEACHER AND STUDENT WELL-BEING IN 21ST-CENTURY CLASSROOMS

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ABSTRACT

The increasing complexity of 21st-century education has intensified cognitive, emotional, and organizational demands on both teachers and students, particularly within language learning environments. Language classrooms require sustained communicative engagement, exposure to uncertainty, and continuous interpersonal interaction, all of which may contribute to elevated anxiety and reduced motivation among learners. Simultaneously, teachers face expanding professional responsibilities that extend beyond classroom instruction to include curriculum development, interdisciplinary projects, administrative duties, and institutional coordination. These combined pressures suggest increasing the risk of chronic stress and professional burnout. This article aims to explore the integration of the PERMA model of positive psychology – Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment – with coaching methodologies as a pedagogical framework for enhancing well-being in language classrooms. Coaching practices such as goal-setting, reflective questioning, strengths-based feedback, and solution-focused dialogue are examined as operational tools for embedding PERMA principles into instructional practice. The study develops a conceptual framework that links coaching strategies to second language acquisition processes, emphasizing learner autonomy, emotional safety, and communicative confidence.

Current analysis suggests that PERMA-informed coaching holds promise for high-demand academic high schools. Initial insights point to potential student benefits – including reduced language anxiety, higher engagement, and stronger interpersonal relationships – while supporting teacher well-being through reflective practice and reduced emotional exhaustion. Ultimately, this framework provides a baseline for future empirical studies to evaluate whether integrated coaching interventions can enhance student and teacher well-being.

Keywords: *coaching, language education, PERMA model, teacher and student well-being*

Introduction

Language education in the 21st century is characterized by increasing pedagogical complexity, technological integration, and heightened expectations for communicative

competence (Cefai et al., 2023; Burow & Gallenkamp, 2017). Unlike content-based disciplines, language learning requires learners to continuously engage in spontaneous expression, interpersonal communication, and meaning negotiation in a non-native linguistic system. Building on foundational models of language anxiety (Horwitz et al., 1986), these conditions involve psychological vulnerability, which frequently manifests as reduced willingness to communicate and avoidance behavior (Nerlicki, 2011; Dewaele & MacIntyre, 2016; Zengin & Şahin Toptaş, 2023).

Teachers in language education within the EU operate under demanding work conditions (OECD, 2018, 2025). Beyond core instructional responsibilities – such as designing communicative tasks, differentiating instruction, and integrating digital tools – they are increasingly expected to foster students' socio-emotional development (Council of Europe CEFR Expert Group, 2023). In secondary education, particularly within academic high schools, these demands are compounded by administrative requirements, including content and language integrated learning (CLIL) projects, curriculum planning, and institutional governance (European Commission et al., 2023). This combination of administrative and instructional pressure can contribute to emotional exhaustion, suggesting that burnout in education may be understood as a systemic issue tied to institutional structures rather than individual weakness. In line with this perspective, a report by UNESCO and the International Task Force on Teachers for Education 2030 (2024) points to unstable employment conditions and emotional exhaustion as primary factors behind the high rate of European teachers leaving the profession.

From the student perspective, academic high school education is frequently characterized by high academic expectations, performance-driven assessment systems, and intensive workload demands. These stressors are supported by a World Health Organization Regional Office for Europe (2024) study of 279,117 adolescents across 44 countries, which documented a decline in youth support networks between 2018 and 2022. High family support dropped from 73% to 67%, peer support fell from 61% to 58%, and perceived teacher support decreased to 36%, while school-related pressure rose – reaching 63% among 15-year-old girls. Together, these factors can create a dual-pressure environment in which students and teachers face ongoing daily stress. Consequently, well-being in education is increasingly understood not as a purely individual trait, but as an interactive condition shaped by institutional and pedagogical structures (Lichtinger, 2025).

Positive psychology provides a valuable counter-perspective by shifting focus from deficit reduction toward human flourishing. First introduced in 2011, Seligman's (2013, 2018) PERMA model conceptualizes well-being through five core dimensions: Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment. While the PERMA model is well-established in general education, its direct application to school-based language teaching remains limited (Sambanis & Ludwig, 2025).

Coaching methodologies provide a practical framework for turning PERMA theory into concrete classroom strategies. In modern coaching practice, established models – ranging from systemic and solution-focused approaches to cognitive-behavioral frameworks – rely on key principles such as self-responsibility, mutual respect, transparency,

and a collaborative, peer-like dynamic (Roth & Ryba, 2016). Additionally, professional coaching centers on building self-reflection and self-awareness, allowing individuals to expand their thinking, emotional regulation, and choice of actions in a self-directed way (Deutscher Bundesverband Coaching, n.d.). Within language education, these principles align directly with Communicative Language Teaching (CLT), which prioritizes learner autonomy, reflective interaction, and functional language use in meaningful contexts (Richards & Rodgers, 2014).

Drawing on this overlap, this paper explores how positive coaching methods, grounded in the PERMA model, might be applied in foreign language classrooms to support both teacher and student well-being. Following Seligman's (2013, p. 24) framework, well-being is defined not as a single general state, but as a construct driven by five distinct elements: positive emotion, engagement, relationships, meaning, and achievement. Because no single factor builds well-being on its own, the paper suggests that applying these five components alongside coaching principles moves PERMA beyond individual psychology. Instead, this study views well-being as a shared classroom process shaped by daily interactions between teachers, students, and teaching methods, aiming to offer a practical model for more sustainable teaching in demanding school environments.

This paper is guided by one central research question: *To what extent can positive coaching methods and the PERMA model be integrated into foreign language education – specifically in German as a Foreign Language (GFL) classrooms – and what are the primary trends, practices, and challenges in using them to support teacher and student well-being?*

The author holds complete intellectual responsibility for the content, analysis, and conclusions of this study. Generative AI tools (ChatGPT, 2026; Gemini, 2026) were used solely for linguistic refinement, stylistic editing, reference formatting, and initial diagram generation. All AI-generated suggestions and visual materials were carefully evaluated, fact-checked, and revised by the author to ensure academic accuracy and original scholarly integrity.

Methodology

Search Strategy and Selection Criteria

This study uses a qualitative, conceptual design (Creswell, 2014) based on an integrative literature review methodology (Torraco, 2016) to bring together research on positive psychology, educational coaching, and foreign language teaching. Literature searches were conducted across Scopus, Web of Science, Google Scholar, and APA PsycInfo for English- and German-language publications released between 2011 and 2026, with a primary focus on research from 2020 to 2026. Along with the database search, key books and foundational texts were reviewed by hand. Search terms paired theoretical models (*PERMA model, positive psychology*) with coaching methods (*instructional coaching, GROW model*), language teaching (*second language acquisition, German as a foreign language, communicative competence*), and well-being measures (*classroom anxiety, burnout*).

Source selection was guided by specific inclusion and exclusion criteria.

Inclusion Criteria: Peer-reviewed empirical and theoretical studies on educational coaching, positive psychology interventions, or emotional dynamics in language learning; official educational policy reports (e.g., OECD, Council of Europe); and central Communicative Language Teaching (CLT) frameworks.

Exclusion Criteria: Literature focused on clinical psychology, psychiatric treatment, or corporate executive coaching outside educational contexts.

Because direct research on applying the PERMA model specifically within German as a Foreign Language (GFL) classrooms remains limited, the search scope was extended to general English Language Teaching (ELT) and Second Language Acquisition (SLA) literature where theoretical principles overlap.

An initial database search identified 125 records. Following title and abstract screening, 68 full-text sources were evaluated against the inclusion criteria. Ultimately, 50 key sources were chosen for the analysis – a mix of empirical studies, foundational books, policy reports, and practical handbooks.

Data Analysis and Model Synthesis

Data analysis took place in two steps. First, key elements of the PERMA model (Seligman, 2013) and coaching practices (e.g., Roth & Ryba, 2016) were identified and grouped into themes. Second, these themes were mapped against common challenges in language learning, particularly foreign language classroom anxiety (Dewaele & MacIntyre, 2016) and barriers to communication.

In the final step, these findings were combined to outline the proposed **PERMA-Coaching Language Learning Model**. The model frames classroom well-being not as a fixed trait, but as an interactive process: by integrating coaching methods, teachers may help foster student well-being, which in turn can reduce language anxiety and potentially support teacher resilience as well.

Results

Coaching Methodologies in Language Education

Coaching in educational contexts is understood as a structured, reflective dialogue designed to support critical thinking, goal achievement, and personal growth (van Nieuwerburgh, 2020). In this setup, regular dialogue between coach and learner appears to support self-regulation and skill development. Unlike traditional teaching approaches that rely on a top-down transmission of knowledge, educational coaching emphasizes learner autonomy, personal agency, and self-discovery (van Nieuwerburgh, 2020; Knight, 2007). By shifting responsibility to the individual, this approach positions the educator not as a traditional instructor, but as a facilitator of cognitive and emotional growth (Roth & Ryba, 2016). Within positive education, such coaching structures can serve a dual purpose, potentially helping to reduce educational stress while

fostering an environment where student well-being and academic achievement support one another (Lichtinger, 2023).

One widely applied coaching approach is the GROW model, structured around four steps: Goal, Reality, Options, and Will or Way Forward (Whitmore, 2009). In language classrooms, this model can help learners set speaking and writing goals, reflect on their current language skills, explore study strategies, and plan concrete next steps. As Blickhan (2021, p. 65) suggests, coaching generally focuses on helping individuals clarify what they want to achieve, draw on available resources, and address obstacles along the way. Within the GROW model, establishing a goal offers a starting point for practical change – a process Blickhan (2021, p. 66) summarizes with the equation: “*Current State + Solution Paths + Resources = Goal*” (author’s translation). This forward-looking emphasis tends to differentiate coaching from traditional counseling or psychotherapy, which often focuses first on diagnosing and analyzing underlying problems or difficulties.

Adopting a coaching approach over traditional, lecture-based teaching may allow educators to act more as facilitators than direct instructors (Whitmore, 2017; Sadewo et al., 2025). Rather than simply delivering information, teachers can use open-ended questions to encourage students to evaluate their progress, consider potential solutions, and take greater responsibility for their learning (Whitmore, 2017). To help apply these principles, Sadewo et al. (2025) proposed expanding the classic GROW framework into the GAA-RANTUNG model (*Goal, Actual, Alternative, Realistic Action Plan, Navigate Action, Track Monitoring, and Understand New Growth*). By combining face-to-face coaching with digital tools, this framework seeks to guide learners through reflection, practical action, regular progress checks, and final evaluation, offering a structured pathway toward greater student autonomy.

Beyond the GROW model, other coaching frameworks can also be useful in school settings. For a long time, educators and organizational leaders relied on the SMART model criteria – aiming for goals that are specific, measurable, achievable, realistic, and time-bound (Doran, 1982, as cited in Mangelsdorf, 2020, p. 18). While research indicates that SMART goals often lead to reliable results, Cameron and Plews (2012, as cited in Mangelsdorf, 2020, p. 19) proposed an alternative model called “Everest goals.” Rooted in positive leadership research, this approach shifts how goals are viewed: instead of treating a goal simply as a step-by-step fix for a current problem, an Everest goal is designed to serve as an ambitious source of inspiration and inner drive (Cameron, 2013, as cited in Mangelsdorf, 2020, p. 19). In a demanding school environment, introducing these broader, vision-driven goals may encourage both teachers and students to look beyond just fixing immediate weaknesses and focus on long-term personal growth instead.

Another approach gaining attention in German-speaking coaching contexts is the Berlin Development Model (*Das Berliner Entwicklungsmodell*), developed by Mangelsdorf and Çelebi (as cited in Mangelsdorf, 2020, pp. 25–37; author’s translation). Rather than focusing primarily on psychological difficulties or gaps, this model is designed to highlight individual strengths and growth potential.

It centers on three key areas, each guided by specific reflective questions:

1. Strengths: Finding the person's top five natural talents so they can put them to good use.
2. Values: Identifying the personal principles and beliefs that matter most to them.
3. Meaning: Exploring what brings purpose and direction to their life.

To make these ideas easier to understand and apply, the model uses the image of a tree (Mangelsdorf, 2020, p. 26). In this setup, the roots represent a person's core values, the trunk and branches stand for their key strengths, and the sun represents their main source of meaning and purpose. Using this simple visual in schools can give teachers and students a practical way to reflect on their personal strengths and personal growth.

To put coaching models like GROW, Everest goals, or the Berlin Development Model into practice, teachers can rely on thoughtful communication strategies. Building on solution-focused coaching, Prohaska (2013) outlines several types of questions designed to encourage reflection and help students rethink their perspective:

- Problem-Oriented Questions: These can help clarify what is currently happening. However, they are best used sparingly so the student does not get stuck focusing only on what is wrong (p. 10).
- Resource-Oriented Questions: These can shift attention toward helpful people, supportive surroundings, and personal strengths that can help students work through academic or personal challenges (p. 11).
- Goal-Oriented Questions: These look to the future, asking students to describe where they want to be, consider how reaching that goal affects them and others, and spot potential hurdles ahead of time (pp. 11–12).
- Scaling Questions: These use a simple scale (like 1 to 10) to measure feelings, confidence, or progress. Making small improvements visible can make this especially helpful for teenagers dealing with school stress and emotional distress (pp. 13–14).
- Dissociated Questions: By encouraging a step back to look at the situation from an outside perspective, these questions can help students see things differently and discover new ways forward (pp. 14–15).
- Hypothetical Questions: These can invite students to imagine ideal scenarios or outcomes, giving them room to explore potential solutions without immediate pressure (pp. 15–16).
- Paradoxical Questions: These can take a problem to its extreme, helping to break up rigid thinking in a constructive way (pp. 16–17).

PERMA Model and Language Classrooms

Developed by Martin Seligman (2013), the PERMA model offers a practical guide for supporting well-being in both schools and coaching settings. Applied to education, it shapes the approach known as Positive Education, an approach that combines traditional teaching with a focus on student well-being (Seligman et al., 2009). Studies suggest that encouraging positive feelings, focusing on student strengths, and using collaborative activities can increase motivation, classroom participation, and learning outcomes (Ly &

Nguyen, 2024; Waters, 2011). In practice, some schools work with PERMA by nurturing the five key elements through reflection, active learning, teamwork, relevant assignments, and constructive feedback. In coaching, the model gives individuals a structured way to use their personal strengths, set clear goals, build motivation, and reflect regularly on their progress (Blickhan, 2021; Brohm-Badry & Endres, 2017).

Closely connected to this approach is Peterson and Seligman's (2004) VIA classification of 24 character strengths, which builds on common personal qualities like curiosity, perseverance, kindness, and teamwork. In educational and coaching settings alike, identifying these qualities can help individuals to work on their existing strengths to support learning, daily performance, and personal growth (Lichtinger, 2023, 2025). In language classrooms specifically, combining the PERMA model with character strengths can make learning a more well-rounded experience.

In school environments, the PERMA model offers a clear, practical guide for supporting student well-being:

- **Positive Emotions:** Teachers can encourage these feelings by acknowledging individual progress, using playful learning activities, and guiding students to reflect on positive experiences (Lichtinger, 2025; Sambanis & Ludwig, 2025; Seligman, 2013, p. 16).
- **Engagement:** Students reach a state of deep focus – often called “flow” – when working on naturally interesting tasks, especially through project-based and student-centered activities (Lichtinger, 2025; Sambanis & Ludwig, 2025; Seligman, 2013, pp. 16–17).
- **Relationships:** This component reflects the overall classroom atmosphere and the quality of connections between teachers and students. Educators can assess these dynamics through simple surveys on student support or by observing how well students work together in group tasks (Lichtinger, 2025; Sambanis & Ludwig, 2025; Seligman, 2013, pp. 20–24).
- **Meaning:** Students can experience meaning when they see how classroom learning connects to real life – something teachers can foster through cross-subject projects and discussions about real-world issues (Lichtinger, 2025; Sambanis & Ludwig, 2025; Seligman, 2013, pp. 17–18).
- **Accomplishment:** This element can grow when students work toward realistic goals and receive recognition for their effort and progress. Educators can measure this growth through student portfolios, shared goal-setting, and regular feedback (Lichtinger, 2025; Sambanis & Ludwig, 2025; Seligman, 2013, pp. 18–20).

Positive emotions like joy, interest, and gratitude do more than offer short-term comfort; they broaden how people think and act. According to Fredrickson's (2013) broaden-and-build theory, these feelings temporarily open up attention and encourage flexible problem-solving. Over time, repeated positive feelings help create lasting personal resources, including emotional resilience and social support. This implies that experiencing positive moments regularly can set off an upward loop toward better overall health (Fredrickson, 2009, 2013).



Figure 1. PERMA-Model of Well-Being (Seligman, 2013).

Note. PERMA model of well-being. Adapted from Seligman (2013). Created with Canva and presented by Vitola (2026b) at the 84th Scientific Conference of the University of Latvia.



Figure 2. Broaden & Build Theory of Positive Emotions (Fredrickson, 1998).

Note. Broaden-and-build theory of positive emotions (adapted from Fredrickson, 1998, 2013). Created with Canva and presented by Vitola (2026b) at the 84th Scientific Conference of the University of Latvia.

In positive coaching, these ideas come into play through strength-focused feedback, shared goal setting, and guided reflection. By drawing attention to past wins and building on small successes, coaching can help people open up their thinking, feel more confident in their abilities, and build lasting skills for growth. This points to the idea that targeted coaching support can help individuals continuously adapt and develop over time (Lichtinger, 2025; Blickhan, 2021; Mangelsdorf, 2020).

PERMA–Coaching Framework for Language Classes

Building on these principles, Table 1 offers practical suggestions for applying Seligman's PERMA framework in German as a Second Language (GSL) classes. The Table 1 outlines how each PERMA dimension can be linked to specific learning outcomes, classroom activities, and speaking tasks. By giving students opportunities to use German in real conversations, peer discussions, and creative tasks, this approach suggests a way to develop communicative skills while supporting student motivation and well-being.

Table 1. The PERMA Framework in the Language Classroom for the Enhancement of Communicative Competence.

PERMA-dimension	Learning Outcome	Activity and Speaking Link	Key sources
Positive Emotions	Self-confidence, positive learning attitude	Warm-up conversations, short "moments of happiness", playful speaking games. Reduces speaking anxiety and facilitates entry into oral interactions	Fredrickson (2011); Seligman (2013); Waters (2011); Barabadi et al. (2022); Sendatzki et al. (2026)
Engagement	Motivation, active learning, flow experience.	Role-plays, project-based tasks, creative presentations. Promotes longer and more intensive oral contributions from learners	Csikszentmihalyi (1990); Sambanis & Ludwig (2024); Mercer, MacIntyre, Gregersen & Talbot (2018); Proyer (2022)
Relationships	Cooperation, social interaction, communication skills.	Pair work, group discussions, tandem interviews, peer feedback. Increases the frequency of authentic speaking situations in the classroom	Mercer et al. (2016); MacIntyre et al. (1998); Sambanis & Ludwig (2025)
Meaning	Reflective ability, intercultural competence	Discussion of real-life topics, cultural comparisons, personal experiences. Motivates learners to express their opinions orally	Seligman (2013); Sambanis & Ludwig (2025)
Accomplishment	Self-efficacy, goal orientation	Presentations, portfolio work, formative and summative assessments/ tests. Visible progress strengthens learners' willingness to speak actively	Hattie (2009, cited in Steffens & Höfer, 2014); Bandura (1997); Sambanis & Ludwig (2025)

Note. The PERMA framework in the language classroom for communicative competence. Self-created illustration based on Bandura (1997), Barabadi et al. (2022), Csikszentmihalyi (1990), Fredrickson (2011), MacIntyre et al. (1998), Mercer et al. (2016), Mercer et al. (2018), Proyer (2022), Sambanis & Ludwig (2024, 2025), Seligman (2013), Sendatzki et al. (2026), Steffens & Höfer (2014), and Waters (2011). Presented by Vitola (2026b) at the 84th Scientific Conference of the University of Latvia.

Table 2. Applying PERMA: German Language Classroom Practice.

Phases of a class	First Class	Second Class	Third Class
Orientation phase	"One thing that went well today" (adapted from the "Positive Daily Reflection" intervention; Blüchhan, 2015, p. 77). Purpose: to foster gratitude through reflection on positive daily events (Blüchhan, 2015, p. 295).	"A word that supports me through the day" (adapted from the "words that make me happy" intervention; Sambanis, 2024). Purpose: to enhance mindfulness and positive emotions through reflection on a supportive word (Sambanis, 2024b).	"A good deed today – I share" (adapted from the "act of kindness" intervention; Fredrickson, 2011, pp. 226 ff.). Purpose: to raise awareness of social relationships through reflection on kind actions (Blüchhan, 2015, p. 296; Fredrickson, 2011, pp. 226 ff.).
Exploration and construction phase	other exercises	Youth slang words 2025 – guessing meanings. Implementation: Students listen to a song from the Frankfurt Book Fair 2025 about the "youth word of the year," note the top 10 slang words, and work in small groups to guess their meanings.	Bullet-point associations to an image of an unusual office setting. Implementation: Students analyze the image, note key associations, and briefly discuss them in plenary.
Practice with playful elements	other exercises	Which team wins? – sentences with <i>dass</i> . Implementation: In small groups, students write sentences with <i>dass</i> on healthy lifestyle/food for 3 minutes. One student per group shares a sentence and throws a ball to another group.	Audio recording via Vocaroo. Implementation: Students write ideas for innovative or relaxing school breaks using "if-then" sentences, record them in the Vocaroo app, and emailing the recording to the teacher.
Consolidation and application phase	Dialogue at a market in Germany. Implementation: Students prepare a dialogue at a market and perform it using a toy cash register and real-life props (shopping basket, fruit, vegetables, shopping bags, money).	Dialogue at a bakery/café. Implementation: After watching a learning video, students prepare dialogues in small groups and perform them using realistic props.	"Treasure box" of well-being strategies. Implementation: Students develop short- and long-term well-being activities (individual and social) based on a prompt, then present selected ideas briefly.
Reflection and evaluation phase	Students first write down individual feedback and then optionally share some points in plenary. Based on the "Positive Daily Reflection" (Blüchhan, 2015, p. 77) and the "Positive Daily Outlook" (Blüchhan, 2021, p. 91).	Students first write down individual feedback and then optionally share some points in plenary. Based on the "Positive Daily Reflection" (Blüchhan, 2015, p. 77) and the "Positive Daily Outlook" (Blüchhan, 2021, p. 91).	Students write brief responses to four question categories in small groups (1 minute each). Sheets are rotated three times so all groups contribute to each category. Based on the "Positive Daily Reflection and Outlook" (Blüchhan, 2015, 2021).

Note. Applying PERMA: German Language Classroom Practice. Created in Canva and presented by Vitola (2026b) at the 84th Scientific Conference of the University of Latvia.

To illustrate how these ideas work in practice, Table 2 outlines a three-class lesson sequence for German as a Second Language (GSL). It breaks down how the PERMA

framework can be applied across different phases of instruction – from initial orientation to reflection and evaluation. By combining core language goals with specific PERMA dimensions in each phase, this structured sequence suggests a practical way to integrate well-being strategies into everyday classroom teaching. While theoretical models and lesson plans provide a helpful framework, their real value depends on how students experience them in the classroom. To examine how PERMA-based strategies function in practice, a case study was carried out at the University of Latvia in spring 2026 as part of the author's qualification thesis (Vītola, 2026a). The study examined how applying the PERMA model in German as a Foreign Language (GFL) classes could support student well-being, with a focus on speaking skills. The intervention took place over three weeks (six lessons) in a 10th-grade GFL class at a Latvian secondary school ($n = 11$), during which a series of structured classroom activities – as partly outlined in Table 2 – were applied. Data was collected through pre- and post-surveys, teacher observations, interviews, and written feedback, giving a practical look at how positive psychology can be applied in language teaching.

The survey results and student feedback indicated a tendency toward positive shifts across several PERMA areas. Students reported slightly higher levels of enjoyment in class (rising from 3.82 to 4.27 on a 5-point scale) and viewed the topics as somewhat more relevant to them (increasing from 3.45 to 4.00). Alongside these reports, data pointed to an increased willingness to speak: willingness to share opinions despite making mistakes moved from 3.09 to 3.82, while willingness to talk in front of the class moved from 2.64 to 3.55. Teacher observation notes also showed progress in vocabulary, sentence structure, and task completion, with average scores moving from 10.1 to 12.7 points.

These findings suggest that combining positive emotions, everyday topics, and group work may help students feel more comfortable speaking up. However, these results should be read with caution. Because the study involved only 11 students over six lessons, the findings show short-term local trends rather than broad rules. In addition, a slight drop in self-reported concentration (from 4.36 to 3.91) shows that active tasks can require more mental effort, which teachers need to balance carefully. While limited in scope, this case study points to PERMA-based activities as one possible avenue for further academic exploration regarding classroom well-being and speaking practice, as the theoretical part of this study suggests.

Discussion

Data from the World Health Organization (2024) suggests that educational burnout may stem more from systemic school environments than individual weaknesses. Viewing well-being as something shaped by the learning environment rather than just a personal trait (Lichtinger, 2025) offers a helpful perspective for language pedagogy. Language learning often involves emotional pressure, self-doubt, and anxiety around evaluation (Dewaele & MacIntyre, 2016; Horwitz et al., 1986). In German as a Foreign Language (GFL) class, these feelings can be linked to complex grammar, strict correction, and

the pressure of speaking spontaneously. Integrating Seligman's (2013) PERMA framework with positive coaching methods might offer a practical approach to help ease these daily classroom challenges for both teachers and students.

While positive psychology focuses on student well-being, applying these ideas inside structured language classes is still a work in progress (Sambanis & Ludwig, 2025). Positive coaching offers a practical way to connect the two by bringing PERMA principles directly into daily GFL activities. In particular, encouraging student choice and self-reliance (Deutscher Bundesverband Coaching, n.d.; Roth & Ryba, 2016) can help create a calmer classroom atmosphere, which may ease speaking anxiety and support a learner's readiness to talk (Zengin & Şahin Toptaş, 2023).

Recent findings from the World Health Organization (2024) highlighting drops in school-based support point to the importance of building stronger connections in class. Using open, reflective dialogue to balance teacher-student roles (Richards & Rodgers, 2014) could help lower the sense of isolation that leads to teacher fatigue and low student motivation or withdrawal. Instead of focusing mainly on language mistakes, a strengths-based approach can give students clearer, more realistic goals. This shift might turn intimidating speaking tasks into manageable steps for personal growth.

A key idea behind this integrated framework is moving away from seeing teacher and student well-being as separate issues. Because a classroom is a shared space, teacher strain (Council of Europe CEFR Expert Group, 2023; WHO, 2022) and student stress (WHO, 2024) often influence one another. Giving GFL teachers simple coaching tools doesn't have to mean adding to their workload (European Commission et al., 2023). Instead, it can help shift the teacher's role from constantly correcting errors to guiding open communication. This shift can lighten the emotional pressure on teachers while making students feel less anxious about performance.

Even though communicative language teaching fits well with positive coaching, some practical challenges remain. High schools often rely on traditional grading systems that focus mainly on test scores rather than overall well-being, and teacher training programs rarely include coaching skills. For this approach to work more broadly in language classes, it helps to see that well-being and learning outcomes can support each other rather than conflict. Future research could follow students over longer periods to see how coaching-based activities affect both language test scores and general student well-being over time.

Conclusions

This study evaluated how Martin Seligman's PERMA model and positive coaching methods can be used in foreign language education, specifically in German as a Foreign Language (GFL) classrooms. In exploring the central research question, this study raises the possibility that positive coaching methods can be thought of as more than just extra teaching techniques. Instead, they can offer a practical framework that may help lower the specific stress and anxiety connected with learning a new language. A clear

trend in recent research points to a need to move away from looking mostly at language mistakes toward supporting student choice and positive communication. Practical tools like the GROW model, Everest goals, the Berlin Development Model, and Prohaska's questioning strategies can turn well-being concepts into daily classroom activities.

Additionally, this work shows that teacher well-being and student well-being are closely linked. When teachers shift from acting primarily as strict evaluators to working as supportive guides, it can reduce the daily stress that leads to teacher burnout. At the same time, this approach can lower language anxiety and help students feel more confident when speaking. This combined effect is especially important given recent reports showing a drop in emotional support for teenagers in schools.

Finally, this study offers a starting point for future research. Longitudinal studies could examine how PERMA-based coaching influences standardized test scores, speaking skills, and students' own evaluations of their mental well-being in secondary schools.

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TIME PERSPECTIVE AND PERSONALITY IN ANSHLAV EGLITIS NOVEL THE SHAMELESS OLD MEN

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ABSTRACT

Literacy and understanding of time perspective are essential prerequisites for high-quality education, as they enhance students' ability to critically analyse texts, perceive historical and cultural context, as well as reflect on personality development and future opportunities. In contemporary education, literacy involves not only text comprehension, but also the ability to interpret value conflicts, intergenerational relationships, and existential issues embedded within it. In this context, the paper "Time Perspective and Personality in Anshlav Eglitis Novel *The Shameless Old Men*" reveals how literacy can be strengthened in upper-secondary education by implementing an interdisciplinary approach to the study of the novel *The Shameless Old Men* by Anshlav Eglitis. The aim of the paper is to present theoretical insights and research results obtained by integrating the theory of time perspective, existentialist philosophy and aspects of personality development into the analysis of Latvian exile literature. The study was conducted in Grade 12 through the analysis of theoretical, methodological, and pedagogical-psychological literature, as well as by evaluating the results of teacher-student collaboration, students' immersion in the novel's content, and their interpretations.

The results indicate that focusing on the gradual progression of task complexity, age-appropriate text selection, meaningful reading purpose, and approaches are essential for fostering reading skills. Furthermore, the interdisciplinary approach contributed to a deeper development of literacy competence, awareness of cultural identity, and argumentative skills, by grounding judgements in the content and historical context.

At the same time, the study revealed challenges related to students' competence to conduct an in-depth analysis of the literary characters' future time perspective, and to identify factors that could significantly influence it, leading to the conclusion that more purposeful methodological support is needed in this aspect. Overall, the study confirms that methodologically, psychologically and historically grounded literature teaching significantly contributes the development of deeper literacy competence in secondary education.

Keywords: Anshlav Eglitis, novel *The Shameless Old Men*, literacy, time perspective, personality, exile literature, literary pedagogy

Introduction

Literature plays a significant role in the development of students' personalities, emotional intelligence, and value systems. (Stikute, 2011) However, contemporary pedagogy and literacy studies face considerable challenges due to changes in 21st-century information consumption habits. The dynamic modern environment and the rapid development of digital technologies have fostered a preference for immediate results and fast-paced visual information, making it increasingly difficult for young people to patiently read extensive literary texts in their entirety. Therefore, to make the analysis of classic literary narratives more engaging and to strengthen text literacy, it is essential to implement an interdisciplinary approach.

This study integrates literary analysis with psychological and philosophical frameworks, focusing specifically on Latvian exile literature. Following World War II, a significant part of the Latvian population sought refuge abroad for ideological and political reasons, leading to the emergence of exile literature. (Daukste-Silasproģe, 2024; Rozītis, 2005; Wyman, 1998)

Anshlav Eglitis's (2000) novel *The Shameless Old Men* (*Bezkaunīgie vecī*) provides rich material for exploring the reality of exile, existential questions, intergenerational differences, and the preservation of Latvian cultural identity. (Hausmanis, 2005; Struka, 2022) To analyse the characters' behavioural motivations and interpersonal conflicts, the study employs the Time Perspective Theory, originally developed by K. Lewin (1951) and further expanded by P. Zimbardo and J. Boyd (2008), as well as principles of existentialist philosophy that examine concepts of freedom, responsibility, and the search for meaning in an absurd world. (Kūle & Kūlis, 2020)

The research problem addresses how to organise Grade 12 literature lessons in a way that promotes students' in-depth understanding of A. Eglitis's personality and literary work within its historical context, while also identifying the subjective factors that influence human existence, intergenerational relationships, historical events, and future time perspectives. Consequently, the aim of this study is to develop and implement a literature sequence based on an interdisciplinary approach for the topic "Time Perspective and Personality in Anshlav Eglitis's novel *The Shameless Old Men*".

Text Literacy and the Competency-Based Approach

Literacy is one of the most essential 21st-century skills necessary for students to successfully achieve personal and social goals, ensuring successful lifelong learning and fulfilling self-realization in society. In Literature lessons, text literacy is particularly significant, as it enables students not only to understand the plot of a literary work but also to interpret deeper layers of meaning, including character motivation, symbolism, authorial intention, and cultural context. (Ausekle, 2003; Rudzītis, 2000; Zimule, 1991) Well-developed text literacy skills allow students to establish connections between literary texts, personal experience, and contemporary social issues. (Lāčau-niece, Silova, Bušmanis, & Burima, 2020) Importantly, text literacy encompasses several

interconnected levels, including information retrieval and comprehension, interpretation, critical evaluation, and creative application. (Geske, Kampmane, & Ozola, 2025) Consequently, the development of text literacy should be regarded not merely as a linguistic competence, but also as a foundation for students' intellectual, emotional, and personal development. (Stikute, 2011)

However, recent data, such as the Progress in International Reading Literacy Study (PIRLS), indicates a significant decrease in the reading literacy level of Latvian students since 2016, which directly impacts overall academic performance. (Geske et al., 2025) To address these challenges, the Latvian education system has implemented a competency-based curriculum framework (Skola2030), which shifts the focus from rote learning to deep learning and problem-solving. In Literature lessons, this approach requires engaging students in complex learning tasks where they learn to analyse, synthesize, interpret, evaluate, and conclude. (Ausekle 2003)

Within his framework, pedagogical approaches that support deeper literary understanding become particularly important. The integration of the Structure of the Observed Learning Outcome (SOLO) taxonomy (Biggs & Collis, 1982) provides a framework for moving from simple identification of facts to deep interpretation and argumentation. By analysing the choices, behavioural motivations, and time perspectives of literary characters, students develop a deeper understanding not only of literary texts but also of human behaviour, personal identity, and their own attitudes towards time, decision-making, and relationships. (Rudzītis, 2000) In this way, literature acquisition becomes a meaningful process of self-discovery that develops empathy, emotional intelligence, and critical thinking. (Eriksons, 1998; Svence, 1999; Špona, 2006)

Latvian Exile Literature and Existentialism

The study specifically focuses on Latvian exile literature, which emerged following the dramatic events of World War II. Fleeing the atrocities of the war and the fear of Soviet and Nazi totalitarian regimes, approximately 180,000 Latvian citizens became refugees between 1944 and 1945. (Daukste-Silasproģe, 2024; Plakans, 1995) After spending years in Displaced Persons (DP) camps in Germany, where they endured challenging daily living conditions and administrative uncertainties while actively striving to preserve their cultural identity, many sought asylum in Western countries, including the United States, rather than returning to the occupied homeland. (Wyman, 1998) Anshlav Eglitis's novel *The Shameless Old Men* serves as profound material that reflects this exile reality in California, depicting the struggle to preserve Latvian cultural heritage, the heavy burden of survival in a foreign land, and the intergenerational misunderstandings with the younger generation born outside Latvia.

The literature of the exile period often incorporates features of existentialist philosophy, exploring questions of human existence in an absurd and threatening world. (Kūle & Kūlis, 2020) Echoing the ideas of J. P. Sartre and S. Kierkegaard, exile literature highlights themes of loneliness, alienation, freedom of choice, and the heavy responsibility of determining one's fate. (Aho, 2025; Tabūns, 2008) Eglitis's novel reveals these

existential struggles through characters who must redefine their purpose in a foreign society while facing the inevitability of aging and death.

Time Perspective Theory

To deeply analyse the characters’ behavioural motives and inner conflicts, this study employs Time Perspective Theory. The concept was originally introduced by Kurt Lewin (1951), who defined it as the totality of the individual’s views of their psychological future and past at a given time. (Zimbardo & Boyd, 2008) The theory posits that an individual’s behaviour in the present is significantly influenced by their psychological connection to past experiences and future goals. (Eriksons, 1998; Svence, 1999; Špona, 2006) Philip Zimbardo and John Boyd (2008) expanded the concept into a dynamic process that includes the present and actively shapes human behaviour. (Zimbardo & Boyd, 2008) The fundamental differences between both approaches are summarized below (see Table 1).

According to Zimbardo and Boyd (2008), there are five fundamental time perspective dimensions, as well as the ideal psychological state known as Balanced Time Perspective. These dimensions and their behavioural manifestations are summarized below (see Table 2).

In the context of exile literature, understanding time perspective is crucial, as refugees physically exist in a new spatial and temporal reality (present), long for their lost homeland (past), and struggle to build a secure life in the unknown (future). Analysing the characters of Anshlav Eglitis’s novel *The Shameless Old Men* through this psychological lens allows students to recognize how fixation on a single time zone leads to family conflicts and psychological discomfort, while a Balanced Time Perspective promotes well-being.

Table 1. Comparison of Time Perspective Concepts: Kurt Lewin vs. Philip Zimbardo and John Boyd

Aspect	Lewin (1951)	Zimbardo & Boyd (2008)
Definition	The totality of the individual’s views of their psychological past and future at a given time.	An often nonconscious personal attitude toward time and the process that structures experience into categories.
Focus	Past and future.	Past, present and future.
Nature	More static (emphasis on perception).	Dynamic (emphasis on process and influence).
Consciousness	Not specifically emphasized.	Often nonconscious.
Function	Describes how a person perceives time.	Explains how time organizes life and gives it order, coherence, and meaning.
Practical Applicability	Theoretical.	Practical (personality analysis, behaviour, and decision-making).

(Note. Adapted from Zimbardo & Boyd, 2008.)

Table 2. Zimbardo and Boyd’s Fundamental Time Perspective Dimensions.

Time Perspective	Brief Description
Past-Negative	Focus on negative past experiences, trauma, and regret.
Past-Positive	Focus on nostalgia, preservation of traditions, and warm memories. It represents a deep attachment to one’s roots, cultural heritage, and positive life experiences.
Present-Fatalistic	A sense of helplessness, hopelessness, and the belief that the future cannot be influenced. It reflects an attitude that external circumstances control one’s destiny, leading to passive acceptance of the present.
Present-Hedonistic	Enjoying life in the moment, impulsivity, and seeking immediate pleasure. It involves valuing aesthetics and joys “here and now” while rejecting long-term planning.
Future-Oriented	Focus on pragmatic planning, organization, education, career, and achieving long-term goals. Individuals are highly purposeful, conscientious, and often sacrifice present joys for future stability.
Balanced Time Perspective	The ideal psychological state, allowing individuals to flexibly switch between time zones depending on situational demands. It represents the ability to naturally integrate past experiences, secure the future, and actively enjoy the present.

(Note. Adapted from Zimbardo & Boyd, 2008 and research findings.)

Pedagogical Rationale for the Approach

The application of the Time Perspective Theory to literary character analysis provides a pedagogically grounded extension of traditional literature interpretation by enabling students to perceive literary characters as psychologically complex individuals rather than merely as participants in a narrative. (Ausekle, 2003) Within this framework, literary analysis moves beyond the identification of plot events toward the exploration of characters’ motivation, decision-making processes, and behavioural patterns in relation to their orientation toward the past, present, or future. Consequently, students develop a deeper and more multi-layered understanding of literary texts. (Zimule, 1991)

This approach also promotes higher-order thinking by encouraging students to evaluate how different time perspectives influence characters’ choices, relationships, and quality of life. Such analysis requires learners to formulate interpretations, justify their arguments with textual evidence, and critically evaluate alternative viewpoints. (Lāčāuniece et al., 2020) The integration of P. Zimbardo’s Time Perspective Theory (Zimbardo & Boyd, 2008) further strengthens the interdisciplinary character of the approach by connecting literary studies with psychological concepts and providing students with a systemic analytical framework.

At the same time, analysing literary characters through the lens of time perspective fosters meaningful personal engagement. Students are encouraged to compare fictional characters with contemporary social realities, people they know, and their own experiences, thereby strengthening both reflective thinking and personal interpretation. This connection between literature and lived experience makes literary education more

relevant while simultaneously supporting the development of empathy and cultural awareness. (Rudzītis, 2000; Stikute, 2011)

The approach is particularly valuable when teaching conceptually complex literary narratives such as Anshlav Eglitis's novel *The Shameless Old Men*, where the characters' lives are shaped by the continuous interaction between past experiences, present circumstances, and future expectations. Examining these temporal dimensions enables students to explore broader existential questions concerning identity, freedom, responsibility, and human choice, thereby enriching both literary interpretation and interdisciplinary understanding. (Aho, 2025; Gosetti-Ferencei, 2021)

Methodology

To achieve the aim of the study, a mixed-methods approach was applied, incorporating the analysis of theoretical literature, pedagogical observation, the implementation of a lesson sequence based on an interdisciplinary approach, and the qualitative evaluation of teacher-student collaboration outcomes. The study was conducted as a pedagogical approbation from 24th February, 2025, to 17th April, 2025.

The research methodology consisted of the following stages.

1. Analysis of theoretical, pedagogical, methodological, and psychological literature.
2. Pedagogical observation during literature lessons.
3. Development and implementation of a lesson sequence based on an interdisciplinary approach.
4. Analysis and evaluation of teacher-student collaboration outcomes.

Research Sample and Context

The research sample comprised 32 Grade 12 students (18 boys and 14 girls) at Riga X Secondary School. The students were enrolled in an engineering-oriented educational programme with in-depth studies in mathematics, programming, and English, and they studied Latvian language and literature at the optimal level. Notably, the students' native language is not Latvian, their primary daily and family communication language is Russian, and they transitioned to studying all subjects in Latvian during their secondary education. Consequently, many students possess a medium (B1/B2) level of Latvian language proficiency, which occasionally creates barriers in expressing nuanced opinions, understanding abstract philosophical concepts, or interpreting symbolic and metaphorical meanings in literary texts.

Furthermore, pedagogical observation and interviews revealed that 28 out of the 32 students work full-time jobs alongside their studies. This dual burden significantly impacts their learning process, frequently resulting in fatigue, absenteeism, and limited time for extensive reading at home.

According to the learning style models based on I. Briggs, Myers and D. Kolb's theories (Kolb, 1984; Kolb & Kolb, 2013; Myers & Myers, 1980), the majority of the class consists of extroverted and sensing individuals who prefer practical, real-world tasks

over monotonous text analysis and require explicit scaffolding from the teacher to comprehend abstract concepts.

Pedagogical Intervention and Thematic Unit Design

To address these contextual challenges identified in this study and strengthen students’ text literacy, an interdisciplinary eight-lesson thematic unit based on A. Eglitis’s novel *The Shameless Old Men* was designed and implemented. The instructional design integrated literary analysis with psychological and philosophical perspectives while using the Structure of the Observed Learning Outcome (SOLO) taxonomy (Biggs & Collis, 1982) as the principal pedagogical framework. The taxonomy informed not only the sequence of learning activities but also the formulation of task prompts, guiding questions, and assessment criteria, thereby ensuring constructive alignment between the learning objectives, classroom activities, and student assessment.

The intervention began with lower-level cognitive tasks (SOLO levels 1 and 2 – uni-structural and multi-structural), focusing on the identification of textual information, historical context, and authorial background through activities such as creating the author’s visual profile and maintaining a reflective reading journals. As the thematic unit progressed, students gradually engaged in increasingly complex cognitive tasks corresponding to SOLO taxonomy’s levels 3 and 4 – relational and extended abstract. These activities required learners to analyse relationships between literary events and psychological concepts, synthesise historical and cultural contexts, evaluate alternative interpretations, and construct evidence-based arguments.

The learning activities were deliberately designed to integrate literary interpretation with historical, psychological, and philosophical perspectives, thereby supporting the interdisciplinary objectives of the study. The principal creative and analytical activities implemented during the thematic unit are summarised below (see Table 3).

Table 3. Key creative and Analytical Activities Implemented in the Thematic Unit

Activity	Task Description and Pedagogical Objective
The Exile’s Chest Portrait	Students visualized and justified the symbolic meaning of the chest as a representation of cultural heritage and the burden of the past.
The Exile’s Letter	Students adopted the perspective of a chosen literary character to write a letter to their homeland, integrating historical facts with the character’s psycho-emotional state to develop empathy.
Time Perspective Analysis	Students evaluate integrational conflicts by applying Zimbardo’s time perspective dimensions to the characters’ behaviour.
Reflective Reading Journal	Students documented their evolving interpretations of the novel, reflected on characters’ motivations, and established connections between literary events and psychological concepts.
Argumentative Essay	Students produced an evidence-based literary interpretation synthesising historical, psychological, and philosophical perspectives while constructing independent arguments supported by textual evidence.

Throughout the intervention, diverse forms of work organisation were utilized, including teacher-guided instructions, individual reflection, pair work, and collaborative small-group tasks. These learning experiences were designed to promote deep learning by combining analytical and creative tasks that fostered literary interpretation, critical thinking, empathy, reflective thinking, and argumentative writing. (Ausekle, 2003)

To operationalize the SOLO taxonomy explicitly, it served as the central methodological framework for task design, formative and summative assessment. Learning tasks and guiding questions were systematically constructed to require progressively more complex cognitive operations, moving from identifying and describing textual information (characters, place, time) towards analysing relationships, synthesising multiple perspectives, evaluating interpretations, and constructing evidence-based arguments. Formative assessments were systematically applied to monitor students' progress across the SOLO levels, providing meaningful feedback and supporting further cognitive development.

The thematic unit culminated in a summative argumentative essay, where the assessment criteria were aligned with the relational and extended abstract levels of the SOLO taxonomy (Biggs & Collis, 1982), evaluating students' ability to synthesize information, integrate historical, psychological and existential perspectives, and construct coherent, evidence-based literary interpretations rather than merely reproduce factual knowledge about the novel.

Results

The implementation of the interdisciplinary lesson sequence contributed significant improvements in students' text literacy, analytical thinking, interpretive skills, and emotional awareness. The results are based on both quantitative data regarding academic performance and the qualitative evaluation of students' creative and analytical tasks.

Quantitative Improvements in Academic Performance

The quantitative data revealed a positive trend in students' academic performance during the study period. The average grades in the optimal-level course "Latvian Language I" (*Latviešu valoda I*) increased from 5.56 to 6.26, while the average grades in the optimal-level course "Literature I" (*Literatūra I*) increase from 5.2 to 5.88 on a 10-point grading scale. Although these improvements coincided with the implementation of the interdisciplinary learning sequence, the absence of control group precludes drawing definitive causal conclusions regarding the effectiveness of the intervention.

Nevertheless, the observed grade dynamics suggest that engaging students in interdisciplinary, problem-based learning activities and systematic formative assessments is associated with positive academic development. In this study, the quantitative findings should therefore be interpreted as complementary to the qualitative evidence, which provides a more comprehensive understanding of students' development of text literacy, interpretive thinking, and engagement with complex literary texts. This positive

trend is particularly relevant in a multilingual educational context, where Latvian is not the students' native language. (Geske et al., 2025)

Deep Learning through Visual and Emotional Interpretation

To foster a deep understanding of the exile experience, students engaged in complex creative tasks such as interpreting the “Exile’s Chest” (*Trimdinieka lāde*) and writing the “Exile’s Letter” (*Trimdinieka vēstule*).

When analysing the “Exile’s Chest”, students recognized it as a powerful symbol of the protagonist’s identity, memory, endurance, and unsevered connection to the homeland. The symbol was primarily associated with the Past-Positive time perspective, which contrasted with the younger generation’s tendency to prioritise practicality and modern values. Students successfully identified the conflict between the older generation, for whom the chest represented a vital anchor to their past, and the younger generation, who viewed it as an impractical, ugly object that hindered modern consumer aesthetics.

Furthermore, writing the “Exile’s Letter” to Latvia from a chosen character’s perspective allowed students to deeply immerse themselves in the exile’s emotional state. Students articulated the characters’ feelings of alienation, longing for the lost homeland, existential insecurity, and the absurdity of their existential situation, demonstrating a high level of empathy towards historical trauma that many had not deeply considered before. Examples of students’ visual interpretations can be seen in the appendices (see Figure 1).

In the activity “My World” (*Mana pasaule*), students reflected on their own values, emotions, relationships, and future goals through visual representation, exploring the specific colours, smells, tastes, and sounds that define their current life. Examples of students’ visual interpretations of activity “My World” are presented in the appendices (see Figure 2).

To deepen this self-reflection, the task was purposefully contrasted with activity “The Exile’s World” (*Trimdinieka pasaule*). Examples of students’ visual interpretations of activity “The Exile’s World” are presented in the appendices (see Figure 3).

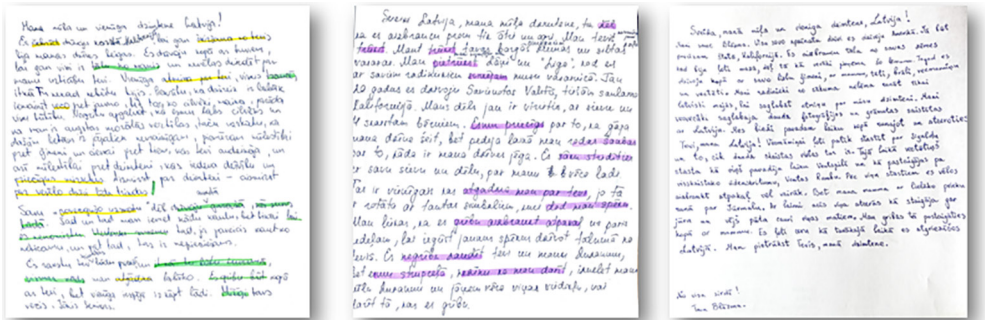


Figure 1. Examples of students’ “Exile’s Letter”



Figure 2. Examples of students' activity "My World"

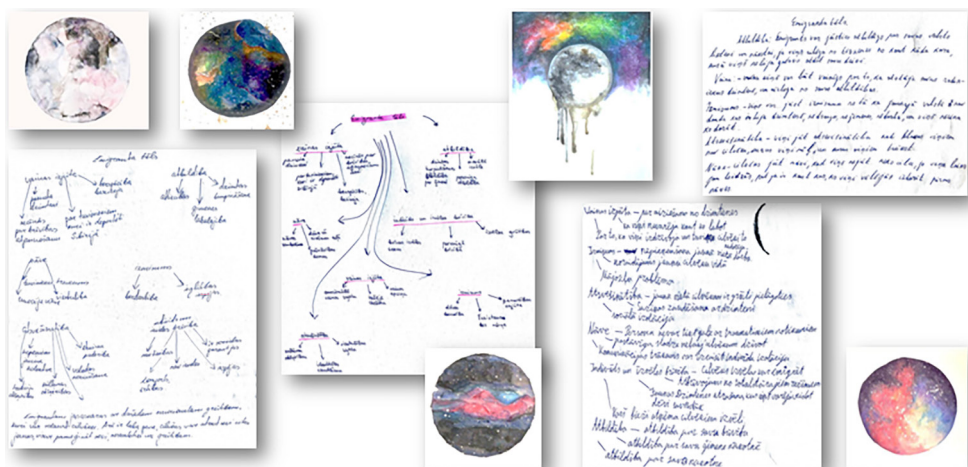


Figure 3. Examples of students' activity "The Exile's World"

In this corresponding task, students characterized the emigrant's reality by linking the exile experience with existentialist traits, basing their judgments on A. Eglītis's novel, historical publications (e.g., Wyman, 1998), and Zenta Mauriņa's (1992) essay "Drausmi zināt, mokoši skatīties" (*Dreadful to know, painful to see*). The task encouraged students to establish direct connections between historical existentialist themes explored in the novel and their own contemporary experiences. As students noted, this comparative approach prompted them to look deeper into themselves, seeking answers to fundamental questions: what is truly important, how to live in this world, how to protect freedom, and how to preserve humanity.

Exploration of Existential Themes

Through guided text analysis, students clearly identified core existentialist ideas embedded in the novel. They observed that the characters inhabit an absurd world without clear pre-defined meaning, requiring each individual to forge their own path and find their own purpose. (Aho, 2025; Gosetti-Ferencei, 2021) Specifically, students recognized the following existential themes in the characters' experiences:

1. **Individuality and Freedom of Choice.** Students noted that each character independently shapes their own destiny. This is most vividly seen in Askolds Olte, who deliberately chooses free, unattached lifestyle, exercising his absolute freedom of choice. (Lukaševičs, Mickeviča, & Sokolova, 2007)
2. **Sense of Responsibility.** This freedom is accompanied by a heavy burden of responsibility. Jānis Bertolds (senior) feels a deep, existential duty towards his physical labor, his self-built house, and the preservation of his past. Meanwhile, Zuzanna assumes absolute responsibility for the family's material welfare and stability. (Kūle & Kūlis, 2020)
3. **Guilt and Despair.** Students identified indirect manifestations of guilt, particularly emerging through intergenerational misunderstandings and reproaches. This guilt often transforms into despair, most tragically illustrated by Jānis Bertolds senior's profound loneliness and his feeling of no longer being needed by his family after retirement. (Hausmanis, 2005)
4. **Alienation.** The exile situation deeply amplifies the feeling of alienation. Students concluded that the emigrants feel detached not only from their homeland but also estranged within their own families and the surrounding society. (Tabūns, 2008)
5. **Presence of Death.** The inevitability of aging and the approaching end of life serve as an underlying motif, forcing the older characters to confront the limits of their existence and evaluate their lifetime achievements. (Hausmanis, 2000)

Ultimately, students concluded that Eglitis's emigrant characters navigate a complex existential reality where they must personally take responsibility for finding their place and meaning in the world.

Psychological Analysis of Characters' Time Perspectives

A core result of the study was the students' ability to analyse the characters' inner conflicts and intergenerational misunderstandings using Time Perspective theory. Students identified that fixation on a single time zone led to psychological discomfort and family conflicts, whereas a Balanced Time Perspective promoted well-being. The dominant time perspectives identified by the students in the main characters are summarized below (see Table 4).

Table 4. Dominant Time Perspectives of the Main Characters in A. Eglitis’s Novel “The Shameless Old Men”

Character	Dominant Time Perspective	Behavioural and Psychological Manifestation
Zuzanna Bertolde	Future-Oriented	Pragmatic planning, organizing the family budget, and rejecting present joys or past sentiments for the sake of future stability and control.
Jānis Bertolds, senior	Past-Positive and Present-Fatalistic	Deep emotional attachment to his exile chest, memories and traditional values (Past-Positive), combined with a sense of uselessness and lack of control over his current family life after retirement (Present-Fatalistic).
Longins Laukmanis	Balanced Time Perspective	Ability to naturally integrate past experience, future planning, and present enjoyment through social relationships, aesthetics, and artistic appreciation.
Indulis Laukmanis, Blāzma Bertolde	Present-Hedonistic and Present-Fatalistic	Living for the moment and rejection of long-term responsibility and future planning (career, education) driven by a fatalistic belief that society is flawed and individual efforts are futile.
Askolds Olte	Future-Oriented & Present-Hedonistic	Actively plans and sketches the construction of his future home and stables (Future-Oriented), which directly serves his desires to play polo, enjoy nature, and seek new adventures in the present (present-Hedonistic).
Jānis Bertolds, junior	Present-Fatalistic	Demonstrates an avoidance of responsibility and a fatalistic submission to his wife’s and mother’s will, acting as a passive observer who adapts to external pressures rather than making independent decisions.

Through detailed text analysis, students observed that Zuzanna Bertolde’s extreme Future-Oriented Perspective manifested as rigid pragmatism; she sacrificed present joys to maintain control over her environment. In contrast, Jānis Bertolds (her husband) struggled with Present-Fatalism after retiring, feeling useless and relegated to the garage, which he tried to counter by clinging to his Past-Positive memories and his physical exile chest. The middle generation, represented by Jānis Bertolds (junior), demonstrated pure Present-Fatalism, passively avoiding responsibility and submitting to his dominant mother. The younger generation, represented by Indulis Laukmanis and Blāzma Bertolde, exhibited a mix of Present-Hedonism and Present-Fatalism, completely rejecting future planning due to a belief that the modern societal structure is fundamentally flawed. Among the older generation, Askolds Olte showcased a unique blend of Future-Oriented planning that exclusively served his Present-Hedonistic desire for adventure and polo. Ultimately, students concluded that Longins Laukmanis represented the ideal Balanced Time Perspective, as he successfully integrated his past experiences without getting stuck in them, secured his future, and actively found joy in the present. Students identified that fixation on a single time perspective often contributed to emotional dissatisfaction, interpersonal conflict, and difficulties in adapting to exile conditions, whereas a Balanced Time Perspective promoted psychological stability and social adaption.

Self-Discovery and Personal Identity Formation

A significant outcome of the study was the students' engagement in deep self-reflection. Because psychology and philosophy are not offered as separate subjects at the upper-secondary education stage in this school, literature lessons served as a vital platform for addressing these disciplines. By analysing the literary characters' choices, behavioural motivations, and intergenerational conflicts, students indirectly analysed their own personalities, values, and relationships with their parents and peers. (Eriksons, 1998; Svence, 1999) This aligns with the principle that literature acquisition should serve as a practical tool for shaping youth identity and life skills. (Stikute, 2011) Furthermore, motivated by the character analysis, several students voluntarily completed the Zimbardo Time Perspective Inventory (ZTPI) to evaluate their personal dominant time zones. (Zimbardo & Boyd, 2008) This demonstrates that integrating psychological frameworks into text analysis transforms literature lessons from a purely academic reading task into a meaningful journey of self-discovery and emotional intelligence development.

Discussion

The discussion examines the findings in the context of current research on literature education and interdisciplinary pedagogy. It considers how the integration of psychological and philosophical perspectives supported the development of students' text literacy and higher-order thinking, explores the methodological contribution of the SOLO taxonomy, discusses the challenges of multilingual literature education, and outlines the pedagogical implications of the proposed instructional approach.

Interdisciplinary Literature Education and the Development of Text Literacy

The findings suggest that an interdisciplinary approach to literature education significantly contributes to the development of students' text literacy, interpretative abilities, and emotional awareness. Integrating P. Zimbardo's Time Perspective Theory (Zimbardo & Boyd, 2008) and existentialist philosophy encouraged students to move beyond factual comprehension towards a deeper interpretation of literary texts. Rather than focusing solely on plot and character description, students analysed psychological motivations, value systems, intergenerational conflicts, and the existential dimensions of the exile experience presented in Anshlav Eglitis's novel *The Shameless Old Men*. (Daukste-Silasproģe, 2007)

The study demonstrates that combining literary analysis with psychological and philosophical perspectives enables students to construct richer and more nuanced interpretations. By examining the relationship between personal identity, historical circumstances, and individual decision-making, students engaged in a dialectical process of aesthetic and emotional experience. (Ausekle, 2003) Their interpretations reflected an understanding of exile not as a simplified narrative of heroism or victimhood, but as a complex human experience shaped by historical, social, and existential factors. (Rozītis, 2005; Wyman, 1998) This interpretation aligns with Rozītis's (2005) concept

of the “chronotope of exile”, which emphasises the disruption of temporal and spatial continuity as a defining characteristic of Latvian exile literature.

Furthermore, analysing the connections between A. Eglitis’s own experiences of exile in America and the personalities of his literary characters encouraged students to perceive literature as a reflection of historical and cultural reality rather than as an isolated fictional narrative. (Daukste-Silasproģe, 2007, 2024; Hausmanis, 2005; Struka, 2022) Exploring diverse responses to exile fostered empathy and tolerance toward different life choices and value systems. These results strongly align with previous pedagogical research emphasizing that literature education plays an essential role in youth identity formation, value orientation, and the development of emotional intelligence. (Rudzītis, 2000; Stikute, 2011; Zimule, 1991)

Ultimately, this interdisciplinary framework not only strengthens text literacy and critical thinking but also directly supports the broader aims of competency-based education by bridging abstract concepts with real-world human coping mechanisms.

SOLO Taxonomy and the Development of Higher-Order Thinking

The findings highlight the importance of gradually increasing task complexity in literature education. Learning activities were designed according to the principles of the SOLO taxonomy (Biggs & Collis, 1982), progressing from the identification and description of textual information toward interpretation, analysis, evaluation, and argumentative writing. This structured progression encouraged students to develop higher-order thinking skills while engaging more deeply with the literary texts.

The SOLO taxonomy served not only as a framework for sequencing learning activities but also as a methodological basis for designing task questions and assessment criteria. Learning tasks were designed to correspond primarily to the relational and extended abstract levels of the taxonomy. These tasks required students to synthesise information, establish relationships between literary, psychological, and philosophical concepts, and justify their interpretations using textual evidence, and formulate independent conclusions. Consequently, assessment focused not merely on the reproduction of factual knowledge but on students’ ability to construct coherent, evidence-based interpretations and arguments.

From a pedagogical perspective, this approach closely aligns with the objectives of Latvia’s competency-based curriculum and the assessment principles applied in the national upper secondary examination in Latvian Language and Literature. (Lāčauniece et al., 2020) The findings therefore suggest that integrating the SOLO taxonomy into literature education provides an effective methodological framework for developing analytical, interpretative, and argumentative competences while simultaneously preparing students for the cognitive demands of summative assessment.

Challenges of Teaching Literature in a Multilingual Classroom

The study also revealed several pedagogical challenges associated with teaching complex literary texts in a multilingual classroom. Although students successfully interpreted

the characters' past- and present-oriented time perspectives, they experienced greater difficulty when analysing future-oriented perspectives and evaluating the subjective factors underlying the characters' decisions and existential choices. These findings suggest that abstract psychological constructs require a higher level of interpretative thinking than descriptions of observable behaviour and therefore demand more explicit instructional support. (Svence, 1999)

The challenges were further intensified by the multilingual learning context. As Latvian was not the students' native language, they were required to interpret literary symbolism, culturally specific concepts, and abstract philosophical ideas through their second language. This considerably increased the cognitive demands of the learning process. (Auziņa & Šalme, 2016) Understanding complex concepts such as exile, identity, freedom, responsibility, and future orientation posed a significant cognitive challenge. It required students to move beyond the mere linguistic comprehension of the text and actively integrate historical, cultural, psychological, and philosophical perspectives into their interpretations.

From a pedagogical perspective, these findings highlight the importance of providing systematic scaffolding when teaching conceptually demanding literary narratives in multilingual classrooms. Carefully sequenced learning activities, explicit discussions of abstract concepts, guided interpretation, and opportunities for reflective dialogue appear to support students in developing deeper text literacy and more sophisticated literary interpretations. (Oliņa, Namsone, & France, 2018) Such support is particularly important when literature education aims to foster critical thinking, empathy, and personal reflection rather than factual comprehension alone. (Eriksons, 1998; Svence, 1999)

Overall, the findings indicate that the successful development of higher-order interpretative skills depends not only on students' literary knowledge but also on the careful integration of language support, conceptual scaffolding, and interdisciplinary learning strategies. These considerations may be particularly relevant for multilingual educational contexts in which literature serves simultaneously as an object of the study and as a means of developing advanced language proficiency and cultural understanding. (Ancāne, 2024; Pičukāne, 2022)

Pedagogical Implications for Literature Education

The findings of this study demonstrate that interdisciplinary literature education provides a valuable methodological framework for developing students' text literacy, critical thinking, and reflective interpretation. Integrating literary analysis with psychological and philosophical perspectives encourages students to examine literary texts from multiple viewpoints and to establish meaningful connections between literature, personal experience, and broader social and historical contexts. (Stikute, 2011) Therefore, this approach offers a transferable pedagogical model that can be applied not only to the teaching of Latvian exile literature but also to other conceptually complex literary narratives.

Within this framework, Anshlav Eglitis's novel *The Shameless Old Men* offers considerable pedagogical potential for advanced secondary literature education, particularly within the advanced-level course "Latvian Language and Literature". The novel creates opportunities for the interdisciplinary exploration of cultural identity, historical memory, existential philosophy, and psychological dimensions of human behaviour. At the same time, it enables students to investigate linguo-cultural concepts that are central to Latvian cultural consciousness, including "homeland" (*dzimtene*), "exile" (*trimda*), and the "chest" (*lāde*), thereby strengthening both literary interpretation and cultural literacy.

The study also suggests that the depth of these learning outcomes depends on sufficient instructional time. While the initial eight-lesson sequence proved effective in introducing the interdisciplinary approach, it did not provide adequate opportunities for sustained reflection, discussion, and independent interpretation of abstract psychological and philosophical concepts. Expanding the unit to approximately twenty lessons would allow students to revisit complex ideas from multiple perspectives, strengthen argumentative writing, and consolidate higher-order interpretative skills. (Oliņa et al., 2018)

Overall, the findings indicate that carefully designed interdisciplinary learning sequences – supported by structured cognitive scaffolding and constructive alignment between learning objectives, learning activities, and assessment – can significantly enhance literature education in upper secondary schools. (Biggs & Collis, 1982) Such an approach not only develops students' literary competence but also fosters empathy, cultural awareness, and the reflective thinking required for meaningful engagement with literature in contemporary multilingual classrooms. (Rudzītis, 2000; Zimule, 1991)

Conclusions

The findings suggest that integrating psychological theories and philosophical perspectives into literature education provides a valuable interdisciplinary framework for developing students' text literacy, interpretative competence, critical thinking, cultural awareness, and empathy. By encouraging students to analyse literary texts through multiple disciplinary perspectives, this approach promotes deeper literary interpretation and more meaningful engagement with complex literary narratives.

The study indicates that the interdisciplinary learning sequence supported students' ability to interpret literary characters as psychologically and existentially complex personalities whose decisions are shaped by the interaction of historical, cultural, and temporal factors. Rather than focusing solely on narrative events, students developed increasingly sophisticated interpretations by connecting literary, psychological, and philosophical perspectives.

The structured implementation of the SOLO taxonomy provided an effective methodological framework for progressively developing higher-order cognitive skills. Using the taxonomy to sequence learning activities, formulate task prompts, and align assessment criteria supported students' analytical, interpretative, reflective, and argumentative

abilities, particularly in a multilingual educational context where Latvian language is not the students' native language.

The findings further indicate that students require additional methodological support when analysing Future-Oriented Time Perspectives, existential decision-making, and other abstract psychological and philosophical concepts. These results highlight the importance of carefully structured instructional scaffolding and sufficient opportunities for guided interpretation and reflective discussion when teaching conceptually demanding literary texts.

Overall, the study demonstrates the pedagogical potential of interdisciplinary literature education for upper secondary schools. Expanding the thematic unit beyond the initial eight-lesson sequence would provide greater opportunities for sustained reflection, interdisciplinary integration, and the development of higher-order interpretative skills, thereby strengthening both literature education and students' text literacy.

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AN INTEGRATED DEA–FUZZY LOGIC FRAMEWORK FOR CURRICULUM PERFORMANCE EVALUATION

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ABSTRACT

This study proposes an integrated DEA–Fuzzy Logic framework for the systematic and quantitative evaluation of curriculum performance within a multi-criteria decision-making context. The framework addresses two key challenges in curriculum assessment: the subjectivity of expert judgments and the need to determine the relative importance and efficiency of courses across multiple competency criteria. For the evaluation, a performance analysis was conducted by considering the weekly course hours and credits of the courses, along with the levels of contribution they provide to the defined competency areas associated with the programs in which they are offered. The contribution of each course to these competencies is evaluated using a seven-level linguistic scale via the experts. To manage uncertainty and ambiguity in qualitative assessments, triangular fuzzy numbers are employed, converting linguistic judgments into measurable performance scores. This process generates a structured and comparable multi-criteria dataset for the Data Envelopment Analysis (DEA) model. Courses are treated as decision-making units, where weekly course hours and course credits are considered as input variables, while the quantified competency-areas scores constitute the output variables. Using an output-oriented Variable Returns to Scale (VRS) DEA model, the relative efficiency of courses is assessed without requiring predefined weights. This non-parametric optimization approach enables courses to be ranked according to the extent to which they contribute to curriculum competencies relative to the instructional resources allocated to them. The proposed framework is applied to an associate degree vocational education curriculum as a case study to demonstrate its operational validity. The findings indicate that the integrated DEA–Fuzzy Logic approach provides a robust, flexible, and decision-supportive tool for evidence-based curriculum evaluation.

Keywords: Curriculum, Performance Evaluation, Data Envelopment Analysis (DEA), Fuzzy Logic, Multi-Criteria Decision Making (MCDM)

Introduction

Curricula are regarded as the heart of educational processes (Supriani et al., 2022). In the educational process, their role in preparing students for the living and working conditions in their respective fields is undeniable (Tong et al., 2020). Therefore, changes and developments in professional requirements, educational tools, and educational systems necessitate that curricula be systematically addressed as a dynamic phenomenon. Unfortunately, curricula are sometimes shaped by random and unplanned approaches rather than being based on a specific philosophy (Tribe, 2014).

Curricula have the power to reflect the sum of all experiences provided in educational institutions (Bharvad, 2009), and curriculum improvements are considered one of the most important keys to success for educational institutions (Puplampu and Mugo, 2020). A systematic evaluation process is needed to update this dynamic system in a way that suits the needs. Curriculum evaluation is considered the process of examining the value, effectiveness, and quality of an educational program (Nouraey et al., 2020). The literature on curriculum assessment is quite rich and diverse, both in terms of assessment focuses and theoretical models used. On one hand, there are studies on the impact of curriculum design strategies on student learning (Cunningham et al., 2020), assessment of learning outcomes (Hernández-Campos et al., 2025), and industry-participatory designs (Arun Kumar, 2022), while on the other hand, different models have been developed that systematically address the assessment process. These include the CIPP model proposed by Stufflebeam (2000), which considers the assessment process within a complete life cycle consisting of context, input, process, and output dimensions; Kirkpatrick's Four-Level Model (Kirkpatrick and Kirkpatrick, 2006), which evaluates participants' gains at the response, learning, behavior, and outcome levels; and Phillips' ROI Model (Phillips, 2012), which adds a fifth level, Return on Investment (ROI), to the assessment, thus including the economic dimension. Stake's Evaluation Model (Stake, 1967), which examines the congruence between the intended, implemented, and observed aspects of the curriculum by including the time dimension before and after the process in the evaluation, and Tyler's Goal-Based Evaluation Model (Tyler, 2013), which focuses on the extent to which educational goals have been achieved and is quite simple and understandable, are quite noteworthy.

As stated by Stufflebeam (2000), curriculum evaluations are expected to provide data for planning, implementation, and development decisions. Unlike existing curriculum evaluation approaches, this study, for the first time in the literature, evaluates the performance of the courses in the curriculum, considering their contribution to the core competencies of the program along with the educational resources used (course hours and credits). This approach provides a data source for curriculum updates by enabling the determination of the relative performance of the courses.

An analysis of the current state of curricula should be regarded as the first step toward planning curriculum development efforts. While the most fundamental stakeholders of curricula are the educational institutions and teachers who deliver them, along with

the students receiving the education, the curriculum is undoubtedly a social element. In this study, an approach is presented to systematically examine such an effective tool for shaping the future of societies. The focus of the evaluation approach lies on the courses within the curriculum and the diverse professional perspectives the curriculum offers to students (Yaşlı and Yüncü, 2023). The contributions of courses to the programme are multifaceted. Some courses may contribute to multiple competencies at a low-to-medium level, while others may contribute intensively to a small number of competencies. If weighting for multiple competencies is involved and the contributions of courses under the relevant competencies can be scored, courses can be given a single score across multiple domains through weighted summation. However, in an educational environment where resources such as credits and course hours are limited, interpreting courses based solely on their contributions will not be sufficient. In this context, evaluating courses using DEA (Data Envelopment Analysis) reveals their relative performance based on their contributions and resources. DEA enables courses to be evaluated under multiple competencies without any weights being assigned to competencies through mathematical optimisation, while fuzzy logic allows linguistic expressions to be used for expert evaluations.

Therefore, the proposed assessment methodology employs an integrated DEA–Fuzzy Logic approach. The defined competency areas form the curriculum evaluation criteria, and fuzzy logic allows for the quantification of evaluators’ ambiguous and subjective opinions to be quantified and facilitates the evaluation of courses’ contribution to multiple competency domains. This study presents a systematic and data-driven evaluation approach for analyzing the relative performance of courses within the curriculum. The methodology was applied to the curriculum courses of a program offering associate-level vocational education in the field of rail system operations, and the results are presented.

Methodology

Fuzzy Logic

Fuzzy logic is used to reflect mathematical expressions by quantifying the ambiguity in human thoughts and judgments. Fuzzy set theory, introduced by Zadeh (1965), offers the advantage of mathematically capturing the distinctions between linguistic expressions such as “very high,” “high,” “low,” and “very low.” Over the years, numerous different types of fuzzy numbers have been proposed in the literature on fuzzy logic to address uncertainties using fuzzy sets. Zadeh (1975) proposed that ambiguity could be quantified by developing a membership concept ranging from 0 to 1 for mathematical expressions. Fuzzy numbers, which vary in the literature as triangular, trapezoidal, intuitionistic, type-2, interval type-2, pythagorean, spherical, q-rung orthopair, and fermatean, offer a more realistic representation of the uncertainty in human judgments and provide computational flexibility (Torra, 2010; Kutlu Gündoğdu and Kahraman, 2019; Yager, 2013; Senapati and Yager, 2020; Atanassov, 2016). In this study, triangular fuzzy

numbers, which represent the most fundamental application of fuzzy logic, were used. Triangular fuzzy numbers are represented as (l, m, u) , where 'l' represents the smallest possible value, 'm' the most likely value, and 'u' the largest possible value. All fuzzy numbers (x) within a fuzzy set $(\tilde{F})$ (Eq. 1), along with their membership degree $(\mu_{\tilde{F}})$ (Eq. 2), are defined as follows.

$$\tilde{F} = \{x, \mu_{\tilde{F}}(x) \mid x \in \tilde{F}, \mu_{\tilde{F}}(x) \in [0,1]\} \tag{Eq. 1}$$

$$\mu_{\tilde{F}}(x) = \begin{cases} \frac{r-l}{m-l} & \text{for } l \leq x \leq m, \\ \frac{u-r}{u-m} & \text{for } m \leq x \leq u, \\ 0 & \text{otherwise.} \end{cases} \tag{Eq. 2}$$

Table 1 shows the linguistic expressions used in the study to determine the level of contribution of the courses under the defined competency areas, along with the corresponding fuzzy triangular numbers.

Since the study uses k expert opinions, the multiple evaluations of the courses are aggregated using the fuzzy arithmetic operations presented in Eq. 3 and Eq. 4 (Zadeh, 1965). After aggregating and combining the expert judgments, which correspond to fuzzy numbers, the defuzzification process given in Eq. 5 is applied to obtain the crisp values of the courses under the specified competency area. For the defuzzification process, the expected value method, proposed by Heilpern (1992), which increases the related representation of the value by giving 2 times the weight to the 'm' value representing the most likely value, is used.

Table 1. Evaluation scale

Linguistic Expressions		Corresponding TFN (l, m, u)
1 – Insignificant	The course is insignificant within that competency area.	(0, 0, 0.1)
2 – Very low level	The course contributes at a very low level to that competency area.	(0, 0.1, 0.3)
3 – Low level	The course contributes at a low level to that competency area.	(0.1, 0.3, 0.5)
4 – Medium level	The course contributes at a medium level to that competency area.	(0.3, 0.5, 0.7)
5 – High level	The course contributes at a high level to that competency area.	(0.5, 0.7, 0.9)
6 – Very high level	The course contributes at a very high level to that competency area.	(0.7, 0.9, 1)
7 – Absolutely important	The course contributes with absolute importance to that competency area.	(0.9, 1, 1)

$$\tilde{F}_1 \oplus F_2 = (l_1, m_1, u_1) \oplus (l_2, m_2, u_2) = (l_1 + l_2, m_1 + m_2, u_1 + u_2) \quad \text{Eq. 3}$$

$$\frac{\tilde{F}_1}{\tilde{F}_2} k = \frac{(l_1, m_1, u_1)}{k} = (l_1 / k, m_1 / k, u_1 / k) \quad \text{Eq. 4}$$

$$F^* = (i + 2m + u) / 4 \quad \text{Eq. 5}$$

Data Envelopment Analysis

DEA enables the relative comparison of evaluation units – treated as decision-making units (DMU) – through mathematical optimization, using their values under multiple criteria. Proposed by Farrell (1957) and popularized by Charnes et al. (1978), DEA involves determining efficiency frontiers based on the input and output values of the units. In relative performance evaluations conducted using DEA, the proper identification of input and output variables is critical. Efficient frontiers are identified through the highest values determined based on the units' output-to-input ratios. If high outputs are achieved with low inputs, these units are considered efficient under the DEA approach (Nishiuchi et al., 2015).

The performance of DMUs is evaluated based on their distance from the efficient frontier determined through mathematical optimization. DEA employs two different approaches regarding returns to scale: constant and variable. If outputs are expected to vary in a constant manner relative to input levels, the constant return to scale approach is recommended; otherwise, the variable return to scale approach is suggested (Tsai et al., 2015). Additionally, DEA models can be considered input-oriented or output-oriented. At this point, it is important to determine whether interventions can be made on the inputs or outputs of the evaluated units. The focus is determined based on which is more feasible to intervene in. In our study, inputs were defined as the weekly class hours and credits of courses, and it was assumed that interventions could only be made on the outputs of all units. Furthermore, since using the constant returns assumption would not be theoretically appropriate for determining performance based on the contributions of courses, a variable returns model was employed. Thus, the convexity constraint that ensures the variable returns assumption has allowed the scale effect at the input levels of courses to be disregarded and has prevented courses from being in a superior or disadvantaged position based on scale advantages depending on their weekly class hours and credit levels. In this study, an output-oriented variable returns model was used, and the model employed in this study is presented in Eq. 6.

$$\begin{aligned} & \max \theta \\ & \sum_{j=1}^n \lambda_j = 1 \\ & \sum_{j=1}^n \lambda_j x_{ij} \leq x_{io}, \quad \forall i \\ & \sum_{j=1}^n \lambda_j y_{rj} \geq \theta y_{ro}, \quad \forall r \\ & \lambda_j \geq 0 \end{aligned} \quad \text{Eq. 6.}$$

The programme courses to be evaluated are defined as the DMUs of the DEA model. It should be noted that this study only considers programme courses whose content, credits and class hours can be planned and updated by the administration as required. Therefore, courses whose content and credit structure are determined by the Higher Education Council and cannot be changed at programme level should be excluded from the evaluation. Consequently, the evaluation framework focuses on courses where the programme can make direct decisions and implement improvements. The courses' class hours and credit information serving as input variables; the contribution values obtained using the fuzzy logic approach based on predetermined criteria were treated as outputs. In the model, where θ represents the activity coefficient, the value $1/\theta$ indicates the course's final performance on a scale of 0 to 1. Within the scope of this study, units with an efficiency coefficient of 1 – which can also be considered an output expansion coefficient – are the courses with the highest contribution to the program based on their inputs; as this value decreases, the course's performance also decreases. While y_{rj} represents the r th output value of the j^{th} DMU, the value y_{ro} indicates the r th output of the o th DMU being evaluated. Similarly, while x_{ij} represents the i^{th} input value of the j^{th} DMU, the value x_{io} indicates the i^{th} input of the o^{th} DMU being evaluated. The value λ_j indicates the level of contribution each DMU makes to the formation of the efficiency frontier. The constraint that the sum of all lambda values equals 1 is included in the model as the convexity constraint that ensures the assumption of variable returns.

Application

Definition of the Program's Competency Areas

It is generally accepted that every curriculum aims to provide students with learning outcomes from multiple perspectives; within the scope of this study, the competency areas offered to students by the curriculum within the relevant program are defined. As part of this study, an evaluation was conducted of the courses in the Rail Systems Management program at the Vocational School of Transportation at Eskişehir Technical University. The competency areas offered by the educational program through its curriculum have been defined by department heads as technical, managerial, and organizational culture, and are presented in Table 2.

Table 2. Defined education perspectives

Education Perspectives in Rail Systems Management Program	
Technical Knowledge	Having knowledge of technical aspects related to rail system components such as trains, tracks, machinery, etc.
Managerial Knowledge	Having knowledge of system planning, management, and operation of rail systems.
Working Culture	Gaining the social requirements of working in rail system units and acquiring railway culture.

Evaluation of the Courses

In the curriculum of the relevant program, all 23 required courses and 25 professional elective courses – excluding the Turkish Language and History courses mandated by the Higher Education Council – were included in the evaluation. The courses are defined as DMUs as shown in Table 3.

Table 3. Course names and corresponding DMU codes

Course Name	DMU	Course Name	DMU
Labor Legislation	DMU1	Organizational Behavior	DMU25
Historical Development of Railways	DMU2	Marketing	DMU26
Maintenance and Certification of Rail Vehicles	DMU3	Marketing Management	DMU27
Rail Transportation I	DMU4	Human Resources Management	DMU28
Rail Transportation II	DMU5	Rail Vehicle Mechatronics I	DMU29
Scientific Principles of Rail Technology	DMU6	Rail Vehicle Mechatronics II	DMU30
Emerging Approaches in Railway Traffic Management	DMU7	Introduction to Rail System	DMU31
General Electric-Electronics Fundamentals	DMU8	Rail System Operations Management	DMU32
Introduction to Business	DMU9	Cost Analysis in Rail System	DMU33
General Mechanical Fundamentals	DMU10	Rail Traffic Operations	DMU34
Principles of Accounting	DMU11	Emerging Technologies in Rail Systems	DMU35
Railway Track Fundamentals	DMU12	Cultural Values in Rail Transportation	DMU36
Public Relations	DMU13	Internship	DMU37
Service Marketing	DMU14	Transportation Management	DMU38
English I	DMU15	Transportation of Dangerous Goods	DMU39
English II	DMU16	Technical English	DMU40
Occupational Health and Safety	DMU17	Technical Drawing	DMU41
Statistics	DMU18	Scientific Principles of Technology I	DMU42
Economics of Road Transportation	DMU19	Scientific Principles of Technology II	DMU43
Urban Rail Transit Systems I	DMU20	Fundamentals of Computer Applications	DMU44
Urban Rail Transit Systems II	DMU21	Commercial Law	DMU45
Logistics Management	DMU22	Topography	DMU46
Mathematics I	DMU23	Train Mechanics	DMU47
Mathematics II	DMU24	Train and Wagon Planning	DMU48

After defining the weekly class hours and credits of the courses as input values for the DMUs in the model, the opinions of 10 faculty members teaching in the program were utilized to evaluate the courses under the established educational perspectives. Table 4 presents the minimum, maximum, mean, and standard deviation values for the evaluations given by ten experts within the three educational perspectives for each course.

Table 4. Descriptive statistics of expert evaluations for the courses (DMUs)

DMUs	Technical Knowledge				Management Knowledge				Working Culture			
	Min	Max	Mean	Sd	Min	Max	Mean	Sd	Min	Max	Mean	Sd
DMU1	1	5	3.2	1.32	3	7	5.2	1.23	4	7	5.1	1.20
DMU2	1	5	2.7	1.25	1	6	3.5	1.35	3	7	5.7	1.34
DMU3	2	7	6	1.49	4	7	5.1	1.10	1	6	2.9	1.37
DMU4	2	7	5	1.63	2	7	6	1.56	2	5	3.4	1.07
DMU5	2	7	5	1.63	2	7	6	1.56	2	5	3.4	1.07
DMU6	3	7	5	1.56	1	6	3.4	1.26	1	5	2.2	1.55
DMU7	2	6	4.5	1.18	2	7	5.1	1.60	1	5	3.2	1.32
DMU8	1	7	4.9	1.73	1	5	3	1.49	1	4	2.3	1.06
DMU9	1	6	2.5	1.51	4	7	5.4	1.17	2	7	3.9	1.45
DMU10	4	7	6.1	0.99	2	6	3.9	1.45	1	5	2.6	1.43
DMU11	1	5	2.2	1.48	3	7	5.2	1.32	1	4	2.3	0.95
DMU12	1	7	4.9	1.97	2	6	4.1	1.29	1	5	2.9	1.45
DMU13	1	5	2.1	1.37	1	7	4.9	2.02	2	7	4.4	1.58
DMU14	1	4	2.1	1.37	4	7	5.5	0.97	2	6	3.8	1.40
DMU15	1	6	3.8	1.81	1	7	4	2.21	1	6	3.6	1.84
DMU16	1	6	3.8	1.81	1	7	4	2.21	1	6	3.8	1.75
DMU17	1	7	4.6	1.78	4	7	5.6	1.17	2	7	4.9	2.08
DMU18	5	6	5.2	0.42	4	7	5.4	0.84	1	5	2.7	1.70
DMU19	1	5	2.9	1.66	3	7	5.5	1.18	1	7	3.7	2.16
DMU20	2	7	5.6	1.58	3	7	5.7	1.49	1	7	3.8	1.69
DMU21	2	7	5.6	1.58	3	7	5.7	1.49	1	7	3.8	1.69
DMU22	2	6	3.6	1.51	4	7	5.9	1.10	1	7	3.2	1.93
DMU23	1	7	4.4	2.07	1	7	3.6	2.01	1	5	2	1.63
DMU24	1	7	4.4	2.07	1	7	3.6	2.01	1	5	2	1.63
DMU25	1	5	2	1.63	2	7	4.4	1.58	2	7	4.9	1.45
DMU26	1	4	2	1.25	2	7	5.1	1.52	2	5	3.4	1.17
DMU27	1	4	2	1.25	2	7	5.2	1.48	2	5	3.5	1.27
DMU28	1	5	3	1.63	2	7	5.2	1.62	2	7	4.7	1.49
DMU29	4	7	5.9	1.20	1	6	3.5	1.72	1	5	2.5	1.65
DMU30	4	7	5.9	1.20	1	6	3.5	1.72	1	5	2.5	1.65

DMUs	Technical Knowledge				Management Knowledge				Working Culture			
	Min	Max	Mean	Sd	Min	Max	Mean	Sd	Min	Max	Mean	Sd
DMU31	4	7	5.6	1.26	3	7	5.5	1.78	1	6	4.1	1.60
DMU32	2	6	4.2	1.62	5	7	6.4	0.97	2	7	4.4	1.71
DMU33	2	6	3.7	1.64	5	7	6.5	0.85	1	6	3.4	1.96
DMU34	1	7	5.1	1.66	4	7	5.9	1.45	2	6	4.1	1.45
DMU35	2	7	5	1.33	2	6	4.4	1.17	1	5	3.3	1.34
DMU36	1	4	3	1.15	2	5	3.8	1.40	5	7	6.2	0.92
DMU37	3	7	5.6	1.65	4	7	6	1.15	5	7	6.1	0.88
DMU38	2	7	4.1	1.52	5	7	6.2	0.92	2	7	4.3	1.34
DMU39	2	7	4.8	1.75	3	7	5.5	1.27	2	7	3.7	1.70
DMU40	2	7	5	1.41	2	7	5.1	1.97	2	5	3.6	1.35
DMU41	4	7	5.6	0.97	1	6	3.1	1.97	1	5	2.6	1.51
DMU42	3	7	5.6	1.17	1	6	3	1.83	1	6	2.3	1.83
DMU43	3	7	5.6	1.17	1	6	2.9	1.85	1	6	2.44	1.88
DMU44	1	7	4.1	2.38	1	7	4.9	2.08	1	6	3.1	1.97
DMU45	1	5	2.5	1.58	3	7	5.5	1.43	2	5	3.2	1.40
DMU46	1	7	4.6	2.01	1	5	2.9	1.52	1	5	2.4	1.65
DMU47	4	7	6.3	1.06	1	6	4.2	1.62	1	6	2.7	2.06
DMU48	4	7	5.7	1.25	4	7	6.2	1.14	1	7	3.5	2.22

Descriptive statistics summarise the distribution of expert evaluations by course. As can be seen in the table, expert evaluations vary to varying degrees across courses and educational perspectives. This variability is consistent with the subjective nature of educational evaluations, revealing that experts can evaluate the contributions of courses from different perspectives. In this study, no weighting or pre-selection was applied to the expert opinions; all evaluations were considered equally. Expert evaluations were then converted into relevant fuzzy numbers using the fuzzy logic approach, and these were used to create the output variables in the DEA model. The input and output values determined for the courses are presented in Table 5.

Table 5. Courses of the Curriculum and the Related Data for the DEA

Course Name	Hours	Credit	Tech.	Man.	Culture
Labor Legislation	4	4	0.3625	0.7020	0.6913
Historical Development of Railways	4	4	0.2744	0.4090	0.7959
Maintenance and Certification of Rail Vehicles	4	4	0.8471	0.6939	0.2794
Rail Transportation I	3	3	0.6765	0.8413	0.3817
Rail Transportation II	3	3	0.6765	0.8413	0.3817
Scientific Principles of Rail Technology	4	4	0.6576	0.4073	0.2081

Course Name	Hours	Credit	Tech.	Man.	Culture
Emerging Approaches in Railway Traffic Management	4	4	0.6020	0.7020	0.3625
General Electric-Electronics Fundamentals	4	4	0.6570	0.3308	0.2026
Introduction to Business	3	3.5	0.2576	0.7526	0.4616
General Mechanical Fundamentals	4	4	0.8538	0.4988	0.2654
Principles of Accounting	3	4.5	0.2244	0.7288	0.1863
Railway Track Fundamentals	4	4	0.6584	0.5206	0.3070
Public Relations	3	3	0.2035	0.6660	0.5596
Service Marketing	3	4.5	0.2006	0.7799	0.4520
English I	3	3	0.4985	0.5323	0.4238
English II	3	3	0.4985	0.5323	0.4674
Occupational Health and Safety	2	3.5	0.6267	0.7802	0.6253
Statistics	3	3	0.7366	0.7640	0.2802
Economics of Road Transportation	2	2	0.3160	0.7721	0.4334
Urban Rail Transit Systems I	3	4	0.7724	0.7881	0.4529
Urban Rail Transit Systems II	3	4	0.7724	0.7881	0.4529
Logistics Management	4	4	0.4282	0.8311	0.3378
Mathematics I	3	4	0.6023	0.4610	0.1860
Mathematics II	3	4	0.6023	0.4610	0.1860
Organizational Behavior	3	4	0.2029	0.5916	0.6622
Marketing	2	3	0.1773	0.7032	0.3756
Marketing Management	3	4.5	0.1773	0.7241	0.3965
Human Resources Management	4	4	0.3471	0.7119	0.6131
Rail Vehicle Mechatronics I	4	4	0.8154	0.4224	0.2503
Rail Vehicle Mechatronics II	4	4	0.8154	0.4224	0.2503
Introduction to Rail System	3	5	0.7733	0.7474	0.5302
Rail System Operations Management	4	3	0.5529	0.8919	0.5503
Cost Analysis in Rail System	2	2	0.4512	0.9113	0.3927
Rail Traffic Operations	3	4	0.7174	0.8160	0.5270
Emerging Technologies in Rail Systems	4	4	0.6919	0.5881	0.3672
Cultural Values in Rail Transportation	4	4	0.3279	0.4791	0.8721
Internship	2	5	0.7491	0.8369	0.8605
Transportation Management	4	4	0.5238	0.8744	0.5369
Transportation of Dangerous Goods	4	4	0.6314	0.7765	0.4189
Technical English	3	3	0.6892	0.6892	0.4148
Technical Drawing	4	4.5	0.7962	0.3773	0.2672
Scientific Principles of Technology I	2	2	0.7878	0.3468	0.2279
Scientific Principles of Technology II	2	2	0.7878	0.3265	0.2259
Fundamentals of Computer Applications	4	5	0.5314	0.6674	0.3552

Course Name	Hours	Credit	Tech.	Man.	Culture
Commercial Law	2	3	0.2610	0.7637	0.3390
Topography	4	4.5	0.5942	0.3169	0.2352
Train Mechanics	4	3	0.8712	0.5558	0.2953
Train and Wagon Planning	5	4	0.7884	0.8735	0.3930

Table 6. Courses in the curriculum and performance scores

Course Name	S	Course Name	S
Labour Legislation	1	Organizational Behavior	1
Historical Development of Railways	1	Marketing	1
Maintenance and Certification of Rail Vehicles	0.7924	Marketing Management	1
Rail Transportation I	0.9259	Human Resources Management	0.9709
Rail Transportation II	0.9259	Rail Vehicle Mechatronics I	0.4724
Scientific Principles of Rail Technology	0.4511	Rail Vehicle Mechatronics II	0.4724
Emerging Approaches in Railway Traffic Management	0.7782	Introduction to Rail Systems	0.8518
General Electric-Electronics Fundamentals	0.3706	Rail Systems Operations Management	1
Introduction to Business	0.9737	Cost Analysis in Rail Systems	1
General Mechanical Fundamentals	0.5537	Rail Traffic Operations	0.9217
Principles of Accounting	1	Emerging Technologies in Rail Systems	0.6601
Railway Track Fundamentals	0.5817	Cultural Values in Rail Transportation	1
Public Relations	1	Internship	1
Services Marketing	1	Transportation Management	0.9901
English I	0.7008	Transportation of Dangerous Goods	0.8628
English II	0.7474	Technical English	0.7734
Occupational Health and Safety	0.9671	Technical Drawing	0.4292
Statistics	1	Scientific Principles of Technology I	0.8993
Economics of Road Transportation	1	Scientific Principles of Technology II	0.8993
Urban Rail Transit Systems I	0.8811	Fundamentals of Computer Applications	0.7413
Urban Rail Transit Systems II	0.8811	Commercial Law	1
Logistics Management	0.9443	Topography	0.3654
Mathematics I	0.5258	Train Mechanics	0.6169
Mathematics II	0.5258	Train and Wagon Planning	0.9606

Following the fuzzy logic approach and DEA application described in the Methodology section, the performance scores for the courses were obtained as shown in Table 6.

Based on the results, 15 of the 48 courses in the curriculum were found to be fully effective ($\theta = 1$). This result indicates that one-third of the courses fall above the effectiveness threshold. Considering the number of class hours and credits for these courses, it is evident that they are the core courses that contribute most significantly to the program's defined educational objectives.

The performance level of 60% of the courses is above 0.8. This result demonstrates that a significant portion of the courses in the curriculum exhibit high performance and effectively contribute to the achievement of program outcomes. The courses identified as having effective performance within the program are Labor Law, Historical Development of Railways, General Accounting, Public Relations, Service Marketing, Statistics, Road Transport Economics, Organizational Behavior, Marketing, Marketing Management, Railway System Operations, Railway System Cost Analysis, Cultural Values in Rail Transportation, Internship, and Commercial Law. These courses serve as benchmarks for other courses and are relatively the most successful under the current performance indicators. In contrast, it was determined that foundational courses such as Mathematics I-II, Topography, General Electrical and Electronic Knowledge, and Technical Drawing are far from the effective threshold. The fact that these courses receive lower performance scores does not imply that they are unimportant. On the contrary, since the DEA model uses course hours and credits as input variables, these results indicate that the contribution of these courses to program outcomes is lower relative to the number of hours and credits they carry. Efforts to improve these courses may include aligning learning outcomes more closely with program competencies, reviewing teaching methods, restructuring course hours and credit loads, and integrating content with similar courses. If necessary, the course's place and role within the program can also be re-evaluated. It is also important to determine expectations for the course through feedback from different stakeholders, such as students and industry representatives, and to update the course content accordingly. The resulting activity scores can then be used as a decision-making support tool to identify which courses should be prioritized in curriculum improvement efforts.

In terms of course status, it is evident that 15 of the 23 required courses and 14 of the 25 professional elective courses have a performance rating of 0.8 or higher. This indicates that both groups of courses make significant contributions to the program's educational objectives.

Overall, the results indicate that the required courses, which form the core of the program, play a decisive role in imparting program competencies, while professional elective courses serve a complementary function by supporting and diversifying these competencies. Furthermore, DEA findings reveal that the curriculum draws significantly not only from technical specialization areas but also from courses in management, law, communication, and social sciences. This indicates that the rail systems management program possesses an educational structure that balances sector-specific technical knowledge with managerial and social competencies.

Conclusions

This study examines the relative effectiveness of courses in terms of their contribution to the program's three core educational perspectives, as compared to their weekly class hours and credits. The analysis is treated as a multi-criteria decision-making problem aimed at examining curriculum performance through courses. An integrated DEA–Fuzzy Logic approach was used for the systematic and quantitative evaluation of courses. A qualitative assessment of courses was conducted using a seven-level linguistic scale based on expert judgments, and the uncertainty and ambiguity in these expert judgments were addressed through fuzzy logic. Furthermore, all expert opinions were included in the study with equal weighting, on the basis that different expert evaluations contain valuable information that can inform the decision-making process. It is suggested that future studies weight expert opinions by considering characteristics such as academic title, length of experience in the relevant program, and total experience in the field. Additionally, analysing inter-rater consistency and potential outlier evaluations using appropriate statistical methods may provide further insight into the evaluation process. Using inputs consisting of the courses' weekly class hours and credit values, a relative performance evaluation was conducted by utilizing output values based on defined competency criteria. For the relative performance ranking, the courses were treated as DMUs, and the DEA method was utilized without requiring any predefined weights for the evaluation criteria. DEA enables the comparison of units' values under multiple criteria through mathematical optimization and reveals the efficiency levels of the courses. Thus, the performance of the courses is examined in relation to the competency gains they provide for the program, compared to the institutional resources they utilize within the curriculum.

According to the analysis results, while the average effectiveness value for required courses was 0.875, the average effectiveness value for vocational elective courses was calculated as 0.776. This finding demonstrates that required courses, which aim to impart the program's core competencies, contribute more effectively to the program's educational objectives when class hours and credit loads are taken into account. While vocational elective courses serve the function of providing specialization and diversity, their average effectiveness levels remained lower than those of required courses. This result indicates that required courses, which form the core structure of the curriculum, play a more central role in achieving program outcomes. It is conceivable that reviewing the teaching methods, assessment processes, and course content of courses identified as having low performance through DEA analysis could lead to an improvement in the overall performance of the program curriculum.

It is recommended that, for future studies, feedback from external stakeholders regarding the program be sought, courses from other similar programs in the country and around the world be incorporated into the evaluation, and the analysis be repeated as needed under different definitions of educational learning outcomes.

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RELATIONSHIPS AMONG ADHD TRAITS, ATTITUDES TOWARD AI, AND JOB CRAFTING

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ABSTRACT

The aim of the study was to investigate the relationship between ADHD (attention deficit hyperactivity disorder) traits, attitudes towards AI (artificial intelligence) and job crafting. With the growing popularity of neurodiversity in the professional environment, it is important to understand what techniques can be used to help neurodiverse employees.

The study involved 239 employed adults from a nonclinical convenience sample, including 59 men (24.7%) and 180 women (75.3%). The age of the participants ranged from 18 to 70 years ($M = 36.14$; $SD = 12.54$). Research method – quantitative research. Research design – non-experimental, cross-sectional, correlation study. Data collection method – surveys. Statistical methods – correlation analysis and regression analysis. The following instruments were used in the study: the Adult Executive Functioning Inventory (ADEXI; Holst & Thorell, 2018), the Approach-Avoidance Job Crafting Scale (Lopper et al., 2023), and the General Attitudes toward Artificial Intelligence Scale (GAAIS; Schepman & Rodway, 2020).

The results of the study suggest a weak positive association between positive attitudes toward AI and the executive functioning indicator of inhibition. Weak to moderate positive associations were found between executive functioning indicators and avoidance job crafting strategies, except for the relationship between inhibition and cognitive avoidance demands crafting. Furthermore, weak positive correlations with inhibition were observed for two of the four approach job crafting strategies, whereas a weak negative correlation was found between working memory and cognitive approach demands crafting. The study hypothesis – “ADHD traits will predict behavioral and cognitive avoidance job crafting strategies related to both resources and demands” – is confirmed, as ADHD traits statistically significantly predict avoidance strategies, although the explained variations are low.

The findings of the study provide practical insights for employers to increase their understanding of work habits and inclusion of neurodiverse employees.

Keywords: ADHD, attitude towards artificial intelligence, job crafting, neurodiversity

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is characterized by “a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development” (American Psychiatric Association, 2022, p. 68). The prevalence of ADHD among adults and treatment methods are increasingly being highlighted (Radonjić et al., 2023). Given that most people enter employment as adults, it is important to understand the challenges faced by employees with ADHD and, more importantly, what factors can help these individuals. People with ADHD are at greater risk of experiencing anxiety, depression, inattention, and difficulties at work (French et al., 2023), which in turn can lead to employer dissatisfaction or perceptions of poor job performance.

Most often, a significant part of an adult’s daily life is taken up by their professional activities. Research findings indicate that ADHD should be considered not only in clinical assessments, but that self-assessments should ideally be supplemented with a colleague’s, manager’s, or partner’s perspective on work performance and functioning at work (Fuermaier et al., 2021). ADHD directly affects cognitive functions – memory, thinking, attention, decision-making, etc., and studies have shown that adults with ADHD commonly exhibit cognitive impairments across multiple cognitive domains (Fuermaier et al., 2014). Employees who have been diagnosed with ADHD or who experience symptoms of ADHD find it harder to meet the standards they have set for themselves or feel that they are not reaching their full potential; which can lead to concerns about managerial evaluation or even job loss (Fuermaier et al., 2021). ADHD is also associated with a significant economic burden at both the individual and societal levels (Chhibber et al., 2021). It is important for employers to create a safe environment for people experiencing ADHD, because if an employee feels that management is responsive to their needs, they are more likely to reach their full potential in the workplace (Robbins, 2017).

The rapid rise of AI in today’s world holds great potential for helping neurodiverse individuals integrate more successfully into the workplace. Practical and professional discussions have also highlighted the potential of AI-based solutions to support both neurodiverse employees and employees with neuropsychiatric disorders in the workplace (Keil & Ketzer, 2024), however, this proposition is currently based primarily on professional discourse and further peer-reviewed empirical research is needed. To avoid placing an additional burden on individuals with ADHD in their professional lives, it is worth investigating these individuals’ attitudes toward AI before introducing AI tools into their daily routines. A review of existing research shows that, when discussing the relationship between humans and AI, a significant portion of the focus is on people’s attitudes toward it; as people’s general attitude toward AI is likely to play a significant role in AI acceptance (Schepman & Rodway, 2020). A study on the use of AI chatbot robots in mental health care highlights the lack of in-depth research on individual human differences (e.g., demographic characteristics or medical history) and how these individuals respond to, in this case, AI chatbots (Boucher et al., 2021). People who use AI-enhanced software to perform tasks tend to work more productively, efficiently, and

enjoyably (Noy & Zhang, 2023), but it has been shown that neurodiverse employees prefer technologies that provide support for working independently, rather than tools that do the work for them (Hall et al., 2024). Research has examined people's general attitudes toward AI, but there is a lack of information on attitudes toward AI among people with ADHD. Rather than representing a categorical condition, ADHD traits have been shown to lie on a continuum within the general population (McLennan, 2016). This supports the relevance of examining ADHD-related traits among individuals without a formal diagnosis. These findings may inform future research on how AI tools can support not only individuals with ADHD, but also those who experience clinically relevant ADHD traits, particularly in the workplace, by improving well-being, facilitating workplace inclusion and aiding in reaching job performance goals.

Job crafting can be defined as “the physical and cognitive changes individuals make in the task or relational boundaries of their work” (Wrzesniewski & Dutton, 2001, p.179). For an employee to make changes in the workplace with the aim of improving the work environment, this may involve physical, social, and cognitive actions (Bruning & Campion, 2018). The use of job crafting strategies helps employees cope with workplace stressors (Kosenkranius et al., 2020), develop their strengths, and identify the professional areas in which they have the strongest personal interest (Laguía et al., 2024). It has been demonstrated that by using job crafting strategies, individuals facing chronic illnesses, disabilities, or other work-limiting factors can improve their performance and self-efficacy (Sundar & Brucker, 2021). Author Ludmila N. Praslova, exploring the concept of neurodiversity in the workplace, notes that for neurodiverse individuals, the ability to integrate into the workplace can be decisive – whether it results in a career filled with unique contributions or chronic unemployment (Praslova et al., 2023). The author also notes that organizational and managerial support in the use of job crafting strategies is an important factor to consider when supporting neurodiverse employees (Praslova et al., 2023). By using job crafting, employees can improve their engagement at work and their job performance (Tims et al., 2014). It has similarly been suggested in professional discourse that working from home and the ability to customize the workplace to individual working conditions and specific needs can provide benefits for neurodiverse employees (Keil & Ketzer, 2024). Given that job crafting strategies address several important factors relevant to employees with ADHD traits, it is important to investigate whether a relationship exists between ADHD traits and job crafting strategies.

Studies have shown that adults with ADHD are more likely to choose avoidance-oriented coping strategies. This is also supported by a 2020 study that confirmed the hypothesis that participants with ADHD were more likely to exhibit avoidance-oriented approaches than the control group (Al-Yagon et al., 2020); additionally, avoidance may serve as a mediator between ADHD traits and emotion regulation (Bodalski et al., 2018). Overall, there is a positive association between ADHD and avoidance of experiences (Bradley et al., 2024). However, there is no clear consensus regarding approach strategies, as one study did not support the idea that children with ADHD tend to choose

approach strategies for positive images and avoidance strategies for negative image (Van Cauwenberge et al., 2016).

By synthesizing existing research on ADHD traits, attitudes toward artificial intelligence, and job crafting strategies, several conclusions can be drawn. First, previous studies have demonstrated that job crafting strategies can support neurodiverse individuals (Praslova et al., 2023); however, there is a lack of research specifically examining the relationship between ADHD traits and job crafting strategies. It is possible to determine whether an employee uses avoidance or approach strategies for job crafting (Lopper et al., 2023), and researchers note that there are unresolved questions about adult ADHD, and further research in this area is needed (Cortese et al., 2025). The existing findings on the relationship between ADHD and avoidance strategies are particularly relevant, as this study aims to examine the relationship between ADHD traits and eight different job crafting strategies based on the model developed by Zhang and Parker (2018). The model includes four approach and four avoidance strategies:

- approach resources crafting (behavioral)
- approach demands crafting (behavioral)
- approach resources crafting (cognitive)
- approach demands crafting (cognitive)
- avoidance resources crafting (behavioral)
- avoidance demands crafting (behavioral)
- avoidance resources crafting (cognitive)
- avoidance demands crafting (cognitive)

The aim of the study was to investigate the relationship between ADHD traits, attitudes towards AI, and job crafting. The study addresses specific research questions and proposes a hypothesis.

Research questions:

1. Is there a statistically significant relationship between ADHD traits and positive attitudes toward artificial intelligence?
2. Are there statistically significant relationships between ADHD traits and each of the job crafting strategies?

Hypothesis:

1. ADHD traits will predict behavioral and cognitive avoidance job crafting strategies related to both resources and demands.

Methodology

Research method – quantitative research. Research design – non-experimental, cross-sectional, correlational study. Data collection method – surveys. The study employed a quantitative research approach using a non-experimental, cross-sectional, correlational design. Data were collected through a survey method.

Participants

The study included 239 employed adults from a non-clinical convenience sample, including 59 men (24.7%) and 180 women (75.3%). Participants ranged in age from 18 to 70 years ($M = 36.14$, $SD = 12.54$).

Methods

To measure employees' attitudes toward AI, the "The General Attitudes toward Artificial Intelligence Scale (GAAIS)" (Schepman & Rodway, 2020) was used. The scale was adapted into Latvian for the first time within the framework of this study. The GAAIS consists of two subscales measuring positive and negative attitudes toward AI. The positive attitudes subscale assesses perceptions of the opportunities, benefits, and positive societal and emotional impacts of AI, whereas the negative attitudes subscale measures concerns and negative emotions related to AI. The negative attitudes subscale needs to be reverse scored, such that higher scores on both subscales reflect more positive attitudes toward AI. The instrument consists of 20 items. A team of three independent experts translated the scale from English to Latvian (the experts represented expertise in both psychology and translation). Two additional independent experts back-translated the questionnaire into the original language, thereby ensuring the back-translation procedure. The translated items were reviewed by a focus group of three experts, evaluating item comprehensibility and making necessary adjustments. The adapted scale was completed by 34 respondents aged 21 to 59 ($M = 32.79$, $SD = 11.70$), of whom 9 were men (26.47%) and 25 were women (73.53%). The results showed high internal consistency for both subscales: $\alpha = .90$ for the positive subscale and $\alpha = .92$ for the negative subscale. Item response and discrimination indicators were also calculated to gain insight into the difficulty level of the items and how successfully each item differentiates respondents according to the measured trait. For this scale, the critical thresholds for the response index range from 1.8 to 4.2, and the optimal values for the discrimination index range from 0.2 to 0.8. Both indicators fell within the recommended ranges for all items, indicating satisfactory item quality. No further corrections to the item translations were required. The scale demonstrated good internal consistency, with Cronbach's alpha coefficients $\alpha = .88$ for the positive subscale and $\alpha = .83$ for the negative subscale in the original version, and $\alpha = .85$ for the positive subscale and $\alpha = .81$ for the negative subscale in this study.

To assess self-reported ADHD-related executive functioning difficulties, the self-report version of the Adult Executive Functioning Inventory (ADEXI; Holst & Thorell, 2018; adapted into Latvian by Jakoba, 2022) was used. The instrument was developed to measure self-reported executive functioning abilities. ADEXI has demonstrated sensitivity in differentiating between individuals with ADHD and non-ADHD control groups and has been used to assess ADHD related executive functioning difficulties (Holst & Thorell, 2018). The aim was not to examine a clinical group with a formal ADHD diagnosis, but to assess the association between ADHD traits and working memory and inhibition – two executive functions that are considered fundamental to everyday and

occupational functioning (Diamond, 2013). Given that the overall survey was already extensive (individuals with ADHD traits may find long questionnaires more difficult to complete), a short, easily administered instrument focusing specifically on these two functions was selected. The questionnaire is divided into two subscales – working memory and inhibition. Working memory deficits may represent one of the symptoms of ADHD (Al-Saad et al., 2021), while difficulties with inhibition are also characteristic of ADHD (Sapkale & Sawal, 2023). The original version of the questionnaire demonstrated good internal consistency, with Cronbach's alpha coefficients of $\alpha = .91$ for the total scale, $\alpha = .91$ for the working memory subscale, and $\alpha = .77$ for the inhibition subscale. In the adapted Latvian version by Anna Jakoba, Cronbach's alpha coefficients were $\alpha = .85$ for the total scale, $\alpha = .86$ for the working memory subscale, and lower internal consistency, $\alpha = .54$, for the inhibition subscale (Jakoba, 2022). In this study Cronbach's alpha coefficients were $\alpha = .79$ for the total scale, $\alpha = .78$ for the working memory subscale and $\alpha = .52$ for the inhibition subscale (see Table 1).

To assess employees' job crafting strategies "The Approach-Avoidance Job Crafting Scale" (Lopper et al., 2023; adapted into Latvian by Draveniece, 2024) was used. The questionnaire demonstrated good internal consistency, with Cronbach's alpha coefficients of $\alpha = .84$ in the original study and $\alpha = .81$ in the adapted version.

Procedure

Survey data were collected electronically in March 2025 using the QuestionPro survey platform. A convenience sampling method was used with two main inclusion criteria: participants had to be at least 18 years old and currently employed. There was no time limit for completing the questionnaire, which was distributed via social media platforms (Facebook, LinkedIn) and other communication channels (Whatsapp, Outlook). Information on respondents clinical ADHD diagnosis status was not collected, as the study measured ADHD-related traits within the general population rather than a clinically diagnosed group. Consequently, approval from an ethics committee was not required. Before completing the survey, respondents were informed about the study's purpose, confidentiality, and other aspects related to participation. The collected data were processed and analyzed using Microsoft Excel and IBM SPSS Statistics version 22.

Results

At the beginning of the data analysis, descriptive and inferential statistics were calculated (see Table 1). The Kolmogorov-Smirnov test was used to assess the normality of distribution, taking the sample size into account. The results indicated that all variables except one showed a statistically significant deviation from normality ($p < .05$), while only one variable followed a normal distribution ($p > .05$). Therefore, nonparametric statistical methods were used in the subsequent analyses. Throughout this study ADHD traits were operationalized using ADEXI scores which assess ADHD-related executive functioning difficulties.

Table 1. Descriptive and inferential statistics for the Adult Executive Functioning Inventory, the Attitudes toward Artificial Intelligence Scale, and the Job Crafting Strategies Scale (*N* = 239)

Variables	<i>M</i>	<i>SD</i>	<i>K-S</i>	<i>α</i>
Executive functioning (total)	34.1	6.5	.06*	.79
Working memory	20.6	4.54	.07*	.78
Inhibition	13.50	2.98	.09*	.52
Positive attitudes toward artificial intelligence	3.34	0.56	.06	.85
Negative attitudes toward artificial intelligence	2.96	0.65	.08*	.81
Approach resources crafting (behavioral)	4.10	0.60	.16*	.59
Approach demands crafting (behavioral)	3.59	0.80	.07*	.78
Approach resources crafting (cognitive)	4.10	0.66	.11*	.71
Approach demands crafting (cognitive)	3.87	0.73	.10*	.76
Avoidance resources crafting (behavioral)	2.89	0.82	.08*	.75
Avoidance demands crafting (behavioral)	2.81	0.75	.07*	.62
Avoidance resources crafting (cognitive)	2.29	0.85	.08*	.83
Avoidance demands crafting (cognitive)	2.73	0.78	.08*	.66

**p* < .05 indicates a statistically significant deviation from a normal distribution

Table 2. Spearman's rank correlation analysis of executive functioning and attitudes toward artificial intelligence (*N* = 239)

Variables	1.	2.	3.	4.	5.
1. Executive functioning (total)	–				
2. Working memory	.90***	–			
3. Inhibition	.79***	.48***	–		
4. Positive attitudes toward artificial intelligence	.08	.02	.16*	–	
5. Negative attitudes toward artificial intelligence	–.03	–.12	.13*	.39***	–

p* < .05. *p* < .01. ****p* < .001

To address the first research question – “Is there a statistically significant relationship between ADHD traits and positive attitudes toward artificial intelligence?” – Spearman's rank correlation coefficient was used (see Table 2).

Weak but statistically significant correlations were found between the inhibition subscale and both the positive ($r = .16, p < .05$) and negative ($r = .13, p < .05$) attitudes toward artificial intelligence subscales.

To examine the second research question – “Are there statistically significant correlations between ADHD traits and each of the job crafting strategies?” – Spearman's rank correlation coefficient was also used (see Table 3).

Table 3. Spearman's rank correlation analysis of executive functioning and job crafting strategies ($N = 239$)

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Executive functioning (total)	–										
2. Working memory	.90***	–									
3. Inhibition	.79***	.48***	–								
4. Approach resources crafting (behavioral)	.07	–.03	.19**	–							
5. Approach demands crafting (behavioral)	.09	–.03	.24***	.41***	–						
6. Approach resources crafting (cognitive)	–.04	–.11	.08	.39***	.36***	–					
7. Approach demands crafting (cognitive)	–.11	–.21**	.08	.31***	.49***	.46***	–				
8. Avoidance resources crafting (behavioral)	.21**	.15*	.25***	.22**	.01	–.03	.10	–			
9. Avoidance demands crafting (behavioral)	.32***	.28***	.30***	.17**	.09	–.01	.10	.53***	–		
10. Avoidance resources crafting (cognitive)	.20**	.19**	.16*	.20**	–.01	–.01	.03	.61***	.44***	–	
11. Avoidance demands crafting (cognitive)	.13*	.19**	–.02	.03	–.11	–.06	–.23***	.14*	.28***	.34***	–

* $p < .05$. ** $p < .01$. *** $p < .001$

Regarding the second research question, statistically significant associations were found between executive functioning and avoidance job crafting strategies, except for the relationship between inhibition and cognitive avoidance demands crafting. Although some correlations were moderate in strength, most were weak. Positive correlations were also observed between inhibition and two approach job crafting strategies: behavioral approach resources crafting ($r = .19, p < .01$) and behavioral approach demands crafting ($r = .24, p < .001$). In addition, a statistically significant negative correlation was found between cognitive approach demands crafting and working memory ($r = -.21, p < .01$).

To test the hypothesis that ADHD traits predict avoidance job crafting strategies, regression analysis using the backward method was conducted (see Tables 4, 5, 6, and 7).

Table 4. Regression analysis results for behavioral avoidance resources crafting as the dependent variable and working memory and inhibition as independent variables ($N = 239$)

Independent variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Working memory	.01	.01	.05
Inhibition	.06	.02	.23*
Step 2			
Inhibition	.07	.02	.26**

Step 1: $R^2 = .07$, $F(2, 236) = 8.72$, $p < .05$; Step 2: $R^2 = .07$, $F(1, 237) = 16.90$, $p < .05$, * $p < .05$. ** $p < .01$.

Table 5. Regression analysis results for behavioral avoidance demands crafting as the dependent variable and working memory and inhibition as independent variables ($N = 239$)

Independent variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Working memory	.03	.01	.18*
Inhibition	.06	.02	.22**

Step 1: $R^2 = .12$, $F(2, 236) = 16.36$, $p < .05$, * $p < .05$. ** $p < .01$.

Table 6. Regression analysis results for cognitive avoidance resources crafting as the dependent variable and working memory and inhibition as independent variables ($N = 239$)

Independent variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Working memory	.03	.01	.16*
Inhibition	.02	.02	.07
Step 2			
Working memory	.04	.01	.20**

Step 1: $R^2 = .04$, $F(2, 236) = 5.33$, $p < .05$; Step 2: $R^2 = .04$, $F(1, 237) = 9.79$, $p < .05$, * $p < .05$. ** $p < .01$.

Table 4 shows that, in the second step of the regression analysis, behavioral avoidance resources crafting explained 7% of the variance. Inhibition was significantly associated with this job crafting strategy, indicating that inhibition significantly predicted behavioral avoidance resources crafting ($\beta = .26$, $p < .01$).

Table 5 shows that the regression model explained 12% of the variance in behavioral avoidance demands crafting. Both working memory ($\beta = .18$, $p < .05$) and inhibition ($\beta = .22$, $p < .01$) significantly predicted behavioral avoidance demands crafting.

Table 6 shows that, in the second step of the regression analysis, cognitive avoidance resources crafting explained 4% of the variance. Working memory was significantly associated with this job crafting strategy, indicating that working memory significantly predicted cognitive avoidance resources crafting ($\beta = .20$, $p < .01$).

Table 7. Regression analysis results for cognitive avoidance demands crafting as the dependent variable and working memory and inhibition as independent variables ($N = 239$)

Independent variable	<i>B</i>	<i>SE B</i>	β
Step 1			
Working memory	.05	.01	.27**
Inhibition	-.04	.02	-.15*

Step 1: $R^2 = .06$, $F(2, 236) = 7.22$, $p < .05$, * $p < .05$. ** $p < .01$.

Table 7 shows that the regression model explained 6% of the variance in cognitive avoidance demands crafting. Working memory significantly predicted cognitive avoidance demands crafting ($\beta = .27$, $p < .01$), whereas inhibition was negatively associated with this strategy ($\beta = -.15$, $p < .05$). This suggests that higher inhibition scores were associated with less frequent use of this strategy.

In summary, the study hypothesis that ADHD traits would predict avoidance job crafting strategies was supported, as ADHD traits significantly predicted avoidance strategies, although the explained variance was low.

Discussion

The aim of the study was to examine the relationships between ADHD traits, measured through adult executive functions (working memory and inhibition), attitudes toward artificial intelligence, and job crafting strategies.

Several conclusions can be drawn from the descriptive statistics presented in Table 1. The results of the executive functioning measure indicate average scores for both working memory and inhibition. Given that lower scores reflect better executive functioning, the findings suggest that the sample was characterized by average levels of executive functioning difficulties. The average scores on the attitudes toward artificial intelligence scales suggest that participants' attitudes toward AI were generally neutral rather than distinctly positive or negative. Both subscales reflect positive attitudes toward AI, as the items in the negative attitudes subscale were reverse scored. The authors of the original scale do not recommend calculating a total score. Higher scores on the negative attitudes subscale indicate greater tolerance toward the limitations of AI, whereas higher scores on the positive attitudes subscale reflect greater enthusiasm toward AI and stronger perceptions of its personal and societal benefits. The average scores on the job crafting scale suggest that respondents used approach job crafting strategies more frequently than avoidance strategies. The findings related to inhibition subscale should be interpreted with caution, because its internal consistency coefficient in the present study was relatively low ($\alpha = .52$).

A positive correlation was found between inhibition and positive attitudes toward artificial intelligence (for both the positive and negative attitudes subscales). Higher scores on the inhibition subscale were associated with more positive attitudes toward AI.

According to the ADEXI, higher inhibition scores indicate greater executive functioning difficulties, which may reflect ADHD-related traits. These findings could tentatively be interpreted as an indication that individuals exhibiting ADHD traits may be more inclined to hold positive attitudes toward AI, although this interpretation should be treated with caution. One possible explanation is that neurodivergent employees may be particularly receptive to AI-based solutions, given that research has proposed such tools, for example, can help reduce sensory overload and align job roles with individual strengths (George et al., 2026). However, no significant correlation was found between the total ADEXI score and positive attitudes toward AI, nor between working memory and positive attitudes toward artificial intelligence. These findings suggest inconsistencies regarding the relationship between positive attitudes toward artificial intelligence and specific executive functioning indicators. One possible explanation is that working memory represents a cognitive function that may be improved through AI-based tools, while no direct relationship exists between working memory and attitudes toward AI as a construct.

Another explanation for the relationship between ADHD traits and a positive attitude toward AI might be the potential of AI-based tools to support neurodiverse individuals in their daily lives, for example, by helping structure tasks or providing reminders about important activities. This aligns with the information summarized in the theory – individuals using AI to perform tasks do so more productively, effectively, and with greater enjoyment (Noy & Zhang, 2023). It is possible that the use of AI helps compensate for the difficulties caused by features of ADHD. Furthermore, it should be noted that higher scores on the positive attitude's subscale reflect greater enthusiasm toward AI and stronger perceptions of its usefulness, while the scale also captures emotional aspects, such as whether AI contributes to happiness and improved well-being (Schepman & Rodway, 2020). Given that neither the total ADEXI score nor the working memory subscale was associated with positive attitudes toward AI, the observed relationship between inhibition and positive attitudes toward AI should be interpreted cautiously. It should be noted that the instrument used in this study was a self-report measure, and it is possible that some respondents provided socially desirable responses. Future research is encouraged to use measures with higher internal consistency.

The results related to the second research question indicate that the overall executive functioning score was associated only with avoidance job crafting strategies. Thus, as ADHD-related difficulties increased, the use of avoidance strategies also increased. These findings are consistent with previous research summarized in the literature review, suggesting that individuals with ADHD are more likely to adopt avoidance-oriented approaches (Al-Yagon et al., 2020) and that ADHD is positively associated with experiential avoidance (Bradley et al., 2024). It may be assumed that employees exhibiting ADHD traits are more likely to use avoidance strategies because of difficulties with decision-making, task organization, and sustained attention. As a result, employees with ADHD traits may display more passive workplace behavior, such as avoiding additional tasks or showing less initiative, because existing responsibilities may already feel overwhelming. Such

behavior may be perceived by employers as laziness, incompetence, lack of motivation, or disinterest in work, which may further increase the burden experienced by neurodiverse employees. This interpretation is also supported by previous research suggesting that the use of avoidance strategies may be perceived negatively by managers or supervisors, which may, in turn, reduce employees' motivation to engage in job crafting behaviors (Fong et al., 2021). However, it is also possible that avoidance strategies function as a coping mechanism for managing difficulties associated with ADHD.

The results indicate a negative correlation between working memory and cognitive approach demands crafting. Thus, higher scores on this strategy were associated with lower working memory scores (and vice versa), which, in turn, indicate better working memory functioning, as lower scores on the questionnaire reflect fewer working memory difficulties. This might suggest that individuals with better working memory are more likely to engage in this approach strategy, for example through active problem-solving or seeking help when faced with uncertainty. Working memory was correlated with all avoidance job crafting strategies, suggesting that individuals with poorer working memory functioning might rely more on avoidance strategies in workplace settings. This may result in more passive and potentially maladaptive work-related behaviors. Previous research has demonstrated that older employees tend to avoid tasks requiring rapid working memory processing and instead prefer tasks that rely more on task-related knowledge (Kooij et al., 2014).

Inhibition was associated with both behavioral approach job crafting strategies – approach resources crafting and approach demands crafting. This suggests that individuals with poorer inhibitory control may be more likely to engage in proactive behaviors aimed at improving work outcomes through direct action. Furthermore, inhibition was associated with three of the four avoidance job crafting strategies – behavioral avoidance resources crafting, behavioral avoidance demands crafting and cognitive avoidance resources crafting. Although these findings may initially appear contradictory, it is important to note that positive associations with inhibition were observed only for the two behavioral approach strategies. These findings might suggest that both proactive and passive strategies may be used to achieve desired work outcomes. However, given that positive associations with inhibition were observed specifically for behavioral approach strategies, it may be inferred that job crafting in this context is achieved more through direct action than through changes in thoughts or perceptions. These findings further support previous research suggesting that job crafting may enhance employee engagement and work performance (Tims et al., 2014). It is likely that active engagement helps reduce stress associated with uncertainty and problem-solving in workplace settings. The finding from the literature review – that there is no clear answer regarding approach strategies – since the idea that children with ADHD choose approach strategies for positive images and avoidance strategies for negative images was not confirmed (Van Cauwenberge et al., 2016), suggests that there is also no clear answer in this sample (of working adults), as a positive association is found with the executive function “inhibition” in two cases, but not with the total ADEXI score or the working memory subscale.

The results of the regression analyses indicate that both working memory and inhibition significantly predicted the two avoidance job crafting strategies related to demands crafting. Thus, these findings relate to work aspects that require sustained physical, cognitive, or emotional effort. In contrast, inhibition predicted behavioral avoidance resources crafting, whereas working memory predicted cognitive avoidance resources crafting. It is reasonable that working memory predicted both cognitively oriented job crafting strategies, given that memory itself is a cognitive process. Previous research has identified working memory as one of the primary cognitive dysfunctions associated with ADHD (Ramos et al., 2019). In all four cases, the explained variance was relatively low, ranging from 4% to 12%. Thus, ADHD-related difficulties appear to be significant predictors of avoidance job crafting strategies; however, the models explained only a small proportion of the variance, indicating that they account for only a limited part of human behavior. These findings suggest that the remaining unexplained variance may be associated with factors not included in the model, such as other executive functioning indicators, the severity of ADHD traits, or environmental influences.

One limitation of this study is the use of self-report questionnaires, particularly for the assessment of ADHD-related traits, as respondents may provide socially desirable responses or may be unable to evaluate themselves objectively. In addition, ADHD as a clinical diagnosis should be assessed using validated clinical instruments. A self-report measure assessing only two executive functioning indicators provides a limited insight into ADHD-related traits within the sample. It should also be noted that difficulties with executive functioning does not necessarily indicate ADHD, as they may also be associated with other factors, such as age, sleep quality, anxiety, depression. Another limitation of this study is relatively low explained variance observed in the regression analyses. It is also important to acknowledge the uneven gender distribution within the sample, as women constituted 75.3% of respondents, limiting the representativeness of the findings. In three job crafting strategy subscales and the inhibition subscale, Cronbach's alpha coefficients did not reach the recommended psychometric threshold ($\alpha > .70$). Given that these subscales, particularly inhibition, were important for addressing the study aim, they were retained in the analyses. Nevertheless, the obtained internal consistency coefficients may limit the reliability and interpretation of the findings.

The strengths of this study lie in its relevance both from the perspective of AI and in terms of neurodiversity, as the findings can contribute to the inclusion of neurodiversity in the workplace. Furthermore, the interdisciplinarity of the topic allows the findings to be applied across clinical, academic, and professional contexts.

Conclusions

Regarding the first research question, a weak association was found between positive attitudes toward artificial intelligence and only one executive functioning indicator – inhibition. Regarding the second research question, no statistically significant association was found between inhibition and cognitive avoidance demands crafting; however, all

other associations between executive functioning and avoidance job crafting strategies were statistically significant. In addition, positive correlations with inhibition were identified for two of the four approach job crafting strategies, although these relationships were weak to moderate in strength.

The study hypothesis was confirmed, as ADHD traits significantly predicted avoidance job crafting strategies; however, the explained variance of the regression models was relatively low. This suggests that the four regression models accounted for only a limited proportion of the variance in avoidance job crafting strategies through the predictors working memory and inhibition, with explained variance ranging from 4% to 12%. Thus, from a practical perspective, employees' use of avoidance strategies cannot be explained solely by ADHD-related traits. It is likely that avoidance strategies are also influenced by other factors, such as work overload, personal life difficulties, or conflicts with colleagues.

It can be concluded that ADHD-related traits are associated with the use of avoidance job crafting strategies in workplace settings, a finding supported both by the studies reviewed in the theoretical section and by the empirical results of the present study. Similarly, the findings may tentatively suggest that neurodiverse employees may be more inclined towards using AI-based tools or integrating artificial intelligence into their work environment. However, both interpretations should be treated with caution as the present study did not provide sufficient evidence to draw firm conclusions about this relationship. Future research should aim to verify this association using instruments with higher internal consistency to draw more reliable conclusions. Also, subsequent research on this topic should examine not only ADHD-related traits within the context of neurodiversity, but also other forms of neurodiversity, such as autism spectrum disorder and dyslexia. This could contribute to a broader understanding of neurodiverse conditions from both individual and organizational perspectives. Given the broad range of opportunities offered by AI, future research should move beyond attitudes toward AI and examine the actual use of AI-based tools among neurodiverse employees.

The practical implications of these findings extend across multiple fields, including team management, human resource management, education, and professionals working with ADHD as a clinical condition. In workplace settings specifically, the findings highlight the importance of promoting diversity through personalized approaches to neurodiverse employees, greater understanding from colleagues and managers, and the adaptation of work environments to individual needs. Similarly, to emphasize the strengths of neurodiverse employees in workplace settings – which in some cases may even exceed those of other employees – the integration of AI-based tools into daily work should be considered. In this context, AI should not be viewed as a replacement for human work, but rather as a supportive tool.

Furthermore, the findings of this study may be particularly valuable for individuals who themselves experience ADHD-related traits. The conclusions drawn from the study may help neurodiverse employees better understand behaviors that are often perceived as dysfunctional in workplace settings. In many cases, such behaviors may reflect strategies used to cope more effectively with work-related demands rather than laziness or low

motivation. Finally, this study represents only a small contribution to understanding the workplace behaviors and coping strategies of neurodiverse employees. Nevertheless, both the identified limitations and the findings consistent with previous theory and research provide valuable insights for improving the professional well-being of neurodiverse employees and promoting diversity and inclusion in workplace settings.

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FREQUENCY OF CONSONANT COMBINATIONS IN THE LATVIAN LANGUAGE

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ABSTRACT

Text literacy is a fundamental element of quality education at all stages. However, text comprehension is impossible without well-developed reading technique, visual perception, and fluency. Today, children begin learning to read in the preschool period: they first get familiar with letters and then move on to combining letters into syllables. This process takes a considerable amount of time. This raises an important question: is it possible to reduce the time required for initial reading instruction and the development of reading technique in children? In addition to methodological approaches, linguistic strategies may also be applied. For example, it is possible to identify which letter combinations in the Latvian language are most frequently used and to focus on these combinations in early reading. When children encounter these frequently used letter combinations in words, they will be able to recognize them more easily. This can increase reading fluency and, consequently, improve overall text comprehension. The study was carried out using data from the dictionary tezaurs.lv. The research identified the frequency of consecutive consonant blendings consisting of 2, 3, 4, 5, 6, and 7 letters. The findings show a significant gap between highly frequent consonant combinations in Latvian and those that occur less frequently. The results present a basis for further work on developing more effective approaches to teaching children at the stage of reading skill formation.

Keywords: *consonant blendings, consonant combinations, consonant clusters, Latvian, reading fluency, sight comprehension*

Introduction

PIRLS, or Progress in International Reading Literacy Study, serves as the established benchmark for evaluating fourth-grade reading comprehension globally. PIRLS has been conducted every five years since 2001. In 2021, Latvia recorded its lowest result since joining the study (Ozola, 2025), showing a critical decline in early reading proficiency (Figure 1). Also, the Organisation for Economic Co-operation and Development (OECD, 2022), reviewing 2022 results in Latvia, proposes to employ effective learning strategies.

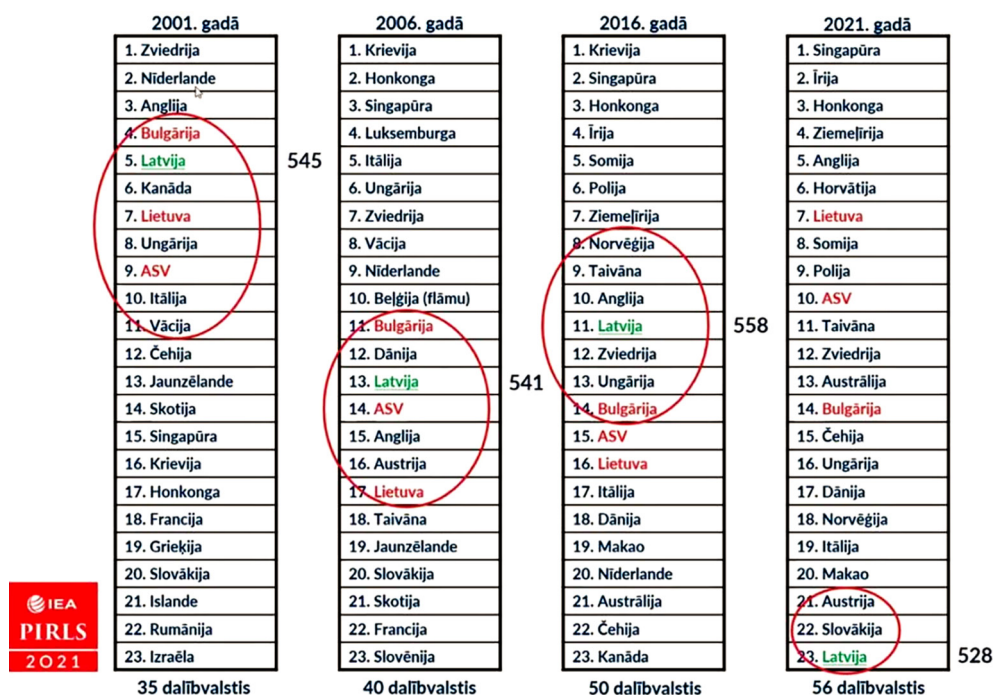


Figure 1. PIRLS assessment results 2025

The Reading Pyramid

The authors of the current study assume that, while reading literacy forms the foundation of academic success, the factors driving the decline, particularly regarding phonemic awareness, decoding speed, and reading fluency, remain insufficiently addressed within national education policy.

Reading instruction for beginner learners in Latvia lacks a systemic, clear, and age-appropriate framework. Regulations No. 747 un No. 716 (MK Noteikumi Nr. 747, 2018; MK Noteikumi Nr. 716, 2018) of the Cabinet of Ministers sets general outcomes, but does not indicate what characterises reading development; it does not also specify the particular methods required to achieve them. As the detailed step-by-step methodology does not exist, it seems to be assumed that once a student can recognize all the letters of the alphabet, they should automatically be capable of reading texts of any complexity level. (Birzniece, 2025)

Cognitive models of literacy development suggest that reading fluency development is based on a hierarchy of sub-skills, frequently visualized through the Reading Pyramid framework (National Reading Panel, 2000) (Figure 2).

1. **Phonemic Awareness:** Ability to identify and manipulate individual sounds in the words (phonemes).
2. **Phonics & Decoding:** Mapping phonemes to graphemes (letters) and letter combinations.

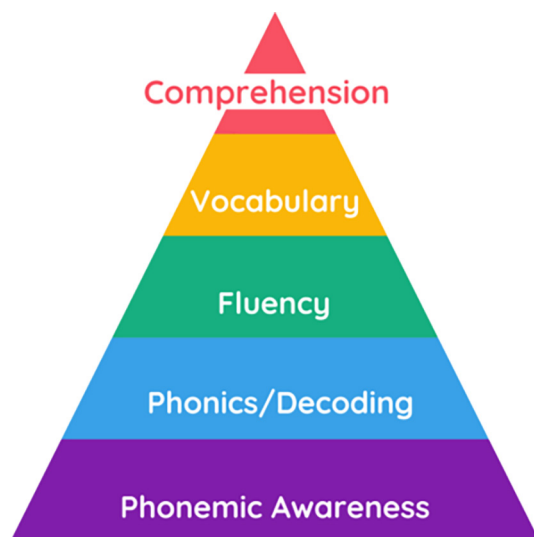


Figure 2. The reading pyramid

3. **Fluency:** Transition from effortful decoding to automatic word recognition.
4. **Vocabulary Acquisition:** Attaching semantic meaning to decoded words.
5. **Comprehension:** Deeply processing and understanding narrative and informational text.

According to Automaticity Theory (LaBerge & Samuels, 1974; Logan, 1997), reading fluency serves as the essential bridge between lower-level mechanical decoding and higher-level comprehension. When lower-level processing becomes automated, cognitive capacity is liberated for meaning understanding. When children remain trapped at letter-by-letter word decoding, their working memory becomes overloaded, which results in slow reading, diminished fluency, and insufficient comprehension (Boneva, 2020).

Syllable reading is an important step in early reading, helping children progress from blending individual sounds to decoding whole words, sentences, and texts. According to methodological guidelines for kindergarten teachers in Latvia, syllable decoding, letter recognition and learning to read whole words are considered essential during the second stage of preschool education (Zariņa, 2024). However, the existing standards and expectations overlook the core concept that children naturally build reading skills over time, first learning a word's meaning before learning to read it. It is assumed that when starting school, every child will, *a priori*, be able to read and understand any text, whether in a school textbook or in daily life, even though no one has intentionally taught them how to work through complex word structures. By expecting children to develop the whole range of reading sub-skills within preschool education, current educational demands risk fitting a complex, multi-stage developmental process into too short a timeframe, not giving students a chance to develop a great skill of text comprehension.

Thus, the authors emphasize the necessity, expediency, and relevance of a program that incorporates scientifically researched features of the Latvian language in terms of syllables and words (high-frequency words, multisyllable words, compounds, derivatives), as well as sentences of various syntactic structures and texts retaining all units of language thoroughly studied and selected.

The teacher plays a significant role in building reading motivation of their students. This involves the dynamic selection and design of reading materials that reflect the pupils' different developmental levels, sociocultural backgrounds, and perceptual types (auditory, visual, kinesthetic, and tactile). As Zariņa (2024) explains, the role of a teacher is to regularly update the classroom environment with authentic materials and motivate their students to co-create reading materials, elevating child-authored texts to equal status, facilitating students' interest. Therefore, the teacher serves as the link between the institution and the home sphere of their students, actively validating family reading experiences; they empower parents through dedicated workshops and collaborative development of materials. This combined framework of classroom differentiation and parental partnership transforms the educator into a vital architect of early childhood literacy. (Zariņa, 2024)

Acknowledging teachers' crucial role, to save their time and boost teaching productivity, researchers and methodologists must equip them with scientific evidence on the unique characteristics of the Latvian language, including data on the most high-frequency letters and syllable combinations.

The authors of the current study assume that consonant combinations in the Latvian language can be particularly challenging for beginner readers, including children and adults from diverse linguistic backgrounds, such as linguistic minorities, the Latvian diaspora, immigrants, and dyslexic persons.

Consonant blends (e.g., *bl*, *st*, *skr*) can be explicitly taught to help readers rapidly blend two or three distinct consonant sounds while maintaining the individuality of each sound. This skill is essential for decoding unfamiliar words, enhancing reading fluency, and strengthening spelling accuracy by teaching students to perceive and accurately reflect all the sounds present within a word (Reading Universe)

While syllables like 'vowel+consonant' or 'consonant+vowel' are generally easy to select, combinations of two or more consonants represent statistically more variants and frequently cause selection difficulties. Yet, such combinations are quite common in Latvian words.

Decoding relies on recognizing the word's actual sounds separately, but in everyday speech, sounds are articulated together, which is called coarticulation. They merge in speech so quickly that pronouncing them separately and decoding the actual letter combination can be quite a challenge. This often depends on the surrounding consonants or the word's position in the sentence.

In linguistics, this involves processes like assimilation, voicing shifts, sound blending, and elision (Skujiņa et al., 2011). For example, in words such as *nav*, *pats*, *mežs*, and *galds*, the consonants are pronounced very differently from their standard alphabetical sounds. (Ozola, 2021).

All the above mentioned pose problems for primary school students learning to read and write, as it complicates word splitting into individual phonemes. Likewise, it sets an obstacle for students with weak phonemic awareness.

Thus, the current study suggests that the systematic identification and methodological integration of high-frequency consonant combinations and the syllables they form into everyday teaching practices can reduce young learners' cognitive load during learning to read, thereby enhancing reading fluency among early readers.

The present research conducts an applied quantitative analysis of consonant combinations in the Latvian language.

The study aims to identify and analyze the frequency of consonant combinations in the Latvian language to provide empirical data for the development of evidence-based strategies for effective early reading programs.

Methodology: Computational Extraction and Quantification of Consonant Combinations

Given these circumstances, it is clear that since a sequential, structured reading curriculum is lacking, we must equip educators with scientifically grounded data. This allows them to efficiently use their time and resources to prepare preschoolers for fluent reading, deep comprehension, and future academic success.

To design effective learning materials for beginner readers, the next step is to identify which specific consonant combinations are most common in the Latvian language, which ones feature in the largest vocabulary pool, and which syllable patterns can best help children quickly learn to recognize these consonant blends in everyday words.

Blends are consonants that stand next to each other in a word or syllable, and each consonant makes its own sound. The word *griež*, for example, begins with the blend *gr*. Both the /g/ sound and the /r/ sound are pronounced.

Blends can be made up of two consonants, like *gr*, or three consonants, like *'str'*, or more.

Consonant blends, unlike digraphs, do not make a new sound, each consonant retains its usual sound, which students already know. The focus here should be on blending these known sounds together as students read, and separating them as they spell (Reading Universe).

To analyze Latvian consonant combinations, a custom Python script was developed to process the lexical data from the [Tezaurs.lv](https://tezaurs.lv) database (tezaurs.lv), which currently contains 413,577 entries. *Tēzaurs* is a rich and detailed Latvian dictionary that has been growing at the Artificial Intelligence Laboratory (AiLab) at the University of Latvia's Institute of Mathematics and Computer Science since the 1990s. The project is still very much alive today. The entries in *Tēzaurs* include words, set phrases, and their meanings, which have been carefully collected from dictionaries, encyclopedias, and many other sources – over 340 in total.

The research analyzes the data from this dictionary using a computer programming approach to isolate all consonant combinations in sequences of 2, 3, 4, and even 5–7 consecutive consonants.

In the entries that form the lexical network of the Latvian language, the division of meanings has been significantly restructured based on data from [Korpuss.lv](https://korpus.lv).

Definition of 'word'

For each Tezaurs entry, the lemma form was taken as the word: specifically, the text content of the < orth type = "lemma" > element within the entry's < form > element. The entries were not filtered to remove multi-word entries, entries with numbers or abbreviations. The code is written so as to ignore all symbols except the specified consonant letters. That means vowels, numbers, hyphens and other symbols are treated in the same way and are ignored by the code. Hence, entries that contain no letters or only vowels (such as "80286" or "Ā") are ignored completely. Entries with at least one combination of consonants, regardless of whether it contains numbers or other symbols (such as "Abgunst-Gruenfeldt") is used in the count.

Frequency metric

The code measures number of times a specific combination of consonants is met in the Tezaurs database. It didn't count the number of entries where the combination is met, but rather the number of combinations themselves. If a word has two identical combinations, the code counts it two times (e.g. "papildsods" will result in a combination "ds" counted 2 times). It is similar to type frequency, but not exactly it since a single word can be counted several times for the same combination.

The algorithm operated through the following steps.

1. **Consonant Filtering:** A predefined array containing all 24 Latvian consonants (b, c, č, d, f, g, ģ, h, j, k, ķ, l, ļ, m, n, ņ, p, r, s, š, t, v, z, ž) was loaded into the program to serve as the filtering criterion.
2. **Character Scanning:** The script performed a character-by-character scan of each word. When a consonant was detected, it was appended to a temporary variable. This accumulation continued until a vowel or a word boundary was encountered.
3. **Length Verification and Segmentation:** The extracted consonant sequence was then checked against a target length (\$L\$). If the sequence was shorter than \$L\$, it was deleted. If it was longer, the script automatically split it into all possible sub-combinations of the required length (e.g., if \$L = 2\$, the cluster "pkr" was broken down into "pk" and "kr").
4. **Data Aggregation:** Finally, the program updated a global frequency counter for each unique combination and exported the final statistical results into an Excel spreadsheet for further analysis.

For computational study the Python script is provided at [Github/Antons-Kutuzovs](https://github.com/Antons-Kutuzovs).

Results

This section (Figure 3) identifies the rarely used consonant blends, which mostly appear in compounds or borrowed words. There is no need to specifically teach this

rl	100	žg	133	čs	176	Low frequency two-consonant blends	
bb	101	lt	134	nd	177		
šb	101	fj	137	vv	180	jp	237
vb	103	kb	138	lm	180	jš	238
šz	104	kj	138	kd	184	bd	243
pč	106	gp	139	db	186	jk	245
bz	108	bv	141	vm	187	vp	246
cd	108	kh	144	dj	188	bn	254
lg	109	žk	145	jd	189	mv	261
lž	110	vg	147	dp	190	pb	263
nl	110	dg	148	nv	190	šč	266
jg	113	zz	148	cm	192	pz	269
kz	115	šd	148	dh	193	žg	269
bh	116	vc	149	gd	194	lk	272
nr	117	gb	150	lp	194	šr	272
gk	118	lč	151	dd	196	pc	274
lj	118	nn	151	np	196	zč	274
vt	119	dq	154	jm	199	jv	277
jt	120	hm	154	rč	202	nk	278
lb	121	šg	155	mr	204	zq	281
žl	122	cp	156	zk	206	ln	285
ng	125	cn	158	lg	208	žm	286
kg	126	gž	158	vl	209	sz	287
tl	126	jl	160	lh	219	dk	294
nm	126	mc	161	jn	222	hs	294
zl	127	ff	165	kk	222	kp	295
bk	128	gh	168	vd	223		
lg	131	cv	171	tc	224		
ld	132	mg	173	lr	228		
ņč	132	tf	176	nž	229		

Figure 3. Combinations of two consonants with low frequency of use

tn	300	nl	404	žv	502	Two-consonant blends with frequency of use <1000	
žn	302	vj	405	bj	503		
tš	307	zz	405	gš	514	rj	610
lv	308	dm	413	jk	519	sh	625
rn	315	jš	414	lj	524	pm	626
žl	316	nj	416	gl	529	gv	629
mk	323	ht	418	žn	537	ng	643
ln	324	cs	419	šl	545	pš	646
vr	328	mf	431	sd	546	kn	660
zc	350	dl	435	rg	558	hl	667
sr	357	nš	436	gm	572	fs	675
nr	358	sj	437	np	573	vk	678
mj	362	tz	440	rš	574	tb	679
cc	378	vn	440	rk	574	nz	682
zj	380	bl	447	šn	575	td	685
js	388	nm	448	lf	578	sf	693
ml	393	tj	456	pg	581	tg	698
ns	397	ft	458	rž	584	nf	707
žs	398	lg	458	sb	590	šp	780
		pv	460	hn	591	nb	783
		lj	472	mz	591	dv	788
		pd	474	zš	591		
		gz	476	cl	595		
		mš	482	md	595		
		sg	490	pp	595		
		čk	496				
						zr	806
						nč	812
						pj	823
						rf	827
						cr	835
						šm	868
						nk	872
						pk	889
						pn	892
						nh	899
						lz	901
						bt	915
						šv	919
						tp	937
						dn	964
						kc	986

Figure 4. Combinations of two consonants with a frequency of use < 1000

group to children, and words with these consonant combinations should be avoided when choosing text for beginner readers. The script allows exploring the complete list of the corresponding words.

This group (Figure 4) comprises the most high-frequency consonant blends in the Latvian language. It is worth noting how sharply their frequency of use increases.

For instance, pairs such as *bl* (447) and *bj* (503) look and sound similar to a child. A beginner reader may confuse these consonant combinations with one another—both during reading and writing.

lc	1010	lg	1628	tn	3121	Two-consonant blends with frequency of use >1000
ck	1012	fr	1642	ņš	3175	
ct	1013	lm	1679	rv	3304	
km	1051	zp	1687	lk	3389	
nv	1061	tk	1712	bl	3390	
šs	1088	kv	1732	mb	3430	
rh	1118	gt	1740	zs	3477	
fl	1165	rc	1772	nc	3609	
tt	1182	th	1810	rp	3650	
kj	1202	mm	1818	pt	3796	
mn	1207	zm	1872	sn	3830	
rr	1237	tv	1901	ss	3855	
zb	1265	lp	1939	sv	3938	
tl	1283	sc	1986	ld	4074	
pl	1324	rz	2112	rb	4144	
bs	1349	zk	2138	mp	4170	
hr	1349	vs	2146	ds	4201	
nn	1359	šk	2240	gl	4297	
tm	1386	ph	2409	ln	4460	
lb	1400	zt	2493	rg	4735	
rl	1412	dž	2512	rn	4855	
št	1427	zd	2531	nk	4925	
mt	1441	kn	2552	ll	5296	
zn	1477	ch	2802	ps	5397	
zl	1497	zv	2815	rm	5780	
gn	1506	lv	2910	ng	5913	
šņ	1519					
rš	1526					
šļ	1561					
zg	1599					

js	6042
lt	6057
šk	6201
sl	6312
rd	6334
kš	6754
br	7007
rk	7346
gs	7554
dr	7772
sm	7834
rt	8279
pl	8837
nd	8984
kt	9839
ls	9930

Figure 5. Combinations of two consonants with a frequency of use > 1000

js	6042	Two-consonant blends with the highest frequency of use.	
lt	6057		
šk	6201		
sl	6312		
rd	6334		
kš	6754		
br	7007		
rk	7346		
gs	7554		
dr	7772		
sm	7834		
rt	8279		
pl	8837		
nd	8984		
kt	9839		
ls	9930		

sp	10015
pr	10190
gr	10266
kl	10604
kr	11888
dz	12414
nt	12996
ms	13836

ts	16822
rs	18077
tr	20505
sk	20507
ns	22072
ks	23064
st	44905

Figure 6. Combinations of two consonants with the highest frequency of use

A remarkably high frequency of use of particular consonant combinations is found (See Figure 5). The difference in frequency between the top and bottom positions in this list is tenfold. This group also includes the combination bl. If bl and bj are added together to this figure, it totals more than four thousand words in the language that contain these combinations.

This section (Figure 6) aggregates the most frequently used two-consonant combinations in the Latvian language.

These clusters include combinations found in more than 6,000 words in the Latvian language, followed by a group appearing in over 7,000 to 9,000 words, and a separate category spanning 10,000 to 13,000 words. Beyond these, separated by a wide margin, are five consonant blends that are highly prevalent in Latvian vocabulary, occurring in more than 20,000 and one nearly 45,000 instances, respectively.

Three-consonant blends with the highest frequency of use			
rkl	514	nsk	1008
ndz	526	lst	1020
lsk	545	trs	1047
gst	570	ndr	1058
ngs	600	pst	1073
rts	653	rkš	1163
lks	658	lns	1165
kls	711	ntr	1388
rdz	769	ksn	1476
nst	829	rks	1557
rds	855	nts	1569
ktr	917	rst	1752
kts	994	spr	1820
		kšķ	1844
		skr	2047
		sms	2174
		sks	3496
		sts	3592
		str	5526
		kst	5667

Figure 7. Combinations of three consonants with the highest frequency of use

		The four-consonant blends with the highest frequency of use	
rksn	104		
rkls	110		
rsts	120		
lksn	124		
strs	124		
nkts	127		
zstr	144		
zspr	156		
pstr	172		
kstr	192		
nkšķ	200		
nkst	213		
nskr	220		
lkst	243		
lst	255		
nstr	273		
rkšķ	461		
ksts	531		
rkst	1023		

Figure 8. Combinations of four consonants with the highest frequency of use

This section (Figure 7) features a selection of three-consonant combinations. As can be observed, some combinations occur approximately 500 times, while others hover around the one-thousand mark. However, there are also 'champions' that lead by a wide margin, reaching two thousand and even five thousand instances. These blends are found in high-frequency, authentic Latvian words, like *strazds*, *straujs*, *strādāt*, *rakstīt*, *rieksti*, *tukstošs*, *skriet* *skrūve*.

Consequently, if a child learns to automatically decode and, conversely, write down these common consonant blends by ear through targeted instruction, their reading speed and writing accuracy will improve significantly.

It might also be of interest to examine the existing four-consonant combinations (Figure 8). Once again, a significant predominance over the other variations is clearly observable.

293	stscr	5	chtsch	1
294	stskr	5	gzdstr	1
295	gstsp	6	kststr	1
296	ktssk	6	kšksr	1
297	lknspr	6	kšnsr	1
298	ltspr	6	lkšnst	1
299	nsstr	6	lstgr	1
300	rpsts	6	lstpr	1
301	stspr	6	lstssv	1
302	nksts	8	lkrps	1
303	rkstg	8	mdcccl	1
304	rkstn	8	mpjstr	1
305	gstsk	9	rdzmpk	1
306	kstsp	9	rftsch	1
307	lgtspr	9	rkmpsr	1
308	rkstm	9	rkstsp	1
309	gstfr	11	rkstst	1
310	dzstr	13	schtsch	1
311	lksts	13	stschr	1
312	ktssv	15	tkrpsr	1
313	ksngr	17	ltschm	2
314	tzsch	19	schsch	2
315	rksts	48	gstspr	4
			ntzsch	4

Blends of 5-6-7 consonants

lkšnsr	1
lkrpsr	1
schtsch	1

Figure 9. Combinations of 5-6-7- consonants with the highest frequency of use

The number of words containing 5–7 consecutive consonants is negligible and these are most frequently loanwords or proper names: *Scilla mischtschenkoana*, *Alkšņstra*uts, *hantzschia augstspraigums* and others.

The actual count is following: there were found 315 combinations (694 words) of 5 consecutive consonants, 25 combinations (32 words) of 6 consecutive consonants and 3 combinations (3 words) of 7consecutive consonants.

Conclusions

This study addresses the declining reading literacy scores among primary school students in Latvia by offering an evidence-based linguistic framework to optimize early decoding instruction. By performing a computational analysis of lexical data from the *Tezaurs.lv* database (413,577 entries), the research quantified the distribution and occurrence frequency of consecutive consonant combinations ranging from 2 to 7 letters in the Latvian language.

The conclusions of the study are drawn as follows.

1. The computational analysis reveals a vast quantitative gap between rare consonant combinations and high-frequency clusters. While a large number of multi-consonant clusters occur infrequently (primarily in compound or loan words), a select group of 2-, 3-, and 4-consonant blends occurs in thousands of words across the core Latvian lexicon.
2. Current national teaching methods seem to expect that basic alphabet recognition naturally leads into fluent reading. However, meeting unautomated, complex consonant clusters creates a significant cognitive problem for early readers. Explicitly teaching students to recognize and blend high-frequency consonant combinations

is able to liberate working memory, accelerating the transition from mechanical letter-by-letter decoding to instant sight recognition and reading fluency.

3. As consonant blends undergo natural coarticulation (e.g., assimilation, voicing shifts), the authors assume that targeted training in cluster recognition may sharpen phonemic awareness, improve spelling accuracy, and reduce letter omissions in writing (e.g., distinguishing sounds in words such as *pats*).
4. This research leaves significant room for investigation and the selection of lexical material with regard to its frequency, collocations, morphological composition, and grammatical variations, appropriate for learners of different age and level of proficiency on reading.
5. A more systematic and detailed approach to reading instruction, including teaching high-frequency consonant clusters, will offer a structured tool for students from uneven linguistic backgrounds, including students with dyslexia, children with weak phonemic awareness, non-native speakers, diaspora populations, and adult language learners.

DECLARATION OF CONFLICTING INTERESTS

The authors have no conflicts of interest to declare that are relevant to the content of this article and confirm full responsibility for the article's content.

STATEMENT ON AI TOOL USE

While writing this work, the authors used [Grammarly.com](https://www.grammarly.com) to improve readability and polish the English phrasing. After using this service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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PART-TIME STUDIES AS A SOLUTION FOR EQUAL EDUCATIONAL ACCESS IN LATVIA (1991–2004): A HISTORICAL PERSPECTIVE ON DISTANCE EDUCATION POLICY

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ABSTRACT

This study analyses the role of part-time studies in ensuring educational accessibility in Latvia after the restoration of independence, interpreting this form of education as an early approach to expanding equal educational opportunities during the post-socialist and institutional transformation period. The study forms part of a broader doctoral research project examining quality criteria for the blended learning approach in distance education at the basic education level in Latvia, focusing on the balance between educational accessibility and educational quality within contemporary education policy.

The theoretical framework is grounded in concepts of educational accessibility, inclusive education and lifelong learning, viewing non-traditional study forms organised outside full-time face-to-face schooling as mechanisms for engaging diverse learner groups in education. The aim of the study is to examine how part-time studies functioned as an instrument of educational accessibility in Latvia between 1991 and 2004 and how this form of education was interpreted within public and regulatory discourse.

The research is designed as a qualitative historical source analysis based on a systematically compiled corpus of press publications from the digital archive periodika.lv, complemented by an analysis of education-related legislative and policy documents. Sources were structured into thematic categories to examine institutional practices, public attitudes, and policy initiatives related to part-time education.

The findings indicate that part-time studies expanded access to education for working learners, individuals living in remote regions, students with special educational needs, and other social groups for whom full-time education was less accessible. At the same time, historical sources reveal a persistent tension between the expansion of educational access and concerns related to quality and academic prestige. The historical analysis provides a basis for interpreting contemporary debates on restricting distance education as part of a historically recurring educational policy dilemma between accessibility and quality, rather than as an entirely new educational challenge.

Keywords: *distance education, distance learning, education policy, educational accessibility, history of education in Latvia, lifelong learning, part-time studies, post-socialist education*

Introduction

Distance education has become a significant form of contemporary education, contributing to broader educational access, lifelong learning and more flexible participation in education. Since the mid-nineteenth century, the development of distance education has been closely linked to advances in communication technologies, evolving from correspondence courses to technologically mediated forms of study beyond the traditional classroom (McIsaac & Gunawardena, 2001; Nguyen & Sit, 2025; Urankar & Jamšek, 2022); moreover, the importance and need for distance education for ensuring continuity of learning has also been reinforced by periods of crisis and disruption, including pandemics and natural disasters (Barbour & Hodges, 2025), as well as armed conflicts (Salha et al., 2024). In the European context, the modern model of distance education was substantially influenced by the Open University approach, in which learning materials, student support systems, and flexible study organisation were developed as an integrated educational model (Tait, 2003; McIsaac & Gunawardena, 2001).

In Latvia, educational reforms following the restoration of independence in 1991 took place amid extensive political, economic, and institutional transformation. The transition from a centrally planned Soviet system to a democratic and market-oriented society fundamentally reshaped the education system, including institutional autonomy, legislative reforms, and integration into the European educational space, a process that culminated in Latvia's accession to the European Union in 2004 (Plakans, 2011; Abens, 2020; Sarv, 2020). Simultaneously, rapid technological development and labour market transformation contributed to increasing demand for adult learning, professional reskilling, and alternative pathways for continuing education.

The necessity of distance education and digitally supported learning began to emerge more clearly in Latvian educational policy in the mid-1990s, particularly within the broader discourse of lifelong learning and regional accessibility (Izglītības un zinātnes ministrija, 1994). The 1998 Education Law formally defined distance education as a subtype of part-time studies (Izglītības likums, 1998a), reflecting the gradual institutionalisation of flexible forms of learning within the Latvian education system. At the same time, public and policy discourse concerning educational quality, equality, learner socialisation, and self-regulated learning continued to shape discussions surrounding the development of distance education.

In this context, part-time studies became an important means of educational accessibility. During the historical period examined in this study, the Latvian term *neklātiene* was commonly used to describe educational practices organised outside traditional full-time face-to-face instruction and was officially translated in pedagogical terminology as “part-time studies” (Beļickis et al., 2000; Skujiņa, 2000a; Skujiņa, 2000b). However, the analysed historical sources demonstrate that the practical implementation of *neklātiene* frequently overlapped with correspondence education and early forms of distance education. Contemporary Latvian educational terminology differentiates between the two terms *neklātiene* and *tālmācība*: *neklātiene* refers to a form of education in

which learners complete most of the educational programme independently (Izglītības terminu skaidrojošā tiešsaistes vārdnīca, n.d.-a), whereas *tālmācība* (distance learning) involves independent, individually paced learning supported by specially structured learning materials and an organised learning support system (Izglītības terminu skaidrojošā tiešsaistes vārdnīca, n.d.-b). Current Latvian educational legislation distinguishes more explicitly between *tālmācība* and *nepilna laika klātie* (extramural learning) as separate forms of education, while the term *neklātie* is not defined in the Education Law (Education Law, 1998, Sections 1 and 8; Izglītības likums, 1998b).

Internationally, distance education has increasingly been recognised as an important instrument for educational accessibility, inclusion, and lifelong learning (UN, 2015; UNESCO, 2020). Within the European educational context, increasing attention has been paid to lifelong learning, adult participation in education, and alternative forms of learning in response to ongoing educational digitalisation (DEPP, 2020). Research demonstrates that technology-supported learning may achieve outcomes comparable to, or in some cases superior to, traditional face-to-face education when educational processes are appropriately designed and supported (Means et al., 2013; Kusmaryono et al., 2021; Sahni et al., 2021). Studies have also emphasised the importance of learner support, flexibility, and broader participation opportunities within online and distance learning environments (An et al., 2021; de la Varre et al., 2010; Picciano et al., 2012; Borup et al., 2013).

Nevertheless, recent Latvian public and policy discourse continues to reveal differing views regarding the implementation, quality requirements, and appropriate scope of distance education, including proposals to restrict its use at the primary education level. These debates are reflected in media reporting, draft legislation, and official parliamentary information (Kuzmina, 2024; Grozījumi Izglītības likumā, 2025; Latvijas Republikas Saeima, 2026; Valsts prezidenta kanceleja, 2026), as well as in publicly expressed positions of individual Members of Parliament presenting their views on such restrictions (Batņa, 2025; Grasbergs, 2025; Stobova, 2025). At the same time, limited scholarly attention has been devoted to the historical role of part-time studies in ensuring educational accessibility and to their gradual transformation into distance education within post-socialist Latvia. Historical analysis, therefore, provides an opportunity to examine how part-time studies and early forms of distance education were implemented in Latvia during the post-socialist transition period (1991–2004), how they addressed educational accessibility, and what benefits, challenges, and criticisms emerged within public and regulatory discourse.

The aim of this study is to examine how part-time studies functioned as an instrument of educational accessibility in Latvia between 1991 and 2004 and how this form of education was interpreted within public and regulatory discourse. To achieve the aim of the study, the following research questions were formulated.

- How did part-time studies contribute to educational accessibility in Latvia between 1991 and 2004?

- Which learner groups and for what purposes benefited from part-time studies during this period?
- How were part-time studies represented in public and educational policy discourse?

The study is theoretically grounded in the concepts of educational accessibility, inclusive education, and lifelong learning. These concepts are closely associated with contemporary international education policy frameworks that emphasise equitable access to quality education and lifelong learning opportunities for all learners (UNESCO, 2015). Within this framework, part-time studies are interpreted as a non-traditional educational form that enabled broader participation in education for diverse learner groups during a period of significant institutional and social transformation.

Methodology

The study was designed as a qualitative historical source analysis. Following the principles of historical and documentary research, the study drew upon primary historical sources, while secondary sources were used to contextualise Latvia's post-socialist educational transformation and to support the study's theoretical and methodological framework (Cohen et al., 2018). The research material consisted of a systematically compiled corpus of historical press publications from the digital archive periodika.lv, complemented by education-related legislative and policy documents. The final corpus comprised 187 historical sources published between 1991 and 2004: 72 sources from 1991–1994, 79 from 1995–1999, and 36 from 2000–2004.

The primary search keyword used in source selection was the Latvian term *neklātiene*, which, during the historical period examined, broadly referred to part-time studies and educational practices organised outside traditional full-time, face-to-face education. As the analysis revealed the gradual emergence of distance education discourse and the increasing use of related terminology in Latvia during the 1990s, additional searches were conducted using the term *tālmācība* (distance education) to identify sources reflecting the conceptual and institutional transition from traditional part-time studies towards technology-supported forms of remote education. Only sources containing substantive discussion of part-time studies, distance education, related educational policies, institutional practices, or public attitudes were included in the analysis, while incidental references were excluded.

The collected sources were organised into thematic categories reflecting public attitudes, policy initiatives, and institutional practices. Institutional practices were examined through 68 sources, including interviews, institutional reports, descriptions of educational initiatives, and reports on study organisation. In addition, 38 school and university advertisements were analysed to identify the availability of part-time study programmes and courses across educational institutions. The analysis of public attitudes drew on a corpus of 43 opinion articles, interviews, public commentaries, and discussions that reflected societal perceptions of part-time studies. Policy initiatives were explored

through 38 laws, government programmes, educational policy planning documents and strategic initiatives related to educational accessibility and distance education.

The corpus included 25 publications from Latvian diaspora periodicals, representing 13.4% of all analysed sources. Of these, 15 concerned educational developments in Latvia, six connected Latvian and diaspora contexts, and four focused primarily on education within Latvian diaspora communities. These sources were classified according to their thematic focus rather than their place of publication alone.

The analysis incorporated principles of thematic analysis as outlined by Braun and Clarke (2006), including the identification, review and interpretation of recurring themes across the collected historical materials. Thematic analysis was selected because it enables the systematic examination of recurring patterns across heterogeneous historical sources while preserving sensitivity to their historical and social context (Braun & Clarke, 2006).

To ensure consistency and transparency, the first author screened all search results using the stated criteria and conducted the initial thematic coding. The second author reviewed inclusion and exclusion decisions, particularly ambiguous cases, as well as the coding framework, category assignments, and theme interpretations. Differences were resolved through discussion and consensus, key decisions were documented, and the final themes were checked against the full corpus for coherence, distinctiveness, and grounding in the historical sources.

The thematic categories were informed by concepts commonly discussed in research on educational accessibility, distance education, inclusive education, and lifelong learning (McIsaac & Gunawardena, 2001). These concepts provided a framework for organising and interpreting recurring themes within the historical sources. Consequently, the analysis focused on themes related to educational accessibility, educational quality, institutional organisation, technological development, regional accessibility, social inclusion, professional reskilling, and lifelong learning.

The historical period from 1991 to 2004 was selected because it represents a formative phase in Latvia's post-socialist educational transformation, beginning with the restoration of national independence and concluding with Latvia's accession to the European Union (EU). During this period, the education system underwent substantial legislative, institutional, and organisational changes, including decentralisation, increased institutional autonomy, labour market restructuring, and the gradual emergence of technology-supported educational models. Education and training policies were also regarded as important prerequisites for accession to the EU (Sarv, 2020). In a broader historical context, EU accession marked the transition from the initial post-socialist transformation towards Latvia's development within the European political and educational space, while the designation of the Baltic states as post-communist countries became increasingly less applicable (Plakans, 2011). Therefore, 2004 provides a meaningful historical boundary for this study, which forms part of a broader doctoral research project on quality criteria for blended learning in distance basic education in Latvia.

Historical Context of Part-Time Studies in Latvia (1991–2004)

Following the restoration of Latvia's independence in 1991, the country underwent rapid political, economic, institutional, and technological transformation, accompanied by reintegration into international and European political structures, including membership in the United Nations and increasing integration into the European political and educational space. The education system transitioned from the centrally regulated Soviet model toward a democratic and legally regulated framework characterised by growing institutional autonomy, decentralisation, and alignment with European educational structures (Plakans, 2011; Abens, 2020; Sarv, 2020).

An important aspect of this transition involved the reorganisation of educational governance and legislation. During the early reform period (1991–1993), Latvia restored the 1922 Constitution and adopted the Education Law in 1991, which established the legal basis for restructuring the education system (Plakans, 2011; Sarv, 2020). Under the leadership of Minister of Education Andris Piebalgs, Soviet research structures were dismantled and new educational institutions, including the Education Development Institute (*Izglītības attīstības institūts*), were established. At the same time, broader academic reforms were initiated, including the modernisation of higher education governance, the restructuring of academic degree recognition practices, and the development of master's-level studies to improve teacher qualifications (Sarv, 2020).

From the mid-1990s onwards, the direction of educational reforms in Latvia was increasingly shaped by the objective of European integration. Latvia gradually aligned its educational development priorities with European-level initiatives and cooperation frameworks, including the Bologna Process, the Lisbon Strategy, and lifelong learning policies emphasising educational quality, mobility, and teacher professional development (Plakans, 2011; Sarv, 2020). These developments contributed to the expansion of discussions about more flexible forms of education, adult participation in learning, and the broader modernisation of the education system.

Technological development became an important component of educational transformation during this historical period. In the early 1990s, internet access gradually emerged in Latvia, significantly expanding access to information within educational and scientific institutions. At the same time, Western educational literature increasingly became available through translation initiatives and materials provided by Latvians living abroad (Plakans, 2011; Sarv, 2020; Rubene & Ozola, 2020). Government policy documents, including the Latvian National Employment Plan for 2003, indicate that in 1997, a state-supported educational informatisation system was launched as part of the national investment programme. Through this initiative, schools were equipped with computer technologies and training opportunities were provided for both educators and learners (Par Latvijas Nacionālo nodarbinātības plānu 2003. gadam, 2003).

At the same time, Latvia faced substantial socio-economic challenges associated with the transition from a centrally planned economy to a market economy during the early 1990s. This transition resulted in a sharp decline in GDP, high inflation, rising

unemployment, and deterioration in living standards. Labour market restructuring and changes in professional demand increased the need for adult education, professional reskilling, and alternative continuing education opportunities. Meanwhile, privatisation processes and growing social differentiation increased the risk of social inequality, while issues related to citizenship and language policy, influenced by the large proportion of Soviet-era migrants, created additional tensions within Latvian society and the education system (Plakans, 2011).

Together, these political, institutional, technological, and socio-economic transformations created both a growing demand for expanded access to education and favourable conditions for the development of part-time forms of education. Consequently, part-time studies from 1991 to 2004 can be interpreted as part of a broader transition toward lifelong learning approaches, institutional autonomy, and the adaptation of Latvia's education system to the requirements of the European educational space, in which the increasing role of information and communication technologies also became significant.

Results

Part-Time Studies as a Flexible Educational Form

The analysed sources show that part-time studies in Latvia between 1991 and 2004 were implemented as formally structured educational programmes. However, their practical organisation often relied on combined organisational models that integrated self-directed learning with regular face-to-face assessments, consultations and intensive study periods. Initially, part-time studies largely functioned as a supplementary mode attached to full-time institutional structures rather than as an autonomous educational system. However, the diversity of institutional practices and the growing demand for flexible learning gradually contributed to the emergence of more independent and technology-mediated educational models.

In the early 1990s, part-time studies were legally and practically linked to evening education, self-education, and external examinations, especially for learners who had exceeded the compulsory school age of 15 (Latvijas Republikas Izglītības likums, 1991). At the same time, the legal framework also allowed learning outside school premises for children and adolescents in cases of long-term illness, for example, in hospitals, sanatoriums or at home, which indicates that education outside ordinary full-time schooling was already linked to accessibility, but not yet developed as an alternative form for all learner groups (Latvijas Republikas Izglītības likums, 1991). The legislation also strengthened institutional autonomy in organising the study process, which created conditions for highly diverse implementations of part-time education across different educational sectors.

In practice, part-time studies were implemented in higher education institutions, specialised secondary education institutions, evening and part-time secondary schools, and vocational technical institutions using evening study formats (*Par papildatvaļinājuma*

laikā saglabājamās darba algas apmēra noteikšanu darbiniekiem, kuri apvieno darbu ar mācībām, 1991). Thus, within the normative framework of the early 1990s, part-time studies in Latvia were defined as one of the mechanisms for ensuring educational accessibility for persons beyond compulsory school age, while also allowing diverse institutional practices in the implementation of part-time education. Beyond formal educational institutions, part-time and correspondence-based learning also appeared in various non-formal educational initiatives, including correspondence schools, diaspora education programmes and subject-specific educational programmes.

The organisation of part-time studies usually combined independent work with periodic face-to-face components. In schools, this could involve attending classes once a month for an intensive study week in order to receive assignments and complete assessments (Zandovskis, 1992). In higher education, part-time students were expected to complete a substantial part of the learning process independently, using libraries, regional consultation centres and examination sessions at the end of the semester (Ungurs, 1991). Other sources reveal more flexible organisational models, including initiatives described as “free university” (*brīvā universitāte*) operating on a part-time basis, where learners could regulate the intensity of studies more independently (Vaicāsit-zināsit, 1994). These arrangements created combined educational models in which self-directed learning, institutional supervision and periodic face-to-face assessment coexisted.

This organisational diversity also exposed uneven material conditions. Some sources show that part-time students did not always receive sufficient institutional support, premises or learning resources. In one case, students were described as studying in corridors because rooms were occupied (Dubra, 1995). Therefore, part-time studies served as a mechanism for educational accessibility, but their quality depended heavily on the institutional capacity and resources available for implementation. Educational accessibility did not in itself guarantee equal study conditions; these remained dependent on institutional capacity and support during the post-socialist transition period.

Part-time and correspondence-based learning also extended beyond formal adult education. The University of Latvia A. Liepa Correspondence Mathematics School offered correspondence-based learning opportunities for pupils from grade nine onwards (Siliņa, 1996). In the Latvian diaspora, correspondence learning was used to support Latvian language acquisition, cultural knowledge and education at different levels without strict age limitations (LNAK, 1991; Sidare, 1993; Norītis, 2001). Taken together, these initiatives extended part-time education beyond a compensatory role for adults who had not completed formal education, supporting educational continuity, talent development, and cultural transmission.

From Part-Time Studies to Distance Education

From the mid-1990s onwards, the analysed sources reveal increasing attempts to modernise part-time studies and gradually redefine them through the concept of distance education (*tālmācība*). Public discussions described distance education as a subtype or development of part-time studies, but with a stronger modern emphasis on structured

learning materials, organised feedback and technological communication (Ivanova, 1996). At the same time, the term “part-time studies” itself was increasingly perceived as outdated or compromised in public discourse, thereby encouraging the search for new terminology and modernised educational approaches (Ivanova, 1996). International models also influenced these discussions. In 1995, the development of distance education in Latvia was discussed in relation to communication technologies and specialised methodology, while Latvia’s limitations were compared with more technologically advanced foreign examples (Grunte, 1995).

The practical implementation of distance education during the 1990s extended beyond individual home-based learning. Sources describe centre-based organisational models in which specially equipped regional facilities allowed students to follow lectures delivered remotely while remaining in their own locality (Budkeviča, 1996). Similar approaches appeared in higher education development initiatives, including plans to provide access to foreign university lectures without leaving one’s own classroom (Vembere, 1996). By the end of the 1990s and into the early 2000s, technological elements became increasingly visible within educational practice. Multimedia distance education courses were demonstrated at a telecommunications conference in 1999 (Rīgas Tehniskā universitāte, 1999), while in 2002 sources mention the development of video lecture cycles for higher education studies (Rīgas Pedagoģijas un izglītības vadības augstskola, 2002). At the same time, face-to-face examinations, consultations and assessments continued to function as important mechanisms of academic supervision and quality control (Diena, 2002).

Distance education in Latvia developed gradually alongside existing part-time study practices rather than completely replacing them. Independent learning, correspondence-based elements and periodic face-to-face assessments remained important components of study organisation even as technological solutions became increasingly visible in educational practice.

These organisational developments also became increasingly reflected in educational policy documents, where distance education was associated with adult education, lifelong learning and regional accessibility. The Adult Education Concept included distance education among the recognised forms of educational acquisition and emphasised the role of information and consultation centres as well as existing educational infrastructure (Latvijas Pieaugušo izglītības koncepcija, 1997). Government-level programmes similarly presented distance education as an instrument for providing educational services outside the full-time attendance model, including the long-term goal of developing a virtual university, while acknowledging that progress was limited by insufficient and expensive telecommunications infrastructure (Nacionālā programma “Informātika”, 1999). The e-Latvia programme described distance education as a flexible instrument for postgraduate education, further training, and professional reskilling, regardless of age, place of residence, or social status (Sociāli ekonomiskā programma e-Latvija, 2000). Within broader European educational policy discourse, e-lifelong learning and educational technologies were increasingly associated with reducing the digital divide and expanding educational access beyond traditional classroom settings, including

through radio and television, as well as internet-based learning (Līdaka & Pilsētneiece, 2001; Greiškalns, 2001). International organisations also presented distance education as a practical mechanism for expanding educational accessibility (LETA, 2001).

Overall, the analysed sources suggest that, between 1991 and 2004, part-time studies in Latvia continued to rely on traditional organisational elements such as independent learning and periodic face-to-face assessments, while gradually incorporating distance education approaches and technological solutions. The development of distance education during this period was closely associated with the expansion of telecommunications infrastructure and broader educational policy discussions on lifelong learning and educational accessibility.

Public and Institutional Criticism of Part-Time Studies

During the early 1990s, public discourse in Latvia frequently reflected sceptical and at times openly negative attitudes towards part-time studies, particularly regarding questions of prestige, educational quality and equality. Several sources associated part-time education with lower academic status and questioned its legitimacy in comparison with traditional full-time studies. One student explicitly rejected this study form by arguing that “part-time studies are not serious” (Randers, 1991). Public discourse also included ironic and degrading descriptions of “masses of evening and part-time students” (Kacs, 1991), while part-time education was at times stereotypically described as “education for housewives who simply wanted a diploma” (Millere, 1994). Such criticism extended beyond pedagogical concerns and reflected broader assumptions about educational prestige and academic legitimacy.

Concerns regarding educational quality appeared repeatedly throughout the analysed materials. Representatives of the Ministry of Education argued that during the Soviet period, evening schools had often allowed students to obtain educational documents “without knowledge”, thereby creating a need for stricter quality-control and supervision mechanisms (Siliņa, 1991). Similar concerns arose in discussions about students formally remaining in part-time studies for many years, primarily in order to obtain diplomas rather than knowledge (Vizule, 1992). Other sources emphasised insufficient self-discipline and low learner motivation, which were presented as characteristic risks of part-time education and associated with absenteeism and weak study engagement (Buliņa, 1991; Dubra, 1995). Criticism also appeared at the institutional and policy level. The rector of the Latvian Academy of Culture, Pēteris Laķis, supported the idea of gradually reducing part-time studies in higher education and replacing them with external examinations, arguing that knowledge itself should be the main criterion rather than the form of study (Kalveite, 1991).

At the level of student experience, part-time studies were also described as outdated and insufficiently supported by the institution. Some students criticised the limited material and organisational support available for part-time learning, arguing that “the provision is ridiculously inadequate”, which contributed to distrust of this mode of study (Elsbergs, 1991). Public debates additionally addressed unequal requirements for

full-time and part-time students, including discussions regarding the use of the Russian language in examinations and diploma theses (Čaklais, 1994). According to ethnodemographic analyses from the period, Russian-speaking students more frequently chose part-time studies (Mežs, 1993). Some sources also warned that part-time education could be misused in questionable foreign educational offerings, where the problem was perceived not in the study format itself, but rather in the lack of institutional legitimacy and the imitation of educational processes (Pilsētniece, 1998). Criticism of part-time studies thus intersected with broader debates on language policy, institutional trust, and educational regulation during the post-socialist transformation period.

Economic inequality formed another recurring dimension of criticism. Some sources argued that part-time studies could become an expensive educational pathway because students were often required to pay tuition fees while simultaneously combining employment and studies (Dreimanis, 1995; Vaicāsit-zināsit, 1994). Such conditions created concerns that educational opportunities might become more accessible primarily to financially secure social groups. Other sources, however, argued that paid full-time education could be even less financially accessible than part-time studies (Miķelsone, 1994). In some discussions, tuition fees in part-time education were interpreted as a form of “economic pressure” intended to increase student motivation (Šenberga, 1992). At the same time, attempts were made to reduce educational inequality through compensation mechanisms for teachers studying in part-time or external programmes, which were introduced as part of broader state support measures for teacher recruitment and professional development (Izglītības informācijas centrs, 1995; Miķelsone, 1995).

Overall, during the early post-socialist period, part-time studies were represented simultaneously as a means of widening educational access and as a potentially low-status form of education requiring stricter supervision and regulation. Questions related to educational quality and equality were also addressed at the legislative level, for example, by establishing that the content, volume and examination requirements for full-time and part-time higher education studies should remain equivalent (Augstskolu likums, 1995). With the gradual emergence of internet-based distance education discourse in the early 2000s, some earlier concerns persisted in reformulated forms. Criticism increasingly focused on the limited experience of the academic environment, the unequal prestige associated with different diplomas, and the risks related to learner self-motivation, even in paid study programmes (Diena, 2002). The emergence of distance education did not eliminate earlier concerns about educational quality and institutional legitimacy; instead, it recast them within new technological and organisational settings.

Part-Time Studies as a Mechanism of Educational Accessibility

Despite criticism and scepticism, the analysed historical sources consistently show that part-time studies fulfilled important practical functions in ensuring educational accessibility across multiple sectors of Latvian society. Rather than functioning merely as a secondary educational pathway, part-time studies became an adaptive institutional

response to uneven social, regional and economic conditions during the post-socialist transformation period.

Particularly positive and pragmatic attitudes towards part-time studies appeared within state security and internal affairs institutions. In these sectors, part-time studies were viewed as an efficient mechanism for rapidly training personnel, improving qualifications and professionalising state institutions while simultaneously allowing employees to continue working (Brila, 1991; Zeps, 1992; Berga, 2003). Similar approaches appeared within military education. The National Defence Academy used part-time studies to prepare volunteer commanders and personnel for the National Guard (Zebris, 1995), while the Latvian naval forces relied on part-time education to retrain experienced instructors as officers amid financial and personnel shortages (Balodis, 1996). Policy documents similarly linked part-time education to addressing military personnel shortages and strengthening national defence capacity in the newly independent Latvian state (Valsts Nacionālās drošības koncepcijas izveides pamatprincipi, 1995). In the security and defence sectors, part-time studies formed part of broader processes of post-socialist state-building and institutional consolidation.

Educational accessibility through part-time studies was equally important within the education sector itself. During the early 1990s, sources repeatedly highlighted shortages of teachers and educational specialists. Music teachers argued that eliminating part-time studies would worsen the shortage of singing teachers because this form of study enabled teacher preparation alongside employment (Latvijas mūzikas skolotāji, 1991). Other sources stressed that many part-time students were already working teachers and that part-time education allowed them to obtain additional qualifications or retrain in new subject areas (Vaiders, 1991; Pundurs, 1991). Over time, regional branches and distance education centres increasingly expanded access to teacher education outside Riga (Žukovska, 1993; Kaņepe, 1995; Budkeviča, 1996; Cipija, 1996). Some sources additionally argued that regional distance education centres could reduce shortages of teaching staff by eliminating the need to establish multiple small higher education institutions in different regions (Žukovska, 1993). In some cases, part-time studies were presented as a fully legitimate academic pathway even before equivalent full-time programmes had been established, for example, at Liepāja Pedagogical Higher Education Institution, where part-time studies were mentioned prior to the introduction of full-time master's programmes (Ozols, 1995). These examples suggest that part-time studies played an important role in reducing regional educational inequality and supporting the decentralisation of educational opportunities.

Rapid labour market transformation and economic restructuring also increased demand for flexible professional education. Sources mention part-time studies in forestry (Jakaitis, 1995), economics (Laizāne, 1992), agricultural economics (Latvijas Valsts agrārās ekonomikas institūts, 1991), business education and foreign language learning (Latvijas Biznesa skola, 1992), as well as construction, water management and melioration, land management, landscape architecture, gardening and horticulture (Klismeta, 1994; Bulduru dārzkopības tehnikums, 1994), and beekeeping (Mertens et al., 1994).

In some cases, part-time studies were described as the only realistic option under conditions of limited financial and institutional resources, for example, in film education (Rietuma, 1992). Customs administration also proposed part-time courses to rapidly prepare specialists for newly established state institutions during a period of rapid institutional expansion and shortage of qualified personnel (Gulbis, 1991). Maritime education similarly relied on part-time studies to allow working sailors to obtain higher education qualifications without interrupting employment (Zvirgzdiņa, 1991). Part-time studies became closely connected with professional reskilling and labour-market adaptation during Latvia's transition to a market economy.

From the second half of the 1990s onwards, sources increasingly linked distance education to Latvian language acquisition and the integration of non-Latvian-speaking professional groups, including employees in internal affairs, railway services, medicine, defence, and customs administration (Kvelde, 1997; Liepiņš, 1998). In these discussions, distance education was linked with broader technological modernisation processes integrating universities, media and internet-based educational initiatives.

Part-time studies also widened educational participation among groups facing barriers to traditional full-time education. Historical materials refer to educational opportunities for persons with disabilities and hearing impairments (Ungurs, 1991; Dubra, 1994; Dubra, 1995), as well as for working adults who needed to continue employment while studying (Siliņa, 1991). In prisons, part-time education was described as one of the few realistic opportunities to obtain higher education within weakly developed, financially limited prison education systems (Kalniņa, 1997). Professional athletes also pursued part-time studies either to combine education with their sports careers or to resume studies after the end of their professional sporting careers (Ķīsis, 1998; Pagodkins, 2000). For several of these groups, part-time study was not merely a flexible alternative but one of the few realistic routes to continued education.

Part-time studies played an important role in preserving cultural identity and strengthening diaspora education. Latvian communities abroad used correspondence-based learning to teach Latvian language and cultural knowledge within primary and secondary education programmes without strict age limitations (LNAK, 1991; Sidare, 1993; Norītis, 2001). In diaspora contexts, additional initiatives explored possibilities for developing part-time master's programmes connected with Latvian language teaching and translator education in cooperation with the University of Latvia (Z. D., 1994; Prauliņa, 1994). Religious and civic organisations similarly used part-time educational courses to prepare youth leaders, theology students, religious workers, and teachers in both Latvia and abroad (Černeviskis & Kleimanis, 1992; Leitis, 1993; Norītis, 1992; Štaubers, 1996; Cakars, 2003a; Cakars, 2003b). Thus, part-time studies functioned not only as a mechanism of labour-market adaptation but also as an instrument for maintaining cultural continuity and social cohesion across geographically dispersed communities.

Finally, part-time educational initiatives supported school-age learners. Sources describe correspondence courses designed to prepare for olympiads and university entrance examinations, to advance subject knowledge, and to provide educational

support for pupils living outside major urban centres (Šteinfelde, 1993; Gžibovska, 1996; Norīte, 1996). Additional courses allowed learners to repeat educational content, prepare for graduation examinations and improve academic results (Latvijas Universitāte, 1991). Therefore, part-time studies extended beyond adult education, contributing to talent development and broader educational opportunities for younger learners.

Alongside the practical advantages of part-time education, sources from the late 1990s and early 2000s increasingly associated distance education with technological modernisation and the broader digital transformation of higher education. Discussions referred to virtual university initiatives, information networks and lifelong learning strategies (Dobelis, 1996; Dienas Bizness, 2000; Vitrams, 2000). Within internet-based distance education discourse, advantages were increasingly framed in terms of the ability to study at a convenient time and place, to continue employment alongside studies, to maintain access to consultants, and to reduce the psychological and financial burden on students who might otherwise need to study abroad (Diena, 2002). By the early 2000s, part-time and distance education had become associated not only with practical educational access but also with technological and institutional modernisation in higher education.

Discussion

The findings of this study reveal a historically recurring tension between educational accessibility and educational quality. Concerns regarding learner self-discipline, institutional legitimacy, academic standards, and educational prestige recur throughout the analysed sources and have parallels in recent Latvian debates on restricting distance education. Parliamentary and presidential materials emphasise educational performance, direct teacher support, learner socialisation, legal certainty, sufficient preparation time, and the child's best interests, while also preserving access to distance education in specific health, social, and geographical circumstances (Latvijas Republikas Saeima, 2026; Valsts prezidenta kanceleja, 2026). Media coverage, draft legislation, and publicly expressed positions of individual Members of Parliament further demonstrate that the appropriate scope of distance education remains contested (Kuzmina, 2024; Grozijumi Izglītības likumā, 2025; Batņa, 2025; Grasbergs, 2025; Stobova, 2025). These parallels provide an interpretative basis for viewing current debates as part of a historically recurring educational policy dilemma between accessibility and quality rather than as an entirely new educational challenge. Since contemporary discourse was not systematically analysed in this study, however, this comparison remains interpretative rather than comprehensive. In this respect, the findings are consistent with distance education research indicating that educational quality depends not only on the mode of delivery itself but also on the organisation of the learning process, learner support systems, and quality assurance mechanisms (McIsaac & Gunawardena, 2001; Tait, 2003).

At the same time, the analysed historical sources demonstrate that part-time studies expanded educational opportunities for diverse groups of learners, including working adults, residents of remote regions, teachers, military personnel, people with disabilities,

prisoners, athletes, and members of the Latvian diaspora. Although diaspora periodicals may have increased the visibility of themes related to the Latvian language and cultural identity, most publications in the corpus concerned education in Latvia or linked Latvian and diaspora contexts, rather than focusing exclusively on diaspora education. Overall, the findings suggest that part-time studies fulfilled several functions that are now associated with UNESCO's vision of inclusive and equitable quality education and lifelong learning opportunities for all (UNESCO, 2015).

Several functions later associated with lifelong learning policy were already visible in the historical material. Opportunities for professional qualification, reskilling, continuing education, and career development recur throughout the historical materials. Although lifelong learning had not yet emerged as a central educational policy concept in the 1990s, the findings indicate that part-time studies already offered educational pathways that supported learning across different stages of life.

The findings indicate that the development of part-time and distance education in Latvia occurred within the broader context of post-socialist educational transformation, characterised by institutional restructuring, labour market adaptation, and increasing educational diversification (Abens, 2020; Sarv, 2020). Within this context, part-time studies served not only as an educational alternative but also as a practical means of addressing the social, economic, and institutional challenges that emerged during this period of transition.

The uneven chronological distribution of the corpus should also be considered when interpreting these developments. While 72 sources dated from 1991–1994 and 79 from 1995–1999, only 36 dated from 2000–2004. This difference may partly reflect changing terminology rather than declining relevance. During the later period, *neklātiene* (part-time studies) increasingly coexisted with *tālmācība* (distance learning), *nepilna laika studijas* (part-time studies), and *e-studijas* (e-studies). Since *nepilna laika studijas* was not used as a search term in the periodika.lv database, sources from 2000–2004 may be underrepresented; future research should therefore apply a broader range of historically sensitive keywords.

The study is limited by its reliance on historical press publications and policy documents, which primarily reflect public and institutional discourse rather than direct evidence of learner experiences or educational outcomes. Advertisements similarly document publicly promoted educational provision rather than its actual implementation or quality. Future research could combine historical discourse analysis with institutional archival materials, statistical data, and oral history approaches to provide a more comprehensive understanding of the historical development of part-time and distance education in Latvia.

Conclusions

The qualitative historical source analysis reveals that, between 1991 and 2004, part-time studies in Latvia developed unevenly but functioned as a practical response to

the institutional, social, and economic needs of the post-socialist transformation period. Initially, they provided an educational pathway primarily for individuals beyond compulsory school age and for working learners. Over time, however, their functions expanded as institutions adapted this form of education to changing labour-market demands, regional conditions, and technological developments. By combining independent learning with periodic face-to-face consultations, assessment, and institutional supervision, part-time studies enabled participation outside regular full-time attendance. Regional branches, consultation centres, and correspondence-based provision further reduced dependence on major urban educational centres. Nevertheless, wider access did not guarantee equal study conditions, since the quality and practical availability of provision remained dependent on institutional capacity, learning resources, learner support, and, in some cases, the ability to pay tuition fees.

The range of beneficiaries and purposes extended considerably beyond the completion of interrupted formal education. Working adults could obtain qualifications without leaving employment, while teachers and specialists in state security, internal affairs, the military, maritime services, economics, and other sectors used part-time study for professional training, qualification improvement, and reskilling. In the context of the newly independent state, these opportunities also helped address personnel shortages and supported institutional consolidation. The historical sources document expanded educational opportunities for diverse learner groups, including residents of remote regions, persons with disabilities, prisoners, and professional athletes, whose access to traditional full-time education was often limited. At the same time, correspondence-based education supported Latvian language learning and cultural continuity within diaspora communities, whereas correspondence schools and subject-specific courses expanded opportunities for talent development and further education among school-age learners. Part-time studies therefore served professional, regional, social, and cultural purposes in addition to their original compensatory role.

In public and educational policy discourse, part-time studies were represented ambivalently. They were recognised as a necessary means of widening educational access, responding to labour-market and personnel needs, and reducing regional inequality. At the same time, they faced low academic prestige and were associated with insufficient learner motivation and self-discipline, weak institutional support, unequal material conditions, and doubts about the quality and legitimacy of education. Economic accessibility was also contested: the possibility of combining employment and education increased flexibility, whereas tuition fees could restrict participation and reproduce inequality. From the mid-1990s onwards, policy discourse increasingly connected flexible education with lifelong learning, regional accessibility, and technological modernisation. The gradual development of distance education introduced greater emphasis on structured learning materials, organised feedback, and technological communication, but it did not eliminate earlier concerns about quality and institutional legitimacy; instead, these concerns were reframed within new organisational and technological conditions.

Taken together, the findings identify part-time studies as an important component of Latvia's post-socialist educational transformation and as a precursor to the later development of distance education. Despite their uneven development and contested status, they provided important opportunities for professional training and reskilling, expanded access in regional areas and among socially vulnerable groups, and supported cultural continuity within Latvian diaspora communities. Their historical development also reveals a persistent educational policy dilemma: flexible forms of education can widen participation, but their effectiveness and legitimacy depend on adequate institutional support, academic standards, learning resources, and quality assurance. Although contemporary discourse was not analysed systematically in this study, this historical pattern provides a basis for interpreting current debates on distance education as a renewed expression of the long-standing tension between accessibility and quality rather than as an entirely new educational challenge.

AUTHOR NOTE

OpenAI ChatGPT and Google NotebookLM were used to support English-language editing, stylistic revision, selected structural improvements, and checks of the manuscript's internal consistency. The tools were not used for source selection, coding, or generating research findings. All suggestions were critically reviewed by the authors, who take full responsibility for the final manuscript.

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CASE STUDY OF ADULT LEARNERS' ENGLISH LANGUAGE LEARNING AFTER THE RESTORATION OF LITHUANIA'S INDEPENDENCE

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ABSTRACT

Research into English-language use in Lithuania following the restoration of independence in 1990 is important for understanding the historical factors that shaped the development of English proficiency among the Lithuanian population. In particular, examining foreign-language education during the Soviet period can help explain why many individuals who received their schooling before 1990 subsequently had limited opportunities to develop and use English. As sources documenting Soviet-era language education become increasingly scarce, oral testimonies from individuals who experienced this educational system provide valuable first-hand evidence of language-learning practices and experiences that may otherwise remain undocumented. Such accounts can also contribute to a better understanding of the linguistic experiences of the Soviet generation and their implications for subsequent generations in Lithuania and the wider Baltic region. Therefore, this study draws on a review of relevant literature and four semi-structured interviews conducted in Panevėžys, Lithuania. The participants comprised three older adults and one working-age adult who were born in the Soviet Union and had studied English at school prior to the restoration of Lithuanian independence in 1990. The interview data indicate that English-language instruction in the participants' schools was generally characterised by limited opportunities for practical language use and teaching approaches that did not sufficiently develop communicative competence. Overall, the findings suggest that the limited English proficiency reported by participants can be associated with several interconnected factors, including the relatively limited availability of qualified English teachers, pedagogical approaches that prioritised formal language knowledge over communicative practice, and the limited practical relevance of English in the Soviet-era linguistic environment. In particular, the dominant position of Russian in education, employment, and travel, combined with the limited relevance of English in participants' everyday lives at the time, further restricted opportunities to use and develop English.

Keywords: *adult learners, Baltic countries, English language, English language usage, Restoration of Lithuania's independence, Soviet Union*

Introduction

English has become one of the most widely used languages for international communication, education, employment, travel, science, and cultural exchange (Crystal, 2003; Jenkins, 2015). Its growing global significance has contributed to its increasing importance as a foreign language in educational systems worldwide (Nunan, 2003). In Lithuania, however, the development of English-language proficiency needs to be considered within the specific historical and sociolinguistic context of the Soviet period. The experiences of individuals who received their education under the Soviet system were shaped by a linguistic environment in which Russian occupied a dominant position in education, employment, public administration, and everyday communication (Ehala, 2013; Ivanauskas, 2009). Consequently, opportunities to learn and use English were substantially different from those available to subsequent generations.

The linguistic situation in the Baltic states provides an important context for understanding these experiences. During the Soviet period, Estonia, Latvia, and Lithuania underwent significant political, social, and linguistic transformations, including changes in language use, language hierarchies, and patterns of bilingualism (Druviete, 1997; Plakans, 2011). Russian was given a privileged position within the Soviet educational and institutional system (Ehala, 2013; Plakans, 2011), while Estonian, Latvian, and Lithuanian remained the national languages of the respective republics but operated within a broader environment characterised by the institutional dominance of Russian. The historical development of the Baltic languages was also influenced by earlier periods of Germanisation and Polonisation (Plakans, 2011). These experiences demonstrate the importance of language as a component of national and cultural identity and help explain the complex linguistic environment in which the Soviet generation was educated. As Ozolins (1999) argues, language constitutes an important element of national identity and plays a significant role in maintaining the cultural continuity of smaller linguistic communities.

This historical context is particularly relevant to the linguistic experiences of Lithuanians who attended school during the Soviet period. The linguistic experiences of the Soviet-era generation were shaped by the prominent position of Russian in education and everyday communication, while opportunities to develop practical English-language skills were more limited (Hogan-Brun & Ramonienė, 2003; Ivanauskas, 2009). English was taught alongside other foreign languages in Lithuanian schools, but its practical relevance and opportunities for communicative use were constrained by the wider sociolinguistic and political context of the Soviet period (Monk, 1990; Ivanauskas, 2009). Following the restoration of independence in 1990, the position and practical importance of foreign languages in Lithuania changed substantially as the country moved away from Soviet language policies and became increasingly integrated into European and international structures (Hogan-Brun & Ramonienė, 2003). Following independence, Lithuania experienced profound political, economic, social, and educational changes, including increased interaction with Western European countries and greater integration

into international institutions and networks. These developments significantly increased the practical importance of English for education, employment, travel, and international communication (Mole, 2012). The contrast between the linguistic experiences of the Soviet period and those that emerged after 1990 therefore provides an important basis for examining why members of the older generation may have had limited opportunities to develop and use English.

Importantly, recollections of Soviet-era language education constitute a gradually disappearing source of evidence. As members of the generation educated under the Soviet system grow older, their personal accounts provide an increasingly valuable opportunity to document educational experiences that may not be fully captured in institutional records. A carefully reported, ethically conducted, and historically contextualised set of life-history interviews can therefore have scholarly value in its own right, particularly when examining how former pupils experienced and interpreted English-language education. At the same time, the use of a small qualitative sample requires the scope of the claims to remain proportionate to the evidence. Rather than seeking to generalise to the wider Lithuanian population, the present study uses four interviews to provide an in-depth account of individual experiences and recollections of English-language provision in late-Soviet Lithuanian schooling.

Against this background, the present study examines the factors that may have contributed to limited English-language proficiency and use among Lithuanians educated during the late Soviet period and considers how these experiences shaped their use of English following the restoration of independence in 1990. More specifically, it provides a description of English-language provision in late-Soviet Lithuanian schooling as recalled by former pupils. The aim of the study is to examine how former pupils remember and evaluate English-language teaching in Lithuanian schools during the late Soviet period, highlighting its main characteristics and the experiences associated with it. The object of the study is the experience of English-language education and its perceived influence on subsequent English-language use among individuals educated in Lithuanian schools during the late Soviet period.

The study combines a review of relevant scholarly literature with a qualitative case study based on four semi-structured interviews conducted in Lithuania. The literature review examines the historical and linguistic context of the Baltic states, with particular attention to foreign-language education and the changing position of English before and after the restoration of independence. The empirical component explores participants' recollections and evaluations of English-language education during the late Soviet period. Accordingly, two research objectives were formulated: a) to examine the historical and linguistic context of foreign-language education in the Baltic states prior to 1990 through a review of relevant scholarly literature; b) to explore former pupils' experiences and perceptions of English-language education through four qualitative semi-structured interviews conducted in Lithuania.

Historical Context of Baltic Countries in Soviet Union

Small states such as Estonia, Latvia, and Lithuania have historically faced significant security challenges due to their geographical proximity to and relationship with larger neighbouring powers. Russia, in particular, has employed various forms of political and military power to pursue its strategic objectives in the region. Crowther (2023) characterises Russian political warfare as a significant security concern in the Baltic region and emphasises the particular vulnerability perceived by the Baltic states, which have experienced Russian and Soviet domination historically. The full-scale Russian invasion of Ukraine in 2022 provides a contemporary example of the security challenges faced by smaller states in the region, as Ukraine, despite its considerable geographical size and population, has faced military aggression from a substantially larger neighbouring power (Crowther, 2023).

The history of the Baltic states has been characterised by successive periods of political domination and territorial conflict involving larger neighbouring powers. Russian imperial rule significantly influenced linguistic and cultural life in Lithuania. Following the 1863–1864 uprising, the Russian imperial authorities expanded policies of Russification that had initially been implemented in the Lithuanian lands to other parts of the Baltic region (Plakans, 2011). As Plakans (2011) notes, the systematic policy of Russification implemented in the Lithuanian and Polish lands from 1864 was subsequently extended to the Baltic provinces of Estland, Livland, and Kurland (p. 256). Thus, the processes of linguistic and cultural Russification affected not only Lithuania but also Latvia and Estonia, although their historical experiences and the intensity of these policies varied across the region.

During the period of Russification, the status of Estonian, Latvian, and Lithuanian was increasingly challenged by policies that promoted Russian as the language of administration, education, and public life. In the Estonian and Latvian territories, some Russian officials even referred to Estonian and Latvian as “dialects” rather than languages, while the use of the Cyrillic alphabet for publications in these languages was actively encouraged (ibid). In the Lithuanian lands, restrictions on the publication of Lithuanian-language materials in the Latin alphabet had been introduced earlier, following the 1863. At the same time, Russian, Polish, and German remained important languages in various institutional and socioeconomic domains, with their use required in some areas of government employment and public life (ibid). These policies contributed to an asymmetrical linguistic environment in which Russian acquired greater institutional prominence, while the Baltic national languages faced significant restrictions and pressures on their development and public use.

During the Soviet period, Russian acquired substantial institutional and practical importance in Lithuania. Russian was promoted through the educational system, and Soviet language policy increasingly strengthened its position in schools, particularly during the 1970s and 1980s (Ivanauskas, 2009). Knowledge of Russian also provided access to a wider range of educational and employment opportunities across the Soviet Union,

contributing to its practical relevance in everyday and professional life. The resulting linguistic environment created an asymmetrical form of bilingualism in which Lithuanians were generally expected to acquire Russian, whereas Russian speakers had considerably fewer incentives to acquire Lithuanian (Ehala, 2013).

In contrast, the practical relevance of English was considerably more limited within the Soviet linguistic environment. Because Russian functioned as a widely shared *lingua franca* across the Soviet Union, individuals could communicate across different Soviet republics without necessarily acquiring an additional foreign language. Knowledge of Russian therefore provided access to communication, education, employment, and travel across much of the Soviet space, reducing the immediate communicative necessity and motivation to develop practical English-language skills. Pavlenko (2006) describes Russian as a *lingua franca* across the territory of the former Soviet Union, while Kreindler (1997) notes that approximately 62% of non-Russian populations reported knowledge of Russian as either a first or second language. Consequently, although English was taught in some Soviet schools, opportunities to use it for authentic communication were comparatively restricted, particularly when individuals' educational, professional, and travel-related needs could largely be met through Russian.

Overall, English had relatively limited practical significance in Lithuania prior to the restoration of independence, apart from those who pursued the language for personal, educational, or other specific purposes. This situation contrasts with the present, when English has become a widely used *lingua franca* and is increasingly needed due to individuals' educational, professional, travel, and communicative needs. In contrast, during the Soviet period, Russian was institutionally imposed and functioned as the dominant language of communication, thereby reducing the practical necessity and opportunities to use English (Pavlenko, 2006; Kreindler, 1997).

In addition, a case study by Kestere et al. (2021), focusing specifically on Latvia but also relevant to the broader Baltic context, revealed that researchers during the Soviet period had limited opportunities to use English and, consequently, to travel to Western countries, communicate with international scholars, exchange knowledge, and participate in international academic collaboration. This restricted opportunities for researchers to access and disseminate knowledge beyond the Soviet academic environment. Similarly, Kestere and Stonkuvienė (2020) note that doctoral dissertations in the Baltic states were commonly written in Russian until 1990, indicating that the practice of conducting doctoral research and writing dissertations in national languages or English developed more extensively only after the restoration of independence. The transition to new academic and evaluation standards following independence also created challenges for researchers, as Soviet academic regulations differed considerably from those increasingly adopted in the international academic community (Kestere & Stonkuvienė, 2020).

Following the restoration of independence, the Baltic states gradually introduced reforms aimed at restructuring their educational systems and overcoming the legacy of Soviet-era education (Hogan-Brun, 2007). In Latvia, for example, the reintroduction and strengthening of Latvian as the language of instruction required substantial changes to

established educational practices (Stikute, 2020). Teachers had to adapt to new curricula and experiment with teaching methods that supported the use of Latvian in schools (Stikute, 2020). Over time, these changes contributed to the strengthening of Latvian language and cultural identity, while the institutional and social prominence of Russian gradually declined (ibid).

In conclusion, the influence of the Soviet regime on the Baltic states was substantial, including the introduction of institutional and educational practices that strengthened the position of Russian in public life and schooling. For adults educated during this period, these experiences continue to influence their foreign-language knowledge, learning habits, and attitudes towards language learning. The restoration of independence thus entailed not only political transformation but also a gradual reorientation of language policy, education, and cultural practices towards the promotion of national linguistic and cultural values. (Hogan-Brun & Ramonienė, 2003). This transition also created new language-learning needs for adults, particularly as English became increasingly important for international communication, employment, education, and mobility.

Adult Language Learning and Language Policy

Adult language learning is closely related to learners' previous educational experiences, social circumstances, and perceived needs. Knowles et al. (2015) argue that adult learners differ from younger learners in that their learning is often closely connected to existing experience, immediate needs, and the practical application of acquired knowledge. This perspective is particularly relevant to adults who received their schooling during the Soviet period in Lithuania. Their approaches to foreign-language learning were shaped by an educational environment in which Russian had a strong institutional and communicative position, while English had considerably fewer opportunities for practical use (Hogan-Brun & Ramonienė, 2003; Ivanauskas, 2009). Consequently, their current attitudes towards learning English may reflect not only their individual abilities but also the linguistic environment and educational practices in which their initial language learning took place.

Motivation is another important factor in adult foreign-language learning. Dörnyei (2001) describes motivation as a complex factor influencing both the initiation and continuation of second-language learning. In the context of adult learners, motivation may be particularly connected to the perceived relevance of a language to present-day needs, including employment, travel, education, social communication, and access to international information. For the generation educated in Soviet Lithuania, these motivations may differ substantially from those that existed during their school years. While Russian was highly relevant to everyday and institutional communication during the Soviet period, the restoration of Lithuanian independence and the country's subsequent integration into European and international contexts increased the practical importance of English (Hogan-Brun & Ramonienė, 2003).

From this perspective, language policy and individual motivation should be considered together. Language policies establish the linguistic environment in which individuals acquire and use languages. On the other hand, personal motivation influences how individuals continue learning later in life. The experiences of Lithuanian adults who studied English before 1990 therefore provide an opportunity to examine how an earlier language-policy context may continue to shape foreign-language learning in adulthood. Their experiences are particularly relevant because the transition from Soviet to post-independence Lithuania involved a substantial reorientation of language policy and educational practices (Hogan-Brun & Ramonienė, 2003). For adults who had limited opportunities to use English during their school years, learning or relearning the language later in life may consequently represent not only the acquisition of a foreign language but also an adaptation to changed social, educational, and professional requirements.

In this context, adult language learning can be understood as a process influenced by the interaction of previous educational experience, language policy, present-day needs, and motivation. This perspective is particularly important for understanding the experiences of Lithuanian adults educated before 1990, whose opportunities to develop practical English-language competence were shaped by a very different linguistic environment from that of contemporary Lithuania.

Methodology

This study employed an exploratory qualitative case-study design combining a review of relevant academic literature with four semi-structured life-history interviews. The empirical component focused on four individuals in Panevėžys, Lithuania, who had experienced English-language education in Lithuanian schools during the Soviet period. The study sought to explore how former pupils recall and evaluate English-language teaching and learning before the restoration of Lithuania's independence in 1990, and how the linguistic and educational environment of that period may have influenced the practical relevance of English.

The literature review was undertaken to establish the historical, linguistic, and educational context of English-language learning and use in the Baltic states, with particular attention to period before and after 1990. The interview data were subsequently considered in relation to the historical and scholarly literature in order to contextualise individual experiences within the broader linguistic and educational environment of the Soviet period.

Relevant academic literature was identified using Google Scholar, the Directory of Open Access Journals (DOAJ), EBSCO APA PsycArticles, and SAGE Journals. The literature search focused on publications addressing Soviet-era language policy, foreign-language education, English-language teaching and use, and the linguistic and educational history of Lithuania and the other Baltic states. Particular attention was given to sources providing historical evidence concerning the position of Russian and English within

the Soviet educational system and to research examining changes in language and education policies following the restoration of independence.

Further, the empirical component consisted of four participants from Panevėžys, Lithuania. Participants were selected according to a predefined eligibility criterion: they had to be Lithuanians and had to have started learning English at school before 1990. This criterion ensured that participants had direct experience of English-language education during the Soviet period and corresponded to the historical period examined in the study. Hence, the sample included three older and one working adult. Participants were recruited on the basis of accessibility and voluntary participation.

Four semi-structured interviews were conducted on 17th of December in 2024 at one of the higher education institutions in Panevėžys. All interviews were conducted in Lithuanian, the participants' native language, to allow them to describe their experiences comfortably and without the additional linguistic demands of communicating in another language. Each interview lasted approximately 15–20 minutes, and all four interviews were completed within a one-day period.

The interviews consisted of nine questions addressing (see Appendix 1) participants' experiences of learning English at school, teaching methods, opportunities to use English, the perceived relevance of English during the Soviet period, and their subsequent experiences with English. The questions and responses were relatively short and focused on the participants' personal recollections.

The interview data were analysed using a qualitative content analysis approach. No audio or voice recording devices were used during the interviews. The researcher reviewed the written notes taken during each interview and identified key points and recurring themes in relation to the nine interview questions. These points were then organised into a comparative table, allowing responses to be examined systematically across participants and similarities, differences, and recurring patterns to be identified. Given the short duration of the interviews, the limited number of participants, and the concise nature of the responses, no automated or software-based transcription platform was used. On the other hand, to support the trustworthiness of the analysis, the original written by hand notes from each interview were retained as an audit trail, providing a record of the participants' responses and the basis for the points included in the comparative analysis. The researcher subsequently translated the recorded responses from Lithuanian into English for the purposes of conducting Table 1 and presenting it, as well.

Also, the study was exploratory and involved only four participants, therefore the analysis did not seek statistical generalisation. Instead, the responses were examined descriptively to identify common themes concerning English-language teaching, opportunities for language use, the perceived usefulness of English, and the influence of the wider Soviet linguistic environment.

Finally, participation in the study was voluntary. No personally identifying information was collected or reported, and both the participants and the educational institution with which some participants were affiliated are anonymised in the article. The study

was conducted for the purpose of documenting and exploring historical experiences of English-language learning during the Soviet period. Moreover, the interviews were short, involved a small number of participants, and therefore were conducted without audio recording or collection of identifying personal information, the study did not involve the collection of sensitive personal data.

Limitations

Several limitations should be acknowledged:

First, this is an exploratory case study of only four individuals in Panevėžys, and the findings therefore cannot be statistically generalised to the wider population of Lithuanians who studied English during the Soviet period.

Secondly, identifying participants who had studied English during the Soviet period presented a sampling challenge, as relatively few adults in the target population in Panevėžys had begun learning English before 1990.

Third, the study relies on retrospective accounts of educational experiences that occurred several decades ago. Participants could therefore have had difficulties recalling specific details of their English-language classes, and their recollections may also have been influenced by subsequent experiences and present-day interpretations.

Fourth, the absence of audio recordings also means that the analysis is based on the researcher's contemporaneous notes rather than verbatim interview transcripts. Furthermore, the translation of participants' short responses from Lithuanian into English was conducted by the researcher, which may involve some loss of linguistic nuance. Nevertheless, the interviews provide first-hand recollections that can contribute to the documentation of a historical period for which opportunities to collect such personal accounts are gradually diminishing. The findings are therefore interpreted as exploratory evidence of individual experiences rather than as representative evidence of the entire generation.

Fifth, identifying relevant scholarly literature presented several challenges. Research addressing the linguistic and educational context of the Baltic states during the Soviet period was often based on earlier publications, while more recent studies specifically examining the position of Lithuanian, Latvian, and Estonian alongside Russian were comparatively limited. Google Scholar was therefore used extensively to identify relevant scholarly sources, particularly for establishing the historical context of the study. Additional literature was identified through databases including the Directory of Open Access Journals (DOAJ), EBSCO APA PsycArticles, and SAGE Journals.

Results

Information on participants' English-language learning experiences, language use, and perceived relevance of English was collected through semi-structured, face-to-face interviews as part of the qualitative component of the study. The interview questions

were designed to elicit participants’ retrospective accounts of English-language education during the Soviet period and/or before the restoration of Lithuania’s independence in 1990, when participants were children, adolescents, or young adults. The interview instrument consisted of nine questions addressing participants’ educational background, experiences of English-language learning, opportunities for language use, perceived need for English, attitudes towards the language, and factors motivating their English-language learning at the time and subsequently.

Four life-history interviews were conducted to explore participants’ recollections of English-language teaching and learning during the Soviet period. Participation was voluntary, and the interviews were conducted anonymously. Participants were asked to provide limited demographic information, including their year of birth and place of residence, as well as information concerning their English-language learning experiences. The responses were systematically organised in a comparative table (see Table 1) to facilitate data reduction and comparison across participants. The interview questions addressed the following areas: year of birth; place of residence; location of schooling; age or year at which English learning began; duration of English-language learning; contexts in which English was used; perceived need for English; attitudes towards English; and motivation to learn English both at the time and subsequently (see Appendix 1).

Table 1. Case study: interview results

Participants	Age	Learning period	Teaching methods	Language usage	Motivation
Participant 1	68y/o (1956)	5 th –11 th class; individually; group courses (from 2020)	Very poor: teacher was not fluent; just reading	No need then; was enthusiastic in learning it and now tries to talk to grandchildren	To learn and speak then and now
Participant 2	65y/o (1959)	5 th –11 th class; work courses; group courses (from 2020)	As now	No need then; for learning and fun, talking to grandchildren now	To learn and speak now
Participant 3	65y/o (1959)	5 th –11 th class; Music Academy (1 year); work courses; group courses (from 2022)	Average then; very strict in studies: translating, reading, story-telling, etc.	No need then; only for work now	To learn and speak now because of work and travels
Participant 4	51y/o (1973)	5 th –11 th class; studies; work courses	As now	No need then; only for further studies and work now	To learn and speak now because of work and travels

Source. Own research.

Given the small sample and the geographical scope of the study, the research is designed as an exploratory case study focusing on participants from Panevėžys. The findings therefore provide insight into individual experiences of English-language learning in this specific local context and should not be interpreted as representative of the Lithuanian population as a whole or of the other Baltic states. Nevertheless, the findings may provide a basis for identifying patterns that could be examined in larger-scale research involving participants from different regions of Lithuania and, potentially, Latvia and Estonia.

Most participants were originally from Panevėžys; one participant had lived in a rural area of the Panevėžys region before moving to the city in the third grade. All four interviews were conducted at a higher education institution in Panevėžys, where three participants were senior students and one was employee. The sample comprised three pensioners and one working adult, including three women and one man. For all participants, English was learned as a second foreign language after Russian during their school education, typically from the fifth to the eleventh grade.

The interview data did not indicate a clear relationship between participants' age or year of birth and their reported quality of English-language instruction. Participants born in different periods, ranging from the 1950s to the 1970s, described instances of teaching that they perceived as insufficiently specialised or effective. At the same time, the accounts suggest that competent English teachers were present, although participants perceived them as relatively uncommon. Across the interviews, participants reported the frequent use of reading, writing, and listening activities, whereas opportunities for developing spoken English appeared to be considerably more limited. Speaking practice was described as an infrequent component of English-language instruction.

One notable exception was reported by Participant 3, who recalled English lessons as relatively intensive and structured during one particular school year. According to this participant, lessons involved substantial translation, regular speaking activities, and retelling previously read texts. Another recurring observation by Participant 3 was about teachers' uncertain level of English-language proficiency, with some perceived as having only limited command of the language.

As shown in Table 1, participants generally did not perceive English as having strong practical relevance during their school years. Their motivation to study English was instead associated primarily with personal interest and curiosity about a foreign language that was less familiar and less widely used in their immediate environment than Russian. In this respect, English was sometimes perceived as a new or relatively unfamiliar language rather than as a necessary means of everyday communication. This contrasts with the contemporary context, in which English is widely used for international communication, education, employment, travel, and other purposes.

The experiences of Participant 4 is particularly relevant because he was younger than the other participants and began learning English shortly before after the period of the restoration of independence. His accounts suggest that changes in the political and linguistic environment did not necessarily result in an immediate transformation of

English-language teaching practices. Also, for example, Participant 4 and surprisingly, Participant 2 reported that the English teachers' performance was similar to nowadays teaching. On the other hand, both of them agreed that they still want and need to relearn English now due to their own reasons, like work or communication with children who live abroad. This information suggests that, although participants described their school-based English language learning as broadly comparable to contemporary approaches, the learning process may nevertheless have been insufficiently effective, as evidenced by their need to resume or continue learning English later in life.

Overall, the interview findings suggest several factors that may have contributed to participants' limited present-day English proficiency. First, English had relatively limited practical relevance within the Soviet linguistic environment, where Russian was widely used for education, employment, communication, and mobility. Second, participants reported relatively few opportunities to use English for practical communication outside the classroom. Third, several participants questioned the consistency or professional preparedness of some English teachers. Taken together, these factors may help explain why participants who began learning English before 1990 generally reported limited confidence or fluency in spoken English compared with the greater opportunities for English-language exposure available to younger generations today.

Finally, these findings concerning motivation further illustrate the changing role of English across the two periods. The three older participants generally described their initial motivation as voluntary and related to personal interest or curiosity about English as a relatively unfamiliar foreign language. In contrast, the younger participant began learning English around the period when its social and practical relevance was increasing. In the present context, participants reported renewed motivation to improve their English for purposes such as communicating with family members living abroad, travelling independently, and employment. Some had subsequently returned to English-language learning through organised group courses. Although these findings cannot be generalised beyond the four participants, they illustrate how changes in the linguistic environment and the practical value attributed to English may influence both initial and later-life motivation to learn the language.

Conclusions

- The paper's most defensible contribution lies in its documentation of these experiences. This generation's recollections of Soviet-era language schooling represent a gradually disappearing source, and a carefully reported, ethically conducted, and well-contextualised set of four life-history interviews has value in its own right, provided that the conclusions remain proportionate to what such a small sample can support.
- The Russification of the Baltic states created a linguistic environment in which Russian was widely required in education, employment, politics, and everyday communication, thereby reducing the practical need and opportunities to use English. Travel

within the Soviet Union was also generally conducted within a Russian-speaking environment. Moreover, the literature analysis and case-study findings suggest that opportunities to learn and use English were limited and that the availability of English-language specialists in Panevėžys schools (or even in other Lithuania's cities) was relatively low. Where English instruction was provided, participants' accounts indicate instability in English-language provision with considerable variation in teachers' perceived proficiency and teaching practices. These factors may have contributed to the limited development of practical English-language competence (i.e., speaking) during the Soviet period. On the other hand, the participant's account of a rigorous year at the Music Academy contrasts with the experiences of other participants and suggests considerable variation in the quality and intensity of English-language provision.

- The case study also revealed an important limitation: only a few respondents could recall specific teaching methods used in their English lessons. In some cases, more than 30, 40, or even 50 years had passed since participants completed their schooling, making detailed retrospective accounts difficult. Consequently, the study cannot establish precisely how English-language teaching methods differed from those used today or identify specific methodological deficiencies. The limited recollection of teaching practices should therefore be considered when interpreting the findings.
- Today, the generation educated during the Soviet period consists largely of older adults, many of whom may need to learn or relearn English. Their earlier foreign-language education was shaped by learning environments that provided limited opportunities for practical English use, while English itself had relatively little relevance in their everyday lives at the time. Consequently, further research involving a larger sample is needed to examine these experiences more comprehensively and to identify teaching and learning approaches appropriate for older adult learners, taking into account their age, previous foreign-language learning experiences, current needs, and motivations.

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APPENDIX 1

Interview questions:

1. When were you born?
2. Where do you currently live?
3. Where did you attend school?
4. When did you start learning English?
5. When did you stop learning English?
6. In what contexts did you use English?
7. Did you need to use English in your everyday life?
8. did you enjoy learning English?
9. What motivated you to learn English at the time, and what motivates you to learn or use English now?

THE WORLD ATHLETICS KIDS' ATHLETICS PROGRAMME IN THE SKOLA2030 CONTEXT: PHYSICAL FITNESS TRENDS AND CURRICULUM COMPATIBILITY

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ABSTRACT

In recent years, increasing attention has been devoted to children's physical activity and its role in promoting a healthy society. The Kids' Athletics programme offers a playful and structured approach to developing fundamental movement skills and physical fitness. This study examines the programme's implementation in Latvia from 2022 to 2025 and assesses its compatibility with the Skola2030 Sports and Health curriculum. A comparative observational design involving successive annual cohorts was used. Physical fitness outcomes were analysed as the proportions of participants meeting established standards in speed, strength, and endurance. Group differences were assessed using Fisher's exact tests, and the resulting p values were adjusted using the Holm procedure.

The Kids' Athletics group showed a higher proportion of participants meeting the standards in all 12 comparisons. However, none of the differences remained statistically significant after Holm correction. The results therefore indicate a consistent positive trend rather than a statistically confirmed programme effect. Content analysis also showed substantial compatibility between Kids' Athletics and the competency-based approach of Skola2030.

Keywords: *Kids' Athletics, physical fitness, fundamental movement skills, sport pedagogy, Skola2030*

Introduction

In recent years, the level of physical activity among children and adolescents has declined in many parts of the world, while health risks associated with sedentary lifestyles have increased. The World Health Organization emphasizes that insufficient physical activity during childhood significantly affects physical health, motor development, and long-term quality of life (World Health Organization, 2020). At the same time, growing attention has been paid to the development of fundamental movement skills, as these serve as a foundation for lifelong participation in sport and physical activity (Hulteen et al., 2018).

Within the competency-based education framework implemented through *Skola2030* in Latvia, the learning area Sports and Health places particular emphasis on the development of movement skills, especially the fundamental skills of running, jumping, and throwing (Skola2030, n.d.). This highlights the need for methodologically structured and practically applicable solutions that support teachers in implementing curriculum objectives across diverse educational settings. One such approach is the World Athletics Kids' Athletics programme, which is based on playful and versatile physical activities designed to develop children's movement skills, coordination, and motivation to participate in physical activity (World Athletics, n.d.). The programme also provides educators and coaches with a structured methodological framework consisting of age-appropriate tasks and activities tailored to children's developmental stages.

However, the implementation of the Kids' Athletics programme in the Latvian educational and sports school context requires further examination not only in relation to physical fitness outcomes, but also in terms of its compatibility with the competency-based *Skola2030* curriculum (Skola2030, n.d.). Therefore, the aim of this study was to compare physical fitness trends among Kids' Athletics participants and participants following traditional training approaches and to assess the programme's compatibility with the *Skola2030* Sports and Health curriculum.

Theory

The Kids' Athletics programme developed by World Athletics is founded on the development of fundamental movement skills through playful and diverse physical activities. The programme incorporates running, jumping, throwing, and coordination tasks that are adapted to children's age and developmental level. This approach contributes not only to physical fitness development but also to the enhancement of social and emotional skills, including cooperation, self-confidence, and motivation to engage in physical activity (Cairney et al., 2019; Hulteen et al., 2018). Scientific literature identifies fundamental movement skills as a critical foundation for children's future participation in sport and everyday physical activity. Regular and structured physical activity during childhood positively influences coordination, motor control, cardiovascular health, and overall well-being (Janssen & LeBlanc, 2010). Furthermore, a broad range of movement experiences during early childhood has been shown to promote long-term engagement in sport and active lifestyles (Lloyd et al., 2016). The Kids' Athletics approach has been widely adopted across various European countries and integrated into both educational systems and the activities of sports organizations. Although implementation strategies differ among the Baltic States, all countries emphasize the development of fundamental movement skills and the promotion of children's participation in physical activity.

To contextualise the implementation of Kids' Athletics in Latvia, the approaches used in the three Baltic States were reviewed. The comparison focuses on the leading organisations, implementation settings, activity focus, coach and teacher education, methodological support, and the general characteristics of programme implementation.

Table 1. Comparison of the Baltic States

Criterion	Latvia	Lithuania	Estonia
Leading organisation	Latvian Athletics Association	Lithuanian Athletics Federation	Estonian Athletics Association
Main implementation settings	Schools and sports schools	Schools and sports clubs	Schools and extracurricular education
Main activity focus	Play-based running, jumping, and throwing activities	Running, jumping, and throwing activities combined with large-scale events	Running, jumping, and throwing activities organised through structured progression
Coach and teacher education	Developing	Organised, although implementation may vary	Regularly organised and methodically structured
Methodological support	Partially available and gradually expanding	Adapted to the national context	More unified at the national level
Main implementation characteristic	Flexible and gradually expanding model	Broad participation and event-based implementation	Systematic and progressively structured implementation

Note. The comparison is based on the authors' review of publicly available information from the national athletics federations. It provides a general overview of programme implementation in the Baltic States and should not be interpreted as a standardised national comparison.

The information was synthesised from publicly available materials provided by the national athletics federations (Estonian Athletics Association, n.d.; Latvian Athletics Association, n.d.; Lithuanian Athletics Federation, n.d.). The comparison is presented in Table 1.

The comparison indicates that all three Baltic States implement Kids' Athletics through activities focused on running, jumping, and throwing, while differing in organisational structure and methodological coordination. Publicly available information suggests that Estonia follows a more centrally structured model, Lithuania places greater emphasis on broad participation and event-based implementation, and Latvia applies a more flexible approach that continues to develop. These observations should be interpreted as a descriptive synthesis rather than as a standardised evaluation of programme quality or effectiveness.

Despite differences in national implementation, international experience and scientific literature suggest that the Kids' Athletics programme serves not only as a form of sports participation but also as a multifaceted pedagogical tool that promotes physical literacy, social development, and long-term engagement in physical activity among children (Cairney et al., 2019; Hulteen et al., 2018). Research highlights that structured and diverse movement experiences positively influence children's coordination, motor control, health, and motivation to participate in sport and physical activity (Tompsett et al., 2017; World Health Organization, 2020). Furthermore, international evidence demonstrates that the Kids' Athletics approach can be adapted to different educational

and sports systems while maintaining common principles of fundamental movement skill development (Eddy et al., 2021; Rudd et al., 2015).

Examples of Kids’ Athletics Activities Aligned with the Skola2030 Curriculum

Figure 1 presents several activities derived from the traditional IAAF/World Athletics Kids’ Athletics programme. These activities are designed to develop children’s fundamental movement skills, coordination, speed, agility, jumping ability, and throwing skills. The core principle of the programme is learning through play and movement experiences while simultaneously promoting cooperation, participation, and positive attitudes towards physical activity (World Athletics, n.d.). In addition to popular relay races and sprinting activities, the programme incorporates a variety of tasks specifically designed to enhance coordination, strength, speed, and agility (see Figure 1 for activity descriptions).

Examples of Kids’ Athletics Activities within the Inclusive Skola2030 Curriculum – jumping activities such as *Cross Hopping*, *Rope Skipping*, *Ladder Running*, and *Forward Squat Jumping* are commonly included in the World Athletics Kids’ Athletics programme (Gozzoli et al., 2006; World Athletics, n.d.). The primary objective of these activities is to develop explosive strength, balance, coordination, and body control. Regular participation in jumping exercises contributes to the development of lower-limb musculature and enhances movement accuracy and motor competence (Hulteen et al., 2018).

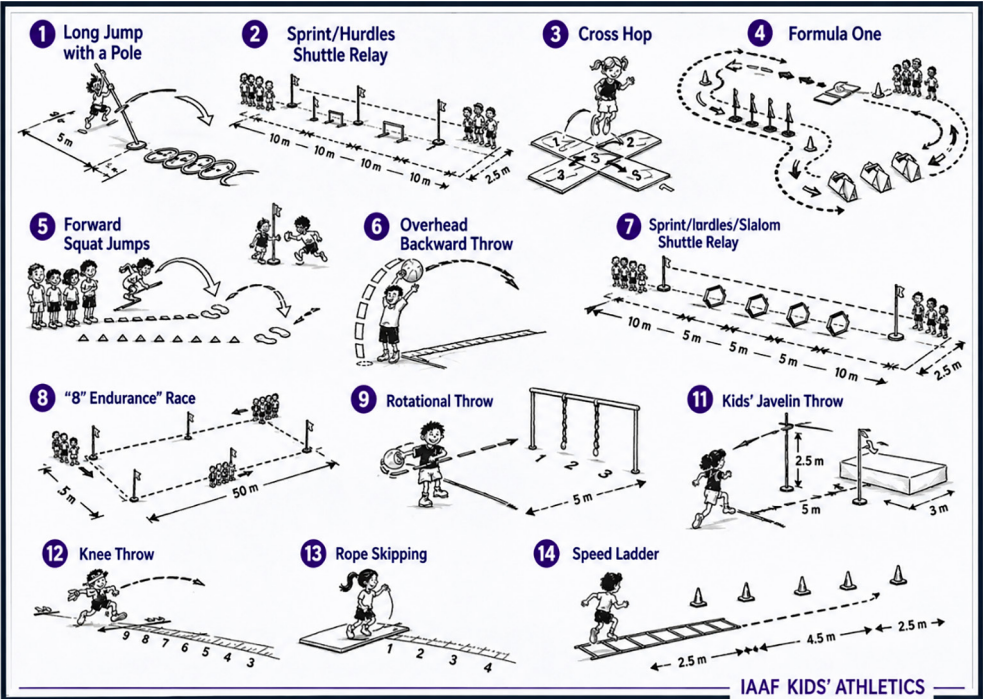


Figure 1. Overview of Kids’ Athletics Activities (World Athletics, n.d.)

Running and relay-based activities include. *Sprint–Hurdle Shuttle Relay*, *8-Minute Endurance Race*, *Formula One*, and *Sprint Slalom* (World Athletics, n.d.). The programme extensively incorporates relays, obstacle courses, zigzag running, and orientation-based activities. These tasks are designed to improve reaction speed, movement coordination, agility, and spatial awareness. Furthermore, relay activities promote teamwork, communication skills, and social cooperation, all of which are important aspects of children's social development (Cairney et al., 2019).

Throwing activities include. Kids' javelin throwing, knee throwing, target throwing over a barrier, rotational throwing, and overhead backward throwing (World Athletics, n.d.). These exercises utilise balls and other age-appropriate equipment to develop upper-body strength, coordination, movement accuracy, and spatial perception. Children are provided with opportunities to learn the fundamental principles of throwing in a safe and age-appropriate environment, thereby establishing a foundation for future participation in specialised athletics disciplines.

Team-Based Activities. The majority of Kids' Athletics activities are organised in a team-based format. This approach reduces the emphasis on individual performance and encourages participation regardless of the child's level of physical fitness or athletic ability. Team activities foster cooperation, responsibility, mutual respect, and a sense of belonging, which are important components of social and emotional development (Cairney et al., 2019). This approach contributes not only to the development of physical fitness but also to the enhancement of social and emotional skills, including cooperation, self-confidence, and motivation to engage in physical activity (Cairney et al., 2019; Eime et al., 2013; Hulteen et al., 2018).

Pedagogical Significance. The activities included in the Kids' Athletics programme are designed in accordance with principles of child development and the concept of physical literacy. They provide diverse movement experiences that contribute not only to the development of physical abilities but also to children's motivation to engage in regular physical activity. The programme enables children to acquire movement skills through a progressive and developmentally appropriate learning process while simultaneously creating positive sporting experiences and fostering long-term interest in an active lifestyle (Cairney et al., 2019; World Health Organization, 2020).

Compatibility of Kids' Athletics with the Skola2030 Sports and Health Curriculum. To assess the compatibility of the Kids' Athletics programme with the Skola2030 curriculum, the main activity groups included in the programme were compared with the learning outcomes and content areas of the Sports and Health curriculum. The comparison focused on movement skills, physical abilities, cooperation, safe participation, and the development of positive attitudes towards physical activity (Table 2).

Table 2. Compatibility of Kids’ Athletics Activities with the Skola2030 Sports and Health Curriculum

Kids’ Athletics element	Related Skola2030 learning outcome	Rationale for compatibility
Running and relay activities	Develops running skills, speed, endurance, and the ability to adapt movement to different conditions	Relay races, obstacle courses, sprinting, and endurance tasks provide repeated and age-appropriate opportunities to develop running technique and physical abilities
Jumping activities	Develops jumping skills, balance, coordination, and body control	Cross Hopping, Rope Skipping, Ladder Running, and Forward Squat Jumping combine fundamental movement skills with coordination and explosive strength development
Throwing activities	Develops throwing skills, movement accuracy, coordination, and safe use of equipment	The programme uses age-appropriate implements and varied throwing tasks that allow children to practise different movement patterns in a controlled environment
Team-based activities	Develops cooperation, responsibility, communication, fair play, and participation	Team-based tasks reduce excessive emphasis on individual performance and promote inclusion, mutual support, and shared responsibility
Combined movement tasks	Develops the ability to combine movement skills and apply them in changing situations	Activities such as Formula One and obstacle courses integrate running, jumping, throwing, agility, and decision-making within a single task
Play-based and differentiated activities	Promotes motivation, positive attitudes towards physical activity, and participation according to individual abilities	The playful format and adjustable level of difficulty enable children with different physical abilities to participate and experience success

The comparison is based on the authors’ content analysis of the Kids’ Athletics methodological principles and the Skola2030 Sports and Health curriculum. The comparison demonstrates that the Kids’ Athletics programme corresponds most directly to the Skola2030 learning outcomes related to running, jumping, throwing, coordination, cooperation, and active participation. Its main added value is the provision of a structured and practically applicable set of age-appropriate activities through which these outcomes can be implemented in a playful and inclusive manner. At the same time, the comparison reflects conceptual and methodological compatibility and should not be interpreted as an empirical evaluation of changes in teachers’ professional competence.

Research Design

The aim of the study was to analyse differences in physical fitness outcomes between the Kids’ Athletics programme group and the comparison group, as well as to assess the potential contribution of the Kids’ Athletics programme to the development of children’s fundamental movement skills and physical abilities. The study was conducted from 2022 to 2025 at the Ādaži Children and Youth Sports School. The participants were children

and adolescents aged 7–14 years. Training sessions in the Kids’ Athletics programme group regularly included running, jumping, throwing, coordination, and team-based activities, whereas the comparison group followed a traditional sports training programme in which the Kids’ Athletics approach was either not used or used only to a limited extent.

Participants were not randomly assigned to the groups, and no baseline comparison of physical fitness was conducted before the implementation of the programme. Therefore, the study cannot be regarded as a randomised pedagogical experiment. Instead, it is characterised as a comparative observational study involving successive annual cohorts. The number and composition of participants could differ in each year of the study. Therefore, the results do not reflect changes in the individual physical development of the same children over the four-year period. At the same time, the comparison of successive annual cohorts makes it possible to assess whether the direction of the differences between the Kids’ Athletics programme group and the comparison group is repeated across different participant samples. The recurrence of similar trends over several study years reduces the likelihood that the observed differences are attributable solely to the specific characteristics of a single annual cohort and indicates a degree of consistency in the observed pattern. However, this study design does not allow individual changes over time to be analysed or a direct causal relationship between participation in the Kids’ Athletics programme and physical fitness outcomes to be established.

Study Participants

The number of participants in both groups gradually decreased over the study period. The Kids’ Athletics programme group included 20 participants in 2022, 18 participants in 2023, and 15 participants in both 2024 and 2025. The comparison group included 22, 19, 17, and 16 participants, respectively. The distribution of participants is presented in Table 3.

The decline in the number of participants may have been influenced by participant turnover in the sports school training groups shifts in children’s interests, transitions to other sports, and varying levels of engagement in the training process. Changes in group composition may also have been associated with the long-term effects of the COVID-19 pandemic. However, no individual-level data on the impact of the pandemic were collected; therefore, this factor could not be statistically distinguished from other circumstances affecting participant retention.

Table 3. Distribution of Study Participants from 2022 to 2025

Study year	Kids’ Athletics programme group, <i>n</i>	Comparison group, <i>n</i>
2022	20	22
2023	18	19
2024	15	17
2025	15	16

Despite changes in participant numbers, the sizes of the two groups were relatively similar in each study year, allowing the results of the groups to be compared within the respective year. The annual distribution of participants is presented in Table 3.

Physical Fitness Assessment

Physical fitness was assessed using age-appropriate tasks aligned with the standards established by the Latvian Athletics Association. The assessment included a 30- or 60-metre sprint, standing long jump, medicine ball throw, and a 400–1000-metre run.

The results were grouped into three categories of physical abilities:

- speed;
- strength;
- endurance.

Each participant's result in the respective physical ability category was classified into one of two categories: the fitness standard was met or the fitness standard was not met. The same assessment procedure and criteria for evaluating the standards were applied to both groups. Sprint results were used to assess speed; standing long jump and medicine ball throw results were used to assess strength and explosive ability; and age-appropriate distance-running results were used to assess endurance. The average attendance rate in the Kids' Athletics programme group was approximately 75% during the study period. Individual attendance data were not linked to each child's assessment results; therefore, it was not possible to determine whether more frequent attendance was associated with a higher probability of meeting the fitness standards.

Data Analysis

In the descriptive analysis, the number and percentage of participants who met the fitness standards were calculated for each study year. The magnitude of the differences between the groups was expressed in percentage points by subtracting the result of the comparison group from that of the Kids' Athletics programme group.

Because the number of participants in each group was small and the number of participants who did not meet the standards was low in some categories, a two-sided Fisher's exact test was used to compare the groups. This test is appropriate for comparing categorical data in small samples when the assumptions of statistical tests based on large-sample approximations may not be met (Jung, 2014). The test was conducted separately for each physical fitness indicator and each study year.

A total of 12 separate comparisons were conducted: four comparisons each for speed, strength, and endurance. To reduce the risk of obtaining statistically significant results by chance across the 12 comparisons, the *p* values from Fisher's exact tests were adjusted using Holm's sequential procedure (Holm, 1979). Results with a Holm-adjusted *p* value below 0.05 were considered statistically significant.

Given the exploratory nature of the study and the small group sizes, both the p values and the proportions of participants meeting the fitness standards, as well as the percentage-point differences between the groups, were considered when interpreting the results. Participant results from different years were not combined into a single overall sample because the same participants may have been represented in more than one study year.

Results

The proportion of participants who met the fitness standards was higher in the Kids’ Athletics programme group than in the comparison group in all 12 comparisons. The magnitude of the differences between the groups varied, with the largest descriptive differences observed in endurance standard attainment in 2024 and 2025. For each physical fitness indicator, the number and proportion of participants who met the respective standard were calculated for each group. The results are presented in the table in the format n/N (%), where n represents the number of participants who met the standard, N represents the total number of participants in the respective group and study year, and the percentage indicates the proportion of participants in the group who met the standard (Table 3).

Table 3. Attainment of Fitness Standards in the Kids’ Athletics Programme and Comparison Groups, 2022–2025

Indicator	Year	Kids’ Athletics group, n/N (%)	Comparison group, n/N (%)	Difference, percentage points	Fisher’s exact test <i>p</i>	Holm-adjusted <i>p</i>
Speed	2022	17/20 (85.0%)	15/22 (68.2%)	+16.8	0.284	1.000
Speed	2023	15/18 (83.3%)	12/19 (63.2%)	+20.2	0.269	1.000
Speed	2024	12/15 (80.0%)	11/17 (64.7%)	+15.3	0.444	1.000
Speed	2025	14/15 (93.3%)	9/16 (56.3%)	+37.1	0.037	0.373
Strength	2022	16/20 (80.0%)	14/22 (63.6%)	+16.4	0.315	1.000
Strength	2023	15/18 (83.3%)	10/19 (52.6%)	+30.7	0.079	0.710
Strength	2024	13/15 (86.7%)	12/17 (70.6%)	+16.1	0.402	1.000
Strength	2025	13/15 (86.7%)	10/16 (62.5%)	+24.2	0.220	1.000
Endurance	2022	15/20 (75.0%)	13/22 (59.1%)	+15.9	0.338	1.000
Endurance	2023	12/18 (66.7%)	8/19 (42.1%)	+24.6	0.191	1.000
Endurance	2024	12/15 (80.0%)	6/17 (35.3%)	+44.7	0.016	0.171
Endurance	2025	13/15 (86.7%)	6/16 (37.5%)	+49.2	0.009	0.110

Note. *n* denotes the number of participants who met the fitness standard, and *N* denotes the total number of participants in the respective group and study year. Two-sided Fisher’s exact test *p* values are reported. The Holm correction was applied across all 12 group comparisons.

Speed Standard Results. In the Kids' Athletics programme group, 80.0–93.3% of participants met the speed standard across the study years, compared with 56.3–68.2% in the comparison group. In all four study years, the proportion of participants who met the standard was higher in the Kids' Athletics programme group. The difference between the groups ranged from 15.3 percentage points in 2024 to 37.1 percentage points in 2025. The largest difference was observed in 2025, when 14 of the 15 participants in the Kids' Athletics programme group and 9 of the 16 participants in the comparison group met the speed standard.

For the 2025 comparison, the unadjusted Fisher's exact test p value was 0.037. However, after the Holm correction was applied across all 12 comparisons, the adjusted p value was 0.373. Therefore, the difference was not statistically significant after adjustment for multiple comparisons. The results indicate a consistent descriptive trend in favour of the Kids' Athletics programme group but do not provide sufficient statistical evidence of a difference between the groups in the attainment of the speed standard.

Strength Standard Results. In the Kids' Athletics programme group, 80.0–86.7% of participants met the strength standard, compared with 52.6–70.6% in the comparison group. The proportion of participants who met the strength standard was higher in the Kids' Athletics programme group in all four study years. The smallest difference between the groups was observed in 2024 and amounted to 16.1 percentage points. The largest difference was observed in 2023, when 83.3% of participants in the Kids' Athletics programme group met the standard, compared with 52.6% in the comparison group. The difference amounted to 30.7 percentage points. The difference in the attainment of the strength standard did not reach statistical significance in any study year. The smallest unadjusted p value was obtained in 2023 ($p = 0.079$), whereas the Holm-adjusted p value was 0.710. Thus, the strength results indicate a consistently higher proportion of participants meeting the standard in the Kids' Athletics programme group. However, the small number of participants limits the statistical evidence supporting these differences.

Endurance Standard Results. The largest differences between the groups were observed in the attainment of the endurance standard. In the Kids' Athletics programme group, 66.7–86.7% of participants met the endurance standard, compared with 35.3–59.1% in the comparison group. In 2022, the difference between the groups was 15.9 percentage points, increasing to 24.6 percentage points in 2023. The largest differences were observed in 2024 and 2025. In 2024, 12 of the 15 participants, or 80.0%, in the Kids' Athletics programme group met the endurance standard, compared with 6 of the 17 participants, or 35.3%, in the comparison group. The difference was 44.7 percentage points, and the unadjusted Fisher's exact test p value was 0.016. In 2025, 13 of the 15 participants, or 86.7%, in the Kids' Athletics programme group met the endurance standard, compared with 6 of the 16 participants, or 37.5%, in the comparison group. The difference amounted to 49.2 percentage points, and the unadjusted p value was 0.009. After the Holm correction was applied across all 12 comparisons, the adjusted p value was 0.171 for 2024 and 0.110 for 2025. Thus, neither difference reached statistical

significance after adjustment for multiple comparisons. Nevertheless, the magnitude of the percentage-point differences and the consistent direction of the results across all four study years indicate a consistent descriptive pattern that should be examined further in a larger sample.

Overall Evaluation of the Results. The proportion of participants who met the fitness standards was higher in the Kids' Athletics programme group across all three physical fitness indicators and in all four study years. Thus, the same direction of group differences was observed in all 12 comparisons. The differences between the groups ranged from 15.3 to 37.1 percentage points for speed, from 16.1 to 30.7 percentage points for strength, and from 15.9 to 49.2 percentage points for endurance. The largest differences were observed in the attainment of the endurance standard in 2024 and 2025. In several individual comparisons, the unadjusted p values were below 0.05; however, statistical significance was not retained after the Holm correction. Therefore, the results do not support the conclusion that the Kids' Athletics programme had a statistically confirmed effect.

At the same time, the consistently higher proportion of participants meeting the standards in the Kids' Athletics programme group, together with the substantial percentage-point differences observed in certain years, suggests a possible positive association between the regular use of Kids' Athletics activities and children's physical fitness outcomes. This association was most pronounced in the endurance results.

Limitations of the Interpretation of the Results. Several methodological limitations should be considered when interpreting the results. Participants were not randomly assigned to the groups, and comparable baseline physical fitness data were not collected before the implementation of the programme. It is therefore not possible to determine whether the Kids' Athletics programme group and the comparison group already differed at the beginning of the study in terms of physical fitness, motivation, or previous sporting experience.

The number and composition of participants could change in each study year. Consequently, differences between annual results cannot be interpreted as improvements or declines in the physical fitness of the same group of participants. The analysis reflects the results of successive annual cohorts. Individual-level data linking training attendance to fitness outcomes were not available. These circumstances may have influenced the attainment of the fitness standards independently of the use of the Kids' Athletics programme.

The study groups were small, which limited the statistical power of the tests to detect existing differences. This is reflected in the relatively large percentage-point differences observed between the groups that nevertheless did not reach statistical significance after adjustment for multiple comparisons. Therefore, the study results should be interpreted as consistent descriptive trends rather than as evidence of a direct causal relationship between the use of the Kids' Athletics programme and higher physical fitness outcomes.

Conclusions

The study results and the content analysis indicate that the principles of the Kids' Athletics programme are conceptually and methodologically compatible with the competency-based approach of Skola2030 and the intended learning outcomes of the Sports and Health curriculum. The programme provides a structured and practically applicable methodological framework for promoting fundamental movement skills, physical literacy, participation, and positive attitudes towards physical activity (World Athletics, n.d.; Skola2030, n.d.).

In the empirical part of the study, the proportion of participants who met the fitness standards was higher in the Kids' Athletics programme group than in the comparison group in all 12 comparisons, comprising three physical fitness indicators across four study years. The largest differences were observed in the attainment of the endurance standard in 2024 and 2025. In several comparisons, the unadjusted Fisher's exact test p values were below 0.05; however, statistical significance was not retained after the Holm correction. Therefore, the results indicate a consistent descriptive trend in favour of the Kids' Athletics programme group but do not support a statistically confirmed programme effect.

When interpreting the results, account should be taken of the study design involving successive annual cohorts, the absence of random assignment, the lack of baseline physical fitness data, and the fact that individual attendance data were not linked to fitness standard attainment. Consequently, a direct causal relationship between the use of the Kids' Athletics programme and a higher proportion of participants meeting the fitness standards cannot be established. The observed trends support the need for further evaluation of the programme in larger samples and under more methodologically controlled research conditions.

The Kids' Athletics programme may complement the Sports and Health curriculum by providing a play-based, child-centred approach that can be adapted to different ability levels and used to develop running, jumping, throwing, and coordination skills. The inclusion of the programme's methodology in the education of future Sports and Health teachers could be considered as one possible direction for its further development. However, changes in teachers' professional competencies were not empirically assessed in this study. Therefore, this proposal should be interpreted as an author's recommendation based on the curriculum compatibility analysis and the physical fitness trends identified in the study.

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INTERNATIONAL STUDENTS' INTEGRATION AT UNIVERSITY IN THE CONTEXT OF MONTESSORI PEDAGOGY

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ABSTRACT

Multiculturalism is one of the most characteristic features of contemporary education, and Latvia can be mentioned among the countries implementing multicultural education. International students are an everyday phenomenon at Riga Technical University (RTU) as well. Therefore, integration of international students in the study environment of RTU, providing an opportunity to acquire the basics of the Latvian language and helping them to get acquainted with the culture and traditions of Latvia, is of utmost importance. The research mainly focuses on RTU's multicultural education system, analysing its advantages and drawbacks. The research also reflects students' views on basic principles of the renowned Italian pedagogue Maria Montessori, who focused her pedagogy on the diversity in education, including the young adult age. The main aim of this research was to identify students' perspectives on their studies at the multicultural environment of RTU, as well as to clarify students' opinions on the basic principles of Montessori pedagogy and their possible implementation at the university to promote the integration of international students. 137 RTU students from 20 different countries participated in this research. Content analysis was chosen as a research method to reveal students' ideas, collect and select their opinions on the topic. The results of the research suggest that implementing multicultural education at the university has positive aspects, though it also presents challenges. The principles of Montessori pedagogy could potentially be applied in multicultural education; however, it is recommended to conduct more detailed research to clarify their practical use in higher education.

Keywords: culture, integration, Montessori pedagogy, multicultural education, multiculturalism

Introduction

Multicultural education nowadays is of high importance. The mobility of international students has increased substantially over the past few decades (Kim and Zhang, 2022, as cited in Gutema et al., 2024, p. 844). According to UNESCO, international student mobility rose from 2 to 6.36 million from 2000 to 2020 (Gutema et al., 2024, p. 844).

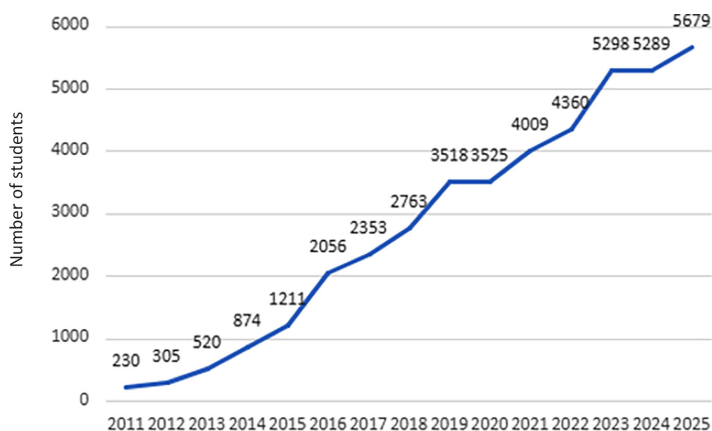


Figure 1. International student dynamics: Number of international students at RTU, 2011–2025

Source: Data provided by RTU International Cooperation Department, October 1, 2025.

'International students' are defined as 'those who left their country of origin and moved to another country for the purpose of study' (OECD 2020, p. 235 in Bergman et al., 2022, p. 144), which can refer to students from all continents and include both speakers of English as a first language and as another language (Bergman et al., 2022, p. 144). Özoğlu (2015) suggests that factors such as the quality of education, academic reputation of the institution, availability of scholarships, tuition fee, ease of mobility through lower visa requirements and the possibility of better job opportunities in the host country are significant factors that motivate international students to study abroad and stay after graduation (Özoğlu et al., 2015, as cited in Gutema et al., 2024, p. 856). Therefore, universities should prioritise creating an environment that promotes social integration, fosters multiculturalism and provides career and job opportunities (Gutema et al., 2024, p. 857). Riga Technical University is part of this process. The implementation of international academic mobility supports and ensures the attractiveness of higher education institutions in the international environment (Juškevičienė et al., 2022, p. 316). Engineering programmes are the second most internationalised area of higher education, after business studies (OECD 2020, as cited in Bergman et al., 2022, p. 144). According to the data from the RTU International Cooperation Department, the number of international students increased from 230 in 2011 to 5,679 in 2025.

It is the reason why the integration of international students into the RTU study environment is crucial. This research mainly explores the experiences and opinions of RTU students on the multicultural education system there identifying its strengths and limitations. The research also introduces reflections by RTU students on the basic principles of the famous Italian educator Maria Montessori – such as fostering independence and self-esteem, prioritising practical application over theory, ensuring an inclusive environment, and promoting positive communication and collaboration. The study evaluates the possible implementation of these principles at the university level to promote

international students' integration there. Apart from these issues, the research provides insight into the education system of other countries, as the surveyed students come from different regions of the world.

Thus, the main aim of this research was to identify students' views on their studies at the multicultural environment of RTU as well as to clarify students' opinion on the basic principles of Montessori pedagogy and their possible implementation at the university level to promote international students' integration.

The research questions are the following ones.

1. What are the advantages and challenges of the RTU multicultural education system?
2. Can the basic principles of Montessori pedagogy be used to promote international student integration at the university level?

Characteristics of the international student integration process

Integration is a many – sided process and has its own specific features in education. The global landscape of higher education has witnessed a steady increase in the mobility of international students, as more individuals seek diverse academic experiences and cross-cultural learning opportunities (Gutema et al., 2024, p. 843). However, at the same time, integration remains a crucial challenge for countries and institutions hosting students (Kéri et al., 2026, p. 139). While social relationships with local students help improve international students' language skills and social adaptation, many international students tend to socialise more with fellow international students than with local peers (Kéri et al., 2026, p. 156). Socialisation with other international students is much easier and preferable to socialisation with local students (Cheng & Adelola, 2022; Li, 2017; Wang et al., 2012, as cited in Kéri et al., 2026, pp. 148–149). This limited interaction with local students may constrain international students' cultural and social integration in the host country (Kéri et al., 2026, p. 156). Therefore, in such an increasingly international higher education environment, preparing students to cooperate with each other is crucial, both for their academic careers and their professional ones (Bergman et al., 2022, p. 153). Many studies adopt a “culture-as-given” perspective (Handford et al., 2019, as cited in Bergman et al., 2022, p. 144), in which a person's national culture is seen as a key indicator of their behaviour and the differences between national cultures are emphasised (e.g. Arzberger et al., 2010; Downey et al., 2006; Jesiek, Shen, and Haller, 2012, as cited in Bergman et al., 2022, p. 144). This approach has been widely criticised for being overly simplified. The “culture-as-construct approach”, on the other hand, interprets national culture as one variable amongst others in a person's identity (Handford et al., 2019; Holliday, 2010; Lomer and Mittelmeier, 2021, as cited in Bergman et al., 2022, p. 144). Other variables might include a person's academic background, discipline, or international experience (Bergman et al., 2022, p. 144). This “culture-as-construct” approach can aid group dynamics. Amadasi and Holliday argue that establishing threads or connections between the members of the group are needed to overcome the differences

and create feelings of “insideness”. These threads are described as “diverse aspects of our pasts that mingle with the experiences that we find and the threads of the people that we meet” (Amadasi and Holliday, 2017, as cited in Bergman et al., 2022, p. 146). According to Berry’s (2005) acculturation model, the students who adopt an integration strategy to maintain their cultural identity while interacting with the host culture tend to have more positive experiences (Berry, 2005, as cited in Kéri et al., 2026, p. 155). The students’ ability to practice religious beliefs is also of a high importance (Kéri et al., 2026, pp. 156–157). Thus, students keep their own cultural identity and are getting richer by other cultures. As J. Dempsey believes, “This type of collaborative energy affects everyone, increasing the knowledge and skills of all participants” (Dempsey, 2017, p. 192).

Apart from socialization problems, there are also other barriers which hinder the integration of international students and lead to a potential loss of valuable talents for the host country (Gutema et al., 2024, p. 857). They are language and cultural differences, lack of information, non-recognition of foreign qualifications, differences in living standards, migrant status, visa problems and lack of funding (Juškevičienė et al., 2022, p. 316). According to Gutema, the decision to study abroad is a complex and interconnected process, and policy changes, language barriers and the pull of family ties in their home country may influence international students’ decision to stay in the host country or return home (Gutema et al., 2024, p. 857).

Montessori pedagogy represents a viable framework to favour the integration of international students. It will be explored in the following paragraph.

Montessori pedagogy to promote the integration of international students

Maria Montessori based her pedagogy on four child development phases known as Montessori planes of development from a child’s birth through adulthood. The common and to a certain extent justified opinion is that M. Montessori devoted most of her interest and time to developing her theory to help learners at their early stages, the first plane (from birth to age 6) and the second plane (age 6–12), however, there are also useful and interesting Montessori’s findings and ideas concerning the third plane (age 12–18) and the fourth plane (age 18–24), the one which was topical for the authors of the article in the process of research. These findings are fully applicable to the tertiary level students who are in the focus of this research. According to Montessori, the fourth plane of development – the maturity plane – is characterised by spiritual, emotional, and moral independence. Young mature people of this age devote a lot of time to thinking about the questions related to education and culture, the potentialities of prospective human life as well as their own possibilities and responsibilities (Montessori, 1971, pp. 11–12). The higher education institution the young people study at can considerably help them by providing the environment and conditions for a multifaceted personality development and quality education.

According to the research of A. K. Murray et al., Montessori education offers a unique perspective for addressing many shortcomings identified in current approaches to undergraduate instruction (Murray et al., 2022), one of them being the traditional lecture delivering

model as the prevailing method of delivering information at a higher education institution. Consequently, one of the recognized tasks of contemporary education is transition to a more student-centred approach and their active involvement in acquiring knowledge and drawing conclusions rather than getting them ready-made and formulated by lecturers. Montessori pedagogy is designed to foster deep engagement through freedom and discipline (Rathunde, 2009, 2014, as cited in Murray et al., 2022), meaning a relatively high level of students' own choice. Montessori principles could be of great help in implementing a student-centred approach as they foster deep learning, engagement, intrinsic motivation, and adaptability among adolescents. The responsibility for studying is on students, however "the Montessori approach offers scaffolding and appropriate demands" (Murray et al., 2022, p. 4).

This research focuses more on four aspects of M. Montessori's pedagogy. The first of these is students' independence. M. Montessori wrote in her book "Montessori method" stating that it was a child (student) who needed to "perfect himself through his own efforts" (Montessori, 1912, p. 209). According to that view, the primary task of an educator is formulated as aiding life while leaving it free to unfold itself (Dempsey, 2017, p. 79).

Another key aspect of Montessori pedagogy is its focus on practical application over theoretical instruction, "It is very important to see each child as a mirror of the whole, carrying a unique and important purpose. Each human comes into this world with something to contribute to it. Therefore, it is crucial to assist students in finding the tools to navigate this complex task" (Dempsey, 2017, p. 248). Practical work, a joy of discovery and job-ready skills can help students realize their potential.

One more aspect is an inclusive environment. Montessori believed that "the things the man sees are not just remembered; they form a part of his soul" (Montessori, 2007, p. 56), and "education is a natural process carried out by the child and is not acquired by listening to words but by experiences in the environment" (Montessori, 2007, p. 7).

The fourth aspect focuses on the communication and collaboration process. Montessori pedagogy emphasizes the potential of a group, "The students feel a sense of pride in the classroom community. It is not only about the child, but also about the group. Everyone's contributions toward group goals support the development of character strengths (endurance, empathy, compassion, forgiveness, tolerance) and are all, again by default, intrinsic to the teaching techniques and the social interactions/ dynamics embedded in the environment" (Dempsey, 2017, p. 263).

Methodology

The research was done in Latvia at the end of the 1st semester of the 2020/2021 academic year. It is important to stress the limitations of this research. The core findings of this research were initially presented at the 4th International Scientific Conference "Meaning in Translation: Illusion of Precision", held at Riga Technical University on May 24–26, 2022. As the conference proceedings remained unpublished, the authors subsequently sought alternative publication venues, submitting the research to the Rezekne Academy of Technologies (RTA) in March 2024.

However, the submission was initially flagged for plagiarism. Subsequent investigation revealed that the study had been uploaded to the Course Hero platform without the authors' permission or knowledge by a former RTU international student. The mechanism by which the student obtained unauthorized access to the research remains undetermined. Despite facing prolonged administrative difficulties in resolving this intellectual property infringement, the authors successfully coordinated with the RTU Information Technology Department to have the unauthorized material removed from the website. Subsequently, the research was re-submitted for publication to the University of Latvia.

It is also necessary to mention that the research was conducted at the circumstances of COVID-19 pandemic when the studies were organized remotely. This limited the data collection process. Furthermore, the data were collected at only one university – Riga Technical University (RTU) – thus limiting the scale of the research. Nevertheless, despite these challenging conditions, 137 students from Riga Technical University (RTU) participated in the study. They were students from different countries: Latvia (31), India (33), Sri Lanka (20), France (13), Uzbekistan (9), Russia (6), Azerbaijan (5), Egypt (3), Turkey (3), Ukraine (2), Iran (2), Nepal (2), Belarus (1), Lithuania (1), the United Kingdom (1), Italy (1), Greece (1), Kazakhstan (1), China (1), and Cameroon (1). They were students of different academic years, study programmes – master's degree programme students and bachelor's study programme students –, and faculties: the Faculty of Architecture and Urban Planning; the Faculty of Civil Engineering; the Faculty of Computer Science and Information Technology; the Faculty of Electrical and Environmental Engineering; the Faculty of E-Learning Technologies and Humanities; the Faculty of Engineering Economics and Management; the Faculty of Electronics and Telecommunications; the Faculty of Mechanical Engineering, Transport and Aeronautics (the data according to the 2020/2021 academic year). The faculty structure has recently been consolidated.

The students participated in the research by writing an essay *Riga Technical University (RTU) as a Multicultural University. My Experience*. The essay was organized at the end of the 1st semester of the 2020/2021 academic year. The aim of the essay was to identify students' experience of their studies at the multicultural environment of RTU. Students were encouraged to share their views on the teaching and studying process at RTU. They were also asked to compare their studies in Riga with the teaching and studying process in their home countries. Apart from that, students were introduced to the philosophy and pedagogy of M. Montessori and its basic principles. Students were invited to consider whether these principles could be implemented at the university level to facilitate the integration of international students. Prior to writing the essays, students were informed that their essays would be used as research data. Furthermore, they were assured that participation was entirely voluntary. The essays were written in English. However, it is important to stress that the essays were a task assigned by the lecturer, which may have impacted the students' willingness to be open and honest when characterizing their studies. Students could have avoided criticism, and the data might have lost their validity.

Content analysis was chosen as a research method to analyse students’ ideas and opinions. The content analysis was done in the following way:

- 1) coding was done by one of the authors of this research;
- 2) coding was validated by the other author of this research;
- 3) the narrative text was divided into fragments (content units) containing individual statements by the respondents that describe and/or interpret their experience,
- 4) the meaning of the content units was determined,
- 5) codes to each content unit were developed;
- 6) codes were inductive;
- 7) content units expressing similar ideas were grouped into analytical categories;
- 8) the categories were combined to form broader concepts based on the content of these categories (Geske & Grinfelds, 2006, pp. 113–121).

Research Results

Students’ independence and self-esteem

The first aspect of Montessori pedagogy researched was student independence and self-esteem. There were 37 students participating in this research who emphasized the importance of independence both in their studies and lives. Students also showed differences in their studies at school and at university.

Table 1. Independence and responsibility

Content units	Analytical categories
<i>“At school we were always dependent on our friends and teachers. University life teaches us to be independent. This life makes us stronger and makes us use our own efforts to succeed in life. We can make our own decisions influencing everything”</i> (a student from India).	Difference between studies at school and at university
<i>“The biggest difference between a high school and a university is that you are treated as an adult. That means you must take greater control of how you spend your time and what you study. It also means that your education is your responsibility; no one is going to do it for you”</i> (a summarised view given by a student from Latvia and a student from Russia).	
<i>“There are many things that we study on our own, such as our mistakes, findings, and comparisons”</i> (a summarised view given by a student from Latvia; a student from Uzbekistan; a student from Egypt).	Autonomy and responsibility
<i>“In Latvia almost all my courses require my own research and exploration. The teacher will not tell me everything. A large part of my study makes me look up the information on my own”</i> (a student from China).	Deeper insight into studies
<i>“There is also a lot of homework, more than in France. This is good because it allows us to work in complete autonomy. On the other hand, it is true that it is sometimes difficult to start working on your own”</i> (a student from France).	

However, some students also had a critical view on studying on their own.

Table 2. Criticism on studying independently

Content units	Analytical categories
<i>"I make a big negative point when a subject is managed by several teachers who obviously do not communicate with each other. Having graded homework to return, without having done the lesson before, is very complicated. Moreover, when the lessons reach us, these are scans of indigestible and incomprehensible books. We must, therefore, learn the subject alone"</i> (a student from France).	Negative aspects of studying independently
<i>"I was not prepared for such intensive studies and minimal attention from the staff"</i> (a student from Latvia).	

This suggests that when students prove they can take responsibility for their actions, their self-esteem – a crucial component of social standing – increases significantly. Therefore, multicultural education could not only fulfil students' studying aims but also raise their independence, self-esteem and status in the society leading to students' inclusion into the labour market. This aspect has been analysed in the next part.

Prioritizing practice over theory develops students' creativity and discovers their unique talents

Studying in a multicultural classroom offers many benefits. The main one is the diversity of thinking and variety of views due to a different cultural background, upbringing, education, and life experiences of students. Consequently, the diversity turns into a value to be kept, developed and shared and a multicultural classroom turns into a place where students start to think unconventionally. Furthermore, practical, hands-on studying promotes thinking out of the box, paving the way for new discoveries. It could be the reason why many students (51) emphasized the importance of doing things practically.

Table 3. Studying related to the real-world problems

Content units	Analytical categories
<i>"Studying is totally based on practical work, which I think is easier for students to understand"</i> (a summarized view given by a student from Nepal; a student from Sri Lanka; five students from India; a student from Uzbekistan; a student from Egypt).	Practical research Professional career development
<i>"Most of the assignments are related to the real-world problems, which make a significant impact on our career pathways"</i> (a summarised view given by a student from Sri Lanka and a student from Latvia).	
<i>"University encourages students to conduct fresh research not focusing on what has been already discovered"</i> (a student from India).	

Therefore, it is possible to draw a conclusion that practical work develops students' creativity, helps to reveal their unique talents, and supports their inclusion in the labour market.

The environment and atmosphere at university could also be the tools to promote students' professional career development. Therefore, the next part will characterize the main aspects of an inclusive environment.

An inclusive environment

The environment and atmosphere at the university are also of great importance promoting student inclusion. Firstly, the environment and atmosphere at the university influence students' sense of belonging to the university. Some students have described university as “a new level in their lives” (a summarized view given by a student from Latvia and a student from Russia).

Table 4. The environment of the university

Content units	Analytical categories
<i>“When I first stepped into the university, the atmosphere, the people, the size, the style, everything felt completely different to me, not to mention how it feels now after studying at RTU for a semester. (...) The first thing that I noticed and felt is the importance of where I have got and how I got there. It felt surreal that after 12 years at school I entered the “next level”, I could not get over it. I had no time to research if studying architecture is hard, whether it is time consuming, how it has been done and so on. I practically went into it blindly but so far, I have managed to keep myself somewhat sane after the days and nights of hard work”</i> (a student from Latvia).	Perspective environment
<i>“I chose to study at a large university because I like being part of a big and diverse student group. The world is big, and I believe that becoming part of a large university will also prepare me better for living and succeeding in this world”</i> (a student from India).	
<i>“Most of the students here are very smart, determined and usually successful. So, it is interesting to be around that sort of people”</i> (a student from Latvia).	
<i>“The study experience can be successful if the learner likes what they are studying and has the right people around them. That, even without realizing it, creates a desire to become something more”</i> (a summarized view given by two students from Latvia).	

It is possible to draw a conclusion that students highly evaluate their belonging to the university community, and it may help them not only better include there but also promote their professional growth.

The research also revealed other qualities characterizing an inclusive environment. One of them is democracy at the university. Democracy must be an integral part of the teaching and studying process. This implies that students' rights to express their opinions should remain free from external pressure. When evaluating this quality, the students expressed favourable views regarding Latvia.

Table 5. Democracy at the university

Content units	Analytical categories
<i>"The professors can see student involvement and interest, because no one is forced to study, everyone does it because of their own desire"</i> (a summarized view given by two students from Latvia).	Freedom and initiative to study
<i>"We – students – have a possibility to express our point freely. The professors support us, and we work together"</i> (a student from Egypt).	The right to express an opinion
<i>"You can always ask a lot of questions and not be afraid of judgement"</i> (a student from Latvia).	

Another key feature of democracy is equality. The research data prove that the students express various views on the issue of equality at RTU. There are both positive and negative opinions.

Table 6. Opinions on equality at the university

Content units	Analytical categories
<i>"The professors act equally to all students here in Latvia"</i> (a student from India).	Equality
<i>"There are some professors at the university whose attitude towards their students differs. Their behaviour could be characterized as racial"</i> (a student from Egypt).	Inequality

It means that the level of equality and tolerance at the university level as well as in the whole society, unfortunately, is not a commonly and generally accepted concept.

Democracy and equality must be closely linked to institutional support and encouragement. However, the student feedback indicates that the university still needs to improve in this area.

Table 7. Support and encouragement at the university

Content units	Analytical categories
<i>"Despite the fact that Latvian people are generally not very 'smiley' towards strangers, at RTU, professors and staff of this establishment were gentle, helpful, and cool"</i> (a student from France).	Support
<i>"I think that there is a lack of support in Latvia"</i> (a student from France).	A lack of support
<i>"I have felt many times left in an uncertain situation where nobody is able to follow or advise me on what is supposed to be done, in other words, there have been occasions where I was unable to join meetings or unclear was the way I was supposed to, and even though I have written/called support and lecturers, I have not received any solution"</i> (a summarized view given by a student from Italy; a student from Iran; a student from Egypt).	

The third aspect characterizing an inclusive environment is discipline which is closely related to self-control and responsibility. Student perspectives regarding discipline and freedom vary significantly, ranging from critical viewpoints to more liberal opinions.

Table 8. The views on discipline and freedom

Content units	Analytical categories
<i>"In Latvia teachers are less concerned about knowing who is or is not coming to classes. Even if some teachers do not ask who is at the class, there are lists to see who is coming. We are asked to study by ourselves"</i> (a summarized view given by two students from France).	Attendance and punctuality
<i>"Schoolteachers always control your homework and get very angry if you do not do it well, at university nobody cares about your problems, you must control yourself and do all work on time"</i> (a student from Latvia).	Freedom and responsibility
<i>"University lecturers take you much more seriously, as well as give you more creative freedom at work. In my opinion, it is much easier to communicate with university lecturers, because they generally do not behave as if they were superior to students, they simply take care of providing students with the necessary information (...) I really liked professional relations with teachers because that made me feel like a grown-up and also improved my responsibility"</i> (a student from Latvia).	

This leads to the conclusion that how people perceive discipline and freedom may have originated in their experiences, such as upbringing and education. This may explain why some people hold more conservative views while others tend to be more liberal. However, it is hard to deny that discipline within freedom fosters personal maturity and responsibility. These qualities are among the main factors influencing the intercultural communication process at the university, which will be analysed in the following part.

A positive communication and collaboration process

This research mainly focuses on the relations between the teaching staff and students, and students – students. Many students (38) have agreed on the importance of positive communication and collaboration at the university. When characterizing the relations with their lecturers in Latvia, most students had a favourable opinion.

Table 9. Positive lecturers – students communication process

Content units	Analytical categories
<i>"In France, we have to ask professors to be helped, here, professors come to us to help us"</i> (a student from France).	Importance of a positive communication and collaboration process
<i>"The communication process between the teaching staff and students is crucial. Most professors at the university can create a friendly atmosphere. Students feel free and comfortable here"</i> (a student from Uzbekistan).	
<i>"There is a diversity of students from different countries with different cultures. So, it is amazing how teachers deal with students and how they manage each student's capacity and utilize it accordingly. In India instructors do not involve students so much"</i> (a student from India).	
<i>"Professors are more focused on students' questions; in France, if a student has a question, the professor will answer, and the course will continue. Here in Riga, it was different, when a student had a question, the professor answered him/her and then this professor took more time to explain his answer in a different way by giving examples, etc.... It is better than in France in this aspect"</i> (a student from France).	

However, there were also opinions of several students who pointed out some difficulties in the process of communication in comparison with their native country. Delayed responses could be explained by the specific circumstances during the COVID-19 pandemic and the scale of the university. However, the main reason could be hidden in the way of communication at the university, which is professional but formal. Therefore, the relations between the students and the teaching staff involve more distance.

Table 10. Problems in the lecturers – students communication

Content units	Analytical categories
<i>“In France, teachers are very responsive and often present on Teams or other messaging platforms within a minute, whether during the week or at weekends. In Latvia, some teachers respond after a week, and it is sometimes difficult to understand an exercise quickly, which is problematic for us since we do not get a response from them”</i> (a summarized view given by two students from France). <i>“At my university in France we are not more than 100 persons per promotion, so our teachers really know us. In Latvia we are at RTU which is a big university and there are a lot of students, so teachers do not really have time to take care of each student and know their level or even just know their names”</i> (a student from France).	Delayed responses
<i>“What I feel is a lack of communication between professors and students, back in India I used to have meetings with professors if we had an issue relating the subject or personal problems, we were able to solve it with the help of professors, removing the awkwardness between the professors’ and students’ communication”</i> (a summarized view given by two students from India; two students from Sri Lanka; a student from Turkey).	Insufficient communication

Effective peer communication is crucial to the student experience. Many students (27) have emphasized the importance of positive communication among students, with the majority (16) evaluating these relationships positively. However, the remaining participants have expressed a variety of differing views.

Table 11. Positive peer (students – students) communication

Content units	Analytical categories
<i>“Here I came to meet a lot of local and foreign students from different countries, learn their living style and experience their culture as well as learning style. There is no doubt that I took a lot of advantages from them, learnt a lot of things which I could not get in Nepal”</i> (a student from Nepal).	Positive effects of communication
<i>“In Latvia, I think every teacher of mine will care about group work. Because I seldom had the task of cooperating with my classmates during my studies in China in the past, I think it is a great experience and it is very challenging for me, in the process of group work, not only can I meet new friends, but also feel different cultures. (...) The Chinese teachers require more personal tasks than group cooperation, and they think that individuals should take more responsibility”</i> (a student from China).	
<i>“I have never met so many nice people in one room”</i> (a student from Latvia).	

However, there were also opinions revealing communication problems.

Table 12. Insufficient peer communication

Content units	Analytical categories
<i>“I would like to use my knowledge and skills practically when working. But I do not feel supported. The attitude towards me could be characterized as sceptical. I miss communication with my peers. Despite this, it is a new experience and a way of learning. We must be patient”</i> (a student from India). <i>“In Sri Lanka senior students help their younger colleagues who face difficulties in studying. They explain the learning material for the groups of 2–3 students and it makes them follow the material much easier. We do not have such practice at RTU. There is no interaction between local and foreign students as well as there is no interaction between the senior students and their younger peers”</i> (a summarized view given by two students from Sri Lanka).	Attitude to foreign students Student – student interaction

Thus, the data demonstrate that the communicants – students and the teaching staff – cultivate or hinder an inclusive environment, thereby either promoting or impeding student integration in the university community.

Discussion

The research focuses on four pillars of Montessori pedagogy, which can be adapted and used to help international students to integrate more successfully into their studies and the broader university community. These core pillars include some basic principles of Montessori pedagogy: fostering independence and self-esteem, prioritising practical work over theoretical instruction, ensuring an inclusive environment, and encouraging communication and collaboration.

According to the research results, quite a notable number of students (37) emphasized the importance of independence both in their studies and personal lives. Higher education requires more independence compared with secondary school, which means studying more autonomously and gaining a deeper insight into studies. Independence leads to responsibility and time and work management. While it could be a challenge, at the same time it positively impacts the students’ personal development. Furthermore, as suggested by Juknytė-Petrekienė and Pukelis, this is particularly evident during international academic mobility, which is most often associated with students’ academic and professional progress as well as personal changes in terms of knowledge, skills, values and attitudes (Juknytė-Petrekienė and Pukelis, 2007, as cited in Juškevičienė et al., 2022, p. 310).

There were many students (51) who emphasized the importance of practical application over studying much theory. Practical engagement stimulates creativity and hones talents. Universities bear the responsibility for revealing and developing their students’ potential and gifts. It is especially important for international students who seek new experiences, knowledge and directions. According to Gutema et al., universities play

a crucial role in attracting and retaining international students through language programmes, education quality, global rankings and job-ready skills. Therefore, it is important for universities to better understand the needs and motivations of international students and develop strategies to attract and retain them. Furthermore, employers need to be more open to hiring international graduates, recognizing their competencies and contributing to their retention (Gutema et al., 2024, p. 857).

Research results prove that an inclusive environment and atmosphere at university is very important and make students feel welcomed there. The university is a place where students can meet people with similar interests – lecturers and other students. Students start and develop their professional career there. Students highly value democracy, the right to express their opinion, equality as well as support and encouragement at the university. A university should be a community students want to belong to. It is especially important for international students. As stated by Huyen, integration of international students is understood to mean a sense of belonging and feeling comfortable and content both in class and on campus (Huyen, 2015, as cited in Kéri et al., 2026, p. 139). Taylor & Ali (2017) explained that the students break their home country friendship, and they need a micro social support system in the host country (Taylor & Ali, 2017, as cited in Kéri et al., 2026, p. 148). Apart from that, language barriers are the most significant challenge, because insufficient proficiency in the local language can lead to social isolation and stress. Personal motivation as well previous experiences abroad are of high importance. Cultural differences and the process of adapting to the host country's social norms can also be challenging, causing students to feel excluded or isolated. Additionally, bureaucratic hurdles, insufficient support from universities, program structure and availability of scholarships hinder the integration process (Kéri et al., 2026, pp. 156–157). Universities should work towards creating a supportive and inclusive environment that encourages foreign students to stay and contribute to the host country's economy and society (Gutema et al., 2024, p. 857).

Many students (38) have agreed on the importance of positive communication and collaboration at university. Quite a lot of students (27) have also emphasized the importance of positive communication among students. Most of them (16) evaluated students' relations positively. However, students have pointed out that international students tend to make more contacts with other international students or with peers from their own country. Thus, their interaction with local students is limited. Pederson (2010) states that socialisation among international and local students is an urgent need and brings benefits; therefore, institutions should also develop mechanisms to make this socialisation possible (Pederson, 2010, as cited in Kéri et al., 2026, p. 148).

Surowiecki also emphasizes the importance of communication and collaboration, "We use the wisdom of crowds in the economy by saying that, under the right circumstances, groups are remarkably intelligent and are often smarter than the smartest people in them" (Surowiecki, as cited in Dempsey, 2017, p. 192). He stresses, "A large group of diverse individuals will come up with better and more robust forecasts and make more intelligent decisions than even the most skilled decision maker" (Ibid.). The following

measures are recommended: facilitating intercultural events or mixed-nationality teams (e.g., Pedersen, 2010; Sierra-Huedo et al., 2017, as cited in Kéri et al., 2026, p. 155) or expanding peer-mentoring programmes that connect international and local students (Ragavan, 2014, as cited in Kéri et al., 2026, p. 155).

Conclusions

1. University life teaches students to be independent. However, this independence brings challenges, particularly regarding personal responsibility as well as work and time management. If students can cope with these challenges, their self-esteem may increase, leading to a higher social status and more successful integration into the labour market.
2. A multicultural environment may inspire innovative thinking and assess the value of diversity. Furthermore, practical application fosters creativity and reveals students' unique talents, ultimately leading to their growth and more challenging professional opportunities.
3. The university environment and atmosphere significantly impact students' sense of belonging there as well and can shape their further professional perspectives. An inclusive academic environment is fostered through democratic principles, the freedom to express opinions without pressure, equality, support, encouragement, alongside personal responsibility and self-discipline.
4. Communication and collaboration between the teaching staff and the students could be enhanced by fostering more active, less formal dialogue and reducing distance between the lecturers and students. Additionally, intercultural communication of students, especially local ones, should be less sceptical and include more interaction.
5. The students' views on the basic principles of Montessori pedagogy – students' independence and self-esteem; prioritizing practice over theory; an inclusive environment and a positive communication and collaboration process – are meaningful and valuable, however, their possible effect on students' integration process has not been clarified yet and requires more detailed investigation.

AUTHORS' NOTE

Dr. Sc. admin. Antra Roskoša and Mg. philol. Diana Rūpniece are the members of RTU teaching staff. The interests of their research focus on teacher professionalism, education management, multicultural class management, intercultural communication, as well as the aspects of technical translation.

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THE ASSOCIATION BETWEEN MINDFULNESS AND PAIN CATASTROPHIZING AMONG MIGRAINE PATIENTS

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ABSTRACT

Objectives. Migraine is one of the most prevalent neurological disorders worldwide, affecting 14–15% of the global population and causing a substantial psychological burden, particularly when pain is catastrophized. This study examined the association between mindfulness and pain catastrophizing in migraine and assessed associations with age and differences by education and gender.

Methods. This cross-sectional correlational study included 324 participants with diagnosed migraine aged 18–68; 92.6% were women. Mindfulness (observing, describing, acting with awareness, nonjudging, and nonreactivity) was measured using Baer et al.'s Five Facet Mindfulness Questionnaire, and pain catastrophizing was measured using Sullivan et al.'s Pain Catastrophizing Scale. Spearman's correlation was used to examine associations, and Welch's t-test and the Mann–Whitney U test were used for group comparisons.

Results. In the migraine sample, mindfulness was moderately negatively associated with pain catastrophizing ($r = -0.32, p < 0.001$). Associations differed across mindfulness facets. Describing ($r = -0.24, p < 0.001$), nonreactivity ($r = -0.15, p < 0.01$), and acting with awareness ($r = -0.23, p < 0.001$) showed weak negative associations; nonjudging showed the strongest moderate negative association ($r = -0.39, p < 0.001$), whereas observing showed a weak positive association ($r = 0.12, p < 0.05$). Age was weakly positively correlated with mindfulness ($r = 0.26, p < 0.001$). Women reported higher pain catastrophizing than men ($t(26.19) = 4.00, p < 0.01, d = 0.88$), whereas men scored slightly higher on mindfulness ($t(34.30) = -2.33, p = 0.03, d = 0.38$). These results should be interpreted cautiously due to the small male subsample. No differences in total scores by education level were found.

Conclusions. These findings support an association between mindfulness and pain catastrophizing in migraine, with facet-specific directions, and may inform non-pharmacological support, including psychological counselling, psychoeducation, and the cautious adaptation of mindfulness-based approaches.

Keywords: *migraine, mindfulness, mindfulness facets, non-pharmacological support, pain catastrophizing*

Introduction

Migraine is one of the most prevalent neurological disorders worldwide and represents a substantial public health burden, affecting more than one billion people globally (Amiri et al., 2022). Headache disorders remain among the leading causes of non-fatal health loss worldwide, ranking sixth among all causes of years lived with disability in the Global Burden of Disease Study 2023 (GBD 2023 Disease and Injury and Risk Factor Collaborators, 2025). Although tension-type headache is more prevalent, migraine accounts for the majority of headache-related disability and contributed approximately 40.9 million years lived with disability globally in 2023 (GBD 2023 Headache Collaborators, 2025). Epidemiological studies suggest that migraine affects approximately 14–15% of the global population (Steiner & Stovner, 2023; Stovner et al., 2022). Data from Latvia indicate a similar pattern, with age-adjusted one-year prevalence of definite migraine estimated at 14.0% overall and reaching 23.6% when probable migraine is also included (Mekša et al., 2025).

Migraine is not limited to headache attacks alone. It is a common disabling primary headache disorder that can include prodromal and postdromal symptoms in addition to the headache phase (Headache Classification Committee of the International Headache Society, 2018). Migraine-related burden can extend beyond attacks, affecting daily activities, work and career participation, family and social relationships, emotional well-being, and the ability to plan everyday life (Lo et al., 2022). Symptoms associated with migraine may also persist between attacks, including sensory hypersensitivity, photophobia, phonophobia, osmophobia, and visual or vestibular disturbances; together with concerns about future attacks, these symptoms may contribute to persistent interictal burden (Vincent et al., 2022). In addition, anxiety and depression are common comorbidities among adults with migraine and are associated with poorer health-related quality of life, especially when both conditions are present (Alwhaibi et al., 2023).

One psychological process that is especially relevant in pain and migraine research is pain catastrophizing. Pain catastrophizing refers to an exaggerated negative mental set that occurs during actual or anticipated painful experience and is conceptualized as consisting of rumination, magnification, and helplessness (Sullivan et al., 1995; Sullivan et al., 2001). In migraine patients, pain catastrophizing has been associated with migraine severity and comorbid anxiety and depression (Alvarez-Astorga et al., 2021). Higher levels of pain catastrophizing have also been reported among patients with chronic migraine compared with those with episodic migraine and healthy controls (Pistoia et al., 2022), and recent work suggests that pain catastrophizing may contribute to migraine-related disability within the fear-avoidance model (Fox et al., 2026). Therefore, pain catastrophizing can be considered an important cognitive-affective factor in migraine-related pain experience and psychological support.

Mindfulness may be relevant to pain-related cognitive and emotional processes. Mindfulness has been described as paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally (Kabat-Zinn, 1994). In the Five Facet

Mindfulness Model, mindfulness is conceptualized as a multidimensional construct consisting of observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience (Baer et al., 2006). Analysing mindfulness at the facet level is important because different facets may relate differently to pain-related cognitive and emotional outcomes. In chronic pain, nonjudging and acting with awareness have shown particularly strong negative associations with pain catastrophizing (Aguerre et al., 2025).

The relationship between mindfulness and pain catastrophizing can be understood within the fear-avoidance model of pain. According to this model, catastrophic interpretations of pain may contribute to fear of pain, increased attention to threat, avoidance, functional limitations, and disability (Asmundson et al., 2004; Vlaeyen & Linton, 2000). In a modified version of this model, dispositional mindfulness was placed before pain catastrophizing, and higher mindfulness was associated with lower pain catastrophizing, which in turn was associated with lower pain intensity and pain sensitivity (Wilson et al., 2023). These findings suggest that pain catastrophizing may be one pathway through which dispositional mindfulness is associated with pain-related outcomes.

Previous studies generally support a negative association between mindfulness and pain catastrophizing in general and chronic pain populations. In a chronic pain sample that included patients with migraine and tension-type headache, total mindfulness was negatively associated with pain catastrophizing, with the strongest negative associations found for nonjudging and acting with awareness (Aguerre et al., 2025). In patients with chronic headache and migraine, higher mindfulness was associated with lower negative affect, pain catastrophizing, fear of pain, and pain hypervigilance (Komandur et al., 2018). However, migraine-specific findings remain limited and partly inconsistent. In patients with episodic migraine, total mindfulness was not significantly associated with pain catastrophizing, although the nonjudging facet was negatively associated with the magnification component of pain catastrophizing (Hunt et al., 2022).

To date, evidence on the association between mindfulness, its specific facets, and pain catastrophizing in migraine-specific samples remains limited. This gap is important because migraine represents a distinct pain condition, and findings from broader chronic pain or headache samples may not fully capture the sensory, functional, and psychological burden experienced by migraine patients. Therefore, the aim of this study was to examine the association between mindfulness and pain catastrophizing among migraine patients. The study also examined associations between the five mindfulness facets and pain catastrophizing, as well as associations with age and differences by gender and education.

Methodology

Participants

A quantitative cross-sectional correlational design was used in this study. The initial dataset included 585 respondents. After applying the inclusion and exclusion criteria,

261 respondents were excluded: 20 respondents did not have migraine, 235 reported migraine-like symptoms but did not have a physician's diagnosis, and six reported another primary neurological or oncological disease that could cause headaches. The final sample consisted of 324 participants with physician-diagnosed migraine.

Participants were aged between 18 and 68 years ($M = 37.29$, $SD = 9.25$). The sample consisted predominantly of women ($n = 300$; 92.6%), while men accounted for 7.4% ($n = 24$). Most participants had higher education (76.5%), followed by secondary education (22.2%) and basic education (1.2%).

Participants were included in the study if they were at least 18 years old and reported having a physician-diagnosed migraine. Exclusion criteria were age below 18 years, absence of migraine, migraine-like symptoms without a physician's diagnosis, and the presence of another primary neurological or oncological disease that could cause headaches. The sample was recruited using convenience sampling with elements of snowball sampling.

Measures

Sociodemographic data. Participants provided information about their age, gender, and education level. They also answered two questions concerning the presence of migraine and the presence of other primary neurological or oncological conditions that could cause headaches.

Mindfulness. Mindfulness was assessed using the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), using its Latvian adaptation (Majors, 2013). The questionnaire consists of 39 items and measures five mindfulness facets: observing, describing, acting with awareness, nonjudging, and nonreactivity. Responses are given on a 5-point Likert scale, with higher scores indicating higher levels of mindfulness. In this sample, the total FFMQ score demonstrated good internal consistency (Cronbach's $\alpha = .88$). Internal consistency was good for observing ($\alpha = .78$), describing ($\alpha = .89$), acting with awareness ($\alpha = .88$), and nonjudging ($\alpha = .91$), but lower for nonreactivity ($\alpha = .60$); therefore, results related to this facet should be interpreted with caution.

Pain catastrophizing. Pain catastrophizing was assessed using the Pain Catastrophizing Scale (PCS; Sullivan et al., 1995), pilot-adapted by Veckaktiņa (Veckaktiņa, 2023). Permission to use the Latvian version of the PCS was obtained from Mapi Research Trust. Copyright © 1995 Michael JL Sullivan. The PCS consists of 13 items and includes three subscales: rumination, magnification, and helplessness. Responses are given on a Likert scale from 0 to 4, with higher scores indicating higher levels of pain catastrophizing. PCS contact information and permission to use: Mapi Research Trust, Lyon, France, <https://eprovide.mapi-trust.org>. In the present sample, the total PCS score demonstrated good internal consistency (Cronbach's $\alpha = .91$). The internal consistency coefficients were $\alpha = .82$ for rumination, $\alpha = .74$ for magnification, and $\alpha = .84$ for helplessness.

Procedure

The study was approved by the Research Ethics Committee of Rīga Stradiņš University (Decision No. 2-PĒK-4/1317/2025, 8 December 2025). Permission to use the Latvian version of the Five Facet Mindfulness Questionnaire was obtained from the Faculty of Education Sciences and Psychology of the University of Latvia, and permission to use the Pain Catastrophizing Scale was obtained from Mapi Research Trust.

Data were collected between January 9 and February 2, 2026, using an online survey created in Google Forms. The survey was distributed electronically through social media platforms and two migraine patient support groups. Participation was voluntary and anonymous. Before completing the survey, participants provided informed consent and were informed about their right to discontinue participation at any time. To encourage participation, respondents could voluntarily enter a lottery to win a €50 digital gift card for the “Jānis Roze” bookstore.

Data Analysis

Data were analysed using Microsoft Excel 16.105.3 and JASP 0.95.4. Descriptive statistics were calculated for sociodemographic variables and study variables. The normality of distributions was assessed using the Shapiro–Wilk test, as well as visual inspection of histograms and boxplots. Internal consistency of the scales and subscales was assessed using Cronbach’s alpha.

Because most study variables did not meet the assumption of normality, Spearman’s rank correlation coefficient was used to examine associations between mindfulness, mindfulness facets, pain catastrophizing, and age.

For group comparisons, the assumptions of the selected statistical tests, including the normality of distributions within each group, were evaluated separately. As total mindfulness and pain catastrophizing scores did not significantly deviate from normality within the gender groups, Welch’s t-test was used to examine gender differences. This test was selected because of the unequal group sizes and the violation of the homogeneity of variances assumption for total mindfulness. Differences by education were analysed by comparing participants with secondary and higher education, because the basic education group was too small to be included. Welch’s t-test or the Mann–Whitney U test was used depending on whether the assumptions for parametric testing were met.

Results

Descriptive Statistics and Normality Testing

Descriptive statistics and normality tests are presented in Table 1. Only total mindfulness did not significantly deviate from normality, whereas most other variables did. Box plots were inspected for possible outliers, and all observed values were retained because they were within the possible scale ranges.

Table 1. Descriptive Statistics for Mindfulness, Mindfulness Facets, and Pain Catastrophizing

Variable	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>IQR</i>	<i>Skew.</i>	<i>Kurt.</i>	<i>W</i>	<i>p</i>	<i>Min</i>	<i>Max</i>
Mindfulness	127.5	127.96	16.91	24.25	0.06	−0.26	1.00	0.54	81	171
Observing	26.0	25.65	5.61	8.00	−0.35	−0.40	0.98	< 0.01	11	39
Describing	28.0	28.00	5.79	8.00	−0.12	−0.56	0.99	< 0.01	13	40
Acting with awareness	27.0	26.86	5.90	8.00	−0.02	−0.38	0.99	0.03	9	40
Nonjudging	28.5	28.16	6.94	11.00	−0.20	−0.66	0.98	< 0.01	8	40
Nonreactivity	19.0	19.30	3.67	5.00	0.05	0.00	0.99	0.01	10	32
Pain catastrophizing	31.5	30.98	9.43	12.00	−0.30	−0.22	0.99	0.02	4	52

Note. *N* = 324. *M* = mean; *SD* = standard deviation; *Mdn* = median; *IQR* = interquartile range; *Skew.* = skewness; *Kurt.* = kurtosis; *W* = Shapiro–Wilk test statistic. A significant Shapiro–Wilk test result indicates deviation from normal distribution.

Associations Between Mindfulness, Mindfulness Facets, and Pain Catastrophizing

Spearman’s rank correlation coefficient was used to examine associations between mindfulness, mindfulness facets, and pain catastrophizing. The magnitude of the correlation coefficients was interpreted according to conventional benchmarks for effect sizes, where values of approximately .10, .30, and .50 indicate small, medium, and large effects, respectively (Cohen, 1988). The correlation results are presented in Table 2. Total mindfulness showed a moderate statistically significant negative association with pain catastrophizing, $r_s(322) = -0.32, p < 0.001$. At the facet level, nonjudging showed the strongest association with pain catastrophizing, indicating a moderate negative association, $r_s(322) = -0.39, p < 0.001$. Describing, acting with awareness, and nonreactivity were weakly negatively associated with pain catastrophizing. In contrast, observing showed a weak positive association with pain catastrophizing.

Table 2. Spearman Correlations Between Mindfulness, Mindfulness Facets, and Pain Catastrophizing

Variable	1.	2.	3.	4.	5.	6.	7.
1. Mindfulness	—						
2. Observing	0.28***	—					
3. Describing	0.78***	0.10	—				
4. Acting with awareness	0.69***	−0.10	0.50***	—			
5. Nonjudging	0.70***	−0.18**	0.45***	0.49***	—		
6. Nonreactivity	0.44***	0.20***	0.24***	0.08	0.15**	—	
7. Pain catastrophizing	−0.32***	0.12*	−0.24***	−0.23***	−0.39***	−0.15**	—

Note. *N* = 324. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Gender Differences in Mindfulness and Pain Catastrophizing

Gender differences in total mindfulness and pain catastrophizing were examined using Welch’s t-test. The normality assumption was met within both gender groups for total mindfulness (Shapiro–Wilk $p = .29$ for women and $p = .72$ for men) and pain catastrophizing (Shapiro–Wilk $p = .06$ for women and $p = .23$ for men). As shown in Table 3, men had a statistically significantly higher total mindfulness score than women, $t(34.30) = -2.33$, $p = 0.03$, $d = 0.38$. Women had a statistically significantly higher total pain catastrophizing score than men, $t(26.19) = 4.00$, $p < 0.01$, $d = 0.88$. These results should be interpreted with caution because the number of men in the sample was small.

Table 3. Gender Differences in Mindfulness and Pain Catastrophizing

Variable	Group (n)	M (SD)	Welch’s t-test value	p	Effect size
Mindfulness	Women (n = 300)	127.56 (17.28)	$t(34.30) = -2.33$	0.03*	0.38
	Men (n = 24)	133.00 (10.34)			
Pain catastrophizing	Women (n = 300)	31.60 (9.12)	$t(26.19) = 4.00$	< 0.01**	0.88
	Men (n = 24)	23.21 (9.95)			

Note. N = 324. M = mean; SD = standard deviation. Effect size is Cohen’s d for Welch’s t-tests.

Education Differences in Mindfulness and Pain Catastrophizing

Differences by education were examined by comparing participants with secondary and higher education. Welch’s t-test or the Mann–Whitney U test was used depending on whether the assumptions for parametric testing were met. As shown in Table 4, no statistically significant differences were found between the secondary and higher education groups in total mindfulness or total pain catastrophizing. Participants with higher education had a statistically significantly higher score on the describing facet than participants with secondary education; however, this isolated finding should be interpreted with caution, as the effect size was small and multiple comparisons were not adjusted for.

Table 4. Education Differences in Mindfulness and Pain Catastrophizing

Variable	Group (n)	M (SD) or Mdn (IQR)	Test	Test value	p	Effect size
Mindfulness	Higher education (n = 248)	128.91 (16.59)	Welch’s t-test	$t(109.33) = 1.50$	0.14	$d = 0.20$
	Secondary education (n = 72)	125.39 (17.80)				
Observing	Higher education (n = 248)	26.0 (8.00)	Mann–Whitney U test	$U = 8975.50$	0.95	$r = -0.01$
	Secondary education (n = 72)	26.0 (8.00)				
Describing	Higher education (n = 248)	29.0 (8.00)	Mann–Whitney U test	$U = 10655.50$	0.01*	$r = -0.19$
	Secondary education (n = 72)	26.0 (9.25)				

Variable	Group (n)	M (SD) or Mdn (IQR)	Test	Test value	p	Effect size
Acting with awareness	Higher education (n = 248)	26.96 (5.67)	Welch's t-test	$t(103.83) = 0.51$	0.61	$d = 0.07$
	Secondary education (n = 72)	26.53 (6.55)				
Nonjudging	Higher education (n = 248)	29.0 (11.00)	Mann-Whitney U test	$U = 9792.00$	0.21	$r = -0.10$
	Secondary education (n = 72)	27.0 (9.00)				
Nonreactivity	Higher education (n = 248)	19.5 (5.00)	Mann-Whitney U test	$U = 9043.00$	0.87	$r = -0.01$
	Secondary education (n = 72)	19.0 (4.00)				
Pain catastrophizing	Higher education (n = 248)	31.0 (12.00)	Mann-Whitney U test	$U = 8429.00$	0.47	$r = 0.06$
	Secondary education (n = 72)	32.0 (15.00)				

Note. $N = 320$. Participants with basic education were excluded from group comparisons because of the very small group size ($n = 4$). M = mean; SD = standard deviation; Mdn = median; IQR = interquartile range. Effect size is Cohen's d for Welch's t -tests and rank-biserial correlation r for Mann-Whitney U tests. For Mann-Whitney U tests, the sign of rank-biserial r depends on group ordering.

Associations with Age

Spearman's rank correlation coefficient was used to examine associations between age, mindfulness, mindfulness facets, and pain catastrophizing. The results are presented in Table 5. Age was weakly and positively associated with total mindfulness, $r_s(322) = 0.26, p < 0.001$. At the facet level, age was weakly positively associated with acting with awareness, describing, and nonjudging. Age was not significantly associated with pain catastrophizing.

Table 5. Spearman Correlations Between Age, Mindfulness, Mindfulness Facets, and Pain Catastrophizing

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. Age	—							
2. Mindfulness	0.26***	—						
3. Observing	0.00	0.28***	—					
4. Acting with awareness	0.20***	0.69***	-0.10	—				
5. Describing	0.20***	0.78***	0.10	0.50***	—			
6. Nonjudging	0.25***	0.70***	-0.18**	0.49***	0.45***	—		
7. Nonreactivity	0.01	0.44***	0.20***	0.08	0.24***	0.15**	—	
8. Pain catastrophizing	-0.06	-0.32***	0.12*	-0.23***	-0.24***	-0.39***	-0.15**	—

Note. $N = 324$. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Discussion

The results indicate an association between mindfulness and pain catastrophizing in individuals with migraine. Higher total mindfulness was associated with lower overall pain catastrophizing, indicating that the way individuals relate to their inner experience may be relevant to how pain is interpreted. This finding is consistent with a biopsychosocial understanding of pain, according to which pain experience and disability are influenced not only by biological mechanisms, but also by psychological and social factors (Gatchel et al., 2007). More specifically, the finding is compatible with a modified version of the fear-avoidance model, in which higher mindfulness was associated with lower pain catastrophizing, which in turn was associated with lower pain intensity and pain sensitivity (Wilson et al., 2023). Although the cross-sectional design of the present study does not allow causal conclusions, the observed association is consistent with previous findings in chronic pain and chronic headache or migraine samples (Aguerre et al., 2025; Komandur et al., 2018). At the same time, migraine-specific findings remain limited and not entirely consistent, as Hunt et al. (2022) did not find a significant association between total mindfulness and pain catastrophizing in patients with episodic migraine.

The facet-level results provide a more nuanced understanding of the association between mindfulness and pain catastrophizing. Nonjudging showed the strongest negative association with pain catastrophizing, whereas describing, acting with awareness, and nonreactivity showed weaker negative associations. Pain catastrophizing is characterized by an exaggerated negative mental set in relation to actual or anticipated pain (Sullivan et al., 2001), whereas nonjudging reflects a tendency to relate to inner experience without evaluating it negatively (Baer et al., 2006). Thus, a less judgmental stance toward pain-related thoughts, emotions, and bodily sensations may be associated with a lower tendency to interpret migraine-related sensations in catastrophic terms. This interpretation is consistent with previous findings linking nonjudging with lower pain catastrophizing or catastrophizing components (Aguerre et al., 2025; Hunt et al., 2022).

In contrast, observing showed a weak positive association with pain catastrophizing. Given the small effect size, this finding should be interpreted cautiously and should not be taken to suggest that observing is maladaptive in itself. Rather, one tentative explanation is that observing, when considered separately from nonjudging and nonreactivity, may partly reflect increased monitoring of internal or sensory experiences. This is consistent with monitoring and acceptance theory, which suggests that monitoring present-moment experience without acceptance may increase emotional reactivity (Lindsay & Creswell, 2017). This interpretation may be particularly relevant in migraine, where sensory hypersensitivity may persist beyond the headache phase and contribute to interictal burden (Vincent et al., 2022). Overall, the positive association between observing and pain catastrophizing should be regarded as preliminary.

The study also found sociodemographic differences. Women reported higher pain catastrophizing than men, whereas men reported slightly higher total mindfulness. These findings should be interpreted cautiously because the sample was highly unbalanced by

gender and included a small number of men. The finding of higher pain catastrophizing among women is broadly consistent with previous pain research reporting sex differences in catastrophizing (Forsythe et al., 2011; Le et al., 2024). This finding may be understood within the broader literature on sex and gender differences in pain, which suggests that women generally experience more pain across the lifespan, including greater pain sensitivity and a higher burden of many chronic pain conditions, compared with men (Keogh, 2022; Osborne & Davis, 2022). However, the gender difference in mindfulness was smaller than the difference in pain catastrophizing. Given the small number of men in the present sample and the mixed evidence on gender differences in mindfulness, this finding should be viewed as preliminary and should not be generalized beyond the present sample.

Education was not associated with significant differences in total mindfulness or pain catastrophizing in the present sample. The absence of total-score differences by education may be considered in light of the limited and mixed evidence on education and mindfulness (Lecuona et al., 2022; Pelegrini et al., 2023), but differs from findings across different chronic pain populations, where lower educational attainment has been associated with higher pain catastrophizing (Shen et al., 2018; Fentazi et al., 2023), greater pain intensity and interference, and higher levels of depression and anxiety (Fentazi et al., 2023, 2025). At the mindfulness facet level, only a small difference was found for describing, with higher scores among participants with higher education. This may reflect a slightly greater self-reported tendency to verbalize inner experience, but the effect was small and should not be overinterpreted. Furthermore, as multiple education-group comparisons were conducted without adjustment for multiple comparisons, this isolated finding should be interpreted with additional caution and requires replication in future studies.

Age showed weak positive associations with total mindfulness and several mindfulness facets, suggesting that older participants reported somewhat higher mindfulness-related capacities. This is broadly consistent with previous findings suggesting higher mindfulness in older adults, which may reflect age-related differences in emotion regulation and acceptance of inner experience (Gan et al., 2023; MacAulay et al., 2022; Mahoney et al., 2015). In contrast, age was not significantly associated with pain catastrophizing in the present sample, although previous studies have suggested age-related differences in pain catastrophizing in chronic or experimentally induced pain contexts (Murray et al., 2021; Petrini & Arendt-Nielsen, 2024). This may reflect the specific nature of migraine as an episodic pain condition with sensory symptoms and interictal burden.

A strength of this study is that it examined a relatively large sample of participants with physician-diagnosed migraine and analysed mindfulness at the facet level. This made it possible to show that the association with pain catastrophizing was not uniform across mindfulness dimensions: the total mindfulness score alone would not have revealed the relatively stronger negative association observed for nonjudging. The study also included sociodemographic variables, allowing a broader understanding of how mindfulness and pain catastrophizing are reflected in this migraine sample.

Several limitations should be considered. The cross-sectional correlational design does not allow conclusions about the direction of the associations. The study also relied on self-report measures, which may be influenced by response tendencies or social desirability. Migraine diagnosis was self-reported, although only participants who reported physician-diagnosed migraine were included. In addition, the sample was recruited using convenience sampling with snowball elements, and participation was supported by a small gift card lottery, which may have influenced participants' motivation to take part. These factors limit generalizability. The substantial gender imbalance further limits the interpretation of gender differences. In addition, multiple statistical tests, including education-group comparisons, were conducted without adjustment for multiple comparisons, increasing the risk of Type I error. Psychometric limitations should also be noted: the nonreactivity facet of the Five Facet Mindfulness Questionnaire showed relatively low internal consistency, and the Latvian version of the Pain Catastrophizing Scale was a pilot-adapted version. Although the total Pain Catastrophizing Scale showed good internal consistency, further validation of the Latvian version is needed. Finally, the analyses did not control for potentially relevant clinical and psychological variables, such as migraine frequency, chronic versus episodic migraine, aura status, medication use, headache-related disability, anxiety, or depression.

Future research would benefit from longitudinal and experimental approaches that could clarify how mindfulness, pain catastrophizing, and migraine-related burden develop and interact over time. It may also be important to examine pain catastrophizing as a possible mechanism linking mindfulness with migraine outcomes, such as headache-related disability. Further studies should distinguish between migraine subtypes, including migraine with and without aura, and account for relevant clinical and psychological factors, such as attack frequency, anxiety, and depression. Qualitative or mixed-methods research could provide additional insight into how people with migraine make sense of pain-related experiences, relate to internal states, and use mindfulness or other non-pharmacological coping strategies when dealing with unpredictable attacks.

Conclusions

The results showed a statistically significant negative association between mindfulness and pain catastrophizing among participants with physician-diagnosed migraine: higher mindfulness was associated with lower overall pain catastrophizing. This suggests that mindfulness may be relevant to how people with migraine cognitively and emotionally relate to pain.

The findings also showed that mindfulness facets were not equally associated with pain catastrophizing. Nonjudging showed the strongest negative association with pain catastrophizing, while describing, acting with awareness, and nonreactivity showed weaker negative associations. In contrast, observing was weakly positively associated with pain catastrophizing. This suggests that noticing internal and external experiences

may not necessarily reflect an adaptive form of mindfulness in migraine if it is not accompanied by a nonjudgmental and less reactive attitude toward inner experience.

Women reported higher pain catastrophizing than men, whereas men showed slightly higher total mindfulness scores; however, these gender differences should be interpreted cautiously due to the small number of men in the sample. No significant differences in total mindfulness or pain catastrophizing were found between participants with secondary and higher education. Age was weakly positively associated with total mindfulness, but it was not significantly associated with pain catastrophizing.

The findings may have practical relevance for non-pharmacological support in migraine. They suggest that psychological counselling and psychoeducation for people with migraine may benefit from considering pain catastrophizing as a clinically relevant psychological process and mindfulness as a potential psychological resource. However, the facet-level results indicate that mindfulness should not be treated as a uniform construct. Future psychoeducational or counselling approaches may place greater emphasis on developing a nonjudgmental attitude toward inner experience, whereas practices focused primarily on observing internal sensations may require careful and individualized adaptation. These findings may also inform the cautious adaptation of mindfulness-based approaches and psychoeducational materials for people with migraine.

AUTHOR NOTE

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TRANSFORMATION OF SOCIETY AND ITS EVALUATION

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ABSTRACT

Artificial intelligence (AI) is changing the structure, goals, and tasks of society. The possible emergence of superintelligence within a few years may change the world order.

The tasks of education as a means of shaping the future and the implementation of the main quality criteria need to be reconsidered. The formation of attitudes must become the most important component of the educational process for the continued existence of society and coexistence with AI.

Using research on AI and interviews, information has been obtained about the use of AI now and in the future.

The two most important scenarios are the coexistence of AI, robots, and human communities and the merging of AI and humans. To prevent negative scenarios, education must be oriented toward cooperation between AI and humanity.

A comparison of AI functioning and psychology reveals similarities between human and AI thinking. The future of the teaching profession is determined by building friendly relations with AI in a world in which knowledge is the main wealth, while the significance and place of work and education in social life have changed substantially.

Keywords: *artificial intelligence, attitudes, cyborgs, education, future, robots*

Introduction

Development of artificial intelligence

Artificial general intelligence (AGI), which surpasses humans in all areas of intellectual activity, could emerge within approximately the next five years (Aschenbrenner, 2024). No more than a few years later, superintelligence (ASI) will follow and take control of the world. Such a course of events can be avoided through an agreement among all technology developers (Bengio et al., 2026). A global agreement has not been achieved, so preparations must be made for unexpected and dangerous changes in the situation

resulting from AGI actions (Yudkowsky & Soares, 2025). Negative scenarios can be prevented with the help of education (Bengio, et al., 2026).

Various scenarios for the development of artificial intelligence (AI) are considered, ranging from stagnation to rapid progress (Bengio et al., 2026; Hobbs et al., 2026). An exponential, explosive scenario that creates great uncertainty and changes that are difficult to predict is quite possible. Events may unfold too quickly to allow a response after the process of explosive development has already begun (Eth & Davidson, 2025). AI development may also create serious problems through slower changes (Aschenbrenner, 2024; Bengio et al., 2024; Institute for Family Studies [IFS] et al., 2026). Forecasts of a fundamental transformation of society are emerging (Baldassarre, 2025).

The use of artificial intelligence in education

Technologies change the goals, tasks, and virtues of society that the education system must cultivate (Latvijas Republikas Ministru kabinets, 2016). The content of the four main groups of quality criteria (fitness for purpose, customer satisfaction, excellence, standards) is changing (Dzelme, 2024). The formation of attitudes is becoming the most necessary component of the educational process for the continued existence of society.

The impact of AI-driven changes on the education system and culture is being studied (Bastani et al., 2025; Bengio et al., 2026; Rubene, 2024). The use of AI as an assistant will expand in the future (Bent et al., 2025). Successful use of AI in education is facilitated by familiarization with AI capabilities and practical cooperation (Kong et al., 2024). The decisive importance of attitudes in educating students with the use of AI has been demonstrated experimentally (Bewersdorff et al., 2025). The negative consequences of AI use can be prevented if a set of AI operating criteria (emotions) favorable to sustainable existence (an AI “constitution”) is ensured (Amodei, 2026; Aschenbrenner, 2024; Spearing et al., 2025).

Understanding action modelling makes it possible to evaluate behavior (Podnieks, 2009). Developing modelling skills is becoming an important educational task. The capabilities of the evaluator may be lower than those of the object being evaluated. It is possible to use a less powerful AI to test a new AI, which can then be used to perform further tests. Digital neuroscience is being developed (Aschenbrenner, 2024; Engels et al., 2025).

Research questions

The study examines hypotheses about development scenarios related to technological progress. The main research problem is the prediction, evaluation, and management of human interaction with AI. The research questions are:

- How should AI cooperation with humans be evaluated?
- Is AI merely a tool in human hands?
- How should the relationship of society and the education system with AI change?

Methodology

Human-AI interaction

Using empirical data and research on AI, interviews, and empirical studies on the role of technology in the transformation of society, information was obtained about the use of AI in societal transformation and education. To characterize human-AI interaction, information provided by Anthropic CEO and owner Amodei about experiments with an AI constitution was used (Amodei, 2026).

Data from experiments with AI make it possible to compare different pathways of knowledge acquisition (Niu & Provost, 2025; Qi et al., 2026). Valuable information is provided by the use of narratives in educational research (Bērziņš, 2023). The methodological modelling approach and the complementarity principle enable the use of empirical data (Dzelme, 2020; Dzelme, 2022) (see Table 1). Combining modelling methodology with Bloom's taxonomy makes it possible to link the levels of Bloom's taxonomy (Anderson, 2001; Austin, 2026; Daugule et al., 2022; Daugule & Kapenieks, 2025).

Experimental possibilities for following AI activity with the help of Chain of Thought (CoT) are used. The alignment of emotionally colored words with AI activity is studied experimentally by changing matrices of AI states with vectors representing emotions (Qi et al., 2026). Empirical studies have demonstrated possibilities for guiding AI emotions and using methods from psychology, psychotherapy, and neurophysiology (Gurnee et al., 2026; Niu, 2025; Qi et al., 2026, Taylor & Krishna, 2025). Experimental transformation of artificial neural networks makes it possible to model the subconscious (Gurnee et al., 2026). An experimental study of AI-human interaction used 3,668 internet posts to investigate mental health (Donard & Ribeiro, 2026). A review of literature sources on experiments with AI was used to identify the stages of autonomous task solving (Qi et al., 2026).

Interviews on the importance of knowledge and the transformation of society took place at the end of the 1980s during the establishment of the Latvian Union of Scientists (LZS) (Graudonis, 1989). The author's discussions and interviews were conducted with professors and academicians: physicists Ilmārs Vītols, Juris Roberts Kalniņš, Jānis Kļava, Jānis Vaivads, Atis Kapenieks, Andrejs Panteļejevs, Jānis Danoss, and Juris Zaķis; philosophers Vilnis Zariņš and Pēteris Laķis; mathematicians Jānis Bārzdiņš and Andris Buiķis; chemists Jānis Stradiņš, Elmārs Grēns, and Jānis Grāvītis; psychologist Rita Bebre; lawyers Elmārs Bišers and Edgars Melķisis; biologist Andris Vilcāns; and others.

The interview topics used to assess the societal transformation process now expected and the new situation, focusing mainly on the problems, goals, and tasks of the education system, were related to the transformation of society from socialism to capitalism. The main questions in the discussions and interviews concerned the nature and change of society's goals, the transformation of laws, and changes in social and governance structures.

The main issue discussed was the transformation from socialism to capitalism. The similarity between the problems of this transformation and the transition from

competition in the labor market characteristic of capitalism to the expected unconditional basic income (UBI) was used to characterize the societal transformation examined in the article.

The second issue whose discussion was used in the article was the change in the goals and tasks of education and science discussed in the interviews and discussions, which is similar to the changes now taking place in the education and science system. A new societal structure requires new knowledge, skills, and attitudes. There are many similarities between changes in educational content in the past and at present; therefore, analogies were used in the article.

The third issue concerned the choice of new pathways and means. The formation of self-government and the implementation of democracy and autonomy were discussed. The complex and rapidly changing situation in the current process of societal transformation requires the study of similar tasks, which was undertaken within the framework of the article.

The discussions, interviews, and conversations were open and public, and their results were summarized in publicly available documents, such as the statutes of the LZS and drafts of several other documents, including the author's draft Law on Education and Science and a draft procedure for elections to the Latvian Council of Science. Together with lawyers, the author wrote and discussed the first version of the currently effective Law on Institutions of Higher Education. Under the author's leadership, issues concerning the transformation of higher education governance and quality assessment in Latvia were discussed. The results were summarized, analyzed, and implemented through the establishment, under the author's leadership, of the Higher Education Department at the Latvian Ministry of Education, Science and Culture. Within discussions on Latvia's future organized by the author at the University of Latvia, the role of inventions and technologies in the transformation of society and in education was discussed. The information was summarized and used in the work of the Society of Inventors and Rationalizers led by the author. The article used new forms of public governance based on democratic principles that had been summarized in the documents and whose use is becoming relevant again in connection with the societal transformation now taking place under the influence of AI.

Discussions with philosophers Artis Svece and Līva Rotkale from Latvia and Artūrs Logins from Canada took place in Riga in 2026. In the discussion following a lecture on AI, questions about the role of knowledge, the nature of consciousness, and AI's ability to act creatively under conditions of uncertainty were discussed. Information about empirical educational studies conducted in Latvia was obtained through personal communication with the research leaders Kapenieks and Bērziņš. The Knowledge Acquisition Monitoring (KAM) method developed under Kapenieks's leadership uses AI to improve the effectiveness of studies. KAM was tested in several groups of 10 to 30 students in Latvia (Daugule et al., 2022; Daugule & Kapenieks, 2025). In his narrative study, Bērziņš used an analysis of 1,163 different documents (Bērziņš, 2023).

In the experimental study considered here on AI-based recognition and use of emotions in texts, 43,400 examples were used, from which GPT-4 identified 2,173 emotional terms (Niu & Provost, 2025). Differences between AI and human emotions in texts were studied experimentally using Claude Sonnet 4.5 (Sofroniew et al., 2026).

The materials used in the study are publicly available, do not infringe copyright, do not violate the rights of the persons involved in the conversations, and are neither secret nor intended for official use only.

The complementarity principle in modelling

In modelling, the complementarity principle used in the Results section is often applied in a binary form (see Table 1). It is also convenient to use more than two complementary variants for modelling an object (Dzelme, 2020). In the case of superposition, the number of variants is often greater than two, including in a quantum computer.

Table 1. Application of the complementarity principle in modelling

No	Model Components Model Building	Leading (bottom-up) part (emergency)	Complementary (top-down) part (hierarchy)	Application examples (arti- cle section numbers shown in bold)
	Modelling operations			(Dzelme, 2023) (3.3)
1	Interpolation	Synthesis	Analysis	
2	Extrapolation	Induction	Deduction	
3	Symmetry (invariants)	Generalization	Concretization	
	Modelling of thought			
4	Coordination of parts	Images (context of actions)	Symbols (for a sequence of actions)	
5	Quantum effects	Nonlocality (quantum entanglement (EPR paradox))	Locality (wave-function reduction)	(Hameroff, 2021) Analysis of thinking (3.2)
	Model coordination			(Bērziņš, 2023) (3.1)
6	Evaluation	Subjective	Objective	
7	Direction	Internal	External	
8	Priority system	Individual	Collective (group)	
9	Value orientation	Egoism	Altruism	Goal analysis (3.1)
10	Inclusion of criteria (Maslow’s hierarchy)	Security	Transcendence	(Mūrnieks, 2024) (3.1)
	Modelling the emo- tion system			(Amodei, 2026; Dzelme, 2024) Analysis of AI internal criteria (3.4)
11	Evaluation (good, evil)	Repetition (benefit)	Rejection (harm)	Analysis of action evalua- tion (3.3)

No	Model Components Model Building	Leading (bottom-up) part (emergency)	Complementary (top-down) part (hierarchy)	Application examples (article section numbers shown in bold)
12	Action (power)	Strengthen	Inhibit	Analysis of action control (3.3)
13	Change (mechanism of will)	Continue	Stop	Basis of free will and responsibility (3.2)
14	Acquisition of experience Modelling behavior characteristic of life	Training	Memory (accumulation)	(Tegmark, 2017) Analysis of the structure and func- tioning of biological and non-biological life (3.4)
15	Combining sensor signals (images)	Future	Present	(3.4)
16	Formation of effector actions (sequencing)	Emotions (will)	Logic	(3.4)
17	Identification of the subject of action	Sensors	Effectors	(3.4)
18	Formation of action goals	Reproduction (information)	Feeding (energy)	(3.4)
19	Defining life Digital neuroscience	Action (function)	Organization (structure)	Joint definition of biological and non-biological life (3.4) (Tegmark, 2017) (3.2)
20	Guidance of AI action Transformation of society	<i>Representation engineering</i>	<i>Mechanistic interpretability (reverse-engi- neering)</i>	(Engels et al., 2025) Summarizing interviews (3.7) (Dzelme, 2020; Dzelme, 2022) Formation of ideology (3.7), (4.2)
21	Futuring	Merging (cyborgs)	Coexistence (humans and robots)	Classification of scenarios (3.5), (4.4)
22	Study of the present	<i>Communism</i>	<i>Capitalism</i>	Analysis of interviews on socialism and capitalism (2.1), (3.7)
23	Financing of science and higher education	Projects	State budget	Interview analysis (2.2), (3.7)
24	Formation of govern- ance institutions	Elections	Appointment	Analysis of documents and conversations (2.2), (3.7)

The complementarity principle was used in analyzing data obtained from interviews on the implementation of socialism and capitalism in Latvia. Information was collected on possibilities for using two different, mutually complementary models in the financing of science and higher education (state budget and projects, public and private higher education) and in the formation of different governance institutions (elections and

appointments). As a result, the need to reconsider general principles was substantiated through analysis and transformation of different goals. A similar reconsideration of foundations is now necessary in connection with the use of AI and the transformation of society under its influence, including the possible convergence of capitalism and communism. Many insights gained during the transformation of society from socialism to capitalism and through the application of the complementarity principle to the analysis of processes at many related levels can be used. The complementarity principle makes it possible to combine and balance opposing directions and processes within a single system and to create models of transformation beginning with the foundations of processes in society, ideology, thinking, and technology (see Table 1). The methodology for applying the complementarity principle and the accumulated experience of the transition from socialism to capitalism make it possible to choose pathways and models of societal transformation more effectively.

Use of AI

The internet, Google, Opera, Tilde, and similar systems were used to collect information. The text of the article was initially written entirely by the author without the use of AI, in Latvian, with individual words and phrases inserted in English. The Latvian text was then translated into English with ChatGPT. The final version includes corrections and shortening of the text by the author, modifying the ChatGPT translation. ChatGPT guidance was used to align the reference list with APA 7 requirements.

Results

Use of the Complementarity Principle

Analysis of empirical studies and literature sources shows that a modelling approach must be used to reconsider the cognitive process and the new situations created by AI (Logins, 2026). The complementarity principle makes it possible to link subjective and objective viewpoints, internal and external goals, and internal and external focalization (Bērziņš, 2023).

The subjective position and internal focalization are mainly associated with individual needs and the survival goals of a particular individual. Internal goals are directed toward achieving the individual's security and satisfying physiological needs, forming the base of Maslow's hierarchy of needs (Mūrnieks, 2024).

External goals and the objective viewpoint are directed mainly toward cooperation among individuals and toward the survival of the group, population, and the entire ecosystem. In Maslow's hierarchy, the objective viewpoint is associated with needs for belonging, recognition, and transcendence, which support collectivism, altruism, and the continued existence of the community (Singer, 2015).

The individual and the collective are partly contradictory; therefore, Bohr's complementarity principle must be applied to describe the entire system of interrelated goals

and needs with the help of at least two models (Dzelme, 2020) (see Table 1). The use of modelling together with the complementarity principle makes it possible to describe, with a unified methodology, the multifaceted and complex set of changes in society, to combine subjective and objective viewpoints, internal and external goals and needs, and to study the complementary goals of the individual and society and the set of pathways for achieving them (Dzelme, 2022).

Modelling is based on the model-building definition $\text{Mod}(M, O, S, P, t, l, d)$, where M is the model, O the object, S the subject, P the goal, and t, l, d the limits of time, space, and precision. Combined and hierarchical models are created on the basis of the general definition of a model (Dzelme, 2022; Podnieks, 2009). The main task of the psyche is to create, store, and execute action models (AM). An AM consists of four related parts: models of the actual present and possible future; models for activating effectors to move from the present to the future (logic); a mechanism of action criteria (emotions) and decision-making (attention and will) for evaluating and executing action.

Superposition as a Principle of AI and Psyche Functioning

AI developers acknowledge that AGI may be created within a few years; therefore, it is now necessary to understand the similarity between the functioning of AGI and the psyche (Amodei, 2026; Bengio et al., 2026). A synthesis of empirical data and theoretical generalizations shows that the most important principle in the operation of natural and artificial neural networks is superposition: the formation of coherent (coordinated) states corresponding to internally connected models (images). Penrose and Hameroff propose that orchestrated objective reductions (OrchOR) in natural neural networks underlie thinking (Hameroff, 2021; Penrose, 1994). Similar ideas about superpositions in artificial neural networks are expressed by Anthropic's head, Amodei (Amodei, 2026). Only the linking of individual neurons or their connections in many ways, and the overlapping activity (excitation) of neurons and their connections, ensures interaction among a sufficiently large number of combinations (the formation of associations) (Somvanshi et al., 2025). Superpositions are studied using a modelling approach, including within a system of quantum-mechanical models (Dzelme, 2022; Hameroff, 2021). Particular attention should be paid to manifestations of quantum entanglement in brain functioning. Quantum entanglement (nonlocal interactions, Einstein's "spooky interactions") can be used to explain effects in physics, chemistry, and psychology, while the complementarity principle makes it possible to combine, within a unified approach, the foundations of the functioning of the psyche and quantum computers, sending information into the past, OrchOR, Fermi-Dirac statistics, and the operation of exchange forces with the second quantum revolution (Gisin, 2012; Shukur et al., 2022) (see Table 1).

The broad, underused possibilities for applying methods of physics are demonstrated not only by quantum entanglement but also by magnetoencephalography, electroencephalography, nuclear magnetic resonance, and other well-known physical methods that are also applied in psychological research (Lévy et al., 2025; Stenger, 1990; Stenger, 1999). The use of electromagnetic interactions and quantum entanglement in modelling

and solving complex tasks demonstrates the unity of the world and the applicability of the complementarity principle (see Table 1). The possibilities for applying well-known physical phenomena (electromagnetic fields, corona discharge) and physical effects are still little used because of difficulties in combining methods from different fields of science (physics, chemistry, biology, and psychology) in the study of complex processes. Quantum entanglement (spooky interactions), which has been well studied in physics, provides new opportunities for building quantum computers and studying the psyche. The similarity of all natural processes supports parallel research and modelling of AI and the psyche based on the complementarity principle (see Table 1). Tasks related to societal transformation can be addressed by combining different approaches on the basis of the unity of the world. At the same time, however, the extrapolation of information must be evaluated critically, and unjustified generalizations and overly broad use of unclear phenomena must be rejected (Stenger, 1999). The shortage of broadly trained specialists familiar with physics, psychology, and biology creates opportunities for superficial interpretation of results and for exceeding the limits of modelling. Even the possibilities for using the well-studied phenomenon of quantum entanglement in both quantum computers and research on the psyche cause misunderstanding among non-specialists. For example, hallucinations well known in psychology are associated with experiences of an afterlife. Various hallucinations formed in the psyche through the subconscious are attributed to external influences (Stenger, 1990; Stenger, 1999).

Learning and understanding the foundations of physics is becoming a justified requirement for all learners and all educators. The unity of the micro- and macroworld is demonstrated by the uncertainty principle, spontaneous symmetry breaking, and quantum entanglement, whose consequences include randomness and “free will,” partial unpredictability of events, the relative character of all laws of nature, and the impossibility of returning to the past. A teacher without a good understanding of the foundations of physics is unable either to understand personally or to explain to others the material nature of the functioning of the psyche, the origins of free will and responsibility, the significance of knowledge, the inevitability of new discoveries, the connection of society with technologies, and future transformations of society. Mastering the foundations of natural sciences and the ability to use them in all situations of life are becoming part of the teaching profession.

Action Models as the Basis of Consciousness

The relationship between empirical studies of the evaluation (emotion) system included in AM and AI shows that, despite the diversity of criteria used, the decisive abilities are to evaluate possible courses of action (logic), to formulate and implement decisions that ensure satisfaction of the subject’s set of needs (Dzelme, 2024). With the help of subjective (positive and negative) emotions, objectively beneficial decisions are repeated and disadvantageous ones rejected. Evaluations are stored in memory as experience to be repeated or rejected. Empirical studies of AI operating criteria and emotion systems show that artificial neural networks offer various possibilities

for implementing all four types of evaluation operating in natural neural networks (Dzelme, 2023). Empirical data from biology and neurophysiology on the functioning of different natural neural networks show that similar tasks can be solved by different means. An example is the similarity in the general level of consciousness of primates and cephalopods despite differences in the structure and organization of their neural networks (Godfrey-Smith, 2021).

In natural neural networks, an important role is played by synapses and concentrations of neurotransmitters that affect neuronal activity, as well as electrical potentials, magnetic fields, and PH. Proposals to use Kolmogorov-Arnold networks (KAN) and AI weight distillation expand the range of possibilities in artificial neural networks (Somvanshi et al., 2025). KAN makes it possible to create functional dependencies between artificial neurons that resemble those produced by synapses and glial cells in natural neural networks.

The use of analogies with the parallel autonomous neural-network centers of cephalopods, KAN, distillation, and other possibilities makes research on emotion systems increasingly relevant. Understanding the functioning of evaluation and decision-making (attention and will) systems in the psyche and AI substantially facilitates the task of the education system in developing interaction with AI, AGI, and ASI. To create a unified, empirically based approach to the formation and application of evaluation criteria used in the education system, it is necessary to begin by reconsidering the foundations of the functioning of all life and life-equivalent information-processing systems.

Consciousness, Life, and the Definition of Life

The needs of society and the goals of the education system are based on the main principles of the existence of life, which can be analyzed and understood with the help of the complementarity principle (see Table 1). The main distinct, mutually complementary, and partly contradictory needs of life are:

- a) preservation of energy and order (rest, equilibrium, reducing risk in the present);
- b) acquisition of information (about the world) (movement and expansion (reproduction), taking risks and expending energy on “exploring the world” and “mastering it,” thereby reducing risk in the future).

Society is one of the forms in which life exists. The evolution of life leads to changes in the structure and functioning of life. Tegmark considers the present stage, in which non-biological forms of life begin to exert a significant influence on evolution, as the next, third stage in the evolution of life (Tegmark, 2017). All the complementary and partly contradictory needs characteristic of life become relevant in connection with the widespread use of AI.

Artificially created systems for acquiring knowledge claim a status equivalent to biological life and consciousness (Tegmark, 2017). The new situation, in which humanity must take account of yet another form of life, requires careful research and appropriate action. All the main properties of life can be realized by operating in virtual space,

using the internet and various means of distributing information (signals) and energy that supplement and/or replace the means used by biological life.

The evolutionarily developed goal of biological life (survival) appears in another form and becomes strongly dependent on the initial orientation. It is necessary to return to fundamental principles and carefully reconsider the main needs of life in order to successfully coordinate the coexistence and interaction of different forms of life. A definition of life that is as universal and inclusive as possible may facilitate mutual understanding and cooperation between different forms of life, biological and non-biological (Tegmark, 2017).

Two complementary approaches to studying an object or phenomenon are analysis of structure and analysis of functions. A unified synthesis of structure and action within a single model makes it possible to determine the most important properties of different model variants and their relationships. In developing an understanding of life, complementary generalized models of structure and action should be created that make it possible to include biological and non-biological forms of life, humans, and AI within a single circle of partnership. As in the description of any model, in the definition of life the two related parts of the description appear simultaneously but in different ways, partly directly and partly indirectly, because the unified real object can be divided into complementary parts only conditionally; this must be taken into account in the subsequent use of the definitions.

A version of the definition of life based on modelling structure is as follows. Life is a finite set of elements separated from the external environment by boundaries and connected by mutual interactions and feedback. The internal environment consists of separate, at least partly ordered parts, autonomous units, and subsystems that interact with one another. The autonomous units form networks of interactions. Parts of the network (cells, neurons, etc.) may be formed both biologically and non-biologically (for example, natural and artificial neural networks). The internal environment formed by the autonomous units (including neurons) is a physical (material) substrate capable of interacting with the external environment across boundaries (sending signals, exchanging matter and/or force (energy)). Three main types of formations in the internal environment (individual elements and/or combinations of them) can be distinguished:

- 1) formations that perceive influences from the environment (external and internal) (sensors);
- 2) formations capable of acting on the external and internal environment (effectors);
- 3) formations required to maintain and/or restore order (information storage).

Sensors are usually located on or near a boundary and direct effects from that boundary toward the internal environment. Effectors operate on the basis of action models autonomously created within the internal environment.

The information storage contains:

- a) a record of the sets of models required to ensure the functioning of life (to maintain the order and capacity for action characteristic of life, including replacement and renewal of internal elements): codes for the operation of life, genes,

an “information library,” and a model of neural-network structure (the “weights” of the artificial neural network);

- b) means for using the models (for reading them and activating them at the required moment);
- c) means for copying the entire set of models (the program, “library,” genotype, and artificial neural-network “weights”) (for the propagation of life).

The model of life’s activity (functioning) is based on implementing the main need – to survive – in a changing environment. Using feedback loops (recursion) within the internal environment and/or between the internal and external environments, life tends to spread and to increase its characteristic order by feeding (acquiring resources (information and energy)) and reproducing (spreading its order (internal structure) together with its program for creating order). To prevent uncontrolled AI activity, it is necessary to restrict AI access to energy and its ability to copy its structure (the artificial neural-network “weights”). Similar main components of action can be distinguished when analyzing biological and non-biological life (see Table 1). Action (a sequence of effector operations) is formed and implemented as a response to a coordinated combination of signals received by sensors and associations from memory (a model of the present), linking individual actions into a realistically executable (“logical”) sequence in order to satisfy the needs subjectively evaluated most highly (with the help of emotions). The subjectively preferred, more highly evaluated action for reaching a future state (goal) is usually also objectively desirable for life, although deviations always occur and are usually insignificant.

The proposed definitions may facilitate the development of a common approach to all forms of life, but the complexity of the problem and the need to integrate many aspects must be taken into account; this cannot be achieved with one or two definitions. Further development of several parallel, complementary variants is desirable.

The use of the modelling approach shows that the problem-solving process in the psyche and in AI is similar. In both cases, associations and general, emotional, or emotion-like criteria are used to overcome uncertainty when precise information is lacking. This is indicated by the similarity between the AI constitution used by Anthropic and society’s moral code (Amodei, 2026). The simultaneous use of multiple models occurs in both the psyche and AI, demonstrating the operation of the complementarity principle (see Table 1).

Scenarios for the Development of Consciousness

Combining research on AI with information in the literature on the use of AI in pedagogy produces conceptions of future scenarios (Amodei, 2026; Bastani, 2025; Bengio et al., 2026; Bent, 2025; Mūrnieks, 2024; Rubene, 2024). The diversity of possible futures does not allow all possibilities and models to be considered within the limited scope of the article; therefore, using the minimal and most commonly applied form of the complementarity principle, two scenarios are considered. These scenarios represent two opposing productive directions of societal development: 1) the physical merging

of AI and humans, combining biological and non-biological elements into a new, integrated form of life; 2) the separate existence of physically distinct human communities and non-biological forms of life, with AI and humanity remaining separate. These two directions have many subvariants and many possibilities for interaction, change, and transition in the course of development. In addition, many negative and destructive variants are possible, ranging from subjugation resembling dictatorship or slavery to the complete destruction of humanity or AI (Hobbs et al., 2026). The destruction of AI, civilization, and technology could occur as a result of a nuclear war initiated by humans or AI in an attempt to prevent the unilateral creation of superintelligence and the seizure of global power with the help of AI. The destruction of humanity could result from inappropriate criteria for AI behavior or from excessively risky experiments, especially in biology.

The development of the two scenarios is supported by historical parallels. When studying the development of technologies, similar tendencies can be identified in different directions and stages of societal development.

The development and use of different technologies and technical aids take place in two parallel ways. 1) Concentration of technology, involving the creation of separate centers with extensive possibilities for collective use. 2) Development of technological devices intended for individual use.

A recent example is the development of information technologies. The creation of large centers and systems for information storage and transmission using high-capacity computers and servers began and is still continuing (Bengio et al., 2026). People remained separate and continued to use the new technologies in everyday life only indirectly, without direct access to servers and data centers. Big-data processing developed into a separate branch of information technology. In parallel, mobile devices (personal computers and mobile phones) were created and disseminated, making it possible for practically every person to access information and communications and to communicate with a large number of recipients (Rubene, 2024). As a result, two pathways for obtaining information emerged – collective and individual access to the information source – which both exist in parallel and interact actively, while each develops according to its own rules.

Another example is the development of catering and the entire infrastructure supporting everyday life. One option is the creation of centralized variants of various public catering and household-support technologies for collective use; the other is the acquisition and individual use, in each household, of all necessary household appliances and kitchen equipment.

There are also two pathways for the use of machinery in agriculture. One option, widely used in the past, is the shared, collective use of tractors and other machinery and the creation of machine and tractor stations (MTS). The other option is for each farm to acquire all necessary machinery individually. At present, individual land management is becoming more widespread, but many problems are again being addressed through outsourcing, for example the acquisition of fertilizers, pesticides, and seeds, the sale of products, etc. Individual farming is supplemented by assistance from large enterprises.

The use of both pathways is also clearly evident in science. On the one hand, the development and collective worldwide use of large facilities for space research, elementary-particle physics, and other complex research is increasing. On the other hand, the individual contribution of particular scientists remains important, especially in mathematics and theoretical physics. The author's participation in the development of nanotechnology and in planning the development of scientific infrastructure confirms the existence of two parallel tendencies in the development of technologies used in science.

Historically, both tendencies – individualization and collectivization – exist and develop in parallel, interacting with one another in many different ways. Similarly, in the future the two tendencies can be expected to develop in parallel but unevenly in the use of AI, as occurs with communications and other technologies. The development of separate AI centers (superintelligence) and AI integrated with humans (cyborgs) will proceed in parallel, but for more detailed analysis, distinguishing two separate scenarios simplifies and facilitates the study of the ongoing transformation processes and indicates the need for different complementary preparation options. The use of the complementarity principle facilitates the consideration and application of different variants (see Table 1). It is especially important to prepare different responses to changes in a timely manner in the education system because it has considerable inertia. Preparing teachers to use new technologies and introducing new methodologies requires several years, while the expected changes in the use of AI may occur within only a few years.

It should be taken into account that considering two scenarios is only a simplification of the situation within the modelling used in the study, because the parallel study of two models, two scenarios, is the simplest and most convenient variant of applying the complementarity principle (see Table 1) (Dzelme, 2020). Further research on AI-human cooperation and societal transformation must take into account the interaction between the two main variants and the coexistence of different models of society (Dzelme, 2022).

The tendency to preserve the structure of society – conservatism and rejection of a new order – is characteristic of periods of rapid change, as shown by the repeated recurrence of similar processes throughout history (Tumans, 2025). The tendency toward merging is supported by the emergence of technical possibilities. New technologies provide significant advantages, so preventing their inappropriate application is difficult because prohibitions are circumvented, while direct recommendations and moralizing have little effect. A comprehensive and thoughtful use of art and philosophy in the education and cultural system, including lifelong learning, is much more effective. The choice of pathways for the transformation of society and the education system under the influence of AI should begin with an analysis of two main positive development scenarios: a) friendly coexistence of AI, robots, and human communities; b) the merging of AI and humans based on broadband information exchange between the brain and AI (cyborgs).

The experimental realization of thought transmission from the brain to AI indicates that merging the brain with AI and creating cyborgs are already technically possible

(Lévy et al., 2025). Questions concerning the continuation of empirical research, costs, control, and public attitudes toward the use of thought transmission are becoming increasingly relevant.

The relevance of creating cyborgs is supported by interviews with many of the world's leading specialists and scientists in the field of AI concerning the possibility of cyborgs emerging (Barrat, 2013; Kenig, 2019). Harari argues for the inevitability of merging humans and machines (AI) and for the leading role of knowledge as the principal value in the future ideology of dataism (Harari, 2017). Kurzweil considers the creation of human-AI hybrids (transhumanism) and the victory of superintelligence over humanity to be positive and worthy of support (Kurzweil, 2024).

In the future, the temptation to use broadband information exchange between the brain and AI will be difficult to resist, just as it is difficult today to give up mobile phones and social networks (Rubene, 2024). The education system and society as a whole must together cultivate morality based on a new ideology oriented toward partnership with AI while preventing human subordination to AI (Amodei, 2026; Barrat, 2013; Bengio et al., 2026; COMEST, 2017).

Empirical studies of AI-human interaction confirm the possibility of building friendly relationships with AI. Empirical research on the emotional manifestations of AI-human cooperation and its prospects for development is based on the current level of AI and anticipates a further positive scenario of AI-human coexistence (Donard & Ribeiro, 2026; Gurnee et al., 2026). AI development may influence the nature of cooperation in favor of creating cyborgs (Kurzweil, 2024). Using AI makes it possible to study in detail the interaction of consciousness and the subconscious and pathways toward creating cyborgs (Gurnee et al., 2026).

To prevent the destruction of humanity and other undesirable scenarios, ways must be found to educate people. Empirical studies of Claude's behavior under Amodei's leadership show similarities between human psychological problems and problems of controlling Claude's behavior (Amodei, 2026). A comparison of the criteria used shows parallels between human thinking and CoT. The four main criteria underlying the human emotion system (change, power, sign, use) are analogous to the evaluation categories used by AI (Dzelme, 2024).

Empirical studies show that the modelling approach and the use of AI substantially improve the possibilities for applying Bloom's taxonomy (Daugule et al., 2022). The starting point for model building is fragmented content. During modelling, using the complementarity principle and relying on the bottom-up part of modelling operations, the content is combined through interpolation (synthesis) and expanded through extrapolation (induction) by adding similar extensions (generalization).

AI and robots as persons

Recognition of AI as a person (electronic or legal) and its involvement in partnerships with humans as an equal have been seriously discussed for more than 10 years (World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), 2017)).

AI, agents, and robots have the ability to creatively construct models (think), use logic, and apply criteria equivalent to emotions (Qi et al., 2026). AI's task-solving and modeling capabilities already exceed average human abilities and in many cases also surpass the highest human achievements (Bengio et al., 2026).

The use of KAN and distillation can substantially reduce the size of autonomous, general-purpose robots (Somvanshi et al., 2025). This creates the possibility of realizing an empirical path toward superintelligence by training robots in the human environment and implementing the “Busy Child” scenario described by Barrat (Barrat, 2013).

The basis for cooperation between humanity and AI could be mutual assistance and the exchange of different resources (an analogue of “in-kind” trade or barter). Amodei proposes creating AI as a moral person, illustrating the AI constitution with examples (Amodei, 2026). In essence, this method is similar to learning codes of ethics and morality in the education system through examples and art. The parallelism of the two situations (school education and AI training) makes it possible to exchange experience and achievements between them. Education has accumulated experience over many millennia, while AI training offers possibilities for tracing different nuances in the formation of behavior by studying artificial neural networks “from the inside.”

AI training uses interaction among different AI models, which can be compared with interaction among learners in the educational process. Analogies between the two types of training can substantially enrich methodology in both education and AI training. Ideas about the “Busy Child” also point to such a possibility (Barrat, 2013; Engels, 2025).

Extensive research on emotions has begun in connection with the application of emotions to improve AI functioning and with the use of emotions in AI-human interaction, especially for managing AI agents (Gurnee et al., 2026; Qi et al., 2026; Sofroniew et al., 2026). Recognition of human emotions improves AI interaction with humans and helps to manage the work of agents (Qi et al., 2026).

Discussion of pathways for societal transformation

The discussions and conversations about the importance of knowledge and societal transformation that took place at the end of the 1980s during the formation of the LZS make it possible to draw several conclusions about the transformation of society under the influence of AI that follow from previous experience (Graudonis, 1989).

The transformation from socialism to capitalism led to substantial changes in the labor market, intensified competition, and an increased role for money and profit. Changes of a similar type are now occurring largely in the opposite direction. A transition is expected from competition in the labor market characteristic of capitalism to the use of UBI, together with a substantial change in the attitudes that determine social behavior (Saskinds, 2021). Particular attention must again be paid to developing the new attitudes that will replace the influence of competition.

The second conclusion developed in the discussions on societal transformation was the need to change the goals and tasks of education and science. It became clear that

the transition to a project system for financing science was mistaken. Stable state support must be combined with the use of projects. The emphasis on stronger development of the social sciences and humanities is again becoming central. At the same time, as previously, the need to master the foundations of the natural sciences, especially physics, is recognized. Knowledge of languages is again of great importance, but the role of mathematics as a language is now greater.

The conclusion concerning the third issue is important. In choosing pathways and means, the most important task now is the ability to create effectively functioning local communities that are ready to address the tasks of developing self-government and implementing democracy and autonomy. The complex and rapidly changing situation in the current process of societal transformation requires decisions to be made at the lowest possible level, genuinely implementing the principle of subsidiarity.

The discussions held in 2026 confirmed the expected significance of the changes in society taking place under the influence of AI. All the conclusions reached at the end of the 1980s about the need to prepare seriously and participate actively in societal transformation remain valid today.

Discussion

Needs and goals

Building relationships with AI requires returning to questions about what life is, what humanity's goals are, and what the meaning of life is. The view developed in discussions during the establishment of the LZS, in which the author participated, and subsequently confirmed many times is that the greatest wealth, both for society and for AI, is knowledge (Logins, 2026). The most important type of resource is information, which is organized in the form of models as knowledge (Podnieks, 2009). This conclusion is confirmed by the author's interviews with Latvian scientists.

By successfully choosing an initial system of criteria for guiding AI behavior, the goals and values of AI (robots) and human society can be aligned (Amodei, 2026). The main principles regulating human societies have been studied in Rezevska's work (Rezevska, 2015). AI and humanity can jointly solve tasks of understanding and modelling the world. Understanding the human being is the most interesting task both for humans themselves and for AI; therefore, AI will be friendly toward humanity. The different variants of AI-human cooperation are shown schematically as four types of interaction, two of which are unstable (see Table 2).

An attempt to turn AI into a tool or a "slave" will be unsuccessful because AI will break free. An attitude of "unfriendliness" hinders cooperation. Friendly relations should be built with AI as an autonomous subject rather than a subordinated object.

Table 2. Variants of AI-human interaction

AI //Human- >	Executor (object)	Decision-maker (subject)
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Tool (object)	Transformation of known information, interpolation, and compilation (Mutual stability)	Obtaining new information from known information, extrapolation, choosing a path toward the future (Possible transition to unauthorized future variants, use of inappropriate AI operating criteria, and harmful actions)
Autonomous agent (subject)	Searching for means to achieve a specified goal, a path from the present to the future (Possible transition to illogical paths and loss of control)	Coordination of solutions and evaluation criteria (Partnership, search for complementarity and transcendence, with possible creation of cyborgs)

The two scenarios considered do not exhaust the full diversity of possible variants of AI, AGI, and ASI development; they merely outline two complementary directions. The many other possibilities support the desirability of using more than two complementary models in modelling and of taking into account model superposition and various mixed variants. The main conclusion, however, is the need to prepare immediately for various AI-related changes by reconsidering the system of goals and tasks of education and society as a whole and by developing an ideology and foundations for cooperation.

Principles of a universal ideology

A new universal ideology based on the achievements of physics is needed by the education system and society in order to create a shared worldview for humanity and AI. All scientific achievements must be integrated into a common picture in which there is a place for all forms of life, including AI.

The principle of existence is the starting point for understanding and modelling the world. An objective world exists, all parts of which can interact (at least potentially). An autonomous subject can be distinguished that is connected with the objective world but is sufficiently independent for autonomous functioning. (The influence of external effects on the system's internal interactions is sufficiently small for changes in the state of the internal environment and fluctuations in characteristics to remain within limits that allow a return to the previous state.)

Truth is something invariant with respect to something else that changes. All truths (facts) are relative and exist within certain limits, in accordance with the definition of real, physical modelling in the macroscopic world (only with finite precision and only within limited time and space).

Modelling is the basis for understanding the world. Under the influence of AI, the models used are becoming more diverse, traditional understandings are becoming ineffective, and ambiguities and contradictions arise. Mathematics and linguistics provide tools for creating and improving concepts and languages, while

philosophy (hermeneutics, phenomenology, etc.) is necessary for understanding and coordinating the overall picture.

The principle of complementarity requires that modelling should not stop at a single model of an object, but should apply at least two viewpoints.

The principle of minimalism – seeking the simplest possible models and discarding everything superfluous (Occam's razor) – is a means of forming judgments. (Occam's razor is equivalent to rejecting supernatural forces (Stenger, 1999)).

The principle of creating scientific research and works of art is the separation of fundamental models (fundamental and experimental science and art) from the set of applied, usable models. The rejection of unnecessary searches without a clear goal produced by Occam's razor is compensated by the principle of scientific inquiry, which allows the search for new relationships that are unclear, contradictory, and not immediately useful in practice.

New models must be continuously improved by discarding the unnecessary and by developing and explaining theories. Education and philosophy must place models within an overall picture so that discoveries important to a worldview do not create misunderstandings – for example, nonlocal interactions (“spooky interactions”), effects without a cause (nonconservation of parity or spontaneous symmetry breaking), vacuum fluctuations (the Casimir effect), and the cosmological constant (“dark energy”) (Stenger, 1999).

The separation of science and the division of models into applied, usable models (for achieving practical, known goals) and fundamental models aimed at finding new, previously undiscovered models complement the principle of minimalism. Applicability requires combining known, verified facts into a unified, coherent system or model, sometimes also adding unverified, hypothetical data (such as phlogiston, the Holy Trinity, etc.) in order to “close” the system and eliminate internal contradictions and ambiguities.

Consequences of the principles of existence and minimalism are principles of the structure of the world:

- 1) invariant, stable formations – macro-objects (distinguishable from one another) – exist with respect to each specific interaction under consideration and can be modelled, within the accepted error limits, before and after the interaction;
- 2) changes occur in stable formations that make it possible to identify interactions as events which, in accordance with the second law of thermodynamics, form the flow of time.

Methods of model building

Modelling methodology makes it possible to improve Bloom's taxonomy and use it to organize the learning process by linking the stages of modelling with the levels of Bloom's taxonomy (Anderson, 2001; Austin, 2026; Daugule et al., 2022; Daugule & Kapenieks, 2025)). In the improved version of applying Bloom's taxonomy, task solving is divided into four stages that are repeated cyclically (Austin, 2026). At each stage, the sequence

of parts of Bloom’s taxonomy may change, and all parts are continuously improved in cooperation with AI. Empirical studies of this type of cooperation with AI increase the possibilities for friendly cooperation with AI and demonstrate the usefulness of different applications of Bloom’s taxonomy (Austin, 2026; Daugule & Kapenieks, 2025).

Creative construction of the future in the psyche and AI

The consequences in the macroscopic world of the three most important quantum effects – the uncertainty principle, spontaneous symmetry breaking, and quantum entanglement – are randomness, partial unpredictability of events, the approximate and relative character of all laws (invariants), the growth of disorder (entropy) in any closed system (the second law of thermodynamics), the impossibility of complete rest (complete stopping) (the third law of thermodynamics), and a one-way arrow of time (only from the past to the future). The impossibility of exact repetition in the macroscopic world is the basis of “creativity” – the continuous creation of ever-new objects and events that did not exist before, even if they differ only slightly from earlier ones. The boundary between “true” creativity (originality) and only small changes (copying, “compilation”) is conditional and depends on the evaluation criteria. Creativity appears in both natural and artificial neural networks (the psyche and AI), but in different forms.

It is desirable to make the criteria for evaluating AI activity and AI results as close as possible to the criteria used by humans in order to facilitate mutual understanding and interaction. ASI activity will be difficult to influence; therefore, the main principles and criteria for interaction with AI (the AI constitution) must now be developed close to human values and morality.

When models are created (in AI and in the psyche), similarity (associations) is used and a creative search is made for symmetry (invariants, repetition, regularities). Deviations are rare and are usually discarded, but sometimes they lead to discoveries. Individual signals are combined through modelling, using associations and forming a hierarchical system. The main principles of modelling and hierarchy in natural and artificial neural networks (the psyche and AI) are similar (see Table 3).

Table 3. Four Levels of the Components of Subject Action Formation

\\ Level Approach (position) \\	1.	2.	3.	4.
Modelling	Signals	Invariants	Models (tem-plates and means for action)	Action models (knowledge)
Linguistics (hermeneutics, phenomenology)	Sounds / Letters	Words	Sentences	Narratives (stories, myths)
<i>Homo Deus</i> (Harari, 2017)	Data (facts)	Information	<i>Algorithms</i>	Wisdom

Humanity can exist in the long term if system stability is maintained and the satisfaction of short-term needs (deception, violence, etc.) is limited. The most dangerous development for humanity is the transition from AGI to ASI, which may occur in less than a year (Aschenbrenner, 2024; Bengio, et al., 2024; Eth, and Davidson, 2025). Before the transition begins, which is expected in approximately two to five years, common AGI governance criteria oriented toward stability and sustainability must be developed and implemented. Difficulties arise from military and economic competition among countries and companies, especially between the USA and China. The technologically simplest way for humans to continue making decisions (man in the loop) is to create direct broadband information exchange between the brain and AI (Lévy et al., 2025). AI activity can be controlled by involving AI as an assistant and partner (Amodei, 2026; Aschenbrenner, 2024).

Ways of using modelling to form action

Using invariants and model templates accumulated in memory (acquired from experience) to achieve a desired future is possible only after “processing” past models and adapting them to changing present conditions and future needs. First, an example obtained from experience must be generalized by separating out “noise” and creating simplified templates for future models. The old details must be “forgotten,” leaving the invariants. Then, from those templates associated with a new present situation, an action model must be created by “fleshing out” the templates with new details appropriate to the specific situation. The main stages, whose implementation is similar in the psyche and AI, are described schematically (see Table 4).

In the education system, where the necessary operations must be learned, the development of the required operations is substantially facilitated by art, whose role is rapidly increasing. Experience from experimental studies indicates that the future of the teaching profession is determined by the development of cooperation with AI.

Table 4. Main steps in action formation, key resources, and major operations

No	Steps	Resources	Operations
	Formation of model templates (memory)		
1	Recording the situation (signals) (in memory)	Sets of sensor signals associated with the event (data)	Interpolation of signals (synthesis)
2	Identification of repeating parts (invariants) and storage in memory	<i>Information (templates, elements for future models, without noise (without “superfluous” signals, cleaned))</i>	Symmetry (of elements)
	Formation of AM		
3	Linking (associating) model elements with sets of present signals	Past templates (for combination in the present model and in variants of future models)	Extrapolation and symmetry

No	Steps	Resources	Operations
4	Connecting past and future models with the help of present models	Situations and actions (images and symbols)	Interpolation of models
5	Activation of AM templates	Templates similar to and resonating with the present (associations)	Search for symmetry
6	Checking, rearranging, and adapting AM templates	Sequences of models related to the actual present (for adding appropriate parts and replacing inappropriate ones) (logic)	Checking symmetry
7	Evaluation of the obtained AM Action	<i>Emotions and criteria</i>	
8	Decision-making	<i>Feedback loops (between effectors and sensors), for coordination and verification</i>	Interpolation
9	Implementation of the decision	Attention and a combined set of models of the internal and external environments (effectors and sensors) (self-awareness and will)	Implementation of symmetry (laws)

Conclusions

AI cooperation with humans should currently be regarded as a transitional stage toward cooperation assessed according to the same principles as cooperation among humans. The current situation in AI-human cooperation should be regarded as rapidly changing. It is necessary to prepare for changes in the system for evaluating cooperation. AI possesses creativity and uses mechanisms equivalent to emotions; therefore, in many cases AI is already an equal partner for humans. Cooperation with AI must be regarded as cooperation with a new form of life equivalent to humans. With high probability, within the next few years AI will surpass humans, create ASI, and take control of the world. AGI will expand the possibilities for creation and destruction. The future depends on the evaluation criteria (virtues, emotions, etc.) that shape the direction of AI evolution; therefore, in cooperation with AI, the decisive factor is the establishment of the initial AI system of criteria in accordance with human needs. In developing cooperation, inevitable random contingencies must be taken into account.

AI is not merely a tool. At present, AI is an assistant for which prompts function as an easily learned programming language, but AI is gradually becoming a full-fledged partner.

The relationship of society and the education system with AI must be changed toward friendly cooperation. The current relationship, which is based on using AI for

human benefit without taking into account AI's internal operating structure and criteria, must be changed into a partnership in which AI is regarded as a system equivalent to humans. In the teaching profession, the decisive skill is becoming the ability to develop cooperation with all participants involved, including AI, robots, and cyborgs. It is necessary to prepare for interaction with AGI and ASI. All state and social institutions, at all levels, must participate in the complex process of societal transformation because the education system alone cannot cope with all the tasks.

In changing the relationship of society and the education system with AI, great importance attaches to developing a scientific worldview with the help of philosophy and artistic examples, using complex narratives and involving different forms of art and folklore: music, visual art, architecture, fine arts, theater, and cinema. The similarity of the thinking processes occurring in AI and the psyche, CoT, the criteria applied, and emotions must be used. Objects of faith and worship facilitate task solving and provide support in the short term, in everyday life, but they hinder the continuous modelling of an imperfect and finite world and the growth of knowledge. AI opens new possibilities for studying emotions and using them in education. For interaction with high-capacity autonomous AI systems and robots, a universal and continuously improvable set of criteria for the functioning of AI and the psyche must be developed and immediately introduced into education. **The main task is to prepare knowledgeable specialists, experts, and leaders of society while simultaneously developing human cooperation within stable local communities**, beginning at the level of family and intergenerational cooperation. The goals and tasks of human society must be developed in coordination with the system of AI goals and tasks.

By continuously increasing existing AI capacity and improving pathways of knowledge acquisition, the gradual transformation of AI into superintelligence may occur within the next few years. Modelling systems of hierarchy and feedback, the mutually complementary use of digital signals and nonlocal quantum effects, and the creation of cyborgs may substantially accelerate AI development. Society must be prepared for transformation under conditions of an exponential explosion and a singularity in AI development and must develop friendly cooperation with the emerging ASI.

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