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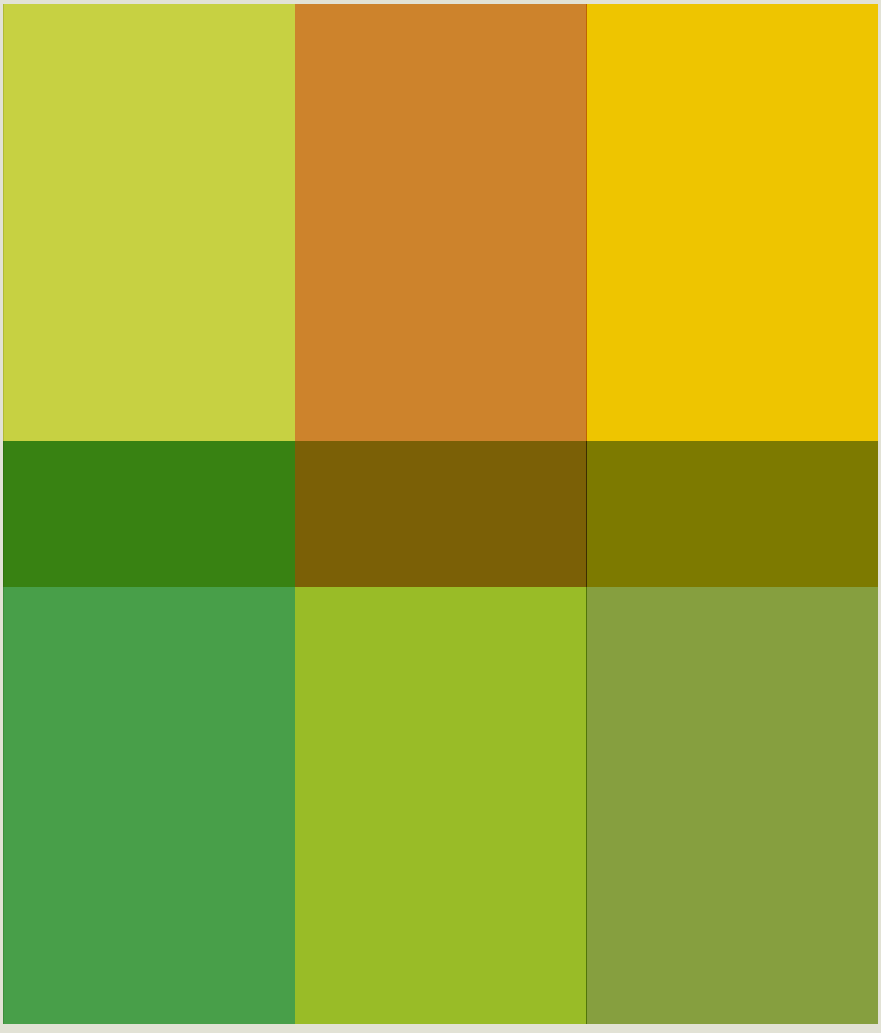

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C·E·P·S *Journal*

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The CEPS Journal is an open-access, peer-reviewed journal devoted to publishing research papers in different fields of education, including scientific.

Aims & Scope

The CEPS Journal is an international peer-reviewed journal with an international board. It publishes original empirical and theoretical studies from a wide variety of academic disciplines related to the field of Teacher Education and Educational Sciences; in particular, it will support comparative studies in the field. Regional context is stressed but the journal remains open to researchers and contributors across all European countries and worldwide. There are four issues per year. Issues are focused on specific areas but there is also space for non-focused articles and book reviews.

About the Publisher

The University of Ljubljana is one of the largest universities in the region (see www.uni-lj.si) and its Faculty of Education (see www.pef.uni-lj.si), established in 1947, has the leading role in teacher education and education sciences in Slovenia. It is well positioned in regional and European cooperation programmes in teaching and research. A publishing unit oversees the dissemination of research results and informs the interested public about new trends in the broad area of teacher education and education sciences; to date, numerous monographs and publications have been published, not just in Slovenian but also in English.

In 2001, the Centre for Educational Policy Studies (CEPS; see http://ceps.pef.uni-lj.si) was established within the Faculty of Education to build upon experience acquired in the broad reform of the national educational system during the period of social transition in the 1990s, to upgrade expertise and to strengthen international cooperation. CEPS has established a number of fruitful contacts, both in the region – particularly with similar institutions in the countries of the Western Balkans – and with interested partners in EU member states and worldwide.

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Revija Centra za študij edukacijskih strategij je mednarodno recenzirana revija z mednarodnim uredniškim odborom in s prostim dostopom. Namenjena je objavljanju člankov s področja izobraževanja učiteljev in edukacijskih ved.

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Revija je namenjena obravnavanju naslednjih področij: poučevanje, učenje, vzgoja in izobraževanje, socialna pedagogika, specialna in rehabilitacijska pedagogika, predšolska pedagogika, edukacijske politike, supervizija, poučevanje slovenskega jezika in književnosti, poučevanje matematike, računalništva, naravoslovja in tehnike, poučevanje družboslovja in humanistike, poučevanje na področju umetnosti, visokošolsko izobraževanje in izobraževanje odraslih. Poseben poudarek bo namenjen izobraževanju učiteljev in spodbujanju njihovega profesionalnega razvoja.

V reviji so objavljeni znanstveni prispevki, in sicer teoretični prispevki in prispevki, v katerih so predstavljeni rezultati kvantitavnih in kvalitativnih empiričnih raziskav. Še posebej poudarjen je pomen komparativnih raziskav.

Revija izide štirikrat letno. Številke so tematsko opredeljene, v njih pa je prostor tudi za netematske prispevke in predstavitve ter recenzije novih publikacij.

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— Georgeta Ion and Chris Brown

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Editorial

Evidence-Informed Inclusive Education: Enablers, Barriers and Innovations

Since the second half of the twentieth century, education has been seen as a key institution for promoting equal opportunities. Consequently, democratic governments have sought to develop policies to mitigate the effects of social inequalities on access to education, schooling conditions and educational outcomes. Yet the persistence of inequality across education systems in developed countries raises fundamental questions about how best to design policies and practices that can offset social disadvantage and provide a legitimate foundation for a meritocratic system and fair access to social positions. In this global context, achieving sustainable improvement in schools that address inequalities in students' learning outcomes – particularly for those from disadvantaged backgrounds – remains a significant global challenge (e.g., OECD, 2012; UNESCO, 2015).

Attaining sustainable student success and contributing to social development requires reducing school failure and promoting a school system that combines quality with equity in the complex and challenging current socioeconomic context. Equity can be understood as the implementation of strategies aimed at reducing the obstacles students face due to social or personal circumstances – such as gender, ethnicity or family background – that may limit their ability to realise their educational potential and attain desirable outcomes (Eurydice, 2019). Despite extensive efforts at the international, European and national levels (e.g., the Fundació Bofill report in Spain; Riera, 2019), educational reforms have often failed to improve education systems or effectively address disparities in student outcomes. Achieving school equity is still an unresolved issue. In this context, this special issue of the CEPS Journal addresses questions such as: How can the most recent evidence and research data be used to inform efforts to address equity and inclusion in schools? How can schools and individual teachers be empowered to take direct action on their decisions in systems where top-down reforms have not yielded the desired results?

Ensuring the systematic use of evidence in schools represents a critical step towards addressing persistent inequalities and designing pedagogical approaches capable of effectively supporting diverse learners.

Yet, despite widespread rhetorical commitment, evidence-informed practice often remains fragmented, uneven and difficult to sustain. Research consistently shows that educators' engagement with evidence is shaped not

only by its availability but also by research literacy, professional beliefs, organisational conditions and the contextual realities of schools. This special issue, entitled *Evidence-Informed Inclusive Education: Enablers, Barriers and Innovations*, brings together empirical studies exploring these dimensions across varied educational levels, systems and socio-cultural contexts.

The first paper, *Is There a Skills Gap? Information Literacy and Primary School Teachers' Attitudes Towards Research*, by María Rodríguez Alcolea and Despoina Georgiou, addresses a foundational issue in evidence use: teachers' information literacy. Drawing on survey data from 120 primary teachers, the study shows that attitudes towards research are shaped by teachers' information literacy skills, identifying a modifiable competency that can be strengthened through targeted professional development. The study highlights the need for targeted professional development to support the sustainable integration of research evidence into primary education.

In *Affirmative Re-Action: Attitudes Towards Roma Students in Serbia*, Simona Bekić and Dragica Pavlović Babić examine perceptions of affirmative action as a mechanism for addressing long-term discrimination and promoting equity among minority groups, based on data from 190 university students. Although most of the respondents support such measures, nuances emerge: male students report more negative views, while insufficient knowledge of affirmative programmes is associated with greater social distance towards Roma people. These findings highlight the need for awareness-raising and structured opportunities for intercultural learning within higher education.

Mirlinda Bunjaku-Isufi's contribution, *Evidence-Based Strategies for Promoting Student Inclusion in Urban and Rural Schools in Kosovo*, presents a mixed-methods exploration of teachers' and students' perceptions of evidence-based strategies that support inclusion across contrasting geographical contexts. The study reveals that professional development, leadership support and collaborative planning are central to perceived inclusion, while implementation varies substantially between urban and rural schools. The findings underscore the importance of context-sensitive policy responses that acknowledge structural disparities.

The paper by Cecilia-Inés Suárez-Rivarola, Saida López-Crespo and Anna Díaz-Vicario, *Teachers' Perceptions of Evidence-Informed Practice: An Analysis According to School Complexity Level in Catalonia*, sheds light on how organisational conditions influence the use of research in teaching in schools with different levels of complexity in Catalonia. Although teachers across settings recognise the value of research, its use is conditioned by time constraints, training opportunities and the cultures of professional reflection within schools. Although differences across

school complexity levels are subtle, they indicate more conducive environments for systematic evidence use in low-complexity schools. The study highlights the need for more targeted teacher training and systematic evaluation of practice as key factors in fostering evidence-informed teaching.

In the paper *Creation of Didactic Materials at an Art Academy for Children with Developmental Disabilities Involved in Equine-Assisted Learning Interventions*, Renata Burai, Sonja Vuk and Antonio Kutleša investigate a practice-based project involving codesign and evaluation of didactic materials for children with developmental disabilities participating in equine-assisted learning interventions. Their findings reveal that engagement and motivation increase when students work on real-world, socially meaningful tasks. Moreover, the usability of materials depends strongly on the individual characteristics of children, emphasising the importance of adaptability and personalisation in inclusive practice.

Beyond the special issue focus, the varia section contributes a series of studies that, while diverse, enrich broader conversations on teaching, learning and educational wellbeing.

Evelyn Mei Ling Wong and Ann Rosnida Md Deni's article, *Promoting Interaction to Enhance Student Perceived Learning and Satisfaction in a Large e-Flipped Accounting Classroom*, demonstrates that interventions such as learner-content, learner-instructor and learner-learner interactions are critical for student learning and satisfaction in both pre-class and in-class online activities. Their work underscores the continued importance of pedagogical design in increasingly digital learning environments.

In *Videoconferencing and Sleep Quality in Slovenian University Students: Is There a Mediating Role of Zoom Fatigue?*, Vita Vuk, Marina Horvat, Vesna Vrečko Pizzulin and Vita Štukovnik examine the link between videoconferencing, fatigue and sleep quality during the COVID-19 pandemic. Their findings reveal that videoconference fatigue mediates the negative relationship between screen use and sleep quality, pointing to the need for more sustainable remote learning practices.

In the paper *The Study of Light as an Experimental Factor in Observing the Development of Children's Artistic Abilities in Kindergarten*, Urianni Merlin and Matjaž Duh investigate how different programmes centred on light and shadow can influence young children's divergent thinking and artistic expression. The results show significant improvements, particularly in creative development, when structured and intentionally designed programmes are implemented.

In *Perceived Change in Job Demands and Resources and Teacher Well-Being During the Pandemic*, Iris Marušić, Josip Šabić and Jelena Matić Bojić

analyse data from over 3,000 Croatian teachers. Despite increased job demands during the COVID-19 pandemic, teachers reported relatively high job satisfaction and manageable stress levels, demonstrating notable professional resilience.

The study by Erika Löfström, Katrin Poom-Valickis and Kirsti Rumma, *Teachers' Metaphors and Beliefs About Teaching and Their Relationship With Job Satisfaction*, highlights how teachers' metaphorical understandings of their work relate to job satisfaction. Those holding student-centred beliefs were more satisfied with their professional environment, pointing to the value of reflective approaches that illuminate teachers' conceptualisations of teaching. The study suggests the importance of considering beliefs, knowledge base and emotions in understanding job satisfaction.

Finally, Melita Lemut Bajec's paper *Teachers' Attitudes Towards Classroom Observations* reveals that teachers generally view classroom observation positively, valuing constructive feedback and opportunities for self-reflection. Although observations may evoke stress or concerns related to supervision, peer observations in particular are considered beneficial, despite perceived risks of bias.

This special issue concludes with a review of *How to Use Research Evidence Well in Education*, by Mark Rickinson, Lucas Walsh, Joanne Gleeson, Blake Cutler, Bernice Plant, Mark Boulet, Genevieve Hall, Connie Cirkony and Mandy Salisbury, which offers a robust framework (QURE) for understanding high-quality research use as reflective, contextualised and supported by organisational structures. The book provides practical guidance for embedding evidence use within everyday professional practice, aligning with the broader themes of this issue.

The contributions included in this special issue collectively provide a nuanced and multifaceted examination of the factors that shape evidence-informed inclusive education. They elucidate the complex interplay between individual professional competencies, contextual conditions, pedagogical design and organisational cultures, highlighting how these dimensions interact to influence educational practices and outcomes. Importantly, the contributions underscore the transformative potential inherent in the deliberate and collaborative use of research to inform policy and practice, fostering more equitable, responsive and inclusive education systems.

By synthesising empirical insights and theoretical perspectives, this special issue advances understanding of how evidence can be mobilised to support inclusive education. We hope it serves not only as a catalyst for reflection among researchers and practitioners but also as an impetus for the refinement

of education policy and practice. More broadly, it aims to stimulate ongoing empirical inquiry and critical dialogue, contributing to a sustained research agenda focused on the development of inclusive, evidence-informed educational environments.

Georgeta Ion and Chris Brown

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Is There a Skills Gap? Information Literacy and Primary School Teachers' Attitudes Towards Research

María Rodríguez Alcolea*[1] and Despoina Georgiou[2]

In recent decades, national and international initiatives have encouraged teachers to integrate research evidence into their teaching practice. In order for teachers to implement evidence-informed practices, they must hold positive attitudes towards research. While much of the existing research focuses on higher education and teacher training, relatively little is known about the factors shaping primary school teachers' engagement with research. The present study addresses this gap by examining associations between primary school teachers' attitudes towards research and their individual characteristics and competencies, specifically their age, years of teaching experience, prior education and information literacy skills. Survey data were collected from 120 primary school teachers. Analyses progressed from bivariate correlations and group comparisons to multiple regression modelling. Although bivariate analyses suggested that older and more experienced teachers reported more negative attitudes towards research, these demographic associations were no longer significant once information literacy skills were included in the regression model. Instead, information literacy skills emerged as the only significant predictor of teachers' attitudes towards research, while prior education showed no effect. By identifying information literacy skills as a malleable competency, the study highlights the opportunity for targeted professional development to facilitate the sustainable integration of research evidence into primary education.

Keywords: evidence-informed practice, primary school teachers, attitudes, personal characteristics, information literacy skills

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Ali obstaja vrzel v spretnostih? Informacijska pismenost in stališča osnovnošolskih učiteljev do raziskav

María Rodríguez Alcolea in Despoina Georgiou

V zadnjih desetletjih so nacionalne in mednarodne pobude spodbujale učitelje, da naj v svojo pedagoško prakso vključijo raziskovalne dokaze. Da bi učitelji lahko izvajali na dokazih utemeljene dejavnosti, morajo imeti pozitivna stališča do raziskav. Medtem ko se večina obstoječih raziskav osredinja na visokošolsko izobraževanje in usposabljanje učiteljev, je o dejavnikih, ki vplivajo na uporabo raziskav pri osnovnošolskih učiteljih, znanega sorazmerno malo. Ta študija obravnava to vrzel s preučevanjem povezav med stališči osnovnošolskih učiteljev do raziskav ter njihovimi individualnimi lastnostmi in kompetencami, zlasti z njihovo starostjo, delovno dobo, s predhodnim izobraževanjem in z veščinami informacijske pismenosti. Podatki ankete so bili zbrani pri 120 osnovnošolskih učiteljih. Analize so potekale od bivariatnih korelacij in primerjav skupin do modeliranja z večkratno regresijo. Čeprav so bivariatne analize nakazovale, da so starejši in izkušenejši učitelji poročali o bolj negativnih stališčih do raziskav, te demografske povezave niso bile več pomembne, ko so bile v regresijski model vključene veščine informacijske pismenosti. Namesto tega so se veščine informacijske pismenosti izkazale kot edini pomemben napovednik stališč učiteljev do raziskav, medtem ko predhodno izobraževanje ni pokazalo nobenega učinka. S tem, da študija opredeljuje veščine informacijske pismenosti kot prilagodljivo kompetenco, poudarja priložnost za ciljno usmerjeno strokovno izpopolnjevanje, ki bi olajšalo trajnostno vključevanje raziskovalnih dokazov v osnovnošolsko izobraževanje.

Ključne besede: na dokazih utemeljena dejavnost, osnovnošolski učitelji, stališča, osebne lastnosti, veščine informacijske pismenosti

Introduction

European and Spanish policies and laws (European Commission, 2012; LOE, 2006; LOMLOE, 2020) encourage teaching professionals to implement evidence-informed practices, defined as the ability to search for, evaluate and apply research evidence alongside professional expertise. In the present study, we use the term evidence-informed practice (EIP) to emphasise the integration of research evidence with professional judgement and tacit knowledge, distinguishing it from more prescriptive notions of evidence-based teaching. In line with these policy frameworks, Spanish educational laws and initiatives (e.g., Department of Education, 2023) promote EIP as a means to enhance teaching effectiveness, professional development and student outcomes.

Despite these efforts, the implementation of EIP in Spanish primary classrooms remains limited (Ministerio de Educación, 2011). Although teachers generally acknowledge the value of research for informing teaching and learning, many remain hesitant to use research evidence in their daily practice (Cabañero et al., 2020; Gairín & Ion, 2021). This suggests a persistent divide between policy expectations and classroom realities. While international calls for EIP in education continue to grow (OECD, 2022), research on its implementation remains limited, particularly at the primary education level. This gap highlights the need to examine individual factors associated with teachers' engagement with research evidence.

The present study examines how individual factors, including demographic factors (age, years of teaching experience and prior education) and competencies (e.g., information literacy skills), are associated with Spanish primary school teachers' attitudes towards research. Drawing on the Theory of Planned Behaviour (Ajzen, 1991), information literacy skills (ILS) are conceptualised as an internal individual competence contributing to perceived behavioural control, which is associated with attitudes towards research. The study further draws on the Knowledge-to-Action framework (Graham et al., 2006) in order to situate ILS within teachers' individual readiness for research use, while acknowledging that broader contextual determinants of implementation lie beyond the scope of the present analysis. By focusing on an underresearched teacher group, we provide new insights into factors associated with attitudes towards research. The findings can inform more targeted professional development efforts and support sustainable strategies for the implementation of EIP, both in Spain and across European education systems.

EIP in Primary Education

EIP positions teachers as discerning professionals who thoughtfully integrate research evidence with their rich experiential knowledge in order to guide instructional decisions (Dalheim et al., 2012; Davies, 1999). This approach is particularly crucial in primary education, as these educators lay the foundational building blocks for future learning and shape young citizens' capacity to navigate an increasingly complex world. By embracing EIP, primary school teachers can make informed decisions about teaching interventions with established empirical support, such as interpreting evidence on the effectiveness of school-based anti-bullying initiatives (e.g., Gaffney et al., 2019), opting for effective interventions for learners with dyslexia (e.g., Galuschka et al., 2020) or enhancing classroom well-being (White & McCallum, 2020).

Consequently, international standards (European Commission, 2012), national laws (e.g., LOMLOE, 2020) and regional policies (e.g., Department of Education, 2023) increasingly emphasise the need for primary teachers to be competent in implementing EIP. Despite these expectations, EIP has not been widely adopted in Spanish classrooms (Ministerio de Educación, 2011). This aligns with findings from Catalonia, a region in Spain where EIP implementation across schools remains inconsistent (Ion et al., 2021).

Primary school teachers in Spain teach children aged 6 to 12 and are required to complete a four-year bachelor's degree in Primary Education. The establishment of this degree structure in 2010, driven by the Bologna Process, partly aimed to develop pre-service teachers' research competencies, an area often overlooked in previous training programmes. While research suggests that teachers generally acknowledge the potential benefits of EIP, many remain resistant to incorporating it into their practice (Cabañero et al., 2020; Gairín & Ion, 2021). This is primarily due to several limitations that teachers encounter, such as lack of time, limited resources, insufficient research skills and lack of institutional support (Díaz Costa, 2010; Perinés, 2018; Raiker, 2020). These limitations reveal the complex relationship between policy requirements, teachers' training and classroom reality.

Teachers' Research Attitudes Towards EIP

Attitudes are commonly defined as predispositions to respond in a favourable or unfavourable manner towards specific behaviours (Aarons, 2004; Diery et al., 2021; Wyer & Albarracín, 2005). The present study measures attitudes towards research, since positive attitudes towards research are viewed as

a psychological prerequisite for the successful implementation of EIP (Diery et al., 2021; Georgiou et al., 2023; Tack & Vanderlinde, 2016). In order to explore how these attitudes are formed and sustained, a dual-lens approach is adopted, integrating the Theory of Planned Behaviour and the Knowledge-to-Action framework. The Theory of Planned Behaviour (Ajzen, 1991) serves as the internal lens, modelling the psychological processes of the individual teacher. This theory identifies perceived behavioural control as a central driver of intention and then behaviour. In the context of this study, ILS are conceptualised as a key component of perceived behavioural control, such that teachers' perceived mastery in finding and evaluating research is expected to be associated with more positive attitudes towards research.

While the Theory of Planned Behaviour explains these internal psychological mechanisms, the Knowledge-to-Action framework (Graham et al., 2006) provides a complementary perspective by situating attitudes towards research within a broader process of research use. The framework distinguishes between individual readiness for research use and contextual determinants operating at the school or system level. The present study focuses exclusively on individual-level factors of readiness, while broader contextual determinants are not explored empirically. Within this focus, teachers' attitudes towards research and their ILS constitute individual readiness for research use, while teachers' age, years of teaching experience and prior education are conceptualised as background characteristics that may be indirectly related to readiness.

This framing allows us to explore whether associations between demographic characteristics and attitudes towards research reflect their shared variance with ILS, while understanding how attitudes function both as psychological drivers and as a foundational component of readiness for research use. Without sufficient individual readiness, engagement with evidence may be limited even before broader implementation processes are considered. Before encountering such challenges, teachers may demonstrate scepticism about the relevance of academic research to real classroom contexts or may exhibit resistance to changing established routines (Monereo, 2010). These attitudes can weaken teachers' readiness to engage with EIP (Ajzen, 1991; Graham et al., 2006). Therefore, fostering positive attitudes towards research is not only a theoretical necessity but also a practical one. Supporting positive attitudes towards research may strengthen teachers' engagement with EIP and, ultimately, instructional decision-making.

Factors Associated With Teachers' Research Attitudes

In order to better understand teachers' engagement with research, the present study focuses on individual factors associated with research attitudes, distinguishing between relatively stable background characteristics and competencies that can be developed over time (Blömeke et al., 2015; Kwakman, 2003). Specifically, we explore teachers' demographic characteristics and ILS.

Individual Demographic Factors: Age, Experience and Prior Education

Changes in Spanish teacher education following the Bologna Process (1999) offer an important historical and policy context for interpreting generational differences among teachers. These reforms extended primary teacher education to a four-year degree and introduced formal research components, including a mandatory bachelor's thesis (BOE, 2007). Research suggests that completing a bachelor's thesis is associated with higher research self-efficacy among pre-service teachers (Palou Julian et al., 2022), which has been linked to more positive research attitudes (Williams & Coles, 2007). This raises the expectation that younger, less experienced teachers may hold more positive attitudes than their colleagues educated before these reforms, although empirical evidence among primary teachers remains scarce. Similarly, teachers with postgraduate qualifications often report stronger research engagement (Kakupa, 2019; Raiker, 2020), yet evidence remains limited.

Individual Competency: ILS

ILS refer to the ability to find, critically evaluate and use information effectively (American Library Association, 2000), and are fundamental to engaging with research evidence (Williams & Coles, 2007). We conceptualise ILS as a practice-oriented competence that supports informed professional judgment, rather than full methodological expertise required to independently evaluate complex intervention studies. Primary teachers require sufficient ILS to identify relevant research, critically appraise its credibility and consider its implications for their classroom context (Davis, 1999; Groß Ophoff et al., 2017; Thomm et al., 2021). However, lack of time, limited access to scientific sources and historically limited attention devoted to research methods in teacher education may hinder the development of these skills (Ratcliffe et al., 2005; van Schaik et al., 2018). This lack of opportunity to engage with research may be associated with less positive attitudes towards research (e.g., Thomm et al., 2021).

Evidence from healthcare demonstrates a positive association between stronger ILS and positive attitudes towards research, often enhanced through

targeted professional development efforts (Brown et al., 2010; Labrague et al., 2019; Lim et al., 2012). It is reasonable to assume a similar relationship between ILS and attitudes towards research in education. However, disciplinary differences between healthcare and education should be acknowledged when drawing such parallels, highlighting the need for further examination of this relationship in educational contexts.

The Present Study

This study aims to explore the factors associated with Spanish primary school teachers' attitudes towards research. By examining teachers' individual factors, the study seeks to clarify associations between individual characteristics and research attitudes among in-service primary school teachers. Given the limited adoption of EIP in Spain and the broader European agenda promoting it, these insights can inform professional development strategies designed to bridge the research-practice gap. Aligned with the Knowledge-to-Action framework, such strategies can help further support an enabling environment where individual teacher readiness is reinforced by institutional and systemic support. Strengthening the integration of research into teaching practice may also contribute to improved instructional quality and better student outcomes across European educational contexts. The following research questions guided the present study:

1. To what extent do primary school teachers' individual demographic factors (age, years of teaching experience, prior education) relate to their attitudes towards research?
2. To what extent do primary school teachers' individual competencies (ILS) relate to their attitudes towards research?

Method

Participants

The participants were $N = 120$ primary school teachers working in Spanish primary schools, mainly women (91%) aged between 18 and 30 years (61%). Most of the participants held a bachelor's degree (60%), followed by a master's degree (28%), and had 1–5 years of teaching experience (63%). Table 1 presents a detailed summary of the participants' sociodemographic characteristics. For participant recruitment, two non-probability sampling methods were used: (a) convenience sampling was applied to select full-time and part-time working primary school teachers who were accessible, and (b) snowball sampling was

employed by asking the initial respondents to distribute the study information to their colleagues (Etikan & Babat, 2017). Informed consent was obtained electronically prior to participation in the study.

Table 1

Participants' Sociodemographic Characteristics

Variable	*n*	%
Gender		
Female	109	91
Male	10	8
Other	1	1
Age		
18–25	39	33
26–30	34	28
31–40	18	15
41–50	10	8
50–60	19	16
Educational background		
Bachelor's degree	72	60
Post-bachelor's degree	13	11
Master's degree	34	28
PhD	1	1
Years of teaching experience		
1–5	75	63
6–10	9	8
11–15	10	8
16–20	11	9
> 20	15	13

Instruments

Data collection was undertaken using a three-part online survey. The first part included sociodemographic questions about gender, age, education, current job and years of teaching experience (6 items). In the second part, two validated instruments were administered: the Information Literacy Test (Leichner et al., 2013) and the Attitudes Towards Research subscale (Georgiou, 2020).

Information Literacy Test

The Information Literacy Test consisted of 22 items designed to assess the participants' ILS (Leichner et al., 2013). The test was divided into two sections: the first section measured the ability to search for information (14 items), and the second section assessed the ability to evaluate the quality of information (8 items). Most of the items were multiple-choice, except for one open-ended item that required the participants to respond using keywords (item 15: Which criteria can be used to judge the quality of a book or a journal article?). The multiple-choice questions typically offered three possible answers, although item 19 provided two options. An example of an item with three possible answers was "Which are the features of a scientific internet forum?" and the answer options were: *The forum is provided by a reputable organisation; Entries are archived, so that the discussion can be retraced; Authors publish using their real names instead of pseudonyms*. Some items allowed for more than one correct answer; for these, each correct choice was awarded 0.33 points, resulting in a maximum possible score of 22. In the original validation study, the test demonstrated good reliability (α = 0.82) (Leichner et al., 2013). In the present study, Cronbach's alpha was calculated to assess internal consistency, resulting in marginal internal consistency (α = .66), which is considered acceptable for exploratory research.

Attitudes Towards Research Subscale

The Attitudes Towards Research subscale, included in the Evidence-Based Teaching scale (Georgiou, 2020), is a six-point Likert scale ranging from 1 ('*strongly disagree*') to 6 ('*strongly agree*'). The subscale consisted of 10 items where teachers indicated their level of agreement with the use of evidence in their teaching practices. All of the items in the attitudes subscale were phrased negatively (e.g., Teaching based on current research evidence is a waste of time), such that higher scores reflected more negative attitudes towards research (items were not reverse-coded for the present analyses). Additional items reflect tensions between research use and professional judgement or autonomy (e.g., Previous teaching experience is more important than the use of current research evidence), indicating that the scale reflects not only scepticism towards research but also concerns about professional autonomy and classroom realities. In order to assess the scale's reliability, Cronbach's alpha was calculated, revealing an acceptable internal consistency for the scale (α = .79) (Gliem & Gliem, 2003).

Both instruments, originally written in English, were translated into Spanish using a back-and-forth translation method (Body et al., 2021), following

a four-step approach. First, the first author, a native Spanish speaker, completed an initial (forward) translation. Second, two fellow bilingual researchers back translated the instruments from Spanish to English. Third, the translations were compared and discussed to ensure linguistic equivalence. Fourth, a pilot test with four Spanish primary school teachers was conducted to assess clarity, comprehension and completion time, resulting in minor revisions and adaptation of domain-specific language to the educational context.

Research Design

The study used a cross-sectional, quantitative correlational design to examine associations between teachers' individual characteristics, ILS and attitudes towards research. The data for the study were analysed using IBM SPSS Statistics (version 28). First, Cronbach's alpha coefficients were calculated to assess the internal consistency of the instruments measuring ILS and attitudes towards research. Before the main analyses, the data were checked to ensure that the assumptions for multivariate analysis were met; specifically, independence of observations, linearity and normality were checked, as well as the absence of multicollinearity, homoscedasticity and outliers. No major violations were found. Descriptive statistics were also calculated. In order to answer the research questions, three types of statistical analyses were performed. First, a Spearman rank order correlation analysis was conducted to examine the relationships between the independent variables (age, years of teaching experience and ILS) and the dependent variable (attitudes towards research). Since the number of participants with advanced academic qualifications was relatively small, a correlation analysis was not suitable for the variable of prior education. Instead, a Mann-Whitney U analysis was conducted to compare the attitudes towards research between two groups: teachers with only a bachelor's degree and those with additional academic qualifications (post-bachelor's diplomas, master's degrees or PhDs). A multiple linear regression analysis was conducted to examine the extent to which individual demographic characteristics (age, years of experience and prior education) and ILS predicted teachers' attitudes towards research. Categorical variables, such as prior education for the regression analysis, were dummy-coded.

Results

Preliminary analyses were conducted to assess whether the assumptions of normality, linearity, homoscedasticity, independence, absence of outliers and multicollinearity were met. Only the assumption of normality was violated for the research attitudes variable, as the histogram and normal probability plot indicated positive skew. Therefore, non-parametric tests were used for bivariate analyses. Multiple regression analysis was conducted to examine multivariate associations, and assumption checks indicated no major violations of linearity, homoscedasticity or multicollinearity. Given the robustness of linear regression to moderate deviations from normality, the analysis was retained. The participants demonstrated moderately positive attitudes towards research, with a mean score of $M = 2.50$ ($SD = 0.85$) on a six-point Likert scale, and achieved an average score of 57.4% ($M = 12.62$; $SD = 2.02$) on the information literacy test. The median age category of the participants was 26–30 years, and the median years of teaching experience was from 1 to 5 years.

The Relationship Between Age, Years of Teaching Experience, ILS and Attitudes Towards Research

Spearman rank-order correlation analyses were conducted to examine the relationships between age, years of teaching experience, ILS and attitudes towards research. A significant positive correlation was found between age and attitudes towards research, $r\,(118) = .25$, $p = .006$, and between years of teaching experience and attitudes, $r\,(118) = .25$, $p = .007$, indicating higher scores on the attitude scale, which reflect more negative attitudes. Conversely, a significant negative correlation was found between ILS and attitudes towards research, $r\,(118) = -.25$, $p = .007$, suggesting that teachers with higher ILS scores tended to report more positive attitudes towards the use of research evidence. Prior education was not included in the correlation analysis due to small group sizes; no significant association was found between prior education and attitudes towards research (see Mann–Whitney U results below). Given that the attitude items were negatively phrased, these results indicate that older and more experienced teachers reported more negative attitudes towards research, whereas teachers with higher ILS scores reported more positive attitudes. Table 2 presents the correlation coefficients.

Table 2

Spearman's Correlation Between the Variables

Variables	1	2	3	4
Attitudes towards research	-			
Age	.25**	-		
Years of teaching experience	.25**	.72**	-	
Information Literacy Skills	-.25**	-.10	-.12	-

Note. **Correlation is significant at the 0.01 level (2-tailed).

Comparison Between Teachers' Attitudes Based on Their Educational Background

In order to compare teachers' attitudes based on educational background, a Mann-Whitney U test was run between teachers with only a bachelor's degree and those with further academic education (post-bachelor's diploma, master's or PhD). The test revealed no significant difference between the two groups, U = 1651.5, z = -.411, p = .681, suggesting that educational attainment beyond a bachelor's degree is not significantly associated with teachers' attitudes towards research.

The Effects of Personal Characteristics and ILS on Attitudes Towards Research

A multiple linear regression was run to determine whether age, years of teaching experience, prior education and ILS were associated with attitudes towards research. The overall model was statistically significant, F (4, 115) = 3.36, p = .012, with an R^2 of .105, indicating that approximately 10.5% of the variance in attitudes towards research was accounted for by the set of predictors. Among the predictors, only ILS was significantly associated with attitudes towards research ($B = -.080$, $\beta = -.191$, $t = -2.091$, p = .039), indicating that higher ILS scores were associated with more positive attitudes. The remaining variables were not significant predictors. Age, years of teaching experience and prior education were not significantly associated with attitudes towards research in the multivariate model. Table 3 presents the regression coefficients.

In summary, while age and years of teaching experience were associated with more negative attitudes towards research in bivariate analyses, only ILS were significantly associated with attitudes towards research in the multivariate

model, with higher ILS scores associated with more positive attitudes. Educational level was not significantly associated with attitudes.

Table 3

Regression Analysis: Primary School Teachers' Research Attitudes

Variables	*B*	*SE B*	*β*	*t*	*p*
Age	.052	.074	.137	.707	.481
Prior Education	-.021	.083	-.023	-.253	.801
Years of Teaching Experience	.020	.048	.084	.427	.670
Information Literacy Skills	-.080	.038	-.191	-2.091	.039

Note. R^2 = .105 (N = 120, p = 0.012).

Discussion

The present study explored how individual demographic characteristics (age, years of teaching experience and prior education) and ILS are associated with primary school teachers' attitudes towards research. The findings indicate that although age and teaching experience were associated with attitudes, only ILS remained significantly associated with attitudes once all of the variables were considered simultaneously. This pattern suggests that differences in attitudes across career stages may be better understood in terms of underlying differences in ILS rather than age or experience per se. These findings have important implications for how teacher professional development is conceptualised and organised.

The first research question examined whether primary school teachers' individual demographic characteristics are associated with their research attitudes. The results showed that age and teaching experience were highly correlated (r = .72), suggesting that these variables largely reflect the same underlying career stage within this sample. Although significant positive associations were found between age, teaching experience and attitudes towards research at the bivariate level, neither variable remained significant once ILS was included in the regression model. This indicates that age and experience are not independently associated with attitudes, and that their bivariate relationships likely reflect shared variance with ILS. In line with previous research, recent educational reforms, such as the inclusion of bachelor's theses, may better prepare pre-service teachers to engage with research (Palou Julian et al., 2022; Williams & Coles, 2007). In contrast, teachers educated before these reforms may have

had fewer opportunities to develop formal research competencies, which may shape their perceived readiness to engage with research and their attitudes towards its use (e.g., Monereo, 2010).

Conversely, no significant differences were found between teachers with a bachelor's degree and those with further academic qualifications. This result contrasts with psychology literature (Leichner et al., 2013) and teacher education literature (Impedovo & Malik, 2016), which suggest that professionals become more information literate as their education advances. In the present sample, however, the median ILS scores for teachers with a bachelor's degree (Mdn = 12.9, IQR = 3.0) and those with further education (Mdn = 12.4, IQR = 2.9) were highly comparable. This small difference suggests that within this cohort, additional formal qualifications did not correspond to higher ILS, which may help explain the absence of significant differences in research attitudes between the two groups.

Another possible explanation relates to teachers' prior research experience. Research engagement can positively shape teachers' research attitudes. For example, doctoral candidates often exhibit stronger research attitudes partly due to their preparation for academic careers (Kakupa, 2019; Raiker, 2020). In the present sample, however, only one participant held a PhD, suggesting limited variation in formal research experience across educational levels. Furthermore, the diversity of postgraduate programmes in education, ranging from research-oriented to more practice-focused degrees, may further explain the similarity in attitudes between the two groups.

Regarding the second research question, a negative correlation between ILS and research attitudes was found, suggesting that teachers with a higher level of ILS tended to report more positive attitudes towards research. This pattern has also been observed in healthcare education (Melnyk et al., 2004; Ruzafa-Martínez et al., 2016) and may similarly apply in the teaching profession.

The most interesting finding emerges from the multivariate regression model. Once ILS was included, the associations of age and teaching experience with attitudes were no longer statistically significant, revealing ILS as the primary unique factor associated with research attitudes. This suggests that less positive attitudes observed among more experienced teachers are not necessarily due to age or experience, but may instead reflect differences in ILS. Importantly, less favourable responses on the attitudes scale should not be interpreted as simple resistance to research. Even among teachers with lower ILS, such responses may also reflect more critical standards for what is considered useful or appropriate research use, including concerns about rigid programmes and whether research fits specific classroom contexts. This scepticism may,

for example, partly reflect professional judgement rather than a rejection of research itself, given that teachers must integrate research evidence with contextual knowledge, experience and sometimes competing educational goals (Renkl, 2022).

From a Knowledge-to-Action perspective, these findings highlight the central role of ILS as a factor of individual readiness for research use (Graham et al., 2006). This is consistent with previous studies showing that stronger self-perceived research abilities are associated with more positive research attitudes (Palou Julian et al., 2022; van der Linden et al., 2015; Williams & Coles, 2007). The present study extends this work by showing that not only self-perceptions but also objectively assessed ILS are associated with research attitudes.

From both a Knowledge-to-Action and a Theory of Planned Behaviour perspective, these findings further suggest that ILS may function as a concrete source of perceived behavioural control (Ajzen, 1991). Teachers who possess stronger skills for finding and evaluating research evidence may feel more capable of engaging with research, which in turn is associated with more positive attitudes. In the Spanish context, where many in-service teachers were trained before the Bologna reforms and received limited formal research training, these findings suggest that structural differences in teacher education may be reflected in differences in perceived ability and readiness to engage with research.

In a nutshell, the findings of the study help us reinterpret the observed age and experience effects. What may appear as a generational gap in research attitudes may be better explained as a skills gap. Differences in attitudes across age and experience groups are therefore more likely to reflect differential access to research training and opportunities to develop information literacy, rather than age-related resistance to evidence use per se.

Limitations and Future Research

The study reveals some limitations that offer new directions for future research. Firstly, the validity of ILS for Spanish primary school teachers should be further examined to confirm their psychometric properties. Although the instrument has been validated in prior research, it has not been formally standardised for Spanish primary school teachers. Therefore, absolute ILS scores should be interpreted with caution, and future research could employ item-level analyses (e.g., IRT) to examine measurement invariance and confirm its consistent functioning across teaching contexts. Secondly, the attitude scale, based on self-reported data, is susceptible to social desirability bias, potentially skewing results. Despite anonymity measures, the positive skew suggests this

bias may exist. Future research should integrate qualitative interviews (e.g., Georgiou et al., 2023) or observational data (Fryer & Dinsmore, 2020) to gain a more comprehensive understanding of teachers' engagement with EIP.

Finally, the sample's demographic composition limits generalisability. Most of the participants were young (under 30), unlike the average Spanish teacher (40–50) (Ministerio de Educación, 2020), and there was only one teacher with a PhD in the sample. These discrepancies mean that the sample may not be fully representative of all Spanish primary school teachers. Future studies should aim for more demographically diverse samples, including a wider range of ages, experience levels and educational backgrounds, in order to enhance external validity and to more accurately assess the influence of personal characteristics on attitudes towards research.

Practical Implications

Given that ILS emerged as the only uniquely associated factor in the multivariate model, professional development efforts may be most effective when they prioritise the systematic development of teachers' ILS across career stages. While age and experience are fixed demographic factors, ILS are a malleable competency that can be intentionally developed. This highlights a clear opportunity for professional development: strengthening teachers' ILS may enhance their engagement with EIP and foster a more research-positive culture across schools.

Professional development efforts should focus on improving teachers' ILS by providing structured access to relevant research summaries, scheduled collaborative planning time to discuss implementation and regular peer observation cycles with feedback (Czerniawski et al., 2016). Such initiatives may be valuable not only for in-service teachers but also for pre-service teachers, as an opportunity to embed EIP within teacher training programmes (Štemberger, 2020). Ongoing mentoring and leadership support could further reinforce the value of EIP in daily instructional decisions (Darling-Hammond et al., 2017; Ion et al., 2021).

Schools should implement continuing-education initiatives and targeted professional learning networks, which can bridge generational gaps, enabling novice and experienced teachers to collaborate on interpreting research and developing evidence-informed strategies (Brown & Zhang, 2017). However, the effectiveness of professional learning networks usually depends on organisational commitment; specifically, the provision of dedicated time and academic resources, and the presence of expert facilitation to guide evidence

interpretation (Prenger et al., 2019). This approach may help narrow the research-practice gap and support more sustainable integration of EIP.

Conclusion

The present study explored the relationship between primary school teachers' individual characteristics and ILS and their attitudes towards research. While age and years of teaching experience were associated with attitudes at the bivariate level, only ILS remained significantly associated with attitudes in the multivariate model. This suggests that apparent differences in attitudes across career stages may primarily reflect underlying differences in information literacy rather than age or experience. Our findings emphasise the central role of ILS in shaping teachers' attitudes towards research and highlight the potential value of targeted professional development initiatives aimed at strengthening ILS across the teaching profession. Strengthening teachers' ability to engage with research evidence may represent a key leverage point for fostering more positive attitudes towards evidence use and supporting the sustainable implementation of EIP in primary education.

Ethical Statement

This research study was approved by the Ethics Review Board of the Faculty of Social & Behavioural Sciences (FERB) at Utrecht University.

Disclosure Statement

The authors have no conflict of interest to declare.

During the preparation of this manuscript, the authors used ChatGPT on 20 June 2025, with the following prompt: "Please check this text for grammatical inaccuracies and suggest potential edits. Direct revisions to the text are not permitted," for the purposes of editing text. The authors have reviewed and edited the output and take full responsibility for the content of this publication.

Data Availability Statement

Due to ethical and privacy considerations, the datasets generated during this study are not publicly available but may be obtained from the corresponding author upon reasonable request.

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Affirmative Re-Action: Attitudes Towards Roma Students in Serbia

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The education system in Serbia has been facing the issue of underrepresentation of sensitive social groups in (higher) education. Although Roma people are estimated to make up around 2% of Serbia's population, they account for only 0.2% of active students (according to the Republic Institute of Statistics, 2022). One measure for correcting long-term discrimination and ultimately equalising minority groups with the majority is affirmative action. Affirmative action has been implemented sporadically in Serbia's education system since 2003 but became official in 2009 through a quota system. Since then, certain progress has been made in increasing the inclusion of students from vulnerable groups at all levels of education. However, it is still necessary to work on activities that not only concern the provision of opportunities for participation in education but also provide social inclusion. Therefore, the main goal of this paper is to examine the perceptions and attitudes of majority students towards affirmative measures for Roma students. This is investigated via an originally constructed questionnaire, completed by a total of 190 students of the Faculty of Philosophy in Novi Sad. The results show that the majority of students support affirmative action, although male respondents demonstrate more negative attitudes towards it. The findings also indicate a correlation between ill-informed students and those with greater social distance towards Roma people. In order to increase the number of Roma students, the authors suggest increasing awareness about affirmative action among both majority and minority groups, and creating diversity courses and networking programmes in higher education institutions.

Keywords: higher education, affirmative action, Roma students, social inclusion

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Afirmativne (re)akcije: stališča do romskih študentov v Srbiji

Simona Bekić in Dragica Pavlović Babić

Vzgojno-izobraževalni sistem v Srbiji se spoprijema s problemom premajhne zastopanosti ranljivih družbenih skupin v (visokem) šolstvu. Čeprav Romi po ocenah predstavljajo okoli 2 % prebivalstva Srbije, predstavljajo le 0,2 % aktivnih študentov (po podatkih Republiškega inštituta za statistiko iz leta 2022). Eden izmed ukrepov za odpravo dolgotrajne diskriminacije in končno izenačenje manjšinskih skupin z večino so t. i. afirmativni ukrepi (tudi *pozitivna diskriminacija*). Ti se v srbskem vzgojno-izobraževalnem sistemu občasno izvajajo od leta 2003, uradno pa so bili uvedeni leta 2009 s sistemom kvot. Od takrat je bil dosežen določen napredek pri povečanju vključevanja študentov iz ranljivih skupin na vseh ravneh izobraževanja. Še vedno pa je treba delati na dejavnostih, ki zadevajo zagotavljanje možnosti za sodelovanje v izobraževanju pa tudi zagotavljanje socialne vključenosti. Zato je glavni cilj tega članka preučiti zaznave in stališča večinskega študentskega prebivalstva do pozitivnih ukrepov za romske študente. To vprašanje smo preučevali s pomočjo izvirno sestavljenega vprašalnika, ki ga je izpolnilo skupno 190 študentov Filozofske fakultete v Novem Sadu. Izsledki kažejo, da večina študentov podpira afirmativne ukrepe, čeprav moški anketiranci kažejo bolj negativno stališče do njih. Ugotovitve kažejo tudi na povezavo med slabo obveščenimi študenti in tistimi, ki imajo večjo socialno distanco do Romov. Da bi povečali število romskih študentov, avtorji predlagajo povečanje ozaveščenosti o afirmativnih ukrepih med večinskimi in manjšinskimi skupinami ter uvedbo tečajev o raznolikosti in programov mreženja v visokošolskih ustanovah.

Ključne besede: visokošolsko izobraževanje, afirmativni ukrepi, romski študenti, socialna vključenost

Introduction

"You do not take a person who, for years, has been hobbled by chains and liberate him, bring him up to the starting line of a race and then say, 'you are free to compete with all the others,' and still justly believe that you have been completely fair" (Peters & Woolley, n.d., para. 12). These are the words of the American president Lyndon B. Johnson, who is best known for signing the Civil Rights Act, the document that was pivotal for US history in prohibiting discrimination based on colour, race, religion, sex or nationality (U.S. Equal Employment Opportunity Commission, n.d.). Later during his term, in 1965, Johnson signed an Executive Order "mandating government contractors to take affirmative action in all aspects of hiring and employing minorities" (Garrison-Wade & Lewis, 2004, p. 24), thus making affirmative action a well-known policy. After this mandate, higher education institutions started implementing affirmative action in their recruitment policies, thus increasing the admission of marginalised groups into college (Garrison-Wade & Lewis, 2004; Schuck, 2002). The implementation of affirmative action in US law led to it being one of the best-known measures for fighting against discrimination worldwide.

Affirmative action refers to positive measures aimed at increasing the representation of minority groups in areas such as employment, education and culture, from which they have historically been excluded (Zalta, n.d.). It applies to various social groups, including "women, ethnic, religious, or racial minorities, and their inclusion in decision-making processes, as well as in societal flows in general" (Čekić Marković, 2016, p. 55). These measures address the long-term effects of historical discrimination and support the inclusion of marginalised groups in social, economic and educational opportunities, responding to their specific needs and enabling equal

standing with the majority population (Crosby et al., 2006). Affirmative action represents a proactive policy in which organisations allocate financial and human resources to prevent discrimination, with the possibility of discontinuation once injustices are remedied (Crosby et al., 2006). Its forms vary depending on the cultural context and target group, ranging from quota systems reserving positions for marginalised groups (Čekić Marković, 2016), to mobilising target groups to apply for jobs or education (Denić, 2014), favouring specific groups in selection processes (Crosby et al., 2006) and, in its mildest form, "carefully examining whether members of target groups are treated fairly in the allocation of social resources" (Denić, 2014, p. 71).

However, new questions arise. Do these measures actually get to the hands of people who need them? Are there better ways to combat societal

barriers? In general, does affirmative action do more harm than good? These are the questions we will be touching on in this paper.[3] As the research is set in Serbia, the group we focused on are Roma students, because they are one of the most excluded groups in the Serbian education system. Even though there are many affirmative measures aimed specifically at this group, the situation regarding educated Roma people has not undergone significant improvement. We therefore sought to examine perceptions and attitudes of majority students towards Roma students at the higher education level.

Affirmative Reaction

The first major case to challenge the legality of affirmative action was Regents of the University of California v. Bakke (1978) (Knight, 2002). At that time, the Davis Medical School of the University of California was implementing a quota-based admissions system, allowing entry through general or special admission for racial minorities and economically disadvantaged applicants. Of 100 available places, 16 were reserved for the special admissions group. After being denied admission twice, Allan Bakke, a white applicant, filed a lawsuit claiming "reverse discrimination" (Knight, 2002). The Court ruled that the quota system violated the Equal Protection Clause of the Fourteenth Amendment and ordered Bakke's admission. However, it upheld affirmative action in principle, stating that race may be considered as one factor among others in admissions decisions (Knight, 2002). This case anticipated ongoing public and legal debates on affirmative action in subsequent decades.

Despite the historical exclusion of certain groups, affirmative action remains highly controversial in public, scientific and legislative discourse (Zalta, n.d.). As Sowell notes (2004, p. 9), "many – if not most – people who are for or against affirmative action are for or against the theory of affirmative action", highlighting the importance of empirical evidence alongside theoretical arguments. Critics argue that affirmative action often benefits middle- and upper-class members of minority groups rather than those most in need (Čekić Marković, 2016), and that beneficiaries may be exposed to stigma or ridicule (Čekić Marković, 2016). Others contend that such policies signal that race, ethnicity or gender outweigh competence and academic achievement, potentially fostering feelings of injustice among majority-group students and reinforcing

3 We intentionally used the term "re-action" in the title as a brief wordplay capturing several dimensions discussed in the paper. Specifically, we aimed to condense the potential positive and negative outcomes of the implemented measure into a single expression: action (the measure itself), reaction (responses to it) and rejection (the possible refusal or contestation of the measure). The term "re-action" therefore serves as a conceptual shortcut that reflects these intertwined processes.

negative intergroup attitudes, even when legal inclusion is achieved (Arcidiacono et al., 2015). Additional concerns relate to academic motivation and performance. Some studies suggest that minority students admitted through affirmative action may feel discouraged when compared to peers with higher entrance scores, which could negatively affect achievement (Heilman & Alcott, 2001; Sowell, 2004). There are also claims that lower admission standards might reduce academic effort or lead to lower teaching standards if instruction is adjusted to accommodate weaker prior preparation (Arcidiacono et al., 2015).

When discussing the positive aspects of affirmative action, the primary rationale is that these measures in education benefit minority students. Studies indicate that the majority of those who enrol in universities through affirmative action measures successfully graduate and gain access to well-paying jobs and a higher quality of life (Allen et al., 2025). Interestingly, affirmative action can also positively influence students belonging to the majority social group, as they have an opportunity to learn and spend time in ethnically diverse environments (Gurin et al., 2002; Holzer & Neumark, 2006). Moreover, "research shows that ethnic diversity contributes to improving the quality of education" (Čekić Marković, 2016, p. 56). In addition, interactions with different racial, linguistic, ethnic and other groups are associated with cognitive development in individuals, unlike interactions within homogeneous social groups (Antonio et al., 2004; Zalta, n.d.).

Education of Roma People in Serbia

The limited availability of data on Roma students makes it challenging to accurately assess their situation in Europe. While existing data indicate that the participation of Roma children in education has improved over time, disparities in educational attainment persist (OECD, 2020). In many countries, Roma individuals are more likely to experience poverty, hunger, unemployment and limited education (OECD, 2020). Ongoing discrimination and the lack of inclusivity in most education systems contribute to many young Roma leaving school prematurely (Milutinović & Simunović, 2024; OECD, 2020). In Serbia, only 76% of Roma children attend the mandatory preschool preparatory programme (Babović, 2022). While 92% of Roma children enrol in primary school, only 64% complete it (Babović, 2022). Their enrolment decreases with higher, non- compulsory levels of education: 28% of Roma children enrol in secondary school, of whom 61% complete it (Babović, 2022). When it comes to higher education (HE) for the 2023/2024 academic year, Roma students accounted for only 0.2% (460 students) of the total active student population (249,768), while the number of Roma graduates that year was 35, or just 0.1% (Republički zavod za statistiku, 2024).

Numerous regulations in the Republic of Serbia guarantee the right to education for Roma people at all levels, including HE. Equal access is ensured through enrolment regulations at state universities, which prohibit discrimination based on "gender, race, marital status, skin color, language, religion, political beliefs, national, social, or ethnic origin, disability, or any other similar basis, status, or circumstance" (Univerzitet u Beogradu, 2019, p. 1). Serbian HE institutions are required to implement affirmative action measures through quota systems aimed at improving the status of students from vulnerable social groups, including persons with disabilities, citizens who completed secondary education abroad, and members of the Roma national minority (Univerzitet u Beogradu, 2019). Under these measures, the government determines the annual number of budget-funded students, with places for affirmative action candidates deducted from self-funded or total budget-funded slots (Univerzitet u Beogradu, 2019). Applicants under affirmative measures take the same entrance exams as other candidates but are ranked on a separate list with a limited number of positions. Importantly, candidates from minority groups may choose whether to apply under affirmative measures. Students admitted through affirmative action retain budget- funded status if they earn at least 36 ECTS per year, compared to 48 ECTS required of the general student population, and may study for up to three times the standard programme duration, versus twice the duration for other students (Narodna skupština Republike Srbije, 2021). Although studies are primarily conducted in Serbian, examinations and academic work may be completed in a minority language in accordance with institutional statutes (Narodna skupština Republike Srbije, 2021). Additionally, up to 10% of state scholarships, student loans and accommodation capacities are reserved for students from vulnerable groups (Čekić Marković, 2016). However, data from 2007/2008 to 2009/2010 indicate that Roma students received significantly fewer scholarships than other minority groups, such as students with disabilities (Čekić Marković, 2016). Beyond state programmes, additional support is provided by local governments and NGOs, including the Roma Education Fund (Radu, 2021).

Although these measures are extremely beneficial, and numerous findings highlight progress in inclusive education (Kovač-Cerović et al., 2016; Kovač-Cerović, 2013; Kuzmanov & Marković, 2021), Roma students remain underrepresented in HE in Serbia (Vlada Republike Srbije, 2021). Thus, it becomes evident that although necessary conditions for achieving equal opportunities have been established in Serbian HE, "this process is not complete and requires further regulatory definition, addressing the social dimension of the issue, and ultimately defining a financial framework" (Vlada Republike Srbije, 2021, p. 19).

Striving for equity in education is crucial not only for the individuals who benefit but also for the education system as a whole. Equity in education refers to the system's ability to provide quality education to diverse students regardless of gender, socioeconomic status, living environment or social group (Pavlović Babić & Baucal, 2013). It is essential for students to feel that they have similar opportunities for success in life. Moreover, equity in education can contribute to economic development, as involving a larger number of children in quality education can lead to a skilled and professionally capable population in the future (Pavlović Babić & Baucal, 2013).

Research Questions

According to studies about intergroup contact, it is essential for people from different social groups to interact in order to bridge gaps between "us" and "others" (Pettigrew et al., 2011). Although not sufficient on its own, increased intergroup contact has shown in the past that it is possible to gradually reduce conflicts rooted in historical divisions. In order to promote equality and reduce tensions, structural measures that ensure equal access to quality education, employment opportunities and housing are necessary. This underscores the importance of initiatives like school desegregation, affirmative action and other diversity-promoting policies (Pettigrew et al., 2011). In order to determine the degree to which affirmative measures in Serbia have helped this case, the main goal of the present research is to determine the intensity and direction of the attitudes of students of the Faculty of Philosophy in Novi Sad towards affirmative action for students of the Roma population. The following research questions were established:

1. What is the degree of familiarity of students with the education policy of affirmative action at the university level of education?
2. What attitudes do students have towards the education policy of affirmative action at the university level of education?
3. What actions would students be willing to implement regarding the education policy of affirmative action at the university level of education?
4. Is there a correlation between the level of social distance towards Roma and the degree of familiarity, attitudes and actions of students regarding the education policy of affirmative action at the university level of education?
5. Is there a correlation between the gender of students and the degree of familiarity, attitudes and actions of students regarding the education policy of affirmative action at the university level of education?

Method

Participants

The research involved 190 undergraduate students from the Faculty of Philosophy at the University of Novi Sad. A convenience sample was used, consisting of participants who volunteered to take part in the survey. The study programmes included were: English Language and Literature (15.9%), History (4.6%), Pedagogy (16.4%), Psychology (14.9%), Social Work (19.5%), Sociology (15.9%), Serbian Philology (7.2%) and Philosophy (5.6%). Out of the sample, 72.8% of the participants identified as female, 23.1% as male and 4.1% did not wish to share this information. The age of the respondents ranged from 19 to 51 years, with an average of 21.5 years. As many as 172 respondents declared that their nationality is Serbian, while the rest of the sample belonged to the following ethnic groups: Croats, Hungarians, Roma, Slovaks or refused to state their nationality (which is permitted according to the Constitution of the Republic of Serbia (2021), Article 47, "no one is obliged to declare their nationality").

Instruments

The data collection employed a battery of surveys and attitude measurements. The first part of the questionnaire consisted of demographic characteristics (four items regarding gender, age, nationality and study group). In order to assess the closeness of participants to the Roma ethnic minority, a modified Bogardus Social Distance Scale was used (Bogardus, 1993), including seven items, i.e., seven types of relationships arranged by closeness across five ethnic groups (Serbs, Hungarians, Croats, Roma and Russians). The participants evaluated the acceptability of each relationship for each ethnic group. A score of one point was assigned for willingness to accept a particular relationship, with a maximum of 7 points per ethnic group, indicating the smallest social distance, and a minimum of 0 points, indicating the greatest social distance. In order to assess the intensity and direction of the students' attitudes towards affirmative measures for Roma students, a self-constructed Affirmative Measures Scale was developed. Based on findings from a prior pilot study, the questionnaire included 22 questions divided into three sections: Experiences and familiarity with affirmative measures (including six items, e.g., "Have you met anyone who has used affirmative measures during university?"), Attitudes towards affirmative measures (13 items, e.g., "Affirmative measures negatively affect my chances of getting a place in a student dormitory"), and Actions regarding affirmative measures (three items, e.g., "If you were the Minister of Education, what

would you do about the affirmative measures for students of Roma national minority?").

Research Design

Prior to the research, a pilot study was conducted on a convenience sample using the focus group method. The pilot study included 12 students, age-diverse but homogeneous in student status, divided into two gender-balanced groups of six, with a moderator present. Each one-hour session was audio-recorded and supplemented with notes. The discussion protocol consisted of 11 questions structured according to the funnel principle and organised into three thematic areas: familiarity with affirmative measures, attitudes towards these measures, and possible actions or alternatives. The transcripts were analysed using a combined inductive-deductive coding approach, with codes verified by frequency. Ten codes were identified, including familiarity with vulnerable groups, "symbolic racism", i.e., stereotypes towards Roma people, limited knowledge of affirmative measures, beliefs about social stratification, personal economic interest, perceived positive effects, feelings of inferiority, perceived risks of corruption or misuse, and alternative solutions for Roma educational integration. The most frequent themes informed the questionnaire items measuring attitudes and beliefs, while less frequent but relevant codes guided the inclusion of items on knowledge, personal experience and perceived risks. Thus, the pilot study provided the empirical foundation for the quantitative instrument used in the main research.

The recruitment of participants was opportunistic and took place in March 2023 during regular university classes. The data were collected in person, using a paper-and-pencil questionnaire that was distributed at the beginning of a scheduled lecture. The students were informed about the voluntary nature of their participation and were asked individually to complete the questionnaire, which took approximately 15 minutes. Before completing it, all of the participants received information about the study and signed an informed consent form, which emphasised anonymity and the exclusive scientific use of the data. The research was carried out among full-time undergraduate students at the Faculty of Philosophy. All of the students present in the selected lectures were invited to participate. Out of the 201 students who were invited, 195 agreed to participate, resulting in a final sample of 190 respondents. The sample therefore includes students from various humanities and social science study programmes offered at the Faculty of Philosophy.

Data were analysed using IBM SPSS Statistics 26.0. Descriptive statistics were used for Research Questions 1–3. Responses to the open-ended question in Research Question 3 were thematically coded. Pearson correlations examined relationships between social distance, familiarity and attitudes towards affirmative measures (Research Question 4). Independent samples t-tests assessed gender differences in familiarity, attitudes and intended actions related to affirmative action (Research Question 5).

Results

Research Question 1 deals with determining the degree of familiarity with the education policy of affirmative action at the university level of education. Most of the participants have heard the term "affirmative action" (84.5%), although fewer of them actually know what is meant by it (68.6%). These questions were followed by a short definition of affirmative action, in order for the participants to understand the rest of the questionnaire. Only 13% of the respondents reported that they had personally used affirmative action measures during their studies. This indicates that a relatively small portion of the sample has direct experience with such measures. In contrast, 61.7% stated that they know someone who has used affirmative action during their studies. This suggests that, although few respondents have personally relied on these measures, a majority are familiar with them through peers or their social environment. A large number of students believe that affirmative action can be abused (75.1%).

With Research Question 2, we intended to understand the attitudes of students towards this education policy. The respondents mostly agree that members of the Roma community have equal chances to enrol in university (see Table 1). The largest number of respondents agree that there is a need for state intervention in enrolling Roma students in university, enrolling in the next academic year and enrolling in the student dormitory, as well as obtaining student scholarships and loans. The items in the rest of the questionnaire were intended to assess how affirmative action affects the respondents: is there a fear that it will in some way jeopardise their chances of enrolling in university, in general, or the next academic year, and enrolling in the student dormitory, as well as obtaining a student scholarship/loan? Again, the respondents overwhelmingly disagreed. Further questions concern the respondents' opinions on how affirmative action affects them, as well as students of Roma nationality. The largest percentage of the respondents neither agree nor disagree that affirmative action has a positive impact on their studies, while a large percentage believe that it has a positive impact on Roma students.

Table 1
Attitudes towards affirmative action

Question	Disagree	Neither agree nor disagree	Agree
1. Roma have the same chances to enrol in university as the rest of the population.	36.3%	13.2%	50.5%
2. State institutions should help the Roma community to equalise their chances for university enrolment.	7.3%	12.7%	80%
3. State institutions should help the Roma community to equalise their chances of enrolling in the next year of university.	12.1%	15.8%	72.1%
4. State institutions should help the Roma community to equalise their chances of enrolling in a student dormitory.	11.9%	18.1%	70%
5. State institutions should help the Roma community to equalise their chances of receiving student scholarships and loans.	10%	11.6%	78.4%
6. Affirmative measures negatively affect my chances of enrolling in the desired studies.	65.8%	18.4%	15.8%
7. Affirmative measures negatively affect my chances of enrolling in the next year of studies.	74.7%	18.4%	6.9%
8. Affirmative measures negatively affect my chances of getting a place in a student dormitory.	65.8%	23.2%	11%
9. Affirmative measures negatively affect my chances of getting a student scholarship/loan.	66.9%	20%	13.1%
10. Affirmative measures positively affect my studies.	17.9%	67.4%	14.7%
11. Affirmative action has a positive impact on Roma students (e.g., graduating from university can provide them with access to better-paying jobs).	11.5%	11.6%	76.9%
12. Affirmative action has a negative impact on Roma students (e.g., they may be discriminated against for enrolling in university through affirmative action).	49%	29.5%	21.5%
13. Affirmative action for Roma students is fair to the rest of the population.	19.6%	28%	52.4%

With Research Question 3, we endeavoured to understand what actions students would be ready to undertake regarding the education policy of affirmative action for the Roma population at institutions of HE, under the hypothetical situation that respondents find themselves in the role of decision makers in education. Descriptive values are presented in Table 2.

Table 2

Actions regarding affirmative measures

Question	*N*	Answer	Frequency	%
If you were the Minister of Education, what would you do about the affirmative measures for students of Roma national minority?	190	I would keep it	126	66.3
		I would abolish it	12	6.3
		I am not sure	52	27.4
If you were the Minister of Education, would you change the way of implementation of affirmative measures for students of Roma national minority?	190	Yes	47	24.7
		No	37	19.5
		I am not sure	106	55.8

Note. N – number of respondents; % – percent.

There was one open-ended question ("If your previous answer is yes, how would you change the way of implementation of this education policy?"), to which 36 answers were received (Table 3). These answers were then coded, resulting in nine codes into which we can categorise the answers and parts of the answers (since some respondents listed more than one suggestion).

Table 3

Coded answers for alternative ways of implementing affirmative action

Code	Frequency	%
Focus on the earlier stages of education for Roma students.	8	24.24
Affirmative action should depend on the material income of students, not on their nationality.	5	15.15
Reduce the number of places for students who enrol in university through affirmative action.	5	15.15
Raise awareness of the importance of education for members of the Roma community because these measures are not used.	3	9.09
Raise awareness of the reasons for the existence of affirmative action measures among the majority population so that discrimination does not occur.	3	9.09
Eliminate any possibility of abuse of these measures.	3	9.09
Add budget-financed spots specifically for marginalised groups, so that the majority population does not "lose" anything in enrolling in university.	2	6.06
Increase the number of places for students who enrol in university through affirmative action education policies.	2	6.06
More research by competent institutions on this topic.	2	6.06

Note. % – percent.

In order to determine the degree of correlation between variables, an analysis of intercorrelations of variables was performed. Using Pearson's

correlation coefficient, a negative correlation was found between social distance and knowledge of what affirmative action is ($r = -.15$, $p < 0.05$). This means that respondents with a greater social distance towards the Roma national minority knew less about affirmative action. No statistically significant relationships were found between social distance and the remaining indicators of familiarity with affirmative measures, hearing about affirmative action, personal use of affirmative measures during studies, knowing someone who used them, or perceiving the possibility of misuse. Although some intercorrelations appear between the familiarity variables themselves (e.g., having heard about affirmative action is associated with having used it during studies, $r = -.20$, $p < .01$, and with knowing someone who used it, $r = .15$, $p < .05$), these are expected patterns that reflect internal consistency of the familiarity construct.

The relationship between social distance and attitudes towards affirmative action in education was also examined. Higher social distance was negatively correlated with support for state assistance to Roma students in university enrolment ($r = -.26$, $p < .01$), student housing ($r = -.28$, $p < .01$), and scholarships or loans ($r = -.26$, $p < .01$), indicating lower endorsement of institutional support. In contrast, social distance was positively correlated with perceptions of personal costs of affirmative action, including reduced chances of university admission ($r = .21$, $p < .01$), access to dormitories ($r = .21$, $p < .01$), and scholarships or loans ($r = .25$, $p < .01$). Higher social distance was also associated with weaker beliefs in the positive effects of affirmative action for Roma ($r = -.40$, $p < .01$) and lower perceptions of its fairness to the general population ($r = -.29$, $p < .01$). No associations were found between social distance and intended actions. Overall, greater social distance was linked to more sceptical attitudes towards affirmative action, which was perceived less as an equalising mechanism and more as a personal disadvantage.

Independent samples t-tests revealed gender differences in attitudes towards affirmative action (Research Question 5). Male respondents expressed more negative attitudes overall, while women showed stronger agreement with institutional support for Roma, including equalising chances for university enrolment ($t(180) = 2.38$, $p = .00$), progression to the next study year ($t(180) = 1.90$, $p = .01$), and access to scholarships or loans ($t(180) = 2.09$, $p = .05$), as well as with the positive impact of affirmative action on Roma students ($t(180) = 2.64$, $p = .01$). Men more strongly endorsed statements emphasising negative personal consequences, such as reduced chances of enrolment, housing and financial support. No gender differences were found in familiarity with or intended actions related to affirmative action, nor for the following items: "Roma have the same chances to enrol in university as the rest of the population", "State institutions

should help the Roma community to equalise their chances of enrolling in a student dormitory", "Affirmative measures have a positive impact on my studies" and "Affirmative measures have a negative impact on Roma students".

Discussion

Based on the data, university students' familiarity with affirmative action is very high (Research Question 1). Most of the respondents had heard of the term (84.5%), and over two-thirds reported knowing what it represents (68.6%). As no comparable prior studies were identified, these findings cannot be directly contrasted with earlier research. The present research contributes to knowledge about students' perspectives on affirmative measures, although caution should be exercised in generalising the findings beyond the context of the study. The sample comprises students from humanities study programmes, which could provide students with substantial background knowledge about mechanisms designed to support equity in education. At the Faculty of Philosophy in Novi Sad, several courses address social inclusion, diversity and inclusive education (e.g., Social Inclusion and Education, International Education and Educational Policies, Sociology of Education) (Filozofski fakultet, 2018). These courses aim to develop critical understanding of inclusive education and access for all, which likely explains the high familiarity with affirmative action observed in this study (Filozofski fakultet, 2018). For example, the course Social Inclusion and Education introduces students to the key educational paradigms of the contemporary world and provides a foundational understanding of inclusive education. Upon completion, students are expected to critically analyse educational issues related to diversity and articulate informed views on the importance of accessible education for all (Filozofski fakultet, 2018).

The respondents also expressed predominantly positive attitudes towards affirmative measures (Research Question 2). Most supported state intervention to assist Roma students in higher education, including enrolment, progression, housing and financial support, while largely rejecting claims that such measures jeopardise their own studies. Regarding actions (Research Question 3), 66.3% supported the continuation of affirmative action at the university level. These findings diverge from prior studies reporting that affirmative action is often perceived as unfair by majority groups (Beaton & Tougas, 2001; Cancian, 1998; Oh et al., 2010). One possible explanation lies in the questionnaire design. When programmes are insufficiently explained, individuals may assume that beneficiaries receive excessive advantages or are unqualified, thus fostering negative reactions (Knight & Hebl, 2005). In the present study, a

definition of affirmative action preceded the attitude scale, which may have reduced misconceptions and influenced more positive responses (Knight & Hebl, 2005).

Research Question 4 examined associations between social distance towards Roma and students' familiarity, attitudes and actions regarding affirmative action. Greater social distance was linked to lower familiarity, reduced support for state intervention and stronger beliefs that affirmative action negatively affects one's studies, while no association was found with actions. These findings align with evidence that prejudice is related to opposition to affirmative action (Steinbugler et al., 2006). Finally, Research Question 5 explored gender differences. No differences emerged in familiarity or support for continuation, although women did express more positive attitudes towards affirmative action than men, which is consistent with earlier research (Beaton & Tougas, 2001; Haneš, 2012; Knight & Hebl, 2005).

Conclusions

Due to the small number of studies on affirmative action measures in our region, we find that the greatest significance of our research is that it is one of the first studies to examine the perception of affirmative measures in the HE context. The results indicate a greater need for informing and sensitising the general population on social inclusion policies. According to the data obtained, the emphasis in this regard should be on men and people with high social distance towards Roma. Education and exposure to diversity could contribute to greater solidarity and cooperation between members of the multicultural society in which we live. By building bridges between members of different ethnic groups, it is possible to reduce, and possibly eliminate, the barriers between the "us" and "the others".

The relevant literature identifies certain alternatives to affirmative action education policies. Although the general public would assume that affirmative action should be implemented according to socioeconomic status rather than race, ethnicity, disability or gender, research suggests that such programmes would not achieve the same results as programmes targeting racial and ethnic minorities (Cancian, 1998). Consequently, we present some alternatives that could be implemented alongside affirmative action policies, which could help increase social inclusion of the Roma community in HE. One suggestion is diversity training, which could be implemented at the university level. This is a type of programme specifically designed to enable students to interact positively, to reduce students' discrimination and prejudice towards groups who are

different from them, and to teach students how to work together successfully (The Ceceilyn Miller Institute, n.d.). Providing people with information about members of their out-group can reduce prejudice and stereotypes (Kalev et al., 2006). One meta-analysis (Bezrukova et al., 2016) found that diversity training was most effective when it was well developed and integrated into the curriculum, as opposed to giving just one lecture on diversity. Integrated training increases the likelihood that content will be supplemented and increases students' motivation to learn (Bezrukova et al., 2016). Another way to enhance social inclusion is the implementation of networking programmes. As Kalev et al. (2006) state, social isolation is the biggest problem for minority groups. To avoid this, it is possible to design networking and mentoring programmes that connect members of the majority with minority social groups. Networking programmes provide a space for members to meet and share information and career advice (Kalev et al., 2006). Although networking can occur without any organisational incentive, the potential of formal networking programmes should not be overlooked. On the other hand, mentoring programmes connect ambitious individuals with mentors for career advice and informal topics. In 1978, the prestigious management magazine Harvard Business Review published an article entitled "Everyone Who Makes It Has a Mentor", which indicates the great potential of mentoring (Kalev et al., 2006).

In addition to all of the above, there is a need for greater awareness of affirmative action education policies among the general population and marginalised groups. Informing the community about affirmative action can reduce prejudice and negative reactions to affirmative measures. Emphasising the value of diversity and creating positive discourse about affirmative action at the university level of education can be particularly effective in raising awareness among the majority population, especially if individuals see that they will indirectly benefit from its implementation (Knight & Hebl, 2005). Education policy makers often make decisions about programmes and actions in isolation from each other (Gulzar et al., 2020). We believe that affirmative action education policies can benefit from the aforementioned supportive programmes in order to be more effective in the integration of marginalised communities.

The main limitation of the present study is the insufficient representativeness of the convenience sample. The sample was imbalanced in terms of gender, age and nationality, with a disproportionately high number of female respondents (142 of 190), a concentration of participants aged 21–22 and a predominance of Serbian nationality (88.2%). These characteristics likely reflect the undergraduate student population from which the sample was drawn. Future research should include students across all levels of study, from multiple faculties

and with greater ethnic diversity. Despite these limitations, the sample meets the study's design criteria, and the findings should be interpreted within this specific research context.

Ethical Statement

This research formed part of the requirements for the author's Master's thesis. It was conducted in accordance with established ethical standards for pedagogical research. The study was approved by the Ethical Research Committee of the University of Belgrade, at the Department of Educational Policy, ensuring compliance with institutional guidelines for research involving human participants in educational settings.

Data Availability Statement

The data supporting the findings of this study are available from the authors upon reasonable request, subject to ethical considerations regarding the protection of research participants.

Disclosure Statement

The authors have no conflict of interest to declare. When preparing this article, the authors used ChatGPT (OpenAI, GPT-5) on 22 January 2026 with the following prompt: "Please improve the academic style and clarity of the following text while preserving its original meaning." The tool was used for stylistic editing and language refinement of selected sections of the manuscript. The authors subsequently reviewed and edited the output as necessary and accept full responsibility for the content and integrity of the publication.

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Evidence-Based Strategies for Promoting Student Inclusion in Urban and Rural Schools in Kosovo

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Ensuring the inclusion of students from diverse socioeconomic and geographical backgrounds, particularly with regard to the differences between urban and rural schools, remains a persistent challenge in Kosovo's education system. Rather than evaluating specific interventions, the present study examines teachers' and students' perceptions of evidence-based strategies that support inclusion. Using a mixed-methods design, the research integrates quantitative and qualitative data to explore how practices such as differentiated instruction, formative assessment, collaborative planning and family engagement are understood and implemented in contrasting school contexts. The sample consists of 100 teachers and school leaders and 100 students aged 10–12 from both urban and rural areas. Semi-structured interviews with educators provide insights into their experiences with inclusive practices, while survey data from teachers and students capture their perceptions of inclusion, classroom climate, and the frequency and perceived usefulness of specific strategies. Thematic analysis was used for the qualitative data, while quantitative analyses, including correlations, regression and ANOVA, were undertaken to compare patterns across school settings. The findings highlight notable differences in how inclusion-supportive practices are implemented across urban and rural contexts, and reveal that professional development, school leadership support and collaborative planning are central factors shaping perceived inclusion. The study offers context-sensitive recommendations for strengthening inclusive education and promoting greater equity across Kosovo's schools.

Keywords: educational equity, evidence-based strategies, student inclusion, student outcomes, urban-rural disparities

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Na dokazih utemeljene strategije za spodbujanje inkluzije učencev v mestnih in podeželskih šolah na Kosovu

Mirlinda Bunjaku-Isufi

Zagotavljanje inkluzije učencev iz različnih družbenoekonomskih in zemljepisnih okolij, zlasti glede na razlike med mestnimi in podeželskimi šolami, ostaja nenehen izziv v kosovskem vzgojno-izobraževalnem sistemu. Namesto da bi ocenjevala posamezne ukrepe, ta študija preučuje zaznave učiteljev in učencev o na dokazih utemeljenih strategijah, ki podpirajo inkluzijo. Z uporabo mešane metode raziskava združuje kvantitativne in kvalitativne podatke, da bi ugotovila, kako se prakse, kot so: diferencirano poučevanje, formativno ocenjevanje, sodelovalno načrtovanje in vključevanje družine, razumejo in izvajajo v raznolikih šolskih kontekstih. Vzorec sestavlja 100 učiteljev in ravnateljev ter 100 učencev, starih od 10 do 12 let, iz mestnega in podeželskega območja. Polstrukturirani intervjuji z izobraževalci ponujajo vpogled v njihove izkušnje z inkluzivnimi praksami, medtem ko podatki iz ankete med učitelji in učenci zajemajo njihove zaznave o inkluziji, vzdušju v razredu ter o pogostosti in zaznani uporabnosti posameznih strategij. Za kvalitativne podatke je bila uporabljena tematska analiza, medtem ko so bile za primerjavo vzorcev v različnih šolskih okoljih izvedene kvantitativne analize, vključno s korelacijami, z regresijo in analizo variance (ANOVA). Ugotovitve poudarjajo opazne razlike v načinu izvajanja dejavnosti, ki spodbujajo inkluzijo, med mestnim in podeželskim okoljem ter kažejo, da so strokovni razvoj, podpora vodstva šole in sodelovalno načrtovanje ključni dejavniki, ki oblikujejo zaznave o inkluziji. Študija ponuja za kontekst prilagojena priporočila za krepitev inkluzivne vzgoje in izobraževanja ter za spodbujanje večje enakosti v kosovskih šolah.

Ključne besede: enakost v izobraževanju, na dokazih utemeljene strategije, inkluzija učencev, učni izidi pri učencih, razlike med mestom in podeželjem

Introduction

In recent decades, the pursuit of inclusive education has become a central priority in international and national education agendas, particularly as systems work to reduce disparities in student participation, engagement and achievement (UNESCO, 2017; OECD, 2012). Despite these efforts, many countries continue to experience deep-rooted inequities, especially between urban and rural schools. Kosovo is no exception. National assessments consistently show gaps in achievement: in several municipalities, students in rural schools score between 8–12 percentage points lower on language and mathematics assessments than their urban peers, while reporting lower levels of school engagement and classroom support (MEST, 2020). These disparities illustrate ongoing challenges to ensuring equitable opportunities for all learners.

Inclusive education encompasses not only access to schooling but also meaningful participation, engagement and achievement for every learner, regardless of personal or socioeconomic circumstances (Eurydice, 2019). Achieving this vision requires evidence-informed strategies that address both systemic barriers and everyday classroom practices. While policy reforms have been introduced across the Western Balkans, including Kosovo, research suggests that top-down initiatives alone often produce limited or inconsistent improvements in inclusion (Riera, 2019; Ion & Brown, 2022).

Recent scholarship reinforces these concerns. Zabeli et al. (2021) report that although teachers in Kosovo understand the principles of inclusive education, classroom implementation remains weak due to limited institutional support and insufficient resources. Mazzuki (2025) highlights the fact that preservice teachers often lack practical competence for inclusive teaching and may have negative attitudes towards students with additional needs, an issue that threatens long-term reform sustainability. Uka et al. (2025) further emphasise the need for professional development that is context-sensitive, particularly in the post-Covid environment, where online training must be aligned with teachers' actual classroom needs. Together, these findings underline the importance of understanding how schools adapt inclusive practices to their local realities.

Given these challenges, there is a clear need to examine how teachers and school leaders actively shape inclusive education through their use of evidence-based strategies such as differentiated instruction, formative assessment, support for students with learning difficulties, and collaboration with families and communities. Understanding how these practices are implemented across diverse settings is essential for advancing equity in Kosovo's schools.

The present study addresses this need by investigating perceptions and reported practices in urban and rural schools, rather than evaluating specific interventions. Using a mixed-methods design, the study explores how inclusive strategies are understood, implemented and supported across contrasting school environments. It draws on quantitative and qualitative data to provide a nuanced picture of the factors that enhance or constrain inclusive practices.

Conceptualising Inclusive Education and Equity

Inclusive education is widely recognised as a fundamental right and a prerequisite for educational quality and equity. It refers to the process of responding to learner diversity by increasing participation in learning, cultures and school communities, while reducing exclusion (UNESCO, 2017). This view emphasises removing barriers and creating environments where all students can thrive (Booth & Ainscow, 2016).

Equity involves the fair distribution of educational opportunities and resources based on learners' diverse needs (OECD, 2018). Whereas equality implies identical treatment, equity recognises that students require differentiated levels of support to achieve comparable outcomes (Ainscow, 2020). In this sense, equity serves both as a guiding principle and an outcome within inclusive systems.

Global frameworks such as the Salamanca Statement (UNESCO, 1994), the UN Convention on the Rights of Persons with Disabilities (United Nations, 2006) and the Incheon Declaration (UNESCO, 2015) have strengthened commitment to inclusion. However, national application often remains inconsistent. In some contexts, inclusive education is narrowly interpreted as related only to disability, thus overlooking socioeconomic status, ethnicity, language background and gender (Florian & Spratt, 2013). This gap highlights the need for more holistic and intersectional approaches.

Studies in the Western Balkans show that although policies promoting inclusion are often present, they are insufficiently embedded in everyday school practice (Kika-Milanović et al., 2021). In Kosovo, despite alignment with EU frameworks, implementation differs considerably between urban and rural contexts (Ahmetaj & Krasniqi, 2023). Zabeli et al. (2021) similarly note that teachers support inclusive ideals but lack systemic support for practical implementation.

Evidence-Based Strategies for Inclusion

Evidence-based practices (EBPs) refer to the intentional use of research findings to guide educational decision-making (Slavin, 2002). In inclusive education, EBPs help teachers respond to diverse learning needs, promote engagement and foster participation (Mitton-Kükner et al., 2016). Common EBPs include differentiated instruction, peer-assisted learning, universal design for learning (UDL) and formative assessment.

Differentiated instruction tailors teaching to student needs, increasing engagement and outcomes (Tomlinson, 2017). Peer-assisted learning supports both academic progress and social connectedness (Roskos & Neuman, 2021). UDL frameworks encourage flexible teaching approaches that accommodate varied learning preferences (CAST, 2018). Formative assessment enables teachers to identify learning gaps and adjust instruction, an approach that is particularly effective in diverse classrooms (Black & Wiliam, 2009). Professional development aligned with inclusive pedagogy improves teachers' capacity to support diverse learners (Darling-Hammond et al., 2017).

In Kosovo, research confirms the effectiveness of inclusive practices when they are contextually grounded. Challenges remain, however, including limited coherence in implementation frameworks (Mehmeti, 2021) and preservice teachers' insufficient practical preparation (Mazzuki, 2025). Additionally, resource constraints in rural schools continue to affect the consistency of implementation (UNICEF Kosovo, 2021).

Urban-Rural Disparities in Inclusion

Urban-rural disparities are well documented and remain a significant barrier to equitable inclusion. Urban schools typically benefit from stronger infrastructure, access to digital tools and more stable staff profiles (OECD, 2020). Rural schools often face multigrade teaching, limited budgets and fewer specialised services, which complicate the use of inclusive strategies (Eurydice, 2019).

Ion and Brown (2022) argue that top-down reforms often overlook contextual differences, leading to policies that do not match rural realities. Teachers in these settings frequently report challenges in applying EBPs due to insufficient training, inadequate support staff and workload pressures (Timperley et al., 2020). Kosovo reflects these patterns: rural schools face limited access to psychologists, pedagogues and specialised support services (Ahmetaj & Krasniqi, 2023). Socioeconomic disadvantage further compounds inclusion challenges, particularly for Roma, Ashkali and Egyptian (RAE) students (Save the Children, 2021).

Research increasingly suggests decentralised and context-responsive approaches, including participatory planning with communities, targeted funding and investment in rural teacher development (Ainscow, 2020; Florian & Black-Hawkins, 2011). International models highlight the potential of blended learning, mobile support units and inclusive extracurricular initiatives to strengthen rural inclusion (OECD, 2023).

Teachers, School Leadership and Inclusive Cultures

Teachers and school leaders are central to translating policy commitments into classroom practice. Teachers' beliefs, values and pedagogical skills shape how inclusion is enacted (Florian & Spratt, 2013). Evidence shows that teachers who embrace inclusive values and receive appropriate training are more successful in supporting diverse learners (Sokal & Katz, 2021).

Professional learning communities (PLCs) have emerged as powerful frameworks for fostering collaborative learning, reflective practice and shared problem-solving. Seminal contributions by Louise Stoll (Stoll, 2006; Stoll et al., 2006) demonstrate that effective PLCs enhance teacher confidence, deepen pedagogical understanding and improve the implementation of inclusive strategies. PLCs enable teachers to jointly analyse student needs, share practices and co-develop instructional approaches (Timperley et al., 2020).

School leadership is likewise crucial. Inclusive leaders promote equity-oriented values, support shared decision-making and allocate resources strategically (Leithwood & Jantzi, 2009). Their actions influence teacher motivation, school climate and the sustainability of inclusive practices (Hoppey & McLeskey, 2013). In Kosovo, leadership-focused professional development remains limited, particularly in rural municipalities. Research stresses that embedding inclusive principles into both teacher education and leadership development is essential for long-term change (Zabeli et al., 2021; Mazzuki, 2025).

Ultimately, inclusive school cultures emerge through coordinated efforts among leaders, teachers, families and communities. Without these interconnected elements, structural reforms alone rarely translate into meaningful practice (Ainscow & Sandill, 2010).

Research from South-Eastern Europe further reinforces the need to understand inclusion within broader policy and contextual dynamics. Although many countries in the region have formally adopted inclusive education principles, the practical implementation of these commitments remains uneven and is often dependent on local capacities. Analyses show that policies frequently remain at the level of strategic documents without being accompanied by

sustained professional support or adequate infrastructural investment, particularly in disadvantaged areas. These findings mirror challenges identified in Kosovo, where there is a persistent gap between policy and everyday instructional practice (Kovač Cerović et al., 2016)

Teachers' beliefs and attitudes also play an essential role in shaping inclusive practices. Evidence suggests that teachers who value inclusion and feel confident in their pedagogical skills are more likely to employ differentiated and flexible approaches. However, positive attitudes alone are insufficient when institutional support, collaboration opportunities and resources are lacking. A study by Štemberger and Kiswarday (2018) demonstrated that although teachers often endorse inclusive principles, structural constraints – including limited resources and inconsistent professional collaboration – hinder their ability to translate these values into practice. These insights resonate strongly with the Kosovan context.

Collaborative professional cultures are likewise central to the development of sustained inclusive practices. Professional learning communities (PLCs) have been shown to enhance reflective dialogue, joint problem-solving and collective responsibility for student learning (Stoll et al., 2006). Research further indicates that sustained professional collaboration strengthens inclusive school cultures and supports teachers in responding more effectively to diverse student needs (Timperley et al., 2020). This highlights the importance of viewing inclusion not as an individual teacher responsibility but as a collaborative and institutionally supported process.

Disparities between rural and urban schools remain a persistent structural challenge across the region. Research has shown that teachers in rural schools frequently report more difficult working conditions, fewer opportunities for professional development and more limited access to pedagogical resources compared to their urban counterparts. Such disparities influence the extent to which inclusive strategies can be implemented consistently and effectively. A study by Javornik Krečič and Grmek (2021) confirmed that geographic isolation, limited support services and infrastructural constraints significantly shape teachers' capacity to enact inclusive practices in rural environments. These patterns reinforce the need for context-responsive policies and targeted support for schools operating in under-resourced settings.

School-family-community partnerships represent an important dimension of inclusive education and educational equity. A framework devised by Epstein (2018) emphasises that effective inclusion is strengthened when schools actively collaborate with families and local communities through shared responsibilities, communication and coordinated support structures. Such

partnerships contribute to improved student engagement and academic outcomes, as well as a stronger sense of belonging, particularly for learners from disadvantaged backgrounds. Within inclusive school systems, collaboration between educators, families and community actors enables a more holistic response to students' academic, social and emotional needs. This perspective aligns with contemporary inclusion models that view equity not solely as a classroom responsibility but as a collective process supported by multiple stakeholders within and beyond the school environment.

Research Problem

Despite national and international commitments to inclusive education, significant disparities persist between urban and rural schools in Kosovo. Although policy reforms and inclusion frameworks have been formally established, their implementation remains uneven and strongly influenced by contextual factors such as institutional support, leadership capacity, access to resources and professional development opportunities. Existing research highlights persistent gaps between inclusive education principles and classroom practice, particularly in rural settings where structural constraints are more pronounced. There is therefore a need to better understand how evidence-based inclusive strategies are perceived and enacted by teachers and school leaders across different school contexts. Examining these perceptions can provide a critical insight into the factors that facilitate or hinder inclusive practices and inform more equitable, context-responsive education policies in Kosovo.

Research Questions

The study was guided by the following research questions:

1. What evidence-based strategies are being implemented to promote student inclusion in urban and rural schools in Kosovo?
2. How do teachers and school leaders perceive the impact of these strategies on inclusion and student experiences?
3. What contextual factors enable or hinder the implementation of inclusive practices across urban and rural settings?

Method

The study employed a mixed-methods design to explore teachers' and students' perceptions of evidence-based strategies that support inclusive education in urban and rural schools in Kosovo. Rather than evaluating specific interventions, the study aimed to understand how inclusive practices are implemented, experienced and shaped by contextual factors.

Participants

The study involved a total of 200 participants drawn from four public primary schools, including two urban and two rural institutions. The teacher and school leader sample (n = 100) was selected through purposive sampling and included classroom teachers, subject teachers, deputy directors, school leaders and support staff with varying levels of professional experience.

The student sample (n = 100) consisted of learners aged 10–12 years and was selected through stratified random sampling based on gender, socioeconomic background and school location in order to ensure demographic diversity. This age group was chosen because students at this developmental stage are capable of reliably reporting their experiences of inclusion, engagement and classroom climate. Moreover, this period corresponds to the upper grades of primary education in Kosovo, where academic demands increase and disparities in participation and support become more visible.

The decision to include equal numbers of teachers/school leaders and students was based on feasibility, proportional representation across the participating schools, and the need to ensure sufficient statistical power for descriptive and comparative analyses. Including both groups enabled the study to capture complementary perspectives on inclusive practices: those who implement them and those who experience them.

Prior to participation, written informed consent was obtained from all of the adult participants, while parental consent and child assent were secured for the student participants. Participation was voluntary, and all of the participants were informed of their right to withdraw at any stage without consequences. Ethical approval was granted by the relevant school-based ethics committee, and formal permission to conduct the research was obtained from the participating schools. Data collection took place between March and May 2025.

Instruments

Quantitative data were collected using two structured questionnaires developed for the purposes of this study.

The teacher and school leader questionnaire consisted of four scales measuring the implementation of inclusive practices, frequency of strategy use, perceived usefulness of inclusive strategies, and institutional and leadership support. The instrument included 31 items rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was piloted with 20 teachers, and internal consistency coefficients (Cronbach's alpha) ranged from .81 to .89. Content validity was established through expert review by two specialists in inclusive education.

The student questionnaire comprised three scales assessing students' sense of inclusion and belonging, academic engagement and classroom climate with perceived teacher support. The instrument included 20 items rated on a five-point Likert scale ranging from 1 (never) to 5 (always). The questionnaire was reviewed by two experts to ensure clarity and age appropriateness. Reliability analysis yielded Cronbach's alpha coefficients ranging from .78 to .86, and construct validity was supported through consistency of factor structure and expert evaluation.

Qualitative data were gathered through semi-structured interviews conducted with 12 teachers and school leaders from the participating schools, evenly distributed across urban and rural contexts. The interview protocol addressed experiences with inclusive education, perceived challenges, institutional support, peer collaboration and recommendations for improving inclusive practice. The interviews lasted 30–45 minutes and were audio-recorded with the participants' consent.

Research Design

An explanatory sequential mixed-methods research design was employed. Quantitative data were collected first in order to identify general patterns in perceptions of inclusive practices. Subsequently, qualitative interviews were conducted to explain and contextualise the quantitative findings and to deepen understanding of contextual influences.

The survey was administered during regular school hours, with researchers present to clarify questionnaire items when necessary. The interview participants were selected based on preliminary quantitative results in order to ensure variation in school location, professional role and years of experience.

The interviews were conducted within two weeks of the completion of the quantitative data analysis.

Quantitative data were analysed using SPSS version 28. Descriptive statistics were calculated to summarise participant responses. Independent-samples t-tests and analyses of variance (ANOVA) were used to examine differences between urban and rural school contexts. Multiple regression analyses were conducted to identify predictors of perceived student inclusion outcomes. All of the statistical assumptions were tested and met prior to analysis.

Qualitative data were analysed using thematic analysis following the procedures outlined by Braun and Clarke (2006). Two researchers independently coded the interview transcripts, achieving an intercoder agreement of 86%. Discrepancies were resolved through discussion, and NVivo 14 software was used to support data organisation, coding and theme development.

In order to enhance validity and trustworthiness, the survey instruments were pilot-tested, reviewed by experts and refined for clarity. Triangulation across data sources, member checking through participant review of thematic summaries, and the maintenance of an audit trail were used to strengthen credibility. Transferability was supported by providing detailed descriptions of participant characteristics, school contexts and implementation conditions.

Results

This section presents the quantitative and qualitative results of the study, followed by their analytical interpretation in relation to the research questions and the broader literature on inclusive education

Frequency and Perceived Usefulness of Inclusive Strategies

Given that effectiveness was not directly measured, the analysis is based on the participating teachers' reported frequency and perceived usefulness of inclusive strategies.

Table 1

Urban-Rural Use of Inclusive Strategies (Teachers)

Inclusive strategy	*Urban M*	*Urban SD*	*Rural M*	*Rural SD*
Differentiated instruction	4.4	0.55	4.0	0.70
Formative assessment	4.2	0.60	3.8	0.75
Peer support structures	4.0	0.80	3.6	0.95
Use of assistive technology	3.5	0.95	2.9	1.05
Family engagement activities	3.7	0.85	3.3	0.90

Note. All scores were rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). *N* = 100 teachers (50 urban, 50 rural).

Table 1 shows clear differences between urban and rural schools in the use of evidence-based inclusive strategies. Across all five strategies, teachers in urban schools reported higher levels of implementation than their rural counterparts. The largest gap appears in the use of assistive technology (Urban M = 3.5 vs. Rural M = 2.9), reflecting unequal access to digital and support resources, a pattern that is consistent with earlier research on infrastructural disparities in Kosovo.

Differentiated instruction and formative assessment received the highest ratings in both contexts, although urban teachers still reported slightly higher use (M = 4.4 vs. 4.0 and M = 4.2 vs. 3.8, respectively). These differences suggest that while both groups recognise the value of these strategies, rural teachers may face additional structural or workload-related barriers that limit their consistent application.

Peer support structures and family engagement activities also show moderate but meaningful gaps between the two settings. This aligns with qualitative reports indicating that rural teachers often work without specialist staff or community-based support networks. Overall, the results indicate that inclusive classroom practices are more consistently implemented in urban schools, whereas rural schools continue to operate under more constrained conditions.

Table 2 compares urban and rural schools on key inclusion indicators, showing significant disparities across contexts.

Table 2

Urban-Rural Differences in Reported Inclusion Indicators

Variable	*Urban M*	*Rural M*	*F*	*p*
Student inclusion score	4.3	3.6	5.67	.019
Institutional support	4.1	3.4	3.12	.002
Access to training	4.0	3.2	2.89	.005

Note. All measures were rated on a 5-point Likert scale.

The results show clear urban-rural disparities across key inclusion-related indicators. The students from urban schools reported significantly higher levels of perceived inclusion *(M = 4.3)* than those from rural schools *(M = 3.6)*. Among the teachers, those working in urban schools reported higher institutional support *(M = 4.1 vs. 3.4*) and better access to professional development *(M = 4.0 vs. 3.2)*. All of the differences were statistically significant, indicating that rural schools operate with consistently lower structural and professional support.

Table 3 shows the results of a multiple regression analysis predicting students' *perceived* inclusion outcomes.

Table 3

Multiple Regression Predicting Perceived Student Inclusion

Predictor Variable	*B*	*P*
Professional development	.34	.001
Administrative support	.29	.003
Collaborative planning	.22	.014

Note. Dependent variable = perceived student inclusion.

The regression model indicates that perceived student inclusion is significantly shaped by teachers' professional development *(β = .34)*, administrative support *(β = .29)* and collaborative planning *(β = .22)*. All of the predictors reached statistical significance, suggesting that inclusion perceptions are strongly influenced by the institutional and professional environment rather than by individual teacher practices alone. The model explained 41% of the variance in perceived inclusion, indicating a moderate explanatory power.

Table 4 summarises the main themes emerging from the qualitative analysis, with illustrative quotes from participants.

Table 4

Key Themes from Thematic Analysis with Illustrative Quotes

Emergent Theme	Illustrative Quote
Contextual constraints in rural schools	"We do our best, but without training and materials, it feels like an uphill battle."
Teacher agency and innovation	"We created informal mentorship groups among students."
Professional development as a catalyst	"Most training programmes stop at the municipal centre – we are forgotten."
Family and community engagement	"NGOs help us, but in villages, the parents don't always understand inclusion."

Note. The themes reflect the participants' perceptions based on the interview data.

The thematic analysis identified four central themes shaping inclusive practice across the participating schools. First, rural teachers consistently reported structural constraints, such as limited training opportunities and shortages of instructional materials. Second, several participants described instances of teacher agency, including informal peer-mentorship initiatives created to support struggling students. Third, uneven access to professional development emerged as a recurring concern, particularly for rural educators, who felt marginalised from municipal training programmes. Finally, family and community engagement varied considerably across contexts, with rural schools reporting lower levels of parental understanding and involvement in inclusion-related activities.

Discussion

The findings of the present study indicate that inclusive practices in Kosovo are shaped by uneven structural, professional and contextual conditions. While teachers report frequent use of some evidence-based strategies, their implementation is strongly influenced by the level of institutional support available in the different school contexts. The clear disparities between urban and rural schools suggest that inclusion is not experienced uniformly and depends heavily on material resources, leadership capacity and access to professional learning opportunities. These patterns are consistent with previous studies showing that institutional limitations and inadequate support structures are persistent barriers to inclusion in Kosovo (Zabeli et al., 2021; Mazzuki, 2025; Uka et al., 2025).

Evidence-Based Strategies: Between Theory and Feasibility

The findings of the present study show that teachers report using differentiated instruction and formative assessment more frequently than other approaches. This aligns with international research highlighting their relevance in diverse classrooms (Darling-Hammond et al., 2017; Tomlinson, 2017). However, lower reported use of assistive technology and family engagement suggests gaps between recommended best practices and what schools are realistically able to implement, particularly in resource-limited environments. These gaps reflect constraints such as limited digital infrastructure, insufficient training and socio-cultural barriers affecting school-family cooperation. Similar challenges have been reported in Kosovo, where teachers endorse inclusion conceptually but struggle to apply practices consistently due to systemic limitations (Zabeli, et al., 2021). These findings indicate that the successful use of inclusive strategies depends not only on teacher effort but also on supportive institutional structures, including leadership, family engagement and community partnerships.

Urban-Rural Disparities: Structural Barriers to Inclusion

The study identified clear differences between urban and rural schools regarding perceived inclusion, institutional support and access to professional development. These disparities mirror international evidence showing that rural schools often operate under more constrained conditions (OECD, 2020; Ion & Brown, 2022).

In Kosovo, rural municipalities frequently lack access to specialised support services and professional learning opportunities, making it harder for teachers to apply inclusive strategies consistently. This trend reflects earlier findings showing that training opportunities are often centralised in urban areas, limiting participation for rural teachers (Uka et al., 2025). These results underscore the need for policies that address geographic and socioeconomic variability instead of assuming uniform implementation conditions.

Leadership and Professional Development as Key Enablers

Regression findings showed that professional development, administrative support and collaborative planning predict teachers' perceptions of inclusion, not actual student outcomes. This distinction is important and aligns with theories highlighting leadership and collaboration as core components of inclusive

school environments (Leithwood & Jantzi, 2009; Florian & Black-Hawkins, 2011). The qualitative insights of the present study highlight the fact that rural school leaders often feel professionally isolated, limiting their ability to sustain inclusive practices. This reinforces calls for strengthening leadership through training, mentoring and professional networks (Timperley et al., 2020). These findings also align with concerns that new teachers in Kosovo may enter the profession without adequate preparation for inclusive pedagogy (Mazzuki, 2025).

Inclusion as an Ongoing Process

The results support viewing inclusion as a continuous and context-dependent process rather than a fixed achievement. Meaningful inclusion requires coordinated action across multiple levels: classrooms, leadership structures and community partnerships. Inclusive cultures develop gradually when systemic barriers are addressed and diversity is actively valued (Booth & Ainscow, 2016).

The variability observed between schools in this study highlights the importance of context-responsive policies that recognise geographical, socio-economic and institutional differences across Kosovo and the wider Western Balkan region.

Conclusions

The present study examined teachers' and students' perceptions of evidence-based strategies aimed at promoting inclusion in urban and rural schools in Kosovo. The findings indicate that although teachers report frequent use of certain inclusive practices, their implementation is strongly influenced by contextual and institutional factors that vary across school environments.

The results suggest that differentiated instruction and formative assessment are among the most frequently applied strategies, while assistive technology and family engagement remain less consistently implemented, particularly in rural schools. In addition, professional development opportunities, administrative support and collaborative planning emerged as significant predictors of perceived inclusion. Participants from rural schools reported lower levels of institutional support, limited access to resources and fewer opportunities for targeted training.

Recommendations

In light of the findings outlined above, inclusion initiatives should be designed in ways that reflect the differing conditions of urban and rural schools, rather than assuming uniform implementation contexts. Education policies would benefit from adopting context-sensitive approaches that account for variations in infrastructure, staffing and community resources.

Equitable access to professional development is essential for strengthening inclusive practice. Training opportunities should be decentralised and delivered through blended, digital and community-based formats to ensure participation of teachers working in geographically remote areas.

School leadership plays a critical role in fostering inclusive cultures. Targeted leadership preparation programmes are needed to support principals and school leaders in promoting equity-oriented values, facilitating collaboration and mobilising available resources effectively.

Strengthening collaboration within schools is equally important. The establishment of structured professional learning communities can support shared reflection, collective problem-solving and the exchange of inclusive teaching practices among educators.

Partnerships with families and local communities should be enhanced through culturally responsive engagement strategies, particularly in rural settings where awareness and understanding of inclusive education may be limited. Stronger school-family collaboration can contribute to improved student participation and belonging.

Finally, systematic monitoring and evaluation mechanisms are necessary to support continuous improvement. The collection and analysis of disaggregated data can enable education authorities and schools to track progress, identify emerging gaps and make informed decisions to promote more equitable and inclusive education outcomes.

Limitations of the Study

While the present study provides valuable insights into inclusive practices in Kosovo, several limitations should be acknowledged. First, the sample was limited to four schools, which restricts the generalisability of the findings to the broader national context. Second, the data relied partly on self-reported perceptions from teachers, school leaders and students, which may be subject to social desirability and response bias. Third, the cross-sectional design captured practices and perceptions at a single point in time and did not allow for

the examination of changes or developments in inclusive practices over time.

In addition, the study focused primarily on socioeconomic and geographic disparities between urban and rural schools, while other important dimensions of inclusion – such as disability, ethnicity, language background and gender identity – were not examined in depth. Future research should therefore adopt longitudinal designs, include larger and more diverse samples, and explore intersectional aspects of inclusion in order to provide a more comprehensive understanding of inclusive education in Kosovo.

Ethical Statement

Institutional approval for conducting the study was obtained from the Municipal Directorate of Education of the Republic of Kosovo and the administrations of the participating schools, in accordance with relevant procedures and regulations. Informed consent was obtained from all of the adult participants, while parental or legal guardian consent and child assent were secured for the student participants. Throughout the research process, anonymity, confidentiality and personal data protection were fully ensured.

Data Availability Statement

The data that support the findings of this study are available from the author upon reasonable request.

Disclosure Statement

The author declares no potential conflict of interest with respect to the research, authorship and/or publication of this article.

The manuscript was originally written in Albanian and subsequently translated into English with language-support tools. Generative artificial intelligence, ChatGPT (OpenAI), used on 7 June 2025, was used with the following prompt: "Translate the following academic text from Albanian into English, ensuring clarity, grammatical accuracy, and academic style; also, assist in improving wording and formatting references according to academic standards." It was used exclusively for translation, grammatical editing, stylistic refinement of the text and assistance in identifying complete bibliographic information for references. AI tools were not used for data collection, data analysis, interpretation of results or generation of research findings. All methodological decisions, analyses and conclusions remain entirely the author's own responsibility.

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Teachers' Perceptions of Evidence-Informed Practice: An Analysis According to School Complexity Level in Catalonia

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The research-informed approach is attracting increasing interest in European and national education policy, as well as in local education policy in Catalonia (Spain). Previous studies have revealed that it is associated with multiple benefits for improving equity and inclusion. This is particularly relevant in the case of vulnerable children: teachers' use of research can facilitate more inclusive practices, benefiting the learning outcomes of such children. In the present paper, we analyse teachers' perceptions of the importance of evidence-informed practices according to the level of complexity of the schools where they work. In doing so, we applied an ad-hoc survey to 314 early childhood, primary and secondary teachers working in high-, medium- and low-complexity schools in Catalonia. The measure of school complexity, as defined by the Catalan administration, classifies schools and distributes resources according to socioeconomic and administrative complexity indicators. Descriptive and comparative analyses were conducted. The findings revealed that although teachers acknowledge the value of educational research, its use is shaped by organisational conditions and the broader school context. Low-complexity schools provide more favourable environments for the systematic use of evidence, highlighting both an opportunity and a challenge to enhance these conditions in more complex settings. Nevertheless, differences across schools by complexity level are generally subtle, with only a few statistically significant variations. Time for training and regular practice evaluation emerge as key factors for implementing teachers' evidence-informed practice across all school types.

Keywords: evidence-informed practice, inclusion, research use, teacher, teaching practice

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Zaznave učiteljev o na dokazih utemeljeni dejavnosti: analiza glede na stopnjo kompleksnosti vzgojno-izobraževalnih zavodov v Kataloniji

Cecilia-Inés Suárez-Rivarola, Saida López-Crespo in Anna Díaz-Vicario

Za na raziskavah temelječi pristop je v evropski in nacionalni izobraževalni politiki pa tudi v lokalni izobraževalni politiki v Kataloniji (Španija) čedalje več zanimanja. Prejšnje študije so pokazale, da pristop prinaša več koristi za izboljšanje enakosti in inkluzije. To je še posebej pomembno pri ranljivih otrocih: uporaba raziskav na strani učiteljev lahko olajša inkluzivnejše prakse, kar koristi pri učnih izidih ranljivih otrok. V tem članku analiziramo zaznave učiteljev o pomembnosti na dokazih utemeljene dejavnosti glede na stopnjo kompleksnosti vzgojno-izobraževalnih zavodov, v katerih delajo. Pri tem smo izvedli za ta namen sestavljeno anketo med 314 učitelji v vrtcih ter osnovnih in srednjih šolah, ki delajo v vzgojno-izobraževalnih zavodih z visoko, s srednjo in z nizko stopnjo kompleksnosti v Kataloniji. Merilo kompleksnosti vzgojno-izobraževalnih zavodov, kot ga opredeljuje katalonska uprava, razvršča vzgojno-izobraževalne zavode in razporeja vire glede na kazalnike družbenoekonomske in upravne kompleksnosti. Izvedene so bile opisne in primerjalne analize. Ugotovitve so pokazale, da učitelji sicer priznavajo vrednost raziskav na področju vzgoje in izobraževanja, njihovo uporabo pa oblikujejo organizacijske razmere in širši šolski kontekst. Vzgojno-izobraževalni zavodi z nizko stopnjo kompleksnosti zagotavljajo ugodnejše okolje za sistematično uporabo dokazov, kar poudarja priložnost in izziv za izboljšanje teh razmer v kompleksnejših okoljih. Kljub temu so razlike med vzgojno-izobraževalnimi zavodi glede na stopnjo kompleksnosti na splošno neznatne, z le nekaj statistično pomembnimi odstopanji. Čas za usposabljanje in redno ocenjevanje dejavnosti se kažeta kot ključna dejavnika za izvajanje na dokazih utemeljene dejavnosti pri učiteljih v vseh vrstah vzgojno-izobraževalnih zavodov.

Ključne besede: na dokazih utemeljena dejavnost, inkluzija, uporaba raziskav, učitelj, pedagoška praksa

Introduction

The research-informed approach is attracting increasing interest in European and national education policy, as well as in local education policy in Catalonia (Spain). This approach seeks to improve educational practices at both the school and classroom levels through broader institutional reforms, such as specialised programmes or organisational change, or by encouraging teachers to integrate academic research into their teaching in order to guide and enhance teaching methods and practice.

The benefits of the research-informed approach for advancing educational equity and inclusion have been highlighted by recent studies (Mikulyuk & Braddock, 2018; Mincu, 2014; Rangel-Pacheco & Witte, 2023). At the institutional level, the integration of research into practice can contribute to the development of more inclusive school cultures through sustained organisational learning and improvement. It is particularly salient for addressing the needs of vulnerable student populations, as teachers' engagement with research can inform more inclusive pedagogical practices and positively influence student learning outcomes.

The question remains, however, as to whether teachers believe research is useful for improving their practice, while a related issue is the extent to which research use can impact inclusion in schools, particularly in those that face more challenges due to the high concentration of students with socioeconomic difficulties and specific educational support needs.

Teachers' Research Use

The relationship between evidence and educational practice is complex, being shaped by personal experience, shared knowledge environments and organisational cultures (Brown et al., 2016; Ion & Iucu, 2016). Despite the growing interest in incorporating the use of research evidence into education, and specifically into professional teaching practice, the literature shows that few teachers actually integrate research into their daily practice (Ahmed, 2015; Kowalczuk-Walędziak et al., 2020). Moreover, some teachers "consider research irrelevant to teaching" (Kaçaniku, 2020, p. 66). For this reason, numerous studies have sought to demonstrate the potential benefits of research for teaching practice. However, it appears that awareness of these benefits does not translate into greater use of research evidence by teachers.

Teachers' engagement with research could explain the apparent gap between the systematic and regular use of research evidence in teaching practice and the perceived benefits of its use. Research engagement appears to be a

key variable that plays a fundamental role in having informed teaching teams capable of integrating research into their professional practice (Kowalczuk-Walędziak & Ion, 2024; Li & Xu, 2024). However, this engagement is largely determined by teachers' perceptions of the meaning and significance of research in their professional contexts (Ion & Iucu, 2014; Thomm et al., 2021). Teachers tend to prioritise the perspectives of their colleagues and their established practices or other sources of information, such as professional blogs, over evidence from scientific studies (e.g., Hood, 2003; Gairín, López-Sirvent, & Suárez, 2021; Ion & Iucu, 2014).

As shown in recent studies in Spain, teachers' engagement with research largely depends on its perceived relevance to their immediate or short-term needs, along with their ability to produce research and to effectively use data derived from research (Ion et al., 2022; Olmos & Pattier, 2021). Teachers value educational research, as it can contribute to improving educational outcomes, yet they often hesitate to incorporate research into their classroom practice. Among other reasons, they argue that organisational conditions, such as time constraints, the absence of collaboration among teacher staff or the lack of leadership in introducing research into the school, hinder its implementation (Gairín, López-Sirvent, & Suárez, 2021; Ion, Díaz-Vicario & Suárez, 2021). Moreover, some teachers continue to consider research an academic product detached from reality and only useful to academics (Camarero-Figuerola et al., 2023; Ion & Brown, 2022; Suárez-Rivarola & Díaz-Vicario, 2025). This attitude creates the need for a deeper exploration of teachers' conceptions regarding the use of research in their practice.

Teachers' Perceptions of Evidence-Informed Practice

In order to understand why teachers decide to engage with research evidence, it is essential to understand how they perceive the debate about evidence-informed practice. Studies in this field have primarily focused on teachers' perceptions of the benefits and costs of evidence-informed practice (Diery et al., 2020; Ion et al., 2024). However, few studies have examined teachers' conceptions of research and its contribution to their teaching practice.

Tack and Vanderline (2014) developed an instrument to improve the understanding of teachers' research disposition. This instrument relates three dimensions: the affective dimension (the value that teachers attribute to research in their daily practice), the cognitive dimension (the capacity to participate in research) and the behavioural dimension (participation in research activities as consumers and producers of research findings). It is interesting to focus on the affective dimension, since it directly conditions the other two dimensions.

Previous research shows that a negative or sceptical attitude towards the use of research evidence is one of the main barriers to evidence-informed practice (Forman et al., 2012; Lilienfeld et al., 2013; Merle et al., 2023). For this reason, it is interesting to analyse which variables condition the attitudes or beliefs that teachers configure around research evidence, since these attitudes or beliefs have been identified as a prerequisite for the use of research evidence (Merle et al., 2023; Nilsen, 2020).

Brown and Zhang (2016) found that teachers' perceptions of research evidence are influenced by organisational practices designed to facilitate and promote the use of evidence within their schools. Similarly, a study conducted by Rahimi and Weisi (2018) concluded that teachers perceive the value of research and engage in research if the work context supports their research activities. Therefore, although attitudes are individual factors, they may be largely mediated by group or institutional variables (Li & Xu, 2024). A teacher may display positive attitudes towards evidence, but institutional conditions may not be conducive (e.g., there may be a lack of institutional support), which may hinder the implementation of evidence-informed practices (Georgiou et al., 2023; Sorgo & Heric, 2020).

We could consider Tien et al.'s (2019) Research Capacity Model (RCM) as a theoretical framework for understanding how multiple factors interact with and influence teachers' research engagement. Specifically, the model integrates individual factors related to teachers' motivation and perceived self-efficacy to engage in research, and institutional factors such as institutional support, school structures and working conditions. Ion et al. (2024) show that teachers' beliefs and perceptions regarding the desirability of using research are linked to their inclination to want to be associated with the act of using research rather than to the perceived benefits of using research. The same study finds that teachers are more inclined to use research when it aligns with their school's overall priorities and when it is an integral part of their school's decision-making processes.

Even though teachers perceive the value and importance of incorporating evidence into their teaching practice, the adoption of this evidence "depends on the feasibility in the classroom as well as on individual situations of the teacher and school" (Hillmayr et al., 2024, p. 9). In short, the limited literature in this field suggests that the real engagement of teachers with research should be analysed in terms of the influence that institutional factors (extrinsic motivation) exert on individual factors (intrinsic motivation).

The "Escoles de Complexitat" Initiative: Supporting Schools in Catalonia

In Catalonia (Spain), there is a longstanding tradition of educational innovation. This tradition has undergone further growth in recent years, as public administrations and private entities have introduced substantial school reforms to promote evidence-based teaching practice aimed at enhancing early childhood and primary education (Ion, Díaz-Vicario & Suárez, 2021). The reforms include a new curriculum for early childhood education encompassing both cycles (ages 0–3 and 3–6); a reduction in class size in the second cycle of early childhood education by the 2024–2025 academic year; and a digital device usage strategy, implemented in 2024, which includes the prohibition of the use of mobile phones in primary and secondary education classrooms in order to promote better coexistence and minimise disruptions.

Among these initiatives, the "Escoles de Complexitat" (complexity schools) programme, implemented by the Catalan Department of Education, aims to provide additional resources and support to ensure educational equity and inclusion in the education system. This programme classifies Catalan schools according to a set of indicators that determine their "nivell de complexitat" (level of complexity). The main indicators used to determine the level of complexity of a particular school are families' educational and occupational background, the migrant background of the students, and the presence of students with specific educational support needs (SEN). According to these indicators, schools are divided into five levels of complexity: low complexity, medium-low complexity, medium-high complexity, high complexity and very high (or maximum) complexity. In practice, however, schools are usually referred to as being of low, medium or high complexity.

The classification system aims to promote educational equity by providing targeted assistance to those institutions facing the greatest challenges. Some of the objectives of the "Escoles de Complexitat" programme include: a) preventing early school leaving and academic failure, b) ensuring the emotional wellbeing of students, c) facilitating positive coexistence within educational centres, d) contributing to student guidance, e) encouraging family involvement, f) strengthening the connection between the school and its community, g) contributing to the development of community-wide plans, and h) reducing absenteeism.

The designation of a level of complexity helps the administration when it comes to providing resources and support to the schools. By 2023, Catalonia had 212 public primary schools classified as maximum-complexity centres, representing 13.39% of the total number of public primary schools in Catalonia

(Ferrer-Esteban et al., 2025). These schools require dedicated support to face the challenges derived from a rapidly changing society, where the changeability of social, economic and cultural factors creates a more complex scenario for education and teaching. These measures include increasing the number of teaching and specialised staff to better address students' diverse educational needs; offering training and support programmes for teachers focused on managing diversity and supporting special educational needs; enhancing material and technological resources to create a more suitable learning environment; and promoting innovative educational initiatives that foster inclusion and academic achievement (Ferrer-Esteban et al., 2025).

Research Questions

In the present study, we describe the use of research evidence by Catalan teachers and examine their beliefs and perceptions regarding the desirability of using research (significance). In addition, we determine whether there are statistically significant differences between the teachers' perceptions of what works in different school complexity levels in Catalonia (Spain). The following research questions are addressed:

(RQ1) How do Catalan teachers use research evidence in their teaching practices?

(RQ2) What are the beliefs and perceptions of Catalan teachers regarding the desirability of using research in their professional activities?

(RQ3) Are there statistically significant differences in the perceptions of research use among teachers working in schools with varying levels of complexity in Catalonia?

Method

The study uses a quantitative and descriptive research approach employing a survey methodology.

Participants

The survey targeted a convenient sample of teachers working in early childhood, primary and secondary education in Catalonia (Spain). A total of 314 teachers answered the questionnaire: 71.7% were female, 24% were male and 4.3% preferred not to state their gender. The participants' ages ranged from 22 to 64 years old: 10.6% were 20–30 years, 23.4% were 31–40 years, 35% were 41–50 years, 28.3% were 51– 60 years and 2.7% were 61–70 years. Regarding educational level, 46.7% held a bachelor's degree, 46.6% a post-graduate or master's

degree and 3.6% a PhD, while 3% had completed vocational education or other types of studies.

A total of 90.9% of the participants worked in public schools, 5.8% worked in private or state-subsidised schools and 3.3% worked in a cooperative school. Of the participants, 19.3% taught in early childhood education, 27.3% in primary education, 58.2% in secondary education and 3.3% in a combination of levels. Regarding their role in the school, 26.6% were senior leaders (school principal, secretary or head of study), 18.3% were middle leaders (coordinators) and 55% were dedicated exclusively to teaching tasks. A full-time employment contract was held by 91.5% of the participants.

With respect to school complexity level, 21.5% of the participants worked in a low-complex school, 47.3% in a middle-complex school and 25.8% in a high-complex school.

Instruments

We used the Research-Use BCS Survey (Brown et al., 2022), which uniquely and simultaneously measure the benefits, costs and significance (BCS) factors associated with educators' use of research, based on Baudrillard's (1968) semiotic theory of consumption and other recent literature (broadly 2010 and later) on research-informed educational practice (RIEP). The survey included 55 items distributed as follows: 15 items for uses, 14 items for benefits, 12 items for costs and 14 items for significance of research, as well as an additional 13 items referring to sociodemographic variables, including the respondents' information and their role and the context of the school in which they work. The items were measured with a 5-point Likert scale (1 = totally disagree and 5 = totally agree). In the present study, only 29 items are analysed: the 15 items related to research use and the 14 items related to research significance. Specifically:

- Eight items were designed to examine how teachers engage with research evidence to inform both their instructional practices and ongoing professional development. Additionally, seven items focused on organisational factors that may facilitate or hinder the integration of research evidence in educational settings.
- The items addressing the perceived value of research use explore teachers' beliefs and attitudes regarding the desirability of incorporating research into their work. This perceived desirability reflects the extent to which educators are inclined to associate themselves with research-informed practices. Such desirability may stem from internal motivations (e.g., alignment with professional identity) or external influences (e.g., expectations from peers or the school environment).

The analysis of the internal consistency of the questionnaire revealed a Cronbach's Alpha of 0.852. Specifically, for the dimensions analysed in this article, the Cronbach's Alpha was 0.870 for the research use dimension and 0.734 for the significance dimension. Globally, the Cronbach's Alpha values are adequate.

Research Design

The data collection process was carried out via convenience sampling. Contact with the teachers was made through the school principals, who voluntarily agreed to send the questionnaire link to the entire teaching staff. The teachers' participation was voluntary. Teachers were informed via email and on the questionnaire's homepage about the study purpose, the data protection policy and how the research team would use the data. The data were collected anonymously to prevent the possible identification of participants.

The data were analysed via the IBM Statistical Package for the Social Sciences (SPSS v. 26.0.0.1). First, a descriptive analysis of the sociodemographic variables was conducted in order to characterise the sample. Second, the means and the standard deviation of the 29 items related to research use and significance were calculated, considering that the nature of the variables is ordinal. Finally, a parametric test (ANOVA and Scheffé test) was applied in order to compare the teachers' perceptions according to the complexity level of the school where they work.

Results

The results are presented and organised in two sections. First, we present the descriptive analysis for the items of the dimension 'research use' and the comparative analysis based on the complexity level of the school in which the surveyed teachers work. Second, we do the same for the dimension 'significance', presenting the descriptive and the comparative analysis.

Teachers' Research Use

Table 1 presents an overview of the descriptive results for the research-evidence use dimension. Research-evidence is mostly used on the teachers' own initiative, rather than on the imposition of the school's management team. Teachers use research evidence to explore new practical techniques (M = 2.94; SD = 0.753), to understand how to think about an issue (M = 2.91; SD = 0.807), to develop new practices (M = 2.77; SD = 0.738) and to persuade colleagues to a point of view or a course of action (M = 2,57; SD = 0.931). However, there seem

to be few teachers who carry out in-class or in-school inquiries to improve their practice (M = 2.75; SD = 0.881).

Regarding the organisational conditions linked to a greater use of research evidence, the participants point out that in their schools they experiment with new ways of working (M = 3.19; SD = 0.708), there is time for training activities (M = 3.16; SD = 0.848), new ideas are valued (M = 3.11; SD = 0.764) and underlying assumptions that might affect key school decisions are frequently discussed (M = 2.84; SD = 0.954).

Table 1

Descriptive analysis for the dimension 'research use'.

Items	*M*	*SD*
I have used research evidence to help me develop new practices	2.77	.738
I have adopted new practical techniques that are based on research evidence	2.94	.753
I have used research evidence to help me understand how to think about an issue	2.91	.807
I have used research evidence to persuade colleagues to a point of view or a course of actions	2.57	.931
I have used research evidence because my organisation requires me to	2.29	.895
I have conducted in-class or in-school enquiries to improve my practice	2.75	.881
I can access a professional learning community or network that supports and encourages professional learning and improvement.	2.80	.893
My immediate colleagues (e.g., department, key stage or year-level colleagues) experiment with new ways of working	3.02	.729
My school (i.e., the organisation as a whole) experiments with new ways of working	3.19	.708
In my school, most people value new ideas	3.11	.764
In my school, time is made available for education/training activities for school staff	3.16	.848
My school regularly evaluates programmes or practices	2.82	.871
My school regularly shares information with staff in relation to the effectiveness of programmes or practices	2.81	.896
My school frequently discusses underlying assumptions that might affect key decisions (e.g., the reasons for selecting a new policy or programme)	2.84	.954

Note. *Likert Scale (1 = totally disagree and 5 = totally agree)
Source. Prepared by the authors.[3]

On analysing research-evidence use with regard to the complexity level of the school in which the teachers work (see Table 2), it can be seen that

3 The prompts in Table 1 correspond to the "Research Use BCS Survey" from Brown et al. (2022) – supplementary material https://www.frontiersin.org/articles/10.3389/feduc.2022.890832/full#supplementary-material The analyses presented here were conducted exclusively for the present study.

teachers who work in low-complexity schools seem to make greater use of research evidence than teachers who work in high-complexity schools. The difference is especially notable for two items: 'I have adopted new practical techniques that are based on research evidence' (M = 3.03; SD = 0.696 / M = 2.86; SD = 0.693) and 'I have used research evidence to help me understand how to think about an issue' (M = 3.00; SD = 0.697 / M = 2.78; SD = 0.878). For both items, however, the differences are not statistically significant.

Regarding organisational conditions, it seems that low-complexity schools have more favourable organisational factors for the use of evidence than medium- and high-complexity schools. Statistically significant differences between low- and high-complexity schools were found for two items:

Teachers working in low-complexity schools report having more time for training activities than teachers in high-complexity schools (M = 3.39; SD = 0.746 / M = 2.94; SD = 0.917) (p = 0.007).

Teachers working in low-complexity schools are more likely than those working in high-complexity schools to report that regular evaluations of programmes or practices are carried out in their schools (M = 3.00; SD = 0.811 / M = 2.58; SD = 0.993) (p = 0.010).

Table 2

Comparison of means based on the school complexity level for the dimension 'research use'.

	School complexity level								
	Low (*n* = 71)		Medium (*n* = 156)		High (*n* = 85)		NS/NC (*n* = 18)		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Sig.
I have used research evidence to help me develop new practices	2.86	.723	2.74	.752	2.69	.756	2.94	.539	.372
I have adopted new practical techniques that are based on research evidence	3.03	.696	2.92	.823	2.86	.693	3.11	.583	.398
I have used research evidence to help me understand how to think about an issue	3.00	.697	2.92	.831	2.78	.878	3.11	.583	.225
I have used research evidence to persuade colleagues to a point of view or a course of action	2.61	.836	2.53	.953	2.59	.979	2.61	.916	.935
I have used research evidence because my organisation requires me to	2.49	.860	2.17	.851	2.32	.978	2.33	.907	.092
I have conducted in-class or in-school enquiries to improve my practice	2.89	.919	2.77	.841	2.64	.949	2.67	.686	.336

	School complexity level								
	Low (*n* = 71)		Medium (*n* = 156)		High (*n* = 85)		NS/NC (*n* = 18)		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Sig.
I can access a professional learning community or network that supports and encourages professional learning and improvement	2.96	.917	2.78	.918	2.71	.843	2.83	.786	.356
My immediate colleagues (e.g., department, key stage or year-level colleagues) experiment with new ways of working	3.11	.708	2.99	.745	3.00	.756	2.94	.539	.638
My school (i.e., the organisation as a whole) experiments with new ways of working	3.37	.660	3.15	.717	3.13	.737	3.17	.618	.132
In my school, most people value new ideas	3.23	.721	3.08	.823	3.05	.706	3.22	.647	.413
In my school, time is made available for education/training activities for school staff	3.39	.746	3.19	.836	2.94	.917	3.00	.767	.007*
My school regularly evaluates programmes or practices	3.00	.811	2.85	.818	2.58	.993	3.06	.725	.010*
My school regularly shares information with staff in relation to the effectiveness of programmes or practices	2.96	.853	2.81	.851	2.64	.986	3.11	.900	.065
My school frequently discusses underlying assumptions that might affect key decisions (e.g., the reasons for selecting a new policy or programme)	2.97	.956	2.88	.901	2.62	1.023	2.89	.963	.105

Note. Likert Scale (1 = totally disagree and 5 = totally agree)
*The significance level is .050.
Source. Prepared by the authors.[4]

Teachers' Perceptions of Research Significance

In the significance dimension (see Table 3), the surveyed teachers exhibit a propensity to use research evidence when this is aligned with meeting the needs of their class (M = 4.05; SD = 0.792) or/and the school's improvement priorities (M = 3.96; SD = 0.754). In addition, they establish a connection between the use of research evidence and the level of reputation and the attractiveness of the school (M = 3.90; SD = 0.840). Similarly, the results show that the teachers are more inclined to use research evidence if their colleagues also use it (M = 3.71; SD = 0.889) and/or if it is a requirement of their performance management targets (M = 3.59; SD = 0.889), both of which are related to external factors. The participating

4 The prompts in Table 2 correspond to the "Research Use BCS Survey" from Brown et al. (2022) – supplementary material https://www.frontiersin.org/articles/10.3389/feduc.2022.890832/full#supplementary-material The analyses presented here were conducted exclusively for the present study.

teachers therefore globally perceive that use of research evidence is a hallmark of an effective profession ($M = 3.68$; $SD = 0.923$). However, they also remark that they think there are few examples of successful use of research evidence in education ($M = 3.59$; $SD = 0.896$). On the other hand, the teachers consider that the complexity level of a school and/or the existence of a research-friendly school culture is not a reliable indicator to use research evidence ($M = 2.67$; $SD = 0.977$).

Furthermore, the surveyed teachers' perceive that there is an expectation in their schools to engage with research evidence to improve practice ($M = 3.53$; $SD = 0.956$), but they felt that the teachers' ($M = 2.96$; $SD = 0.859$) and school leaders' ($M = 3.08$; $SD = 0.874$) awareness, engagement and research use is not developing as quickly as one might expect.

Table 3

Descriptive analysis for the dimension 'significance'.

Items	*M*	*SD*
I can think of few, if any, examples of successful uses of research evidence in education	3.59	.896
Using research evidence enhances a school's reputation and attractiveness as a place to work and learn	3.90	.840
The use of research evidence is the hallmark of an effective profession	3.68	.923
Schools with a low or medium complexity level are more likely to use research-based interventions and/or have a research-friendly culture	2.69	1.122
School leaders seek out research evidence to support their existing views or plans of action	3.42	.924
I am more inclined to engage with research evidence when it is aligned to meeting my school's improvement priorities	3.96	.754
Researchers are not expert authorities in relation to education	2.67	.977
Teachers' awareness, engagement and use of research evidence are developing rapidly	2.96	.859
School leaders' awareness, engagement and use of research evidence are developing rapidly	3.08	.874
I am more inclined to engage with research evidence when this is a requirement of my performance management targets	3.59	.889
The awareness, engagement and use of research evidence are developing rapidly among other key staff in schools	3.11	.923
I am more inclined to engage with research evidence when it is aligned to meeting the needs of my class	4.05	.792
There is an expectation in my school that we should engage with research evidence to improve practice	3.53	.956
I am more likely to use research evidence if my colleagues are also using research evidence	3.71	.889

Note. *Likert Scale (1 = totally disagree and 5 = totally agree)
Source. Prepared by the authors.[5]

5 The prompts in Table 3 correspond to the "Research Use BCS Survey" from Brown et al. (2022) – supplementary material https://www.frontiersin.org/articles/10.3389/feduc.2022.890832/full#supplementary-material The analyses presented here were conducted exclusively for the present study.

On analysing research significance with regard to the complexity level of the school in which the teachers work (see Table 4), it can be seen that that teachers who work in low-complexity schools tend to have a greater perception that using research is desirable. However, there are three items for which teachers working in medium-complexity schools tend to have a better perception of significance: (i) 'School leaders seek out research evidence to support their existing views or plans of action' (M = 3.46; SD = 1.000), compared to low-complexity schools (M = 3.45; SD = 0.883) and high-complexity schools (M = 3.30; SD = 0.880); (ii) 'I am more inclined to engage with research evidence when it is aligned to meeting my school's improvement priorities' (M = 4.01; SD = 0.772), compared to low-complexity schools (M = 3.94; SD = 0.773) and high-complexity schools (M = 3.88; SD = 0.705); and (iii) 'Researchers are not expert authorities about education' (M = 2.68; SD = 0.973), compared to low-complexity schools (M = 2.64; SD = 0.964) and high-complexity schools (M = 2.67; SD = 1.007). Moreover, the teachers working in high-complexity schools are more inclined to engage with research evidence when this is a requirement of their performance management target (M = 3.68; SD = 0.747), compared to low-complexity schools (M = 3.60; SD = 0.875) and medium-complexity schools (M = 3.53; SD = 0.978).

Despite the differences in perceptions between teachers working in low-, medium- and high-complexity schools, statistically significant differences were only found in one of the 40 items in this dimension, i.e., teachers working in high-complexity schools believe more than teachers in medium-complexity schools that schools with a low or medium complexity level are more likely to use research-based interventions and/or have a research friendly culture (M = 3.08; SD = 1.114 / M = 2.47; SD = 1.066) (p = 0.003).

Table 4

Comparison of means based on the school complexity level for the dimension 'significance'

	School complexity level								
	Low (n = 71)		Medium (n = 156)		High (n = 85)		NS/NC (n = 18)		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Sig.
I can think of few, if any, examples of successful uses of research evidence in education	3.81	.791	3.53	.955	3.54	.889	3.50	.707	.157
Using research evidence enhances a school's reputation and attractiveness as a place to work and learn	3.99	.707	3.91	.901	3.79	.822	4.06	.873	.405
The use of research evidence is the hallmark of an effective profession	3.89	.772	3.67	.972	3.52	.929	3.61	.916	.105

	School complexity level								
	Low (*n* = 71)		Medium (*n* = 156)		High (*n* = 85)		NS/NC (n = 18)		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	Sig.
Schools with a low or medium complexity level are more likely to use research-based interventions and/or have a research-friendly culture	3.08	1.114	2.47	1.066	2.79	1.144	2.71	1.160	.003*
School leaders seek out research evidence to support their existing views or plans of action	3.45	.883	3.46	1.000	3.30	.880	3.63	.500	.488
I am more inclined to engage with research evidence when it is aligned to meeting my school's improvement priorities	3.94	.773	4.01	.772	3.88	.705	4.00	.767	.621
Researchers are not expert authorities in relation to education	2.64	.964	2.68	.973	2.67	1.007	2.59	1.004	.977
Teachers' awareness, engagement and use of research evidence are developing rapidly	3.04	.898	2.95	.874	2.91	.830	2.82	.728	.724
School leaders' awareness, engagement and use of research evidence are developing rapidly	3.32	.849	3.04	.849	3.00	.916	2.88	.885	.071
I am more inclined to engage with research evidence when this is a requirement of my performance management targets	3.60	.875	3.53	.978	3.68	747	3.67	.767	.657
The awareness, engagement and use of research evidence are developing rapidly among other key staff in schools	3.29	.956	3.05	.945	3.05	.876	3.24	.752	.272
I am more inclined to engage with research evidence when it is aligned to meeting the needs of my class	4.11	.622	4.05	.836	3.96	.828	4.28	.826	.408
There is an expectation in my school that we should engage with research evidence to improve practice	3.75	.823	3.46	.989	3.42	1.000	3.67	.907	.122
I am more likely to use research evidence if my colleagues are also using research evidence	3.84	.792	3.73	.908	3.58	.912	3.53	.943	.242

Note. Likert Scale (1 = totally disagree and 5 = totally agree)
*The significance level is .050.
Source. Prepared by the authors.[6]

Discussion and Conclusions

In this paper, we have reflected on teachers' perceptions of the importance of evidence-informed practices concerning the level of complexity of the schools where they work. We started by exploring recent studies about teachers'

6 The prompts in Table 4 correspond to the "Research Use BCS Survey" from Brown et al. (2022) – supplementary material https://www.frontiersin.org/articles/10.3389/feduc.2022.890832/full#supplementary-material The analyses presented here were conducted exclusively for the present study.

research use and their beliefs about evidence-informed practice. This theoretical framework enabled us to examine and reflect on teachers' perceptions of research evidence in the Catalan context, where schools are categorised by complexity based on socioeconomic and administrative complexity indicators that determine the resources allocated by the Catalan Administration. For this purpose, we have explored three main questions: (RQ1) How do Catalan teachers use research evidence in their teaching practices? (RQ2) What are the beliefs and perceptions of Catalan teachers regarding the desirability of using research in their professional activities? and (RQ3) Are there statistically significant differences in the perceptions of research use among teachers working in schools with varying levels of complexity in Catalonia?

First, the findings indicate that teachers predominantly engage with research evidence (RQ1) on their own initiative, such as to explore new practical techniques and to understand how to think about an issue, rather than by imposition of the school's management team. While research is used to improve practice, deepen understanding and support collegial persuasion, it remains uncommon for teachers to undertake formal inquiries within the classroom. Moreover, in line with authors such as Rahimi and Weisi (2018) and Li and Xu (2024), teachers show greater involvement with research when it aligns with classroom needs, school improvement priorities and/or when other colleagues in the school are also involved.

Second (RQ2), with regard to teachers' beliefs and conceptions about research, we find that teachers attribute a high value to research for professional and organisational improvement. Specifically, the results indicate that teachers perceive the use of research evidence as enhancing a school's reputation and attractiveness as a place to work and learn, and as a hallmark of an effective profession. At the same time, teachers affirm that their schools expect them to engage with research evidence in order to improve practice. However, although the teachers in our study recognise the value and importance of using research in their professional practice, it is surprising that these same teachers believe that teachers' awareness, engagement and use of research evidence are not developing rapidly (Ahmed, 2015; Kowalczuk-Walędziak et al., 2020). These findings confirm the existence of variables that act as mediators between teachers' perceptions of research, their engagement and the actual use of research evidence in professional practice (Hillmayr et al., 2024; Sorgo & Heric, 2020).

Third, regarding teachers' perceptions of research use in schools of varying complexity in Catalonia (RQ3), our findings indicate that educators in both low-, medium- and high-complexity institutions view their schools as environments that foster experimentation with innovative practices and value

new ideas. This aligns with previous studies showing that teachers appreciate research-based approaches to enhancing teaching and schools (Gairín, López-Sirvent & Suárez, 2021; Suárez-Rivarola & Díaz-Vicario, 2025), even though the literature reports variability in their actual implementation (Ahmed, 2015; Ion, et al., 2022; Kaçaniku, 2020; Kowalczuk-Walędziak et al., 2020). Moreover, our study found that teachers in high-complexity schools are more likely than those in medium-complexity schools to believe that research-based interventions are implemented in schools with solid performance, high educational standards, well-achieving students and a research-friendly culture. This could indicate that the implementation of evidence-based research is related not only to the teacher's perceptions but also to organisational conditions and contextual factors. As determined by other studies in the field (e.g., Brown et al., 2016; Hillmayr et al., 2024; Ion & Iucu, 2016), this could indicate the need for a deeper exploration of individual, organisational and systemic factors influencing the adoption of the evidence-based research approach.

Integrating research into everyday classroom activities can improve learning outcomes and help bridge the gap between theory and practice. The present paper supports the idea that research can help to build an education system that is more equal and inclusive by empowering teachers to enhance their instructional methods, make informed decisions and adapt to diverse student needs through evidence-based practices. It is therefore essential not only to analyse how teachers use scientific research but also to understand how they perceive the relevance of educational research for their teaching practice and how the organisational and contextual factors impact this perception. In this regard, it becomes essential to strengthen the organisational conditions of more complex school settings, where research-informed practices may yield the greatest benefits. Promoting equitable access to professional development and fostering collaborative and reflective structures may help to reduce disparities in research engagement across schools.

The present study has some limitations: the sample is context-specific with a relatively small number of teachers, making generalisation difficult. Reliance on surveys could also constrain validity; thus, future research should integrate qualitative methods for greater depth.

Nonetheless, the findings of the study highlight the need to further examine the gap between the perceived value of evidence in teaching and its actual adoption, particularly through the interactions between teacher, classroom and school variables.

Ethical Statement

The study adhered to the principles outlined in the Code of Good Research Practices of Universitat Autònoma de Barcelona (Spain), the home institution of all of the authors, and was confirmed as ethically appropriate by the Ethics Commission of the Faculty of Education, University of Ljubljana, Slovenia. The authors declare that this research was conducted under the ethical principles established for the social sciences, ensuring respect for the dignity, privacy and autonomy of all of the participants. Informed consent was obtained from all of the participants. Furthermore, data confidentiality and transparency in the use of information were safeguarded.

Data Availability Statement

The data that support the findings of this study are available in FIGSHARE (DOI: 10.6084/m9.figshare.25262332).

Disclosure Statement

The authors have no conflict of interest to declare. When preparing this article, the authors declare they have not used any type of artificial intelligence. The authors accept full responsibility for the content and integrity of the publication.

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Creation of Didactic Materials at an Art Academy for Children with Developmental Disabilities Involved in Equine-Assisted Learning Interventions

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This paper presents a practice-based exploratory project focused on the codesign and evaluation of didactic materials for children with developmental disabilities participating in equine-assisted learning interventions. The project was conducted during the 2022/2023 and 2023/2024 academic years through a collaboration between the Art Education Department of the Academy of Fine Arts in Zagreb, the Don Kihot Association and partner organisations. Ten graduate students participated as part of their coursework in the subjects Pedagogy, and Methodology of Fine Arts. The primary aim of the project was to integrate theoretical instruction with artistic practice through project-based learning and gamification, while preparing future teachers to design inclusive didactic materials adapted to the needs of children with developmental disabilities. A secondary aim was to explore how such codesigned materials function in practice during equine-assisted learning sessions. The study adopted a qualitative, practice-oriented approach. Data were collected through student portfolios, teachers' and collaborators' reflective notes, and structured evaluation forms completed by practitioners during the application of the didactic materials with three child participants. The project resulted in ten original didactic toys and games. The findings indicate that student engagement and intrinsic motivation increased through real-world, socially relevant design tasks. Practitioner evaluations suggest that the usability and acceptance of didactic toys depend strongly on the child's specific type of developmental difficulty as well as on task complexity, thus highlighting the importance of adaptability and individualisation. The study contributes to practice-based research in inclusive art education and equine-assisted learning by offering empirically grounded reflections on the design and use of didactic materials.

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Keywords: children with special needs, equine-assisted learning, didactic materials, gamification, project-based learning, inclusive education

Priprava didaktičnih gradiv na umetniški akademiji za otroke z motnjami v razvoju, vključene v oblike učenja s pomočjo konj

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Ta članek predstavlja praktično-raziskovalni projekt, osredinjen na sooblikovanje in evalvacijo didaktičnih gradiv za otroke z motnjami v razvoju, ki sodelujejo v oblikah učenja s pomočjo konj. Projekt je potekal v študijskih letih 2022/23 in 2023/24 v sodelovanju med Oddelkom za likovno vzgojo Akademije za likovno umetnost v Zagrebu, društvom Don Kihot in partnerskimi organizacijami. V projektu je sodelovalo deset podiplomskih študentov v okviru predmetov Pedagogika in Metodologija likovne umetnosti. Glavni cilj projekta je bil povezati teoretično poučevanje z umetniško prakso prek projektnega učenja in igrifikacije, hkrati pa pripraviti bodoče učitelje na oblikovanje inkluzivnih didaktičnih gradiv, prilagojenih potrebam otrok z motnjami v razvoju. Drugi cilj je bil raziskati, kako takšna sooblikovana gradiva delujejo v praksi med učnimi urami s pomočjo konj. Študija je uporabila kvalitativni, v prakso usmerjen pristop. Podatki so bili zbrani na podlagi študentskih portfeljev, refleksivnih zapiskov učiteljev in sodelavcev ter strukturiranih ocenjevalnih obrazcev, ki so jih izpolnili učitelji med uporabo didaktičnega gradiva s tremi sodelujočimi otroki. V okviru projekta je nastalo deset izvirnih didaktičnih igrač in iger. Ugotovitve kažejo, da sta se vključenost študentov in notranja motivacija povečali prek nalog iz oblikovanja gradiv, ki so bile realistične in družbeno relevantne. Ocene učiteljev kažejo, da sta uporabnost in sprejemljivost didaktičnih igrač močno odvisni od specifične vrste razvojnih težav otroka ter od zahtevnosti naloge, kar poudarja pomen prilagodljivosti in individualizacije. Študija dopolnjuje v prakso usmerjeno raziskovanje na področju inkluzivne umetnostne vzgoje in učenja s pomočjo konj, saj ponuja empirično utemeljene refleksije o oblikovanju in uporabi didaktičnih gradiv.

Ključne besede: otroci s posebnimi potrebami, učenje s pomočjo konj, didaktično gradivo, igrifikacija, projektno učenje, inkluzivno izobraževanje

Introduction

Practice-based learning, as a form of experiential learning, responds to the demands of the twenty-first-century workplace (Huggins, 2017). Accordingly, contemporary higher education in teacher studies should integrate theory and practice, adopt interdisciplinary learning and be grounded in problem-based approaches. The need for additional education of future teachers to work with children with special educational needs and improve their inclusion in the education system has been recognised and is addressed by many researchers. Kavkler et al. (2015) write that teachers experience communication challenges and fail to recognise pupils' strengths, so it is necessary to encourage future teachers to shift their focus from deficits to identifying and developing pupils' strengths, thus promoting success despite ongoing learning difficulties. According to Šmid (2016), teachers' awareness of the actual abilities of pupils with special educational needs is key to making inclusion more effective. Kink-Hampersberger et al. (2023) have developed teacher training that includes *habitus reflexivity*, which helps future teachers to recognise inequality and power imbalances, and to adapt to changing educational contexts, as effective practice is rooted in solid theoretical understanding. For better inclusion of children with developmental disabilities in mainstream education, in accordance with the Salamanca Statement and the Framework for Action on Special Needs Education (UNESCO, 1994), a project was conducted at the Art Education Department of the Academy of Fine Arts in Zagreb. The project involved ten second-year graduate students of the teacher training programme Fine Arts Culture and was carried out within the integrated coursework of the subjects Pedagogy, and Methodology of Fine Arts Education during the 2022/2023, 2023/2024 and 2024/2025 academic years.

A project was designed in which students connected theoretical knowledge with its practical application in the development and implementation of new didactic materials. The project was conducted in collaboration with the Croatian Association of Multiple Sclerosis Societies (a non-governmental, non-profit, social organisation that includes 21 county member associations, thus covering the entire territory of the Republic of Croatia, https://sdmsh.com.hr) and the Don Kihot Association for equine-assisted therapy and (re)habilitation of children with developmental disabilities and persons with disabilities (https://www.donkihot.hr). The Croatian Association of Multiple Sclerosis Societies engaged a paediatrician to familiarise students with approaches to children with developmental disabilities. The students then visited the ranch of the Don Kihot Association, and after the visit, they conceptually designed didactic

materials, created sketches, discussed their ideas and developed them using computer software. Based on the resulting designs, didactic toys were produced using appropriate materials and available production techniques (CNC, 3D printing, silicone moulding). The designed didactic toys and games were evaluated by the association with children undergoing equine-assisted therapy.

Equine-Assisted Activities and Therapies

According to Stojnović (2015), equine-assisted therapy is a specialised therapeutic practice involving interaction with horses according to predefined goals, methods and didactic materials, carried out by professionals such as pedagogues, teachers, special educators, sociologists, psychologists and physiotherapists who have additional training in equestrianism and equine therapy (specialisation level). Various subtypes of equine-assisted therapy exist, including hippotherapy, which focuses on improving neurological and sensorimotor functions. Hippotherapy or physiotherapy with horses (Hallberg, 2017) impacts mental and cognitive abilities through complex sensorimotor stimuli and is used for a broad range of difficulties such as cerebral palsy, autism, speech, reading and writing disorders, hearing and vision impairments, emotional disorders, behavioural problems, educational neglect and more. Therapeutic riding helps address motor coordination issues (Tomašek, 2023) and stimulates tactile sensations through touch, balance systems and sensory input (Šaban & Kosinac, 2014). As part of equine-assisted therapy, special education riding (therapeutic-pedagogical riding or vaulting) is aimed at developing children with difficulties by fostering their individual and social development through interaction with horses. It is based on knowledge from pedagogy, special education, social pedagogy, psychology and occupational therapy, and is implemented as a comprehensive, goal-oriented approach to working with children with developmental disabilities and individuals with disabilities (Stojnović, 2015). This therapy aims to improve coordination, concentration and attention, and to reduce aggression, overcome fears, boost self-confidence and foster a sense of support (Šuvak, 2004). It can be conducted individually or in groups and includes the development of motor skills, socialisation and improved concentration. Intervention goals include reducing behavioural disorders and developing communication skills and self-confidence (Tatković et al., 2018). Learning is often integrated into horseback activities, making it more engaging and effective.

New Didactic Materials (Toys and Games) for Equine Therapy and Equine-Assisted Learning

Play is increasingly used in learning due to its significant impact on the development of social, moral, emotional and interpersonal skills. The content of the game must be clearly defined with set rules and learning outcomes. Depending on their purpose, didactic games can be *perceptual-motor games*, aimed at sensory development and distinguishing objects by shape, size and characteristics; *attention and reaction games*, developing accuracy and speed; *memory games*, reinforcing knowledge through mental activity; or *puzzles*, helping children sort by colour, shape or quantity (Grm, 2021, p. 327). These games aim to develop sensory perception, concentration, memory, socialisation and character. They can include physical movement, recognising colours and textures, inserting shapes into matching slots, understanding comparative relationships, contrasts in colour and form, rhythm recognition and spatial awareness. With this foundation, didactic toys and materials were designed to develop the visual and sensory abilities of children with developmental disabilities.

Creativity as an Integral Part of the Teaching Process and Content Transfer

Play is a central element of human culture and creativity (Huizinga, 1950) and is closely linked to creative expression in artforms such as dance, drama and visual arts (Read, 1943, 1956). Structured activities such as games and performances can bring about a *flow state* with therapeutic value (Csikszentmihalyi, 1988). Creativity and play share qualities like process orientation, openness to uncertainty, exploration, divergent thinking, choice and creation (Duffy, 1998, 2006). Creativity is often defined as original thinking resulting in new ideas or products, involving ideation and feasibility testing, relying first on imagination and later on learned skills (Petrović Sočo, 2000).

At the Academy of Fine Arts in Zagreb, the Art Education Department encourages combining imagination, ideas and skills through interdisciplinary links between theory and practice. Students are encouraged to transfer their creative processes into learning and teaching, aligning with the concept of *teaching creatively* and *teaching for creativity* (Jeffrey & Craft, 2004). Assignments are derived from life experiences (Ames, 1992, in Palmer, 2005), prompting students to engage in real-world action (McGonigal, 2011). One such assignment was the present project. Through guided cognitive, intuitive and exploratory activities, students developed new didactic toys, improved their making skills with new technologies and gained independence in project execution. Tarr (1996)

outlines six key areas of the creative process in artists and educators: free exploration with materials, concepts and ideas; external stimulation; specific skills and techniques; a supportive work environment; reflection; and presentation. These align with the *incubation model* of teaching (Torrance, 1995): problem identification, confirmation, alternative solution creation, evaluation, and implementation planning. The project-based teaching was framed through gamification. Benefits in higher education include informal learning from digital environments so that new cognitive skills emerge, as well as visual-spatial representation and multitasking (Greenfield, 2009). Gamification fosters intrinsic motivation, collaboration, friendly competition and experimentation without fear of failure (Gee, 2008; Lee & Hamer, 2011, as cited in Koutropoulos & Porter, 2020), resulting in *flow*, which is common to both games and the creative process. The present project featured dual gamification. The students first went through the same process experienced by participants in equine-assisted interventions, and then, based on that experience, designed games that function as a combination of two types of gamification: content gamification (modifying content to adapt it to the principles of a game) and structural gamification (applying game elements to guide users through content that remains unchanged) (Kapp, 2012). The designed games will benefit children involved in the treatment on two levels: introducing them to visual arts (and other) content and providing gameplay with a therapeutic effect. In this process, extrinsic and intrinsic motivation are combined, arising from the use of an allusive base of meaning (Broudy, 1987, 1999) through which children think and feel. Motivation operates during the learning of skills, concepts and attitudes both directly, through the immediate perception of information, and indirectly, through associations. The application of the designed games involves gestures, behaviour and actions, thereby activating the emotional brain (Chabot & Chabot, 2004).

Purpose of the Project and the Study

The project was designed as an educational and co-creative intervention in higher art education. Its primary aims were to provide students with opportunities for practice-based learning that integrates theory and practice, problem-solving and interdisciplinarity, in order to facilitate the transfer of their creative processes from art courses to the development of didactic materials for children with developmental disabilities, and to foster the development of empathy and inclusive attitudes among students.

In contrast, the study is positioned as an empirical, practice-based qualitative investigation. Its overarching research aim is to examine how the

co-creative design and application of didactic materials within equine-assisted learning contexts influences students' learning, and how practitioners and children with different developmental profiles engage with and respond to the newly developed materials.

Problem and Objectives

Despite increasing emphasis on inclusive education and experiential learning in higher education, opportunities for art students to engage in practice-based, interdisciplinary projects that connect artistic processes with socially relevant applications remain limited. At the same time, equine-assisted learning environments, which are increasingly used to support children with diverse developmental profiles, often lack specially designed didactic materials.

Consequently, there is a need for educational initiatives that simultaneously support inclusive practices, foster empathy and social awareness among students, and explore innovative ways of developing and applying learning materials for children with developmental disabilities.

The research objectives are:

1. to assess how the process influenced the students (i.e., how participation in a project-based and gamified design process supports art education students in developing competencies for inclusive didactic material design);
2. to explore how practitioners and children with different developmental disabilities perceive and use the newly designed didactic toys during equine-assisted learning sessions;
3. to identify which design features (e.g., complexity, adaptability, materiality) appear to facilitate or hinder the usability and acceptance of equine-assisted learning, and the inclusive participation of children in it.

Research Questions

Guided by these objectives, the current empirical analysis addressed the following research questions:

1. In what ways does participation in a practice-based, project-based and gamified design process shape students' motivation, perceived preparedness and understanding of inclusive didactic material design for children with developmental disabilities?
2. How are the newly designed didactic materials used and experienced by

practitioners and children with different developmental profiles during equine-assisted learning sessions?

3. Which specific design features of the didactic toys appear to support or constrain children's participation, engagement and task completion in equine-assisted learning contexts?

Method

The study is designed as a practice-based exploratory qualitative study embedded within a pedagogical project conducted in higher art education. The methodological approach is aligned with the aims of practice-oriented and intervention-based research, focusing on systematic reflection on design processes, implementation contexts, and practitioner and user responses.

The methodological framework integrates elements of qualitative project documentation, reflective practice and practitioner-based evaluation, allowing for an in-depth examination of the educational and applied dimensions of the project.

Participants

The research sample consisted of two interconnected participant groups:

(a) Ten graduate students enrolled in the university master's programme Fine Arts Education: eight female students and two male students, aged 23–26 years. During their previous studies, the students had attended art workshops at the following institutions: Special Hospital for Children with Neurodevelopmental and Motor Disorders, Zagreb; Rehabilitation Centre Zagreb for children with special needs; Autism Centre in Zagreb. The student participants were second-year graduate students attending the compulsory courses Pedagogy, and Methodology of Fine Arts Education. Participation in the project formed part of their regular coursework and assessment. All of the students completed the full project cycle, from conceptual design to prototype development and reflection.

(b) Three children with developmental disabilities participating in equine-assisted learning sessions at the Don Kihot Association.

The child participants were purposefully selected by practitioners at the Don Kihot Association based on their regular participation in equine-assisted learning programmes and their ability to safely engage with the newly designed didactic materials. The sample included:

- a 7-year-old child with cerebral palsy attending a mainstream programme with individualised support;
- an 8-year-old child with intellectual disabilities, delayed speech-language development and motor planning difficulties, attending a customised programme;
- a 12-year-old child with autism spectrum disorder participating in a specialised programme.

Instruments

Multiple qualitative data sources were used to document and reflect on the project process and its outcomes:

1. Teachers' and collaborators' reflective notes, recorded throughout all project phases, focusing on student engagement, decision-making processes, collaboration and emerging challenges.
2. Student portfolios, comprising conceptual sketches, written reflections, design rationales and documentation of material choices and production processes.
3. Didactic toy prototypes, analysed as artefacts of the design process and as functional tools during equine-assisted learning sessions.
4. Structured evaluation forms, completed by practitioners at the Don Kihot Association during and after the application of the didactic toys with child participants. The forms focused on usability, acceptance and adaptability, observing responses across cognitive, motor, social and emotional domains.
5. Case-based observations, documenting individual child–toy interactions during equine-assisted learning sessions.

The instruments were developed specifically for the purposes of this project, in close collaboration with practitioners, and were intended to support systematic reflection rather than standardised measurement.

Research Design

Project Process

The project was conducted in three interrelated phases, each corresponding to specific pedagogical and research objectives:

- Phase 1: Familiarisation and Conceptual Design

  The students were introduced to the characteristics and needs of

children with developmental disabilities through a guest lecture delivered by a paediatrician and through a field visit to the Don Kihot Association. During this phase, they observed equine-assisted learning sessions, explored the physical environment and available equipment, and engaged in guided discussions. Based on these experiences, the students developed initial concepts and sketches for didactic toys, which were discussed and refined through peer and mentor feedback.

- Phase 2: Prototype Development and Exhibition
  In the second phase, the students translated their conceptual designs into functional prototypes using contemporary production techniques, including 3D modelling, CNC processes and additive manufacturing. The completed prototypes were presented at the final exhibition of the Art Education Department in June 2024. Following the exhibition, the didactic toys were donated to the Don Kihot Association for practical use.

- Phase 3: Application and Practitioner Evaluation
  In the final phase, practitioners at the Don Kihot Association integrated selected didactic toys into equine-assisted learning sessions with the child participants. Each child engaged with 3–6 toys over five sessions conducted between 30 June and 29 September 2024. Practitioner evaluations were recorded using structured forms (evaluation criteria: cognitive development, motor development, social interaction and participation, emotional functions, usability, user acceptance, overall user satisfaction) and reflective notes.

After the research was completed, the didactic toys were returned to the students and to the artistic associate of the Academy of Fine Arts (who is also a volunteer of the Don Kihot Association) for refinement and production using environmentally friendly materials.

Data Analysis

Data analysis followed a qualitative, interpretative approach. Project documentation, portfolios and practitioner evaluations were subjected to iterative thematic reading. Patterns related to student learning, toy usability, child engagement, task complexity and adaptability were identified and compared across cases.

The analysis focused on cross-case synthesis and analytical reflection, which is consistent with the exploratory and practice-based orientation of the

study. The analysis sought to address the research questions by linking observed patterns to design features and contextual factors within equine-assisted learning environments.

Results

The results are presented in relation to the three research questions and are organised thematically. The findings synthesise practitioner evaluations and observations of child engagement across cases. Detailed descriptions of individual toys, materials and student authorship are provided in the supplementary materials.

Student Learning Outcomes and Engagement (RQ1)

Analysis of student portfolios, reflective notes and mentor observations indicates that participation in the practice-based design project had a positive impact on the students' motivation, engagement and perceived preparedness for working with children with developmental disabilities.

The students demonstrated increased intrinsic motivation, particularly after direct exposure to the equine-assisted learning context during the field visit. Engagement was further strengthened through gamified project structures, peer collaboration and the opportunity to design artefacts intended for real-world use. The students' reflective notes reveal a shift from initial uncertainty and fear of "doing something wrong" towards greater confidence in adapting artistic ideas to diverse learner needs.

The iterative design process – moving from conceptual sketches to functional prototypes – supported the students' understanding of inclusive design principles, such as simplicity, adaptability and material safety. The students also reported improved competence in using contemporary production technologies (e.g., 3D modelling and printing) as tools for pedagogical problem-solving rather than purely technical skills.

Usability and Acceptance of Didactic Materials (RQ2)

The practitioner evaluations indicate that the usability and acceptance of the didactic toys varied across the children and were closely linked to task complexity, motor demands and cognitive load. Toys that allowed gradual progression, clear rules and immediate sensory feedback were generally more readily accepted.

Across all cases, the children responded positively to toys that integrated movement, tactile stimulation and visual cues within the equine-assisted learning

sessions. The combination of riding-related bodily engagement and hands-on manipulation of objects appeared to enhance focus and sustained participation.

In contrast, toys involving multiple simultaneous demands – such as complex bilateral coordination, abstract rules or many elements – were initially met with hesitation or frustration, particularly by children with intellectual disabilities or autism spectrum disorder. However, practitioner support and task simplification often led to improved engagement over repeated sessions.

Child-Specific Interaction Patterns (RQ3)

Cross-case analysis highlights distinct interaction patterns linked to the children's developmental profiles:

- *Child with cerebral palsy (age 7):*
  This child accepted all of the selected toys with minimal adaptation. Toys supporting balance, proprioception and gross motor control were particularly effective. The possibility of varying task difficulty contributed to sustained engagement and increased confidence.
- *Child with intellectual disabilities (age 8):*
  Acceptance was strongly influenced by task simplicity and clarity. Toys with straightforward goals and demonstrative instructions were most successful. More complex tasks initially elicited resistance, but performance improved with guided support and encouragement.
- *Child with autism spectrum disorder (age 12):*
  Familiar shapes, colours and predictable structures facilitated engagement. Toys with excessive visual or functional complexity led to frustration. Gradual introduction of challenges and reduction of elements improved task completion and emotional regulation.

These patterns suggest that adaptability and modularity are key design features for didactic materials used in equine-assisted learning, allowing the practitioners to tailor activities to individual needs.

The practitioners emphasised that effective didactic toys should allow for immediate modification during sessions, including simplification of tasks, adjustment of material resistance and reduction of sensory input. The ability to combine or separate game elements was identified as particularly valuable.

Overall satisfaction with the designed materials was high, with the practitioners noting their potential for repeated use across sessions and for integration into individualised learning plans. At the same time, evaluations highlighted the need for further refinement of several toys in terms of size, weight and number of elements.

The results indicate that:

1. practice-based, gamified design projects can effectively support student learning and motivation in inclusive art education;
2. the acceptance and effectiveness of didactic materials in equine-assisted learning depend on the alignment between toy design and individual developmental profiles;
3. adaptable, modular and sensory-responsive designs are particularly suitable for diverse equine-assisted learning contexts.

Discussion

The findings of this practice-based exploratory study provide insight into the potential of codesigned didactic materials within equine-assisted learning contexts, particularly when developed through interdisciplinary collaboration between art education, inclusive pedagogy and practitioner expertise. The discussion interprets the results in relation to the research questions, relevant theoretical frameworks and existing literature. While the broader project functioned as an educational and design intervention in higher art education, the present paper specifically reports on the empirical, qualitative analysis of student learning processes and the use of codesigned didactic materials in equine-assisted learning sessions.

Contribution to Inclusive and Practice-Based Education

The results support existing research emphasising the importance of preparing future teachers for inclusive practice through authentic, context-based learning experiences (Kavkler et al., 2015; Šmid, 2016). By engaging students in the real-world design of didactic materials for children with developmental disabilities, the project enabled a shift from deficit-oriented perspectives towards recognising individual strengths and adaptive possibilities.

The practice-based nature of the study aligns with contemporary approaches to intervention-oriented and design-based educational research, where knowledge and skills are generated through reflective engagement with practice rather than through experimental control (Mann et al., 2020). This positioning addresses critiques regarding the applicability of research findings to complex educational settings and supports calls for more evidence-informed yet context-sensitive practices in inclusive education.

Creativity, Gamification and Learning Design

The integration of creativity and gamification played a central role in

both student learning and the functionality of the designed didactic materials. Consistent with theoretical perspectives on creativity and play (Huizinga, 1950; Csikszentmihalyi, 1988; Jeffrey & Craft, 2004), the project demonstrated how structured, yet open-ended design tasks can foster intrinsic motivation, experimentation and sustained engagement. Gamification supported learning on multiple levels: it provided students with experiential insight into equine-assisted learning processes and informed the design of games that combine educational content with embodied interaction. This dual-layered gamification resonates with Kapp's (2012) distinction between content and structural gamification, and contributed to the emergence of flow experiences observed among both the students and the child participants.

Implications for Equine-Assisted Learning Practice

The study contributes to the growing body of literature on equine-assisted learning by highlighting the role of didactic material design as a mediating factor in therapeutic and educational engagement. Rather than focusing solely on the horse–rider interaction, the findings suggest that carefully designed artefacts can extend and structure learning opportunities within sessions. Practitioner evaluations underscore the importance of adaptability, modularity and sensory responsiveness in didactic toys used with children with developmental disabilities. These findings are consistent with research emphasising individualisation and accessibility in inclusive interventions, supporting the shift from standardised activities towards flexible, child-centred approaches (UNESCO, 1994; UNESCO, 2016).

Importantly, the results also reinforce critical distinctions between equine-assisted therapy and equine-assisted learning. While therapeutic outcomes were not formally measured, the observed benefits relate primarily to engagement, participation and learning processes, rather than clinical change, thus supporting the appropriateness of framing the project within equine-assisted learning rather than therapy. Recent systematic and scoping reviews of equine-assisted activities and therapies for neurodevelopmental populations similarly highlight improvements in social engagement, communication and participation, while stressing the need for individualised, flexible approaches tailored to developmental profiles such as autism spectrum disorder, intellectual disabilities and cerebral palsy (Trzmiel et al., 2019; Cleary et al, 2024; Zoccante et al., 2024). These syntheses underscore the importance of adapting task demands, sensory input and interactional structures to support differential responsiveness among children, which is consistent with the design patterns observed in the present study.

Cross-Case Insights and Individualisation

The differences observed across the child cases highlight the necessity of individualised design strategies. The child with cerebral palsy benefited from activities emphasising balance and proprioception, while the children with intellectual disabilities and autism spectrum disorder required clearer structures and reduced complexity. These findings align with inclusive education principles that advocate for multiple pathways to participation and learning and resonate with the framework of Universal Design for Learning, which emphasises multiple means of engagement, representation, and action and expression to reduce barriers and support learner variability (CAST, 2018; Novak, 2021). The ability to adjust task difficulty, reduce sensory overload and scaffold engagement emerged as critical factors in sustaining motivation and preventing frustration. This reinforces the importance of practitioner mediation and iterative design refinement in applied educational contexts.

Conclusion

This practice-based exploratory study examined the design, implementation and evaluation of didactic materials developed within an interdisciplinary art education project for use in equine-assisted learning contexts. The findings highlight the value of integrating creative design, gamification and real-world engagement into teacher education as a means of fostering inclusive pedagogical competencies. The current study makes three main contributions. First, it demonstrates that project-based and gamified learning approaches can effectively enhance student motivation, confidence and preparedness for working with children with developmental disabilities. Second, it provides empirically grounded insights into how codesigned didactic materials function in equine-assisted learning sessions, showing that acceptance and effectiveness depend on the alignment between toy design, task complexity and individual developmental profiles. Third, the study contributes to practice-based research by articulating key design principles – such as adaptability, modularity and sensory responsiveness – that support inclusive engagement in equine-assisted learning environments.

Several limitations must be acknowledged. First, the small sample size and single-context setting limit the generalisability of the findings. Second, the study relied primarily on practitioner observations and reflective evaluations rather than standardised outcome measures. Third, the absence of a comparison or control condition restricts causal interpretations of observed effects. These limitations are inherent to exploratory, practice-based research and

should be considered when interpreting the findings. The study is therefore best understood as a pilot exploration that generates hypotheses and design insights rather than definitive evidence.

Future research could build on this exploratory work by involving larger and more diverse samples, incorporating longitudinal designs and combining qualitative reflection with standardised assessment tools. Comparative studies across different equine-assisted learning contexts or cross-institutional collaborations could further strengthen the evidence base and support the development of transferable design principles. Additionally, participatory research approaches involving children and practitioners as co-researchers could provide deeper insight into user perspectives and contribute to more inclusive knowledge production.

Ethical Statement

The study was conducted in accordance with ethical standards for pedagogical and practice-based research. The parents of the participating children were fully informed about the procedures of the project and provided written informed consent in line with the Don Kihot Association's protocols. Child assent was obtained in an age-appropriate manner during the sessions. Participation was voluntary, data were anonymised and all of the materials were used exclusively for research and educational purposes. The authors declare that the research was carried out following ethical standards for pedagogical research. The research study was approved by the Academy of Fine Arts in Zagreb Ethical Research Committee.

Data Availability Statement

Due to ethical and privacy considerations, the datasets generated during this study are not publicly available but may be obtained from the corresponding author upon reasonable request.

Disclosure Statement

The authors declare that there are no conflicts of interest in connection with this pedagogical research. The study was conducted exclusively for academic and scientific purposes, with no commercial or financial interests influencing the research process or its outcomes. The authors have no conflict of interest to declare.

When preparing this article, the authors used Perplexity Pro on 10 March 2026 with the following prompt: "Proofread the attached paper in standard English" for the purpose of checking and correcting grammatical and spelling errors in the text, in accordance with the rules of the English language. The authors subsequently reviewed and edited the output as necessary and accept full responsibility for the content and integrity of the publication.

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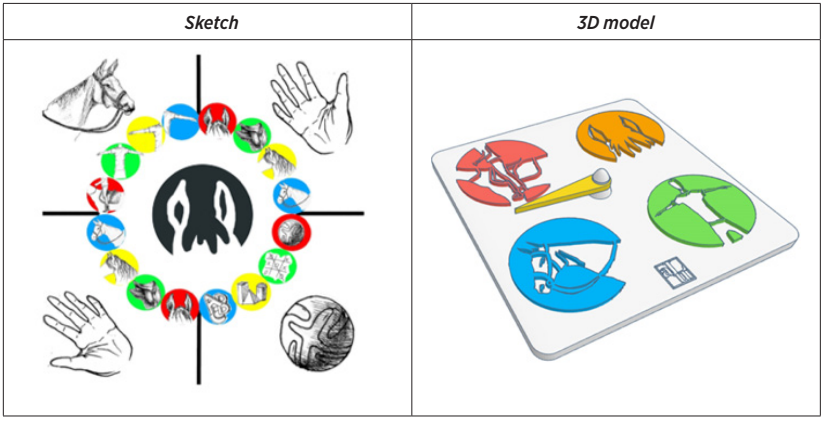
Appendix

New Didactic Games

For each didactic toy/game, the name of the student who designed and created it is provided, along with the name of the newly designed didactic toy, the material and technique used for its creation, as well as its contribution.

Student: Antonela Beli
Name of didactic toy: *Pathpony* (Figure 1)
Technique/Materials: 3D printing (FDM), PLA (plant-based plastic), acrylic spray, Posca marker
Contribution: The emphasis is on the development of motor skills while simultaneously thinking about the given challenge. The child is given an opportunity to improve motor skills, to learn through hands-on experience by performing the assigned task, and to engage in social interaction and communication through cooperative play.

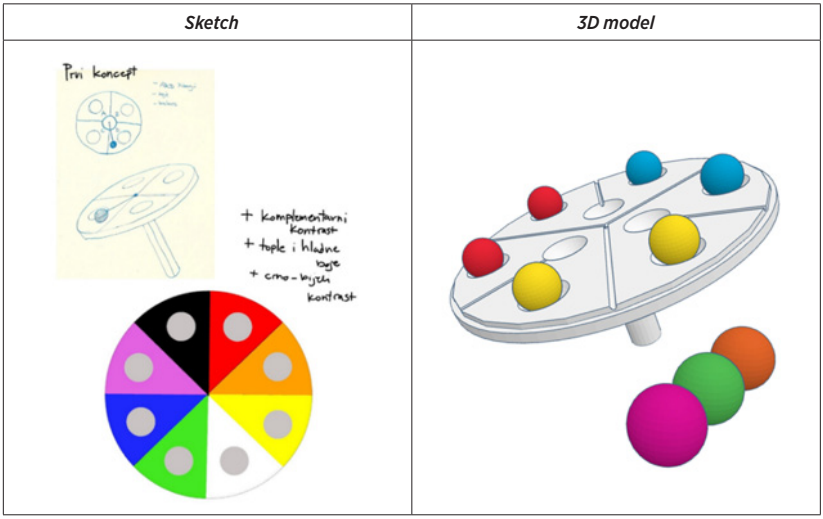
Figure 1
Pathpony



Note. This educational toy is a horseback-adapted version of Twister, featuring a cardboard mat with a spinner and 16 fields divided into four quadrants. Two quadrants focus on tactile tasks involving touching the horse or its gear with either hand, one quadrant includes balance challenges, and the last quadrant incorporates other games, such as ball play. It can be played solo or by multiple children to encourage cooperation and communication.

Student: Lea Krmpotić
Name of didactic toy: *Colour Carousel* (Figure 2)
Technique/Materials: 3D printing (DLP), resin, acrylic spray, Posca marker
Contribution: Introduction to colours: chromatic and achromatic; complementary contrast; warm-cool contrast; black-and-white contrast; colour-to-colour contrast; light-dark contrast. Development of motor skills and hand-eye coordination: balancing with the hand and placing the ball into the colour indentation that has been assigned.

Figure 2
Colour Carousel

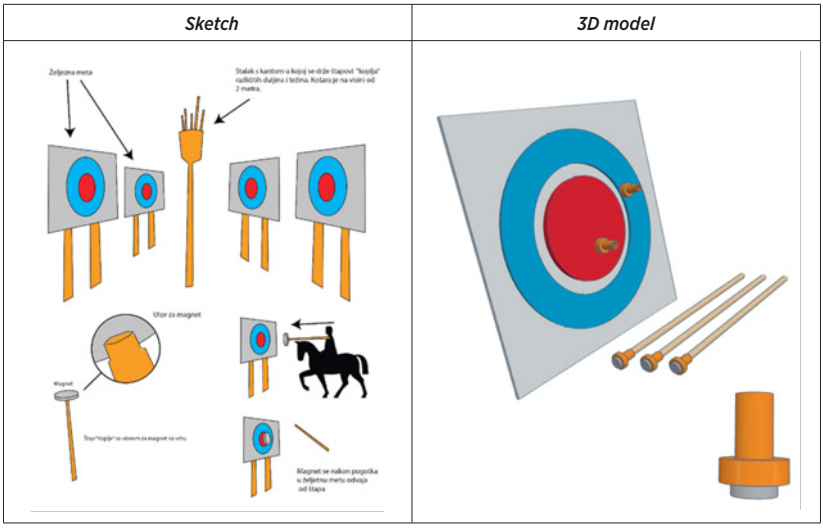


Note. The didactic toy *Colour Carousel* consists of three parts: a handle with a vertically mounted colour disc featuring eight indentations, and a ball attached to a string at the centre. The goal is to balance the toy by hand and make it land in the indentation of the specified colour.

Student: Ante Šabić
Name of didactic toy: *METAMAGA – Hit the target with a spear while riding* (Figure 3)
Technique/Materials: 3D printing (FDM), PLA, magnets, acrylic spray, aluminium plate, wood
Contribution: Encouraging the rider to rise, bend and lean, as well as to aim at targets, develops balance and body coordination, the ability to assess proximity and distance, as well as cognitive abilities, logical thinking and the application of knowledge in connecting different target dimensions and pairs of colours.

Figure 3

METAMAGA – Hit the target with a spear while riding



Note. This game involves hitting a target with specially designed lances that have detachable magnetic tips. The lances vary in length, colour and weight, and are stored in a basket accessible to horseback riders. The magnetic tips differ in colour and shape for educational purposes. Played while riding, the game can be used for scoring points or therapy. Variations include free-lance throwing and colour-matching between lance and target.

Student: Lea Plaščar

Name of didactic toy: *Winding Path* (Figure 4)

Technique/Materials: 3D printing (FDM), PLA, acrylic spray, Posca marker

Contribution: Development of fine motor skills by means of the transfer of rings from one end of the stick to the other, cognitive abilities in assessing how to navigate different variations of difficulty and path length, and social skills through cooperative play in pairs.

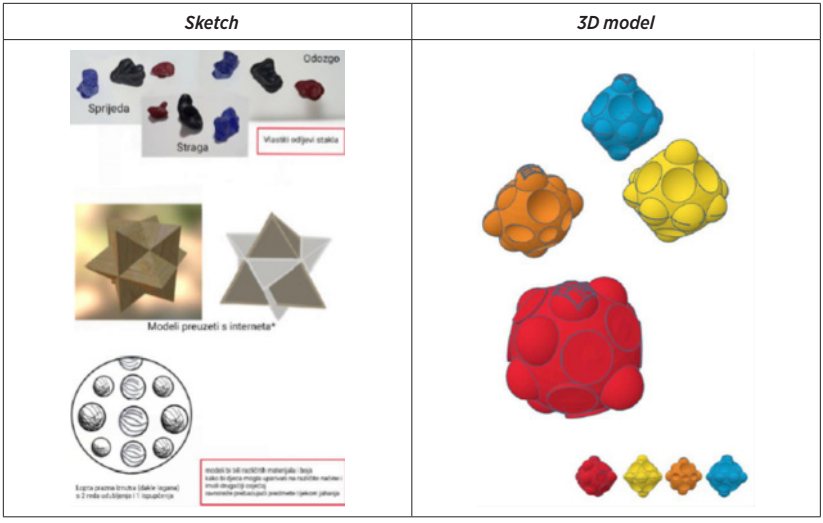
Figure 4
Winding Path

Sketch	*3D model*
	

Note. Winding Path is a two-player game where players use 3D-printed path segments to move a multi-coloured ring from one end of a stick to the other. The path's length and level of difficulty are adjustable. Success depends on coordination and cooperation, as the players must work together to guide the ring by moving their hands.

Student: Lorena Šimić
Name of didactic toy: *Kordata* (Figure 5)
Technique/Material Used: 3D Printing (DLP), FLEX resin, acrylic spray, Posca marker
Contribution: Development of tactile perception through engagement in various sensory activities during play; development of concentration and motor skills through a form of juggling the object from one hand to the other (matching by colour, texture, or weight).

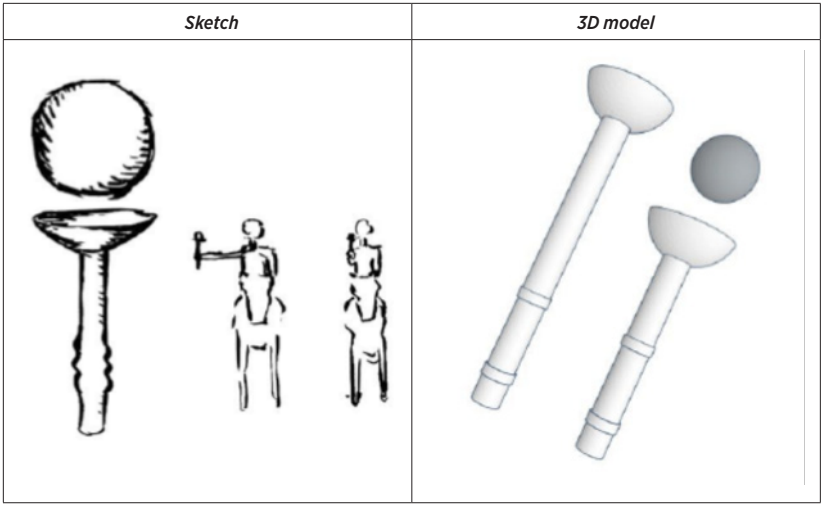
Figure 5
Kordata



Note. This didactic toy combines tactile stimulation with cognitive tasks. After a few minutes of horseback riding, the child is given objects varying in colour, shape, texture and material to stimulate the senses. The child practises transferring these objects between their hands using different movements (e.g., over the head, across extended arms or around the torso). Later, activities include matching objects, e.g., "match the red ball with the blue bumpy ball".

Student: Antonio Piljek Jagić
Name of didactic toy: *Sceptre* (Figure 6)
Technique/Material Used: 3D Printing (FDM), resin, acrylic spray.
Contribution: The rider practises balance and joint mobility to prevent stiffness (riding with one hand on the horse, while the other holds an aid shaped like a stick with a groove at the top for a ball; the child is given various coordination tasks).

Figure 6
Sceptre

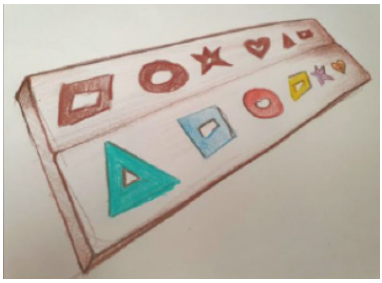
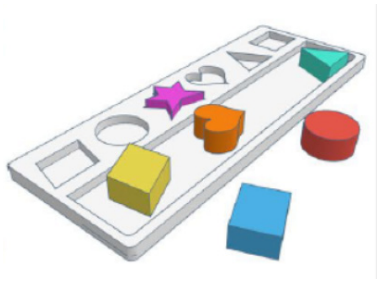


Note. This didactic toy is a lightweight rod with a bowl-shaped top that holds a tennis-sized ball. Designed for use while horseback riding, the child holds the rod in one hand to practise balance and control by keeping the ball steady. Movements involve lifting the rod in front of the face and body, and then extending the arm, all without letting the ball fall.

Student: Ivona Katalinić
Name of didactic toy: *Notice and Insert* (Figure 7)
Technique/Material Used: 3D Printing (FDM), PLA (plant-based plastic), acrylic spray
Contribution: Motor: Coordination development – inserting shapes into a given frame; dexterity. Cognitive: Colour recognition; noticing and identifying geometric symbols; recognising elements of nature.

Figure 7

Notice and Insert

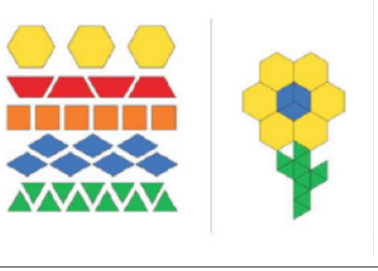
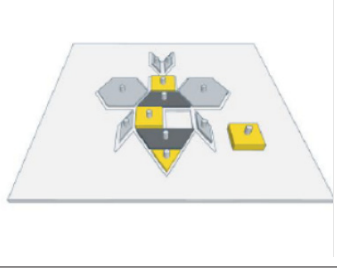
Sketch	*3D model*
	

Note. This two-part game involves a wooden board with colourful shapes and matching signs along a nature trail (e.g., a green triangle on a leaf, a blue square on a flower). While riding, the child matches the shapes on the board to signs seen on the trail by moving them from the bottom to the top row. The shape order changes each time, promoting observation, memory and matching skills.

Student: Marcela Bencek
Name of didactic toy: *Pattern Blocks* (Figure 8)
Technique/Material Used: 3D Printing (FDM), PLA (plant-based plastic), acrylic spray, Posca marker
Contribution: Encouraging the development of spatial thinking, fine motor skills, cognitive skills and creativity. In addition, playing with pattern blocks can help children learn concepts such as colours, shapes, patterns, symmetry, etc.

Figure 8

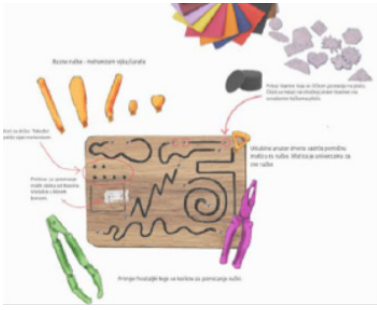
Pattern Blocks

Sketch	*3D model*
	

Note. Pattern blocks are sets of construction blocks that come in various shapes, colours and sizes, allowing children to use their imagination and creativity to build different structures. They feature a variety of patterns, such as geometric shapes, animals, numbers or letters.

Student: Petra Vuković
Name of didactic toy: *Plochko, Fine Motor Skills Device* (Figure 9)
Technique/Material Used: 3D Printing (FDM), PLA (plant-based plastic), acrylic spray, Posca marker
Contribution: Using various hand paths while grasping and moving handles helps train fine motor skills, which can also be practised by twisting the handles into the corresponding grooves. Motor skills are also developed by placing, moving and repositioning small pieces of fabric attached to the board with Velcro. Cognitive skills related to visual language (various types of lines, colours and shapes) are also developed.

Figure 9
Plochko, Fine Motor Skills Device

Sketch	*3D model*
	

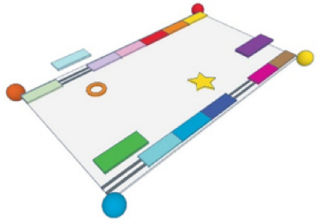
Note. The didactic toy is a wooden board with shaped grooves equipped with screw nut mechanisms for attaching various handles. Velcro patches at the groove ends hold small coloured fabric pieces (primary, secondary, tertiary colours) stored in a locked compartment. It includes three types of grips to enhance motor skills and can be used in different positions (in front, on a horse, or in the lap). The activities involve matching fabrics to grooves, tracing grooves to explore colour mixing, and identifying paths based on specific colour combinations.

Student: Sara Kudrić Smerke
Name of didactic toy: *Hypo Blanket* (Figure 10)
Technique/Material Used: Cotton, felt
Contribution: The balls, which can be added to or removed from the blanket, serve to additionally stimulate motor and tactile abilities, thus also impacting cognitive and emotional processes. While walking, the horse's movement stimulates the rider, who can simultaneously interact with the Hypo Blanket. The rider is familiar with the contents of the blanket and, with therapist assistance, uses lateral torso rotation and/or trunk flexion to direct their

hands towards a targeted element. In doing so, the rider gradually strengthens abdominal muscles, the pelvis and spine, thereby improving the stability of both upper and lower extremities. The goal of the Hypo Blanket is to enhance and develop coordination and balance.

Figure 10

Hypo Blanket

Sketch	*3D model*
	

Note. This game involves tracing lines on a board using handles of different shapes and sizes to develop fine motor skills and grip strength. The level of difficulty can be adjusted by changing handle types. The board features geometric and organic shapes, varied lines and colourful fabrics to support learning visual art concepts through hands-on play.

Biographical note

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Antonio Kutleša, MA in Art Education, is an artistic associate at the Academy of Fine Arts, University of Zagreb, in the Department of Sculpture. His research and professional interests include the development of creative and technical competencies in digital environments, and the encouragement of experimental approaches to visual expression. He also volunteers at the Don Kihot Association for equine-assisted therapy and (re)habilitation of children with developmental disabilities and persons with disabilities.

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Promoting Interaction to Enhance Student Perceived Learning and Satisfaction in a Large e-Flipped Accounting Classroom

Evelyn Mei Ling Wong*[1] and Ann Rosnida Md Deni[2]

This research was conducted to investigate the effects of an e-flipped classroom in promoting interaction to enhance students' perceived learning and satisfaction in a large accounting course. This research examines how e-flipped education, which incorporates pre- and in-class activities, affects students' perceptions of their learning and satisfaction by encouraging learner-content, learner-instructor, and learner-learner interaction. Students enrolled in a second-year management accounting course made up the respondents. A questionnaire with seven indicators presenting each variable was used to gather data. The findings of this study revealed that all three interactions (i.e., learner-content, learner-instructor, and learner-learner interaction) were significant determinants of perceived student learning in the in-class activities, while only learner-content and learner-instructor interactions were the significant determinants of the student perceived learning in the pre-class activities. This study also shows that all three interactions significantly determined students' satisfaction in both the pre-class and in-class activities. Moving forward, a well-designed online course with appropriate interactive activities is vital in promoting a supportive online learning experience.

Keywords: e-flipped classroom, interaction, large accounting class, student-perceived learning, student satisfaction

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Spodbujanje interakcije za izboljšanje zaznanega učenja in zadovoljstva pri študentih v večji e-obrnjeni učilnici pri pouku računovodstva

Evelyn Mei Ling Wong in Ann Rosnida Md Deni

Ta raziskava je bila izvedena z namenom raziskati učinke e-obrnjene učilnice pri spodbujanju interakcije za izboljšanje zaznanega učenja in zadovoljstva študentov v večji skupini pri predmetu računovodstva. Preučuje, kako e-obrnjeno izobraževanje, ki vključuje dejavnosti pred poukom in med njim, vpliva na zaznavanje učenja in zadovoljstva študentov s spodbujanjem interakcije med učencem in vsebino, med učencem in učiteljem ter med učencem in učencem. Sodelujoči v raziskavi so bili študentje, vpisani v drugi letnik predmeta poslovnega računovodstva. Za zbiranje podatkov je bil uporabljen vprašalnik s sedmimi kazalniki, ki so predstavljali po eno spremenljivko. Ugotovitve te študije so pokazale, da so bile vse tri interakcije (tj. interakcija med učencem in vsebino, učencem in učiteljem ter učencem in učencem) pomembne determinante zaznavanja učenja študentov pri dejavnostih med poukom, medtem ko so bile le interakcije med učencem in vsebino ter učencem in učiteljem pomembne determinante zaznavanja učenja študentov pri dejavnostih pred poukom. Ta študija tudi kaže, da so vse tri interakcije bistveno določale zadovoljstvo učencev pri dejavnostih pred poukom in pri dejavnostih med poukom. V prihodnje je dobro zasnovan spletni tečaj z ustreznimi interaktivnimi dejavnostmi bistvenega pomena za spodbujanje podporne spletne učne izkušnje.

Ključne besede: e-obrnjena učilnica, interakcija, večja skupina pri predmetu računovodstva, zaznano učenje pri študentih, zadovoljstvo študentov

Introduction

Due to the Covid-19 pandemic, traditional face-to-face classes were conducted either fully online or in hybrid mode. Determining student perceived learning and satisfaction was important in online learning environments during the pandemic, particularly because most students are more used to the traditional face-to-face setting. It is important to understand the effectiveness of online teaching and students' satisfaction with online learning, as these are important indicators of their learning experiences and success.

Ensuring students are engaged in any online courses can be more challenging than in face-to-face on-campus courses (Meyer, 2014). This is because learning does not occur in the same physical location, and interactions are often asynchronous. Because of this challenge, it is vital that instructors employ relevant strategies to ensure that the online course maximises students' experiences and engagement through interactions with other students, the instructor and course content. It is vital that the quality of the interactions between these components become one of the main focuses of online sessions (Meyer, 2014) and that similar emphasis be given to each type of interaction (Moore, 1989). Lack of interactions during online learning can be a serious concern as previous studies have determined the positive influence of interactions on student satisfaction in distance learning (Moore & Kearsley, 1996). Numerous other studies have confirmed the importance of learner-content interaction and learner-instruction interaction; however, learner-learner interaction in the online learning environment remains a topic of debate (Battalio, 2007; Kuo et al., 2014).

This study is inspired by Moore's transactional distance theory and will, therefore, focus on all the three types of interaction that Moore (1989) cited: learner-content interaction, learner-instructor interaction, and learner-learner interaction. The purpose of this action research study is firstly to explore the impact of interactions on both the students' perceived learning and their satisfaction. Previous studies investigated the impact of interactions on overall student satisfaction (Kuo, 2014; Kuo et al., 2014; Moore & Kearsley, 1996); however, this study will investigate how these interactions affect students' perceived learning and satisfaction, specifically during pre- and in-class activities. Secondly, many previous studies that investigated the influence of interaction on student satisfaction were conducted in the context of online courses or distance education (Eom et al., 2006; Kuo, 2014; Kuo et al., 2014; Moore, 1989, 1991; Sher, 2009) but limited studies have been conducted to investigate similar links in the context of the e-flipped classroom (eFC). Thirdly, most of the previous studies were conducted in the Western context, while this study is conducted in

an Asian context in which 95% of the students are Malaysian. Lastly, few studies on the area investigated were conducted within the context of accounting education in higher education. The current study is thus vital.

The next section reviews the relevant literature on the importance of all the three types of interaction from the perspective of Moore's transactional distance theory followed by the influence of interaction on student perceived learning and satisfaction and the use of eFC to promote interaction and engagement.

Perceived Learning and Student Satisfaction

Perceived learning is the student's interpretation of his/her capability in understanding the course content and in applying the principles or concepts learned in the course to achieve the course learning outcome (Hiltz, 1988), while, according to Astin (1993), students' satisfaction can be defined as their perception and perceived value towards their college experience and education received while attending an educational institution.

Student satisfaction is an important indicator of the quality of their learning experiences (Moore & Kearsley, 1996) and student success (Noel-Levitz, 2018). Timely feedback from instructors to their learners is viewed as a top priority in improving student satisfaction (Noel-Levitz, 2018). Many researchers have investigated student satisfaction in online courses and distance learning and identified interactivity as one of its key predictors (Bolliger & Martindale, 2004; Hiltz, 1988; Kuo et al., 2013; Sher, 2009). All three interactions (i.e., learner-content interaction, learner-instructor interaction, and learner-learner interaction) were positively associated with how satisfied the students felt and how much they thought they had learned (Bernard et al., 2009).

Learner Interactions

According to Moore (1991, p. 2), transaction distance is the 'physical separation that leads to a psychological and communications gap, a space of potential misunderstanding between the inputs of instructor and those of the learner'. In a previous study, Moore (1989) describes transactional distance theory as interaction or dialogue. Moore's three interactions from the transactional distance theory (i.e., learner-content interaction, learner-instructor interaction, and learner-learner interaction) are one of the learning theories that can be applied to promote effective student engagement; these theories are also known as engagement strategies (Meyer, 2014).

Learner-content interaction is a one-way flow of information from the course content to the student (Moore, 1989). This is a highly active individualised

process that occurs between the student and the course content, either in terms of recorded videos, PowerPoint slides, group discussion, peer review, reflection, and more. Learner-instructor interaction refers to the two-way reciprocal communication between the course instructor and learners by motivating the students to learn and providing guidance and support when needed (Moore, 1989). Moore (1989) further asserted that learner-instructor interaction was highly desirable by many learners as the feedback provided by the instructor is 'especially valuable in responding to the learners' application of new knowledge' (p. 3). Learner-learner interaction refers to the interactions between one student and another or among a small group of students working on any class activities in a collaborative manner (Moore, 1989; Moore & Kearsley, 1996). This will allow students to learn from each other by exchanging ideas (Salas-Rueda et al., 2022) and is indeed crucial in their learning, sometimes even more so, as students may understand their peers' explanations better and easier compared to that of their instructors.

Previous studies have reported the importance of interactions to promote better student satisfaction in online courses (Bickle et al., 2019; McCormack, 2010; Moore & Kearsley, 1996; Wong, 2023a; Wong, 2023b). Online courses with high levels of interactivity result in higher levels of student motivation, improved learning and satisfaction compared to online courses with lesser interactive learning activities (Croxton, 2014).

Some studies reported learner-content interaction as the most important determinant of student satisfaction in online learning compared to learner-instructor interaction and learner-learner interaction (Chejlyk, 2006; Keeler, 2006). According to Tuovinen (2000), learner-content interaction is reported as the most important interaction as it is where student learning takes place. Therefore, students tend to prioritise learner-content interaction rather than the learner-instruction interaction or the learner-learner interaction in online courses (Conrad, 2002). Similarly, Kuo (2014) reported that learner-content interaction was the only significant determinant of African American students' satisfaction in an accelerated online course offered by a university in the United States. Kuo et al. (2014) also found learner-content interaction to be the strongest determinant of student satisfaction in a fully online setting.

Many studies have reported the significant impact of learner-instructor interaction on student satisfaction and perceived learning in online courses (Fredericksen et al., 2000; Moore, 2014; Sher, 2009). According to Sher (2009), learner-instructor interaction is one of the most critical factors in enhancing student satisfaction in an online course. This is in line with the findings of Battalio (2007), who concluded that learner-instructor interaction was the most required interaction in his summary from several online studies. The timeliness and quality of

instructor feedback have been proposed as the reason learner-instructor interaction is a major predictor of student satisfaction (Walker & Kelly, 2007). Parahoo et al. (2013) found similar results in Saudi Arabia, where faculty interactions had a significant impact on the satisfaction of male students, especially in terms of faculty empathy, availability of faculty and promptness of faculty feedback. Other studies with similar findings are reported by Goh et al. (2017). For example, Fredricks et al. (2004) and Gray and DiLoreto (2016) also found a significant impact of learner-instruction interaction on student-perceived learning. However, the relationship between learner-instructor interaction with student satisfaction appears inconsistent in the studies by Hamdan et al. (2021), Kuo et al. (2014), and Li and Jhang (2020), as the interaction between learner and instructor was not found to be a determinant of students' satisfaction in their online learning.

In contrast, some studies have suggested that improved student satisfaction and learning can be achieved by integrating learner-learner interaction, which is necessary for a better online learning experience (Mabrito, 2001; Sher, 2009). Mabrito (2001) stimulated features of the face-to-face classroom in the online business writing course with the inclusion of an asynchronous discussion forum, as well as synchronous discussion and collaborative learning via sharing of research and draft in progress, to promote interactive learning experiences in the online business writing course. This study concluded that in order to enhance the online learning experience and boost student satisfaction, learner-learner interaction is crucial (Mabrito, 2001). The findings of this study were replicated in other studies on learner-learner interaction, for example, Goh et al. (2017) and Parahoo et al. (2015). A recent study by Li and Jhang (2020) also found similar results whereby learner-learner interaction is evident and positively related to promoting student satisfaction in the online course due to the collaborative group assignment in the online course. Previous studies also suggested learner-learner interaction to be a significant determinant of perceived learning and satisfaction in online courses (Fredericksen et al., 2000; Moore, 2014). Findings in some other studies, however, reported that learner-learner interaction is not essential and may be negligible in online courses as it has no effect on students' satisfaction (Gray & DiLoreto, 2016; Kuo et al., 2014).

Despite the varying outcomes, these studies show that the different types of interactions have some impact on perceived learning and students' satisfaction. These studies also imply that the effects of interactions are very much context dependent. This highlights the complex nature of online learning and the importance of having more research in the area, hence the current study.

e-Flipped Classroom

The traditional flipped classroom (FC) in a face-to-face setting has garnered much acceptance and has been widely adopted to promote active learning and student-centred learning, improve student performance and engagement in the learning activities, as well as promote self-regulated learning and allow students to retain information for a longer time (Garner & Chan, 2019; Gilboy et al., 2015). The FC, which encourages student-centred learning, exchanges lecturing time with hands-on learning activities. Students are required to prepare before the flipped class by watching pre-recorded video lectures and attempting pre-class activities at their own pace. During the in-person session, students connect further by focusing on discussing and applying the concepts learned and engaging in interactive group activities.

Class size and the level of learner-instructor interaction or engagement have been suggested by Garner and Chan (2019) as factors that may influence the effectiveness of the traditional FC. In contrast, a study done by Wong et al. (2019) found that the traditional FC implemented in a large first-year financial accounting course with almost 300 students was successful at promoting engagement by allowing learners to interact and discuss the lesson with other learners with the course instructor, as well as interaction with the course content. The study shows that despite the class size, the FC was effective in promoting students' engagement, most probably because of its design and planning.

As suggested by Barbera et al. (2013), the course design is one of the most influential variables on student satisfaction and perceived learning. This is extended to the context of the FC (Chan et al., 2018). A badly designed FC might affect students' readiness to adopt flipped learning and leave a bad impression on its effectiveness.

In contrast, the eFC is seen as the current trend and has started to make its way as one of the strategies to promote active learning and engagement in online learning, especially during the Covid-19 pandemic (Playfoot, 2021; Stöhr et al., 2020). The pre-class activities for the eFC are similar to those of the traditional FC, in which students are to engage with prepared materials before the in-class session. In the eFC, the in-class activities will be conducted entirely online. Thus, the eFC combines both the asynchronous and synchronous teaching.

There are a few aspects to be considered when conducting eFCs. For one, the absence of face-to-face sessions highlighted the importance of synchronous sessions in any online learning. Knapp (2018), who examined the use of video conferencing in promoting interaction in a flipped online master programme, found that the use of synchronous sessions had successfully promoted interactions as if students were in a face-to-face classroom setting. Phillips and

O'Flaherty (2019) reported the importance of having a competent tutor who is both content-confident and consistent in content delivery as well as trained in using the features available in the virtual classroom to improve student satisfaction with the flipped online nursing course. Recent studies on e-flipped learning show that the eFC is as effective as the traditional one, particularly in improving student satisfaction and perceived learning (Ismail & Abdulla, 2019; Playfoot, 2021; Wong, 2023b).

The Purpose of This Study

Prior studies that examined the relationship between interactions and students' overall perceived learning and satisfaction were mostly focused on online courses or distance learning in the Western context and were mostly non-accounting-related. The literature review also found that those studies on FC investigated traditional FC, and very few examined the impact of interactions in eFC.

The current study was conducted to fill these gaps. Its main objective was to investigate the impact of interactions in an eFC on students' perceived learning and satisfaction in the pre-class activities as well as the in-class activities. In supporting this purpose, the primary research objectives are as follows:

- *Objective 1:* To investigate the correlation between interaction (learner--learner interaction, learner-instructor interaction, and learner-content interaction), student-perceived learning, and student satisfaction in eFC instruction.
- *Objective 2:* To investigate the relationship between interaction and student-perceived learning in eFC instruction.
- *Objective 3:* To investigate the relationship between interaction and student satisfaction in eFC instruction.

Method

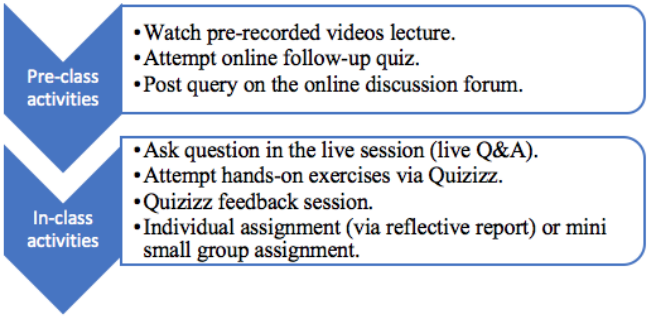
This study was designed as correlational research to enable the researchers to evaluate the relationships and effects between dependent and independent variables.

Participants and the Background of This Study

For students majoring in Accounting and Finance in Malaysian business schools, this Management Accounting course is a required second-year course. Over the course of the 14-week course, the eFC was administered during the

two-hour lecture period from Week 2 to Week 6 (a total of five e-flipped sessions). The eFC instruction conducted in this course can be summarised in Figure 1.

Figure 1
Activities conducted in the eFC instruction



Instruments

The online survey was collected in Week 6 of the course after the end of the last e-flipped lecture class. A total of 151 students (82%) consented to participate in the study. There were three scales used in the online survey: 1) interaction scale, 2) perceived learning scale, and 3) student satisfaction scale.

Interaction Scale

The interaction scale was adapted from Kuo et al. (2014). It requires students to rate their level of interaction with either other students or instructors or the course content in this eFC. This scale comprises three subscales: learner-learner interaction (LLI), learner-instructor interaction (LII), and learner-content interaction (LCI), with a total of 18 items. The items are on a 5-point Likert scale, where '1' indicates strongly disagree, and '5' indicates strongly agree. Each subscale has strong reliability, as indicated by the Cronbach alpha reliability values for this study, which vary from 0.84 to 0.89. High ratings suggest a high level of interaction, while low ratings denote a low amount of interaction.

Perceived Learning Scale

In this study, students' perceived learning is measured twofold: perceived learning on 1) pre-class activities and 2) in-class activities in the eFC. These two scales are self-developed survey questionnaires comprising 10 items with 4 items and 6 items for the pre-class activities and in-class activities, respectively.

Both these scales required students to rate their perceived learning in e-flipped instruction on a 5-point Likert scale ranging from '1' (strongly disagree) to '5' (strongly agree). The Cronbach alpha also indicated a strong convergence for both scales, with 0.86 for its reliability coefficients. High scores on the scale indicate high perceived learning towards the eFC activities, while low scores indicate low perceived learning towards the eFC activities.

Satisfaction Scale

Similar to the above, the student satisfaction scale comprises two separate scales asking students to rate their satisfaction with both the pre-class and in-class activities in the eFC. These two subscales are also self-developed survey questionnaires comprising a total of 10 items, with 4 items and 6 items for pre-class activities and in-class activities, respectively. These two scales required students to rate their satisfaction level during this eFC on a 5-point Likert scale ranging from '1' (strongly disagree) to '5' (strongly agree). Internal consistency reliability, as estimated with Cronbach alpha for the two scales, was reasonably high: 0.84 for both scales. High scores indicate high student satisfaction with the eFC instruction, while low scores indicate low student satisfaction with the eFC instruction.

Data Analysis

Descriptive statistics were used to analyse the Likert scale responses, and SPSS software (version 25) was used for statistical analysis. To determine whether there was a relationship between the pre-class and in-class activities of the eFC and the learner-learner, learner-instructor, learner-content interactions, student-perceived learning, and student satisfaction, the Pearson correlation was computed. In addition, one-way analyses of variance (ANOVA) and multiple regression analyses were used to examine the effects of learner interaction with instructor, content, and other learners on student satisfaction and perceived learning in pre-class and in-class activities in the eFC instruction.

Results

Descriptive Analyses of Interactions, Perceived Learning and Student Satisfaction in e-Flipped Classroom Instruction

Table 1 indicates the mean score, midpoint, or median, standard deviation and reliability information for each scale based on the sample collected in this study. All three types of interaction had mean scores ranging from 3.48 to 4.07, with learner-instructor interaction (M = 4.07, SD = 0.55) having the highest mean score and higher than the median. This is followed by learner-content interaction (M = 3.91, SD = 0.76) and learner-learner interaction (M = 3.48, SD = 0.65), which had the lowest mean score, with both of these scales had an average mean score slightly below their median.

Students perceived learning on the pre-class and in-class scales as high, with mean scores of 4.08 (SD = 0.63) and 3.98 (SD = 0.62), respectively. Students perceived learning in the pre-class had an average mean score higher than the median score of 4.0, while the perceived learning for the in-class activities had an average mean score slightly lower than the median score by 0.02. Both the students' satisfaction with the eFC instruction for both pre-class and in-class activities was high, with a mean score of 4.11 (SD = 0.70) and 4.05 (SD = 0.61), respectively. For the satisfaction subscale, the average mean score was higher than the median score of 4.0, as reflected in Table 1 below.

Table 1
Descriptive statistics

	Mean	Median	*SD*	*α*
LCI	3.91	4.0	.76	.89
LII	4.07	4.0	.55	.84
LLI	3.48	3.5	.65	.87
PL – Pre-class	4.08	4.0	.63	.86
PL – In-class	3.98	4.0	.62	.86
SS – Pre-class	4.11	4.0	.70	.84
SS – In-class	4.05	4.0	.61	.84

Note. LCI – learner-content interaction, LLI – learner-learner interaction, LII – learner-instructor interaction, PL – perceived learning, and SS – student satisfaction.

Relationship Between Interactions, Perceived Learning and Student Satisfaction in e-Flipped Classroom Instruction

Objective 1: Correlations between interactions, perceived learning, and student satisfaction in e-flipped classroom instruction

From Table 2, all three interactions with students' perceived learning in the pre-class and in-class activities have moderate positive relationships except for learner-learner interaction during pre-class activities, which has a weak positive relationship with perceived learning. Learner-content interaction ($r = 0.59$, $p < 0.01$) correlated the greatest with the student's perceived learning on the pre-class activities, while learner-instructor interaction ($r = 0.61$, $p < 0.01$) correlated the greatest with the student's perceived learning on the in-class activities in this eFC. This shows that the pre-class and in-class activities that promote interaction between learners with content, learners with the instructor, or learners with another learner may also promote students' perceived learning.

Additionally, the results demonstrated that all three interactions had moderately favourable associations with students' satisfaction with the in-class and pre-class activities. Among the three interactions, learner-learner interaction correlated the least with student satisfaction in both the pre-class activities and in-class activities with $r = 0.45$, $p < 0.01$ and $r = 0.44$, $p < 0.01$, respectively. However, it seems that learner-content interaction ($r = 0.65$, $p < 0.01$) correlated the greatest with student satisfaction with the pre-class activities, while the learner-instructor interaction ($r = 0.60$, $p < 0.01$) correlated the greatest with the student satisfaction with the in-class activities in the eFC. This shows that the pre-class and in-class activities conducted during the eFC, which promote interaction between learners with content, learners with instructors, or learners with learners, may also enhance students' perceived satisfaction.

Table 2

Correlations between interactions, perceived learning, and satisfaction

	LCI	LII	LLI	PL – Pre-class	PL – In-class	SS – Pre-class	SS – In-class
LCI	1						
LII	.60**	1					
LLI	.46**	.47**	1				
PL – Pre-class	.59**	.48**	.37**	1			
PL – In-class	.52**	.61**	.51**	.60**	1		
SS – Pre-class	.65**	.54**	.45**	.77**	.70**	1	
SS – In-class	.52**	.60**	.44**	.56**	.87**	.72**	1

Note. ** Correlation is significant at the 0.01 level (2-tailed).

Objective 2: Relation between interaction with student perceived learning in e-flipped classroom instruction

Multiple regression was conducted to determine whether the three interactions (i.e., learner-content interaction, learner-instruction interaction, and learner-learner interaction) predict student perceived learning on the eFC instruction for both the pre-class and in-class activities. Regression results indicated that the model with the three interactions significantly predicted student-perceived learning for both the pre-class activities and in-class activities in the eFC instruction with $F(3,147) = 30.342$, $p < 0.001$ and $F(3,147) = 40.475$, $p < 0.001$, respectively. The model accounts for 37% of the total variance in student-perceived learning on pre-class activities and 44% of the total variance in student-perceived learning with the in-class activities in the eFC.

Nevertheless, a closer examination of the model's coefficient estimates revealed that, as Table 3 illustrates, the learner-learner interaction was not a significant predictor ($p > 0.05$) of students' perceptions of their own learning from the pre-class activities. After the learner-learner interaction was eliminated from the model, the findings revealed that $F(2, 148) = 44.876$, $p < 0.001$, which explained 37% of the variance in how students rated their learning on the e-flipped pre-class activities. This indicates that the model is marginally stronger in the absence of learner-learner interaction and has no effect at all.

Learner-content interaction was found to be more significant among those significant predictors in the pre-class activities. In contrast, the learner-content interaction was the weakest of the three interactions during the in-class activities, while the learner-instructor contact was the strongest and most significant.

Table 3

Results summary of regression analysis (N = 151)

	B	Std Error	*b*	*t*	*p*-value
PL – Pre-class					
LCI	.378	.070	.453	5.386	.000
LII	.197	.097	.171	2.031	.044
LLI	.080	.074	.082	1.081	.281
PL – In-class					
LCI	.143	.065	.175	2.213	.028
LII	.435	.089	.386	4.863	.000
LLI	.235	.068	.247	3.449	.001

Note. The variance inflation factors (VIFs) are all below 2.

Objective 3: Relation between interaction with student satisfaction in e-flipped classroom instruction

Regression results indicated that the model with the three independent variables of interaction significantly predicted student satisfaction for the pre-class activities in the eFC with $F(3, 147) = 42.908$, $p < 0.001$ and accounted for 46% of the total variance in student satisfaction with the eFC pre-class activities. The regression results also revealed the model significantly predicted student satisfaction with the in-class activities with $F(3, 147) = 34.809$, $p < 0.001$ and accounted for 40% of the total variance in student satisfaction with the eFC in-class activities. Hence, all three interactions (i.e., learner-content interaction, learner-instructor interaction, and learner-learner interaction) were significant predictors of student satisfaction with both the pre-class and in-class eFC activities, as shown in Table 4.

Learner-content interaction was once again the most important factor of student satisfaction with the pre-class activities among those significant predictors, whereas learner-learner interaction was the least significant. The learner-instructor interaction was the greatest and most important indicator of student satisfaction with the in-class activities, which is consistent with the findings on perceived learning. In terms of predicting their level of satisfaction with the in-class activities in the eFC, the learner-learner interaction was similarly found to be the weakest of the three interactions.

Table 4

Results summary of regression analysis (N = 151)

Variables	*B*	Std Error	*b*	*t*	*p*-value
SS – Pre-class					
LCI	.427	.072	.463	5.931	.000
LII	.244	.100	.192	2.447	.016
LLI	.155	.076	.144	2.035	.044
SS – In-class					
LCI	.164	.065	.205	2.508	.013
LII	.443	.090	.402	4.901	.000
LLI	.144	.069	.155	2.092	.038

Note. The VIFs are all below 2.

Discussion

This study attempted to understand the relationship between learner-content, learner-instructor, and learner-learner interaction with student-perceived learning and student satisfaction in the pre-class and in-class activities in an eFC. Consistent with prior research on the significance of interactions on students' satisfaction in online courses (Kuo et al., 2014; McCormack, 2010; Moore & Kearsley, 1996), the findings of this study have confirmed the importance of interactions in an online FC instruction and emphasise the importance of all interactions: learner-content, learner-instructor, and learner-learner interaction. The nature of the interaction may differ from study to study, but the overall principle of the importance of interactions in online learning, either in asynchronous or synchronous learning, remained consistent. This study contributes to the literature on the significance of interactions on students' perceived learning and their satisfaction in the online learning environment, especially in the classroom where e-flipped instruction is adopted.

The findings in this study also found that all three interactions are significant determinants of student-perceived learning in in-class activities; however, only learner-content and learner-instructor interaction are found to be significant determinants of student-perceived learning in the pre-class activities in this e-flipped instruction. This study also found that the three interactions in this study are significant determinants of student satisfaction in both pre-class and in-class activities. As such, the results from this study supported the transactional distance theory of Moore (1989; 1991) and Moore and Kearsley (1996), who have highlighted the importance of the three interactions as an engagement strategy in an online learning environment.

Learner-Content Interaction

Consistent with the literature, our study reported learner-content interaction as a significant determinant of both student-perceived learning and satisfaction in pre-class and in-class activities (Chejlyk, 2006; Keeler, 2006; Kuo, 2014; Kuo et al., 2014; Tuovinen, 2000).

During the pre-class activities, students' learning takes place via the pre-recorded video lectures. Understandably, this has resulted in the students prioritizing learner-content interaction more than the interaction with other learners or with their instructor (Conrad, 2002). The online follow-up quiz may have further enhanced students' engagement with the content as they would need to refer to the pre-recorded video when attempting the quiz.

The in-class activities, which included 1) an activity with Quizizz, an online quiz platform, and 2) an individual reflective report, or 3) a small group discussion, may have further motivated students to engage with the content. For example, the activity with Quizizz may have helped students evaluate and reinforce their understanding of what they have learned prior. The individual reflective report would further help them engage with content as they were asked to summarise learned concepts and concepts with which they were still struggling. In addition, the small group discussion, which required them to discuss assignment questions with their peers, may have further reinforced their engagement with content. This shows that the design activities may have enhanced learner-content interaction, which had a positive impact on students' perceived learning and satisfaction in this eFC.

Learner-Instructor Interaction

Our study discovered that 1) learner-instructor interaction significantly determined student perceived learning and satisfaction in both the pre-class and in-class activities, and 2) learner-instructor has the strongest positive relationship with perceived learning and student satisfaction in the in-class activities. In this regard, the result of this study deviates from prior studies by Hamdan et al. 2021; Kuo, 2014 and Li and Jhang, 2020. The study done by Li and Jhang (2020), for example, reported learner-instructor interaction as not a significant predictor of student satisfaction in the online social work undergraduate classroom. The authors found that the results could be affected by the content of the interaction, which could be due to an inexperienced instructor who taught the course online for the very first time and had put more focus of the interaction on course administration-related issues than content-related interaction.

There are several potential reasons for the departures of the results in this study as compared to the above studies and in supporting the significance of learner-instructor interaction in the online learning environment. Firstly, the eFC was designed to promote learner-instruction interaction, particularly through instructor's feedback, for example:

1. Instructor's feedback to students' questions and confusion with content through the online discussion forum (pre-class).
2. Instructor's automated feedback for the online follow-up quiz (pre-class).
3. Instructor's feedback for questions posted during the Q&A session (in class).
4. Instructor's feedback for the Quizizz activity (in-class).

5. Instructor's response to students' individual reflective reports or the small group discussion on the assignment (in class).

The feedback received from the instructor and the (nearly) immediate response to students' queries may have a positive impact on student's perceived learning and satisfaction with both the pre-class and in-class activities. Perhaps students could have been satisfied with their learning experiences, as many different means are made available for them to get feedback from their instructor, as the instructor plays a crucial role in reaffirming students' understanding of the principles and concepts learned (Moore, 1989). This shows that the instructors' timely feedback, as recommended by Chickering and Gamson (1987), seven principles for good practices in undergraduate education, remains important when supporting learning in an eFC environment.

Secondly, students may have valued instructor's content knowledge as she was an experienced instructor for this course. This is very much in line with the findings of Bolliger and Martindale (2004) and Phillips and O'Flaherty (2019), both who have highlighted instructors who teach in the online courses and the virtual FC should be a good instructor and an effective teaching staff.

Thirdly, since the e-flipped instruction was conducted with a combination of both asynchronous (with pre-class activities) and synchronous (with in-class activities) instruction, the instructor's presence may have been further enhanced. The strong presence of the instructor during pre-class and in-class activities has been appreciated by the students, which could possibly affect their learning positively and result in more satisfied learning.

Learner-Learner Interaction

The finding of this study revealed that learner-learner interaction is also a significant determinant of student-perceived learning for the in-class activities and a significant determinant of student satisfaction for both the pre-class and in-class activities, which is essential in student learning and cognitive development (Moore, 1989; Rawas et al., 2020). However, our study found that learner-learner interaction does not significantly affect student-perceived learning and may be negligible in the pre-class activities as it has no effect on perceived learning, similar to that of Alqurashi's (2019) finding. It is not surprising that learner-learner interaction is not a significant predictor of student-perceived learning in the pre-class activities. This probably could have been due to the design of the pre-class activities, where learner-learner interaction has not been taken into consideration when designing the e-flipped instruction.

Perhaps another reason could be that students find it more reliable to ask the course instructor through the online discussion forum than asking their peers, as their course instructor is a course expert (Dixson, 2010).

Our findings revealed that learner-learner interaction significantly predicted student satisfaction in both the pre-class and in-class activities, which contradict those reported by Gray and DiLoreto (2016), who discovered that learner-learner interaction significantly impacted student-perceived learning but did not significantly affect student satisfaction. Kuo et al. (2014) reported that learner-instructor and learner-content interaction were significant predictors of student satisfaction, but learner-learner interaction was not when group activities were not required for learners. Our study conformed with this finding, as when the live Q&A session and mini small group assignment activities were incorporated as part of the in-class activities, these activities could have encouraged and supported learner-learner interaction. This is also in line with McCormack (2010), who reported that different forms of technology and assignments when used appropriately, enhance communication, and promote quality learning. There is no clear explanation as to why students were satisfied with the learner-learner interaction in the pre-class activities, though they did not find that these resulted in perceived learning. Perhaps students had discussed the content of the pre-recorded video and the online follow-up quiz with their peers outside of class, which is beyond the scope of this study.

Conclusion

This study has contributed to the literature that the strategy and the design of a course are important to promote interaction that results in learning and student satisfaction. A carefully designed course and crafted class activities undoubtedly can influence and promote the interaction among learners with course content, instructor and peers in any classroom setting. Bernard et al. (2009) and Moore (1989) both shared similar opinions regarding instructional design as one of the ways to foster increases in the quality of interactions. Thus, we echo Moore (1989), who states that proper planning using different types of activities and different communication mediums is warranted to ensure the maximum effectiveness of each type of interaction that is most suitable for different course areas or specialisations. The study also shows the importance of an instructor's presence and feedback, particularly in an eFC environment.

This is the first study to have examined all three interactions and have reported the significance of them on student-perceived learning in in-class activities and student satisfaction in both the pre-class and in-class activities,

though only learner-instructor and learner-content interaction are significant determinants in the pre-class activity in the online course using an eFC strategy. Therefore, the result of this study has contributed to the field of online education and shows that it is possible to have all three interactions be a significant predictor of students' perceived learning and satisfaction if the appropriate activities are implemented and incorporated into the design of the course to promote these types of interactions.

However, this study has some limitations. It was conducted in only one cohort of second-year management accounting students and was only conducted once. Future studies should involve a bigger cohort of students, perhaps from different disciplines and different years of study. Data collection may be done more than once for comparison, which may have helped derive better conclusions. Despite this, as this is action research, the sampling and data gathered are adequate to inform the researcher on what worked and what did not work in the eFC for improvement purposes.

Disclosure Statement

The authors have no conflict of interest to declare.

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Videoconferencing and Sleep Quality in Slovenian University Students: Is There a Mediating Role of Zoom Fatigue?

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Given the expanding utilisation of technology in educational settings, online learning has become a common teaching method. It prevailed during the Covid-19 pandemic, but the effects of attending videoconferences with active participation on psychological functioning have not yet been studied in detail. This article aimed to evaluate the relationship between videoconferencing and sleep quality – one of the crucial mechanisms promoting physical and mental well-being. Additionally, we were interested in the potential mediating role of videoconferencing fatigue in this relationship. The survey took place during the Covid-19 epidemic (in Spring 2021). Our results show a negative relationship between videoconferencing/screen device use and sleep quality and that this relationship is mediated by videoconferencing fatigue. Results of the further analysis revealed that perceived study suitability plays a significant role in determining to what extent the duration of videoconferences relates to feelings of videoconferencing fatigue. Our findings aid in understanding the relationships between videoconferencing, Zoom fatigue, and sleep better. They may be helpful in optimising remote learning today, as they remain frequently used in higher education worldwide.

Keywords: Online learning, sleep quality, university students, videoconference fatigue, Zoom fatigue

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Udeležba na videokonferencah in kakovost spanja pri slovenskih študentih: mediacijska vloga Zoom izčrpanosti

Vita Vuk, Marina Horvat, Vesna Vrečko Pizzulin in Vita Štukovnik

S porastom rabe tehnologij v izobraževanju je spletno učenje postalo pogosta metoda poučevanja. Prevladovalo je med epidemijo covida-19, vendar učinki aktivne udeležbe na videokonferencah na psihološko delovanje niso bili podrobneje raziskani. Namen tega članka je bil preučiti odnos med udeležbo na videokonferencah in kakovostjo spanja, enega ključnih mehanizmov za spodbujanje telesnega in duševnega počutja. Zanimala nas je tudi mogoča mediacijska vloga videokonferenčne utrujenosti v tem odnosu. Vzorec je vključeval 529 slovenskih študentov, raziskava pa je potekala med epidemijo covida-19 (spomladi 2021). Naši rezultati kažejo negativno razmerje med uporabo videokonferenc/zaslonskih naprav in kakovostjo spanja ter potrjujejo, da je videokonferenčna utrujenost mediatorka v tem odnosu. Rezultati nadaljnjih analiz so razkrili, da ima zaznana ustreznost študija pomembno vlogo pri določanju, v kolikšni meri se trajanje videokonferenc povezuje z občutki videokonferenčne utrujenosti. Naše ugotovitve pripomorejo k boljšemu razumevanju odnosov med videokonferencami, t. i. Zoom izčrpanostjo in spanjem. Lahko bi bile koristne pri optimizaciji učenja na daljavo, ki se še vedno pogosto uporablja v visokošolskem izobraževanju po vsem svetu.

Ključne besede: spletno učenje, kakovost spanja, univerzitetni študentje, videokonferenčna utrujenost, Zoom izčrpanost

Introduction

The Covid-19 pandemic prompted an unprecedented shift to remote learning, with online platforms and videoconferencing becoming vital for education (Revilla-Cuesta et al., 2021). This transition raised concerns about 'Zoom fatigue' and its impact on students' well-being (Nadler, 2020; Riedl, 2022). Additionally, extensive screen device use has sparked questions about its effects on sleep quality (Levenson et al., 2017; Touitou et al., 2016). This study explores the interplay between online learning, Zoom fatigue, and sleep patterns among university students. By investigating the relationships between screen device usage, videoconferencing behaviours, and sleep quality, we seek to provide insights to enhance students' experiences in virtual learning environments.

Online Learning During the COVID-19 Epidemic

The rapid development of information communication technology (ICT) has led to changes and redesigns of educational processes. A shift from traditional classroom-based learning to online modes has been observed in recent years (Allen & Seaman, 2016). This transition was accelerated during the Covid-19 epidemic when face-to-face means of knowledge delivery were impossible due to public health measures (Mohamed Hashim et al., 2022; Rafsanjani et al., 2022; Unver & Sungur, 2022). As a result, the educational process in the majority of institutions was conducted in online learning mode, in which videoconferencing platforms have been regularly applied as a means of lecture delivery (Gabrovec et al., 2021; Massner, 2021; Student Organization of Slovenia, 2020). Additionally, class sessions were recorded, enabling students to revisit the content at a later time (Unver & Sungur, 2022). In light of digital transformation, ICT-based assisted learning modes are increasingly becoming part of hybrid or stand-alone online practices of knowledge delivery in higher education institutions, and some study programmes are solely delivered online (Allen & Seaman, 2016). Research indicates that videoconferencing is a frequently implemented online learning tool (Ng et al., 2023). However, the possible effects of such learning modes on students' well-being and overall psychological functioning still need to be fully understood.

Available research indicates several advantages and disadvantages of ICT-based assisted learning modes. On the one hand, it allows students and educators to interact interactively in real-time, enhance teacher-student or multiway engagement, and expand access to remote learning (Al-Samarraie, 2019). In primary school students, distance learning had a beneficial contribution to

the development of self-regulated learning skills, as well as facilitated proficiency in utilising ICT (Drvodelić & Domović, 2022). On the other hand, studies indicate that online education via screen devices poses specific challenges compared to traditional in-person education, such as the lack of interaction during lectures, difficulty understanding the content, and the lack of regular daily routine (Gabrovec et al., 2021).

Despite students having mixed impressions of online learning in general, a few negative consequences of videoconferencing have been identified. In times of the Covid-19 pandemic, when the use of videoconferencing sharply rose, there were reports of exhaustion, fatigue, and the need for recovery before embarking on the next activity following prolonged usage of videoconferences (Nadler, 2020; Riedl, 2022). This phenomenon has been referred to as 'videoconferencing fatigue' or 'Zoom fatigue' (Nadler, 2020). Riedl (2022) proposes the following definition:

> Zoom fatigue (synonym: videoconference fatigue) is defined as somatic and cognitive exhaustion that is caused by the intensive and/or inappropriate use of videoconferencing tools, frequently accompanied by related symptoms such as tiredness, worry, anxiety, burnout, discomfort, and stress, as well as other bodily symptoms such as headaches'. (p. 157)

The consequences of videoconferencing fatigue are evident across various dimensions of individuals' functioning, such as physical (e.g., physical exhaustion, eyestrain), emotional (e.g., anxiety, irritableness, moodiness, emotional exhaustion, elevated stress), cognitive (e.g., disengagement, inability to focus) and social (e.g., disconnectedness, isolation) (Li & Yee, 2022).

As Zoom fatigue represents a relatively new construct, research examining different aspects of this phenomenon is still emerging. However, available data indicate that Zoom fatigue is prevalent among students using videoconferences. Oducado et al. (2022b) reported that 66.7% of nursing students experienced Zoom fatigue during virtual meetings. Additionally, students might be a vulnerable population as data implicate that individuals who use videoconferences primarily for study purposes report a higher level of videoconferencing fatigue compared to those who use it in the work context (Queiroz et al., 2021). Despite the recognition that Zoom fatigue is a prevalent problem amongst students, a scarce amount of research on the determinants of this phenomenon exists. Nevertheless, the available evidence indicates that Zoom fatigue is related to aspects of conferences *per se* (interval between and duration of videoconferences) and environmental aspects (ergonomics during online sessions) (Ghanem et al., 2023; Salim et al., 2022). Potential mechanisms underlying this

phenomenon in student populations include a perception of physical confinement, cognitive overload associated with generating non-verbal cues, and mirror anxiety (Ghanem et al., 2023; Oducado et al., 2022a).

Screen Device Use and Its Impact on Sleep

Sleep is a central tenet of physical and mental well-being and academic success (Alvaro et al., 2013; Buysse, 2014; Itani et al., 2017; Jike et al., 2018). Specifically, poor sleep health negatively affects cognitive processing across different cognitive domains, such as executive functioning, sustained attention, and long-term memory, which are vital components of efficient encoding, storage, and retrieval of information presented during the education process (Diekelmann & Born, 2010). Research shows that university students who prioritise sleep are likely to see an improvement in academic performance (Hershner, 2020) and are better able to cope with stress (Killgore et al., 2008).

Research indicates that one risk factor for poor sleep is the extensive use of screen-based technology; daily screen time is negatively associated with both sleep quality and quantity (Levenson et al., 2017). The predominant focus of research on the association between digital media use, screen time, and sleep pertains to children and adolescents (Hale & Guan, 2015), but a few studies have confirmed an association between screen time and sleep quality and sleep duration among young adults and university students (Fossum et al., 2014; Levenson et al., 2016; Rosen et al., 2016). Most studies examined the relationship between evening screen use and sleep, while comparatively fewer studies delve into the broader scope of daytime screen exposure, including videoconferencing, and its impact on sleep patterns. For example, Pham et al. (2021) emphasised that those students who used the devices within one to two hours before bedtime reported poorer sleep quality. Findings from other studies highlight the effects of shorter screen time; for example, social networking use even as early as 30 minutes before bedtime is associated with disturbed sleep in young adults (Levenson et al., 2017). Majumdar et al. (2020) reported that heavy screen use among college students is associated with disrupted sleep patterns, particularly a shorter sleep duration, with most participants reporting feeling sleepy during the day, which the authors suggest is also due to exposure to screen devices before bedtime.

Several possible underlying mechanisms, such as heightened physiological arousal and hormone suppression due to blue light emission (e.g., Touitou et al., 2016), contribute to the impact of screen use on sleep. However, findings have not been consistent, as some studies have not confirmed the effects of blue

light or screen brightness in general on sleep quality and other sleep parameters (e.g., Higuchi et al., 2005; Pham et al., 2021). Therefore, researchers agree that there are significant associations between screen use and sleep, but little is known about the type of relationship and other potential confounders. This is partly because few studies have examined how screen use directly affects sleep over time (Scott & Woods, 2018).

Limited research explores how overall screen device usage throughout the day, including videoconferencing, impacts sleep quality. To the best of our knowledge, no prior research has examined the mediating role of Zoom fatigue in relation to electronic media usage and sleep quality. Given the increasing prevalence of videoconferencing in current and possible future educational processes, investigating these relationships is of great importance. Thus, this paper aims to determine relationships between screen device usage, videoconferences, and sleep quality and to establish the potential mediating role of Zoom fatigue. In this paper, we interchangeably employ the terms 'Zoom fatigue' and 'videoconference fatigue'. The terms delineate individuals' experience of fatigue during and/or following participation in a videoconference, irrespective of the specific videoconferencing platform utilised.

Aim and Hypotheses of the Current Study

The primary aim of this study was to assess the relationship between videoconferencing and sleep quality. Moreover, our study aimed to explore the potential mediating role of videoconferencing fatigue on this association. Additionally, we assess whether study type preference served as a moderator in these relationships. Building upon prior research, we hypothesised a negative relationship between videoconferencing duration/screen time and sleep quality. Furthermore, we predicted a negative relationship between videoconferencing fatigue and sleep quality. Finally, we expected that videoconferencing fatigue would mediate the relationship between videoconferencing duration and sleep quality.

Method

Participants

Initially, our sample consisted of 719 Slovenian university students. Considering our main research question and to ensure the validity of the data, we first reviewed our data. We excluded participants who reported no

videoconferences in this period and/or participants who reported that an individual videoconference lasted longer than the total time spent on videoconferences. The analyses were therefore performed on a sample of 529 participants. Most (81.3%) were women; most were undergraduate university students (75.4%); 23.6% were postgraduate students, and 0.4% were enrolled in a PhD programme. The majority of participants were enrolled in a public university (98.1%). The majority, 51.2%, of participants were studying at the University of Ljubljana, 41.8% were studying at the University of Maribor, 4.9% were studying at the University of Primorska, and 0.4% were studying at the University of Novo Mesto. The few remaining participants were studying at other colleges. On average, participants were 21.9 years old (*SD* = 2.0). In terms of medical background, the majority of participants did not report any chronic somatic (86.8%) or mental (89.2%) illness or diagnoses of sleep disorder (99.6%).

Instruments

Sleep quality. Sleep quality was assessed with the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989). The PSQI, a self-reported questionnaire, evaluates sleep quality and disturbances. It comprises nineteen individual items, which yield seven 'component' scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The scoring of the answers is based on a 0 to 3 scale, whereby '3' reflects the negative extreme on the Likert Scale. The global PSQI score ranges from 0 to 21, with higher scores indicating more severe sleep disorders/ lower sleep quality (Buysse et al., 1989). The Slovene version of PSQI has been proven reliable and valid in the Slovene population (Košir, 2021). The present study's reliability coefficient was satisfactory (Cronbach's alpha = .77).

Videoconferencing fatigue. Videoconferencing fatigue levels of the faculty were determined using the Zoom Exhaustion & Fatigue Scale (ZEF Scale; Fauville et al., 2021), which consists of a set of fifteen questions, answerable on a 5-point Likert scale (1 = 'not at all/never' to 5 = 'extremely/always'). The scale is categorised into five domains: overall, visual, social, motivational, and emotional (Cronbach's alpha between .81 and .88). The scale assesses potential detrimental psychological effects or harm following online interactions, both in educational and professional contexts. In the original study, 'Zoom Fatigue' was defined as the fatigue individuals may experience during or after engaging in videoconferencing based on the ZEF total score. In the present research, we utilised the variables continuously, which was in line with the developers'

instructions for scale usage. The Slovene version of ZEF was obtained for the present study using standardised translation procedures. Exploratory factor analysis using the Principal axis factoring method demonstrated that extracting a single factor explains 55.7% of the total variance. A scree plot supported the one-factor solution. Furthermore, the eigenvalue associated with the subsequent factor marginally exceeded 1 (1.17), contributing only an additional 7.77% to the overall variance. Factor loadings for the single-factor solution ranged from .60 to .84. Subsequent confirmatory analysis (CFA) was conducted in R (R core team, 2024) using the lavaan package (Rosseel, 2012). The results of the second-order CFA analysis with the overall ZEF score as a second-order factor and five abovementioned first-order factors indicated a satisfactory fit to the data, $\chi^2(85) = 409.24$, $p < .001$, CFI = 0.95, TLI = 0.94, RMSEA = .09, SRMR = .05. The reliability coefficient in our sample was good (Cronbach's alpha = .88 for ZEF total score).

Digital Media Usage and Videoconferencing

Additionally, the participants answered four open-ended questions about the frequency and characteristics of digital media use based on the study on digital media use before bedtime in university students (Orzech et al., 2016). We asked about the average total daily screen time, the average amount of screen time in the last two hours before sleep, the average total daily duration of videoconferences, and the average duration of an individual videoconference.

Research Design

This prospective cross-sectional study occurred amid the officially declared Covid-19 pandemic in Slovenia (18th May until 20th June 2021). Most universities officially switched from in-person teaching to remote learning during this time, and most of the education was done using web-based platforms. University students were invited to participate in our online-based study through social media platforms, university newsletters, and email. Each participant provided informed consent prior to the commencement of the study. All subjects reported their demographic data and general health-related information, data related to remote learning, videoconferencing, and overall digital media use, and completed two standardised questionnaires that assessed their sleep quality and videoconferencing fatigue. To ensure anonymity, no personally identifiable information was collected from participants. They had the option to withdraw from the survey at any time without needing to provide a reason, and

this would not affect their academic status. The study was conducted in compliance with the principles outlined in the Declaration of Helsinki and received approval from the National Medical Ethics Committee.

First, descriptive statistics and frequency analyses were performed to describe the demographic, health-related, remote learning, overall digital media use, and videoconferencing data in the Slovenian university student population. We identified a few outliers in videoconferencing variables. The outliers were identified using the criteria of $z > \pm 3$. We identified 11 cases, and performing an analysis omitting these cases did not affect the conclusions (see Appendix), so results for the whole sample are reported. Next, we performed correlational analyses to analyse the relationship between the variables. Lastly, we performed a mediation analysis using the Process Macro ver. 4.2 (Hayes, 2012). We also performed a moderated mediation analysis to test whether a mediational process is conditional on another variable (Muller et al., 2005). In our case, the variable was how well this (remote learning) approach fits or suits the individual compared with the conventional type of study. The moderated variable was added to the model as an un-centred binary variable with 0 = suits less/much less and 1 = suits equally and more/much more. We tested moderated mediation using model 7 of the Process Macro by Hayes (2012). All analyses were performed using the IBM Statistical Package for Social Sciences (SPSS) ver. 26 (IBM Corp, 2019).

Results

Descriptive Statistics and Correlations Between Daily Screen Time, Videoconferencing, Videoconferencing Fatigue, and Sleep Quality

First, we introduce a table containing descriptive statistics encompassing measures of central tendency (mean), dispersion (standard deviation), asymmetry (skewness), kurtosis, and internal reliability (Cronbach α coefficient) for the study variables.

Table 1

Descriptive statistics of the study variables

	n	*M*	*SD*	*S*	*K*	α
Daily screen time[a]	529	7:08	2:59	0.51	-0.27	-
Screen time in the last two hours before sleep[a]	490	1:20	0:32	0.11	-1.06	-
The average duration of individual videoconference[a]	529	1:51	0:51	3.15	20.02	-
The average total duration of videoconferences[a]	529	4:50	2:08	1.48	4.06	-
Zoom exhaustion and fatigue	529	41.34	13.74	0.08	-0.62	.89
Global PSQI score	529	7.50	3.67	0.59	-0.08	.77

Notes. [a] = hh:mm format, *n* = number of participants, *M* = mean, *SD* = standard deviation, *S* = skewness coefficient, *K* = kurtosis coefficient, α = Cronbach alpha coefficient.

As shown in Table 1, the average daily screen time was about seven hours a day. Of that, almost an hour and a half of screen time usage was in the last two hours before bedtime. The average duration of an individual videoconference was nearly two hours a day, together almost five hours a day on average. After excluding outliers (see Appendix), the average time spent on videoconferences lowered slightly. We also analysed how participants perceived online learning compared to the conventional study approach. Almost half of the participants (44.2%) answered that distance learning suits them less or much less compared to the conventional form of study, a little over 10% (11.5%) answered that this kind of study fits them equally, and 36.1% answered that this form of study fits them more or much more, compared to the conventional study approach. Eight per cent of the participants did not answer this question since they were not a part of the conventional study approach, so they could not compare the forms of study.

Due to some outliers in the average duration of total and individual videoconferences, as indicated by the values of skewness and kurtosis coefficients (Table 1), we re-ran the descriptive analysis and correlations without those outliers (for the procedure of identifying outliers, please see Statistical analysis in the Methods section of this paper). The results of these analyses (n = 518/n = 479) can be found in Appendices (Tables 1 and 2). As we can observe from correlational analyses, the overall pattern of results is similar to those of the whole sample. Based on these results, we continued our analysis based on the entire sample (n = 529/490).

Next, we performed a correlation analysis on the study variables. The results are presented in Table 2.

Table 2
Correlational matrix of the study variables

		1	2	3	4	5	6
1	Daily screen time	-					
2	Screen time in the last two hours before sleep	.31**	-				
3	The average duration of individual videoconference	.11*	.15**	-			
4	The average total duration of videoconferences	.22**	.09*	.36**	-		
5	Zoom exhaustion and fatigue	.12**	.16**	.20**	.27**	-	
6	Global PSQI score	.22**	.19**	.09*	.17**	.44**	-

Notes. * $p < .05$; ** $p < .01$

The results show low but significant correlations between variables of screen time use, specifically daily screen time, screen time two hours before bedtime, the average duration of an individual videoconference, and the average time spent on videoconferences. Due to the non-normal distribution of variables, measuring time spent on videoconferences, we re-ran the analysis using the Spearman rank-based correlation. The results show only minimal changes. The correlation between screen time and duration of individual conferences was no longer significant, $r_s = .04$, $p = .324$. The same goes for the correlation between screen time before bedtime and total time spent on videoconferences, $r_s = .06$, $p = .220$. Other correlations showed a similar overall pattern of results and led to the same conclusions.

Relationship Between Videoconferencing and Screen Time With Videoconferencing Fatigue and Sleep Quality

In this paper, we mainly focus on the relationship between time spent on videoconferences with measures of videoconferencing fatigue and sleep quality. As expected, all four measures of screen time and duration of videoconferences were positively related to videoconferencing exhaustion and fatigue, with the lowest ($r = .12$, $p < .01$) but still significant correlation with overall screen time and the highest ($r = .27$ $p < .01$) with the total time spent on videoconferences a day (on average).

Similarly, there was a positive correlation with the global PSQI score (higher scores reflect lower sleep quality (Buysse et al., 1989), indicating that more time spent on videoconferences and on screens was generally related to lower sleep quality. The correlation coefficient ranged from .09 ($p < .05$) with the average duration of individual videoconference to .22 ($p < .01$) with overall screen time.

Lastly, we were interested in whether the relationship between screen time/videoconferencing and sleep quality was mediated by videoconferencing fatigue. Please note that all reported effects are unstandardised. The relationship between the duration of an individual videoconference and sleep quality (total effect: c = 0.38 ± 0.36, p = .040) was mediated by videoconferencing fatigue (direct effect: c' = -0.02 ± 0.33, p = .932). The bootstrapped 95% confidence interval (CI) revealed that the indirect effect was significantly different from zero (CI 0.24-0.60). It was further shown that the association between the total duration of videoconferences a day and sleep quality (c = 0.29 ± 0.14, p < .001) was mediated by videoconferencing fatigue (c' = 0.09 ± 0.14, p = .196). The CI of indirect effect was significantly different from zero (CI 0.13-0.28). The overall pattern of results remained after controlling for overall screen time.

Additionally, we were interested in the role of study suitability in these relationships, so we performed a moderated mediation analysis. For the purpose of this analysis, we divided the variable of study suitability into two categories: (0) for those who answered that distance learning suits them less or much less compared to the conventional form of study and (1) for those who answered that this type of study suits them equally or more or much more, compared to the conventional. Those who did not answer this question (n = 43) were omitted from this analysis (so we performed the moderated mediation analysis on 486 participants).

The results revealed that the relationship between the duration of an individual videoconference and videoconferencing exhaustion was moderated by study suitableness (b = -4.49, SE = 1.43, p = .002). The analysis of simple slopes revealed that the relationship was stronger for those who reported that this type of study was less suitable to them (b = -5.88, SE = 1.00, p < .001) compared to those who answered that it was equally or more suitable for them (b = 1.38, SE = 1.02, p = .176). Next, we tested if there is a conditional indirect effect (Preacher et al., 2007) using the Index of moderated mediation (Hayes, 2015). The index of moderated mediation was -0.54 (95% CI: -0.98, -0.18), suggesting that the suitability of the study moderated the indirect effect of the duration of individual videoconference on sleep quality. Probing the two indirect effects showed that the indirect effect was significant for those who answered that this kind of study did not suit them (IE = 0.70, 95% CI: 0.45, 1.07) but not significant for those who answered that distance learning was equally or more suited from them, compared to conventional type of study (IE = 0.17, 95% CI: -0.09, 0.44).

Similar results can be drawn from the analysis of the total videoconference duration. The study suitableness moderated the effect between duration of videoconferences and videoconferencing exhaustion (b = -1.29, SE = 0.52, p =

.014) so that this effect was significant for both but stronger for those who answered that this type of study was less suitable for them (b = 2.29, SE = 0.37, p < .001), compared to those for whom this type of study was equally or mode suitable (b = 0.99, SE = 0.37, p = .008). The Index of moderated mediation showed that the mediation was moderated by study suitableness (Index = -0.15, 95% CI: -0.28, -0.03). Both indirect effects were positive (at 0, IE = 0.26; at 1, IE = 0.15) and significant (the 0 did not fall between the lower and the upper limit of the 95% CI for both effects).

In addition, we analysed the mediating role of videoconferencing fatigue in the relationship between screen time and sleep quality. The results revealed only partial mediation. The relationship between daily screen time and sleep quality (c = 0.27 ± 0.10, p < .001) was partially mediated by videoconferencing fatigue (c' = 0.21 ± 0.09, p < .001). The indirect effect was significantly different from zero (CI 0.02-0.09). The results were similar for screen time two hours before sleep. The relationship with sleep quality (c = 1.32 ± 0.59, p < .001) was partially mediated by videoconferencing fatigue (c' = 0.45 ± 0.27, p = .002); the bootstrapped CI was different from zero (0.18–0.73).

Discussion

Our study aimed to investigate the relationship between videoconferencing/screen use and sleep quality, with a particular focus on understanding the role of videoconferencing fatigue in this association. Additionally, we were interested in study type preference as a possible moderator in the relationship between videoconferencing and videoconferencing fatigue. In this present study, videoconferencing/screen use was related to lower sleep quality. In agreement with our expectations, this relationship was mediated by videoconferencing fatigue. Further analyses also showed that study type preference acted as a moderator in relation to videoconferencing and videoconferencing fatigue.

Our study was conducted during the Covid-19 epidemic in Slovenia when online learning was the primary method of teaching curriculum in universities. Our results show that participants spent about seven hours on display devices daily, almost an hour and a half in the last two hours before bedtime. Until today, no universally agreed-upon recommended daily screen time specifically for adults exists, but research consistently shows that excessive screen time can have adverse effects on various aspects of one's health and well-being, such as physical activity and health, sleep quality, and social interactions (Lissak, 2018; Pardhan et al., 2022; Nakshine et al., 2022; Tang et al., 2021). At the same time, little is known about the effects of videoconferencing.

Notwithstanding the benefits and usability of videoconferencing tools during the Covid-19 epidemic (Riedl, 2022), recent studies have highlighted concerns regarding the significant increase in videoconferencing usage in educational settings, particularly due to its potential impact on the physical and mental well-being of students during virtual meetings (de Sobral et al., 2022).

As expected, videoconferencing exhaustion and fatigue were positively related to all four measures of screen time and duration of videoconferences in our study, with the lowest but still significant correlation with overall screen time and the highest with the total time spent on videoconferences a day (on average). This means that among the factors explored, the most robust relationship between Zoom exhaustion and fatigue was found for the total time on videoconferences, with participants spending more time on videoconferences reporting more videoconferencing exhaustion and fatigue. Results are in accordance with recent studies (Oducado et al., 2022a; Salim et al., 2022) demonstrating that the duration of videoconferencing time might significantly predict videoconferencing fatigue among higher education faculty. Overall, screen time (including videoconferencing time) still relates to videoconferencing fatigue. However, as it evidently includes other activities besides videoconferencing (i.e., social media, video games, reading news), the relationship with videoconferencing fatigue is less strong than for videoconferencing itself.

Although research on videoconferencing fatigue is still emerging, an increasing number of researchers are endeavouring to elucidate the underlying causes and factors that contribute to this fatigue experienced during and following videoconferences. On the one hand, technical difficulties, such as incorrectly functioning platforms, audio or video glitches, screen sharing problems, or unstable Internet connection, can increase frustration and stress during videoconferencing (Nadler, 2020). Additionally, some scholars have suggested that videoconferencing, as a component of computer-mediated communication exhaustion (Nadler, 2020), imposes greater psychological demands compared to face-to-face interaction (de Sobral et al., 2022; Williams, 2021) and even exceeds the demands of meetings conducted via other mediums (Shoshan & Wehrt, 2022). Several factors might contribute to that. Prior research has underscored the heightened cognitive effort required in videoconferencing settings to interpret nonverbal cues, including facial expressions, vocal intonations, and body language of participants (Bailenson, 2021; Baker & Murphy, 2021; Wiederhold, 2020). Non-verbal cues are essential in communication, but in videoconferencing, these cues might be limited or more challenging to interpret accurately due to pixilation, video delays, or participants being in different locations. As a result, individuals may have to concentrate more to understand these cues,

leading to cognitive load, greater energy consumption, and exhaustion (Bailenson, 2021). Cognitive overload might further be increased, as videoconferencing requires individuals to process multiple information streams simultaneously, including visual and auditory cues, chat messages, and screen sharing. This continuous need to pay attention, absorb information, and actively participate can overwhelm cognitive resources, leading to mental fatigue (Bailenson, 2021). Moreover, in conventional face-to-face interactions, individuals typically do not sustain continuous eye contact, nor do participants consistently fixate on the speaker throughout the conversation. Conversely, in videoconferencing, continuous direct gaze is frequently maintained (Bailenson, 2021). Maintaining prolonged eye contact might create an intensity that is ordinarily reserved for close relationships but unusual for work colleagues (Bailenson, 2021), which can be mentally exhausting and create a feeling of being constantly watched.

Considering all these possible factors that might contribute to Zoom fatigue and exhaustion in videoconferencing, our finding that longer daily videoconferencing time relates to more prominent videoconferencing fatigue in university students is not surprising. We also speculate that the length of an individual conference might have played a part in itself. Our results show that the average reported time of an individual videoconference in our sample was nearly two hours. Previous research has suggested that videoconferences should not last more than approximately 40 to 45 minutes in order to protect the well-being of participants (Baker & Murphy, 2021), so the length of individual videoconferences might have increased the vulnerability of participants to experience more fatigue during/after the meetings. For further assessment of factors contributing to videoconferencing fatigue, see Döring et al. (2022).

Prior research suggests that persistent symptoms of virtual meeting fatigue, if unaddressed, could pose challenges to various facets of students' well-being and potentially undermine the effectiveness of the teaching and learning environment (García-Bullé, 2020). Nevertheless, almost nothing has been known about the relationship between videoconferencing, videoconferencing fatigue, and sleep, with the latter being well-known as one of the crucial mechanisms promoting the mental and physical well-being of university students and their academic success (Orzech et al., 2011).

In our study, the results reveal that the subjective sleep quality total score in our sample was relatively high and beyond the threshold for healthy sleep (Buysse et al., 1989), reflecting relatively low subjective sleep quality in participants at the time of the study (please note that higher PSQI scores indicate lower sleep quality). As mentioned, it is not insignificant that our study was undertaken during the Covid-19 epidemic, when the mental and physical

vulnerabilities (Li et al., 2021; Peng et al., 2023) of university students, including healthy sleep (Valenzuela et al., 2023), were aggravated. Thus, the low sleep quality might not be representative of the sleep of Slovenian university students in times beyond the Covid-19 epidemic. Among diverse factors contributing to sleep problems during the epidemic, such as increased general stress and anxiety (Grubic et al., 2020; Kavčič et al., 2020), profound health behaviour changes (i.e., unhealthy eating behaviours (Du et al., 2021) and lower physical activity levels (Rodríguez-Larrad et al., 2021)), and disruption of the regular schedules and routines (Liu et al., 2021), the enormous increase in digital media use and screen time was seen as one of the main detrimental factors (Watanabe et al., 2022). More specifically, it was found that increased screen time during the Covid-19 epidemic led to prolonged sleep latency, shorter sleep time, lower sleep quality, and more symptoms of insomnia in the general population (Krishnan et al., 2020; Salfi et al., 2021) and in students as well (Majumdar et al., 2020). Consequently, students were also more tired and less vigilant during the day (Majumdar et al., 2020).

As expected, the results of our study reveal significant correlations between sleep quality and all measures of screen time and duration of videoconferences. While almost nothing has thus far been written on the relationship between videoconferencing specifically and sleep, the extensive use of screen-based technology has previously already been linked to poor sleep in university students and young adults before (Levenson et al., 2016; Orzech et al., 2016; Thomée et al., 2011) or during the Covid-19 pandemic (Dhir et al., 2021; Krishnan et al., 2020; Lastella et al., 2020; Salfi et al., 2021). Previous studies have mainly focused on-screen use around bedtime, investigating various mechanisms through which digital media usage could affect sleep (Cain & Gradisar, 2010). As our study confirms the significant negative relationship between screen usage before bedtime and sleep quality, we sum up these possible mechanisms. First, the duration spent engaging with digital media could directly substitute sleep time or other behaviours conducive to better sleep, thereby delaying the onset of sleep (Lastella et al., 2020). Second, engaging in screen-based activities in the evening can lead to cognitive and emotional arousal, potentially resulting in sleep disturbances through physiological responses (Cain & Gradisar, 2010; Gregory & Sadeh, 2016; Scott & Woods, 2018). Moreover, electronic screens emit short-wavelength or blue light, which can impact physiological functions by enhancing alertness and delaying the circadian rhythm through the suppression of melatonin secretion, a hormone typically released in the evening (Dijk & Cojachen, 1997; Chang et al., 2015). Thus, to protect sleep from the negative impact of screens, basic sleep hygiene rules recommend turning off

screen devices at least one to two hours before bedtime. In our study, the average screen time before sleep was almost one hour and a half in the last two hours, so participants violated this fundamental sleep hygiene rule, possibly contributing to lower sleep quality.

We also found that longer total daily videoconferencing time and the duration of a single videoconference negatively correlate with sleep quality. As the mechanisms between videoconferencing and sleep have not been widely explained before and, knowing the adverse effects of Zoom fatigue on various aspects of one's well-being, we were specifically interested in the possible role of Zoom fatigue in this relationship. The results of our mediation analyses reveal that the relationship between the duration of an individual videoconference and sleep quality is mediated by videoconferencing fatigue, and the same mediating effect of Zoom fatigue was found in the association between the total duration of videoconferences a day and sleep quality. When Zoom fatigue was included, the association between videoconferencing length and poorer sleep quality was no longer statistically significant. When general screen devices were used, Zoom fatigue was found to mediate the relationship only partially between the length of videoconferences and sleep quality. This is probably due to the fact that screen device use is a much broader concept and only partially includes active participation in videoconferences and/or lectures.

Furthermore, we tested whether the online studying preference can further explain the relationship between the length of videoconferences and Zoom fatigue. Namely, previous research has already shown that the subjectively/individually perceived suitability of studying determines students' well-being (Butnaru et al., 2021). The results of our moderated mediation showed that the association between the time spent on videoconferences and Zoom fatigue was stronger for those who did not find online studying suitable. In addition, the mediation or indirect effect was found to be stronger for those who found online studying less suitable. It shows that alongside all the objective factors of Zoom fatigue mentioned above; it is also important to take into account individual/subjective factors that can either improve or worsen feelings of Zoom fatigue.

Limitations

The study was undertaken during the COVID-19 epidemic, when online learning was introduced practically overnight, and students were forced to make rapid transitions from face-to-face to remote learning. We do not know, on the basis of our results, what the specific effects of the epidemic were and

if remote learning and videoconferencing do have the same impact on videoconferencing fatigue and sleep in times beyond the Covid-19 epidemic. Furthermore, our study commenced in May and June 2021, coinciding with the conclusion of the summer semester, amid the realisation that the global pandemic's duration extended beyond initial expectations. Students might have experienced exhaustion and a sense of being overwhelmed due to the epidemic's ongoing impact, compounded by the typical stress and fatigue associated with the semester's end. Thus, the results of our study might not be generalisable to online learning in general. A study examining the potential role of Zoom fatigue in the current online learning programmes would thus be beneficial in exploring these relationships further and better understanding them.

In our study, we did not have objective control over videoconferencing, meaning that participants retrospectively reported the time spent on videoconferences but did not define what kind of videoconferences they attended and for what purpose exactly they were used. Thus, we do not know whether university students actually attended online meetings or just participated in online lectures with mostly one-sided communication and their cameras turned off. We also do not know whether the videoconferences were used for studying purposes only. Thus, we can only speculate about the exact mechanisms of prolonged videoconferencing that contributed to Zoom fatigue in our sample.

We also do not know whether similar relationships exist between the length of the lectures/seminars, exhaustion related to attending the lectures or classes, and sleep for face-to-face learning. As we did not compare online and face-to-face learning, we cannot be sure that this effect is unique to online learning. Conducting a study focusing on face-to-face meetings or lectures would be interesting to see if the patterns are similar.

In this study, we highlighted the subjective suitability of the online study as a factor significantly determining the relationship between Zoom fatigue and sleep. Nevertheless, we did not explore what factors contribute to this subjective evaluation of the 'suitability' of the online study. We thus cannot make any inferences about the characteristics of students who evaluated online study as more suitable than face-to-face learning compared to those who evaluated online study as less suitable. We can only speculate that factors such as personality differences, other obligations, or social skills might have contributed. Also, students from various study programmes may have differed in the degree of obligations in online learning, thus experiencing different levels of comfort in online study. Factors contributing to the suitableness and comfort of online study should be addressed and better explored in the upcoming research.

Conclusions

In conclusion, our study contributes to the growing body of research examining the impact of videoconferencing and screen device use on sleep quality and well-being among university students. As anticipated during the Covid-19 pandemic (Zackal, 2021), many universities and colleges persist in conducting meetings through web-based platforms, with some institutions exclusively utilising online learning modalities to this day. By elucidating the mediating role of videoconferencing fatigue and the moderating effect of study type preference, our findings provide valuable insights for educators, institutions, and policymakers in optimising online learning practices. To decrease the likelihood of videoconferencing fatigue and exhaustion and to promote well-being and healthy sleep in the students, meeting length should be considered when planning online learning. If videoconferences are used, efforts should be made to ensure that an individual conference, as well as total videoconferencing time, is not overly long. A threshold of 45 minutes per videoconference has been proposed in previous research (Bailenson, 2021) to mitigate the adverse effects of videoconferencing. However, whether this threshold is most suitable also in the context of the adverse effects of videoconferencing on sleep remains to be determined. Additionally, as our results reveal, Zoom fatigue is more likely in students who find online learning less suitable than in-person learning compared to those who find online learning more suitable. When planning a study process, students' preferences should be taken into account. While the precise factors influencing learning mode suitability in our study remain uncertain, it is conceivable that providing classes or training to enhance familiarity with web-based meeting platforms could enhance the suitability of online learning and bolster the well-being of students or other videoconferencing users. The outcomes of our study offer insights into the connections among videoconferencing, Zoom fatigue, and sleep, providing valuable implications for the design of educational practices. These findings can inform strategies for navigating future public health crises, like the Covid-19 epidemic, by optimising remote learning approaches. Additionally, they contribute to the ongoing enhancement of online learning methods in higher education settings, ensuring their effectiveness and adaptability in today's context. Ultimately, our study underscores the need for ongoing research and proactive measures to address the challenges associated with online learning, with a focus on promoting student well-being and academic success in an increasingly digitalised educational landscape.

Disclosure Statement

The authors have no conflict of interest to declare.

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Appendices

Appendix 1

Table 1

Descriptive statistics of the study variables without the outliers

	n	*M*	*SD*	*S*	*K*	α
Daily screen time[a]	518	7:07	2:55	0.45	-0.40	/
Screen time two hours before sleep[a]	479	1:20	0:32	-0.21	-1.05	/
The average duration of individual videoconference[a]	518	4:42	1:50	0.73	0.41	/
The average total duration of videoconferences[a]	518	1:49	0:43	1.43	3.24	/
Zoom exhaustion and fatigue	518	41.24	13.77	0.10	-0.61	.95
Global PSQI score	518	7.51	3.68	0.60	-0.07	.77

Notes. [a] = hh:mm format, *n* = number of participants, *M* = mean, *SD* = standard deviation, *S* = skewness coefficient, *K* = kurtosis coefficient, α = Cronbach alpha coefficient.

Appendix 2

Table 2

Correlational matrix of the study variables without the outliers

		1	2	3	4	5
1	Daily screen time	-				
2	Screen time in the last two hours before sleep	.31**	-			
3	The average duration of individual videoconference	.08	.04	-		
4	The average total duration of videoconferences	.29**	.14**	.32**	-	
5	Zoom exhaustion and fatigue	.12**	.16**	.28**	.20**	-
6	Global PSQI score	.23**	.20**	.21**	.09*	.44**

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The Study of Light as an Experimental Factor in Observing the Development of Children's Artistic Abilities in Kindergarten

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Playing with light and shadow is an inexhaustible stimulus for preschool children to develop divergent thinking and artistic expression. Creativity develops through artistic expression, and the experience enriches and matures thematically through the more conscious use of artistic language. The aim of the experimental study was to measure the level of artistic development in children aged five and six years. The level of creative, optical-thematic and artistic development was observed. In the study, two different programmes with implemented activities (experimental factors) were planned and compared with a control group. The first programme (experimental factor EP1) was described as modern and adapted to the children's interests and incentives, while the second programme (experimental factor EP2) was prepared in advance and called traditional. A total of 161 children aged five and six years took part in the study. In order to measure the level of general artistic development, test drawings were made at the beginning and end of the experiment. These were analysed by a team of experts according to the aforementioned developmental aspects. The results of the experimental group with the traditional approach showed a statistically significantly higher performance in monitoring creative development than the control group. Within the two experimental programmes, the children in the EP1 programme achieved statistically better results in the aspect of creative development than the children in the EP2 programme. The results show that a well-designed programme for playing with light and shadow can have a positive effect on children's artistic development.

Keywords: art, artistic exploration of light, approach to planning, artistic development

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Študija svetlobe kot eksperimentalni dejavnik pri opazovanju razvoja otrokovih umetniških zmožnosti v vrtcu

Urianni Merlin in Matjaž Duh

Igra s svetlobo in senco je za predšolske otroke neizčrpna spodbuda za razvoj divergentnega mišljenja in umetniškega izražanja. Z umetniškim izražanjem se razvija ustvarjalnost, z zavestnejšo uporabo umetniškega jezika pa se izkušnja bogati in tematsko dozoreva. Namen eksperimentalne študije je bil izmeriti stopnjo umetniškega razvoja pri otrocih, starih pet in šest let. Opazovali smo raven ustvarjalnega, optično-tematskega in umetniškega razvoja. V študiji sta bila načrtovana dva različna programa z izvedenimi dejavnostmi (eksperimentalni dejavniki) ter primerjana s kontrolno skupino. Prvi program (eksperimentalni dejavnik EP 1) je bil opisan kot sodoben ter prilagojen interesom in spodbudam otrok, drugi program (eksperimentalni dejavnik EP 2) pa je bil vnaprej pripravljen in poimenovan kot tradicionalni. V študiji je sodelovalo 161 otrok, starih pet in šest let. Za merjenje stopnje splošnega umetniškega razvoja so bile na začetku in koncu eksperimenta izdelane testne risbe. Te je skupina strokovnjakov analizirala glede na zgoraj omenjene razvojne vidike. Rezultati eksperimentalne skupine s tradicionalnim pristopom so pokazali statistično znatno boljšo uspešnost pri spremljanju ustvarjalnega razvoja kot pri kontrolni skupini. Znotraj obeh eksperimentalnih programov so otroci v programu EP 1 dosegli statistično boljše rezultate z vidika ustvarjalnega razvoja kot otroci v programu EP 2. Rezultati kažejo, da ima lahko dobro zasnovan program za igro s svetlobo in senco pozitiven učinek na otrokov umetniški razvoj.

Ključne besede: umetnost, umetniško raziskovanje svetlobe, pristop k načrtovanju, umetniški razvoj

Introduction

Creativity is a multifaceted and complex aspect of human expression, encompassing a variety of forms, including fine arts, performing arts, music, literature, dance, etc. During the preschool years, it is extremely important for children's overall development to provide them with experiences in different areas. By listening to music, for example, the children develop their hearing and repeat the words they hear, while some also dance to music, thus developing many diverse abilities. By listening to fairy tales and looking at illustrations, "children develop their vocabulary, they develop imagination and the capacity of longer concentration" (Duh, 2016, p. 73). Artistic creativity involves creating original ideas, exploring new concepts and techniques, and conveying emotions, experiences and perspectives through artistic media.

According to numerous authors, artistic expression – and creativity in general – originates from individual diversity, the key being a supportive environment as well as the process and product of creativity. The image of a creative person can also be extended to the idea of creativity as the essence of human existence and its manifestation in all areas of human activity (Herzog, 2009). Some authors associate the source of the majority of the research in this area with Anglo-American countries and explain the possible aspects from which creativity can be seen as: scientific, social, practical, pedagogical, etc. Paraphrasing the 5-factor Kaufman model (2012, in Županić Benić, 2021), the areas in which creativity is expressed are: personal/everyday, studio, performance, technical/scientific and artistic. Rogers (1970) noted some time ago that creativity is not limited to one area, and that there are no basic differences in the creative process, regardless of whether it concerns painting a picture, composing a symphony, inventing a new device, developing a scientific theory, etc. Considering the wide application of creative abilities, Karlavaris and Kraguljac (1981) see great importance in the development of art pedagogy and the artistic expression of the child. Guilford empirically confirmed the factors of creativity that, according to the author, arise from divergent thinking: "The creative processes of contemporary art are based on new solutions for societal problems, the production of ideas and the creation of new relations, while the focus is transferred from the artifact to the process, as there can be creative thinking even when there is no tangible product" (Guilford, 1968, p. 121 in Vuk et.al., 2015, p. 55).

Artistic Expression

Artistic creativity is not limited to a specific skill or talent, but encompasses a wide range of abilities and approaches. Creativity is one of the aspects that develop through artistic expression. In their work, Herzog, Lopert and Duh (2017) present different understandings of creativity that have the same meaning in the sense of something new and innovative (Huzjak & Županić Benić, 2017), but with certain nuances. Duh and Büdefeld (2018) claim that creativity is the ability to connect previously unrelated ideas and products. The authors emphasise the aspect of thinking and view creativity as the possibility of developing new ideas and using existing knowledge to find new solutions, whereby the new solution must have value. Sternberg and Lubart (1999) define creativity as the ability to create new, original work, such as products and solutions that are useful and adaptable within a given framework. Zupančič (2017) cites Addison's thought from 2010, according to which creativity is not understood as a quality that one possesses, but as a potential that demonstrates the dynamic interrelationship between people and their environment, which be developed in most people under suitable social and pedagogical conditions.

Today, we know that we can measure creativity by analysing its factors. To measure creativity, Lemons (2011) suggests four factors that can be measured by drawings: fluency, flexibility, redefinition and originality. Kim (2006), on the other hand, suggests that fluency, originality and elaboration can be observed in activities in which participants complete a drawing. Fluency, originality, flexibility and elaboration are evaluated in tasks that test divergent thinking (Pelowski et al. 2017).

Six categories are used to measure creativity today: sensitivity to problems (perception of artistic values), elaboration (organisation and use of artistic elements), flexibility (adaptation by means of artistic expression), fluency (a wealth of artistic ideas), originality (unusual and individual realisation) and redefinition (which also connects the redefinition of previous art experiences into new art structures) (Tomljenović, 2015). Several authors (Duh, 2004, 2018; Duh & Büdefeld, 2018; Herzog, 2008, 2009) categorise the factors of artistic creativity into two groups. The first factors promote quantity and enable artistic creativity (redefinition, fluency and elaboration), while the other factors activate quality and promote artistic creativity (originality, flexibility and sensitivity to artistic language). According to Herzog (2009), redefinition is seen as the conscious redefinition of an idea, material or a visual impression into something new. This can be encouraged by consciously set activities, such as the redefinition of a work of art (Petrač, 2015).

Fluency is also related to creativity and refers to the tendency to generate multiple or unusual responses to artistic problems (Sawyers & Canestaro, 1989). The fluency of ideas is expressed by motor dexterity as a factor of creativity, which enables various fine operations and richer artistic procedures for the realisation of these ideas (Herzog, 2009).

Elaboration is also a quantitative component and indicates the ability to develop new ideas and plan future procedures. Elaboration can be recognised as an individual's ability to provide details to produced ideas, which can also be linked to creative interpretation (Botella et.al., 2018). Besemer (1998) calls elaboration the synthesis of something that is well thought out and attractive.

According to Duh et al. (2016), originality is expressed in unexpected artistic solutions, in connecting unusual and imaginative ideas.

Flexibility, in the form of the child's dexterity and adaptation to expressive means, is seen in the relationship between the child and the technical material, ranging from clumsy and rough use to successful mastery of techniques and exceptional motor skills in the adequate use of technical materials and means. Such openness to adaptation enables the ability to engage flexibly with new things (DeYoung, 2006). Sensitivity to artistic language is a factor where one immediately notices what is important in the artistic interpretation of motifs (Duh, 2004). Karlavaris (1974) states that sensitivity towards artistic language is the ability of the individual to recognise and experience an artistic motif and to choose the appropriate material for the interpretation and creation of a new artistic whole.

Creativity factors in drawing refer to the experience of the observed environment or inner feeling, transposition and search for artistic solutions through the composition of artistic elements – point, line, shape, colour, texture and volume – with regard to compositional elements, motor and technical possibilities, and adaptation to materials.

In addition to the creative aspect, artistic expression also develops the optical-thematic aspect of artistic development in such a way that the representation of the artistic motif will be thematically enriched and of higher quality depending on the child's experiences: "Optical-thematic development, or artistic-intellectual development, coincides with the stage of intellectual development and is a measure for determining the phases of a child's artistic expression" (Herzog, 2018, p. 977). Given the elemental nature of the representation of 'self', optically thematic vision analyses the representation of the human figure at the very beginning, and then everything else that is shown in the drawing. According to the criterion of scale (Karlaviaris, 1974), the artwork can be analysed by observing which elements of the human figure are depicted and how

they are depicted. The head, the torso, the arms, the legs, the clothing and other details can be indicated in such a way that they can not only be guessed, but can be clearly identified, and can also have the aesthetic value of original and individual expression.

Artistic expression thus develops an optical-thematic aspect that is creative and formative, demonstrating a richer and more conscious use of artistic language. The visual aspect analyses the work from the perspective of artistic language, i.e., the analysis of artistic form, which provides information on how particular thematic content is artistically understood and processed, within which lies the essence of art (Petrač, 2015). This artistic language analysis, which we call the formative aspect of the artwork in the present paper, implies knowledge and recognition of artistic language and compositional elements. The elements of visual language are line, shape, colour, texture, volume and space (Jakubin, 1989; Kandinsky, 2001; Petrač, 2015; Tanay, 1989), as well as compositional elements such as contrast, harmony, rhythm, balance, proportion, dominance and unity (Jakubin, 1989). Individuality is highly recognisable in handwriting, and the formative aspect therefore follows the art of mastering art techniques and the compatibility of this aspect with artistic language; in short, the formative aspect follows the harmony of the artistic structure, technique, idea, message and suggestiveness of individual artistic expression.

Research Problem

The aim of the present experimental research of children's artistic expression was to measure the extent to which children's artistic expression develops through creative, optical-thematic and formative development. A seven-month study was conducted with children aged 5–6 years on the subject of light and shadow. The prevalence of a holistic approach to the study of light and shadow is an indicator that there are different developments even among educators when it comes to this topic. In the urban preschool institutions of Reggio Emilia, visual aids are used for creative purposes. Experience has shown that children who use different light sources in their environment, e.g., projectors, overhead projectors, mirrors, illuminated zones in shadow areas, are significantly more satisfied (Ceppi & Zini, 2001).

According to the experience of pedagogue Malaguzzi (2010), the study of light and shadow as physical phenomena leads to major changes in children's approach to the problem at the age of 4–5 years. Children begin to observe reality with greater attention, their views of reality become more numerous and their ability to mentally organise actions (the actions of objects and associates)

grows to the extent that it begins to give exceptional meanings and develops greater flexibility in reasoning (Malaguzzi, 2010).

Considering that the basis for designing and enabling free activities is listening to the child and observing his/her cognitive processes, rather than clumsily proposing activities regardless of the child's interests, the idea arose to introduce two experimental programmes into the research. The first experimental programme (EP1) was based on children's interests and was called modern, while the second was a predetermined experimental approach (EP2), which was called traditional. The latter was developed on the basis of a great deal of pedagogical experience and research, as well as on pilot projects carried out over the past year. The experimental programme, according to which the children explored light and shadow, is described in more detail by Merlin (2023). The preschool teachers in the experimental groups received the same basic incentives and visual aids, i.e., common instructions during approximately 50 sessions, which included basic visual aids and materials, as well as artistic expression through drawing, painting, sculpture and graphic techniques. While encouraging artistic expression, the preschool teachers monitor and accompany the process of artistic creation with analytical observation. The development of art culture in children aged 5–6 years is often characterised by playful exploration. Children can participate in open art activities that encourage them to experiment, take risks and enjoy the creative process, without the pressure of achieving a specific result. Playful exploration of art and design nurtures their creativity, curiosity and confidence.

The aim of the present research is to analyse the effect of the experimental approaches EP1 and EP2 in comparison to a control group of children KP (using an approach based on the usual implementation of the content of the valid curriculum) in order to shed light on the development of artistic expression of children aged 5–6 years in the County of Istria. The effect of studying light on the children's artistic expression was measured according to the developmental aspects of artistic expression: optical, thematic, creative and formative.

Research Hypotheses

The following hypotheses were formulated in the study:

H1: At the end of the research, the children of the EP1 group will show better results in artistic expression than the children of the KP group.

- H1.1: At the end of the research, the children of the EP1 group will show better results in terms of optical-thematic development than the children of the KP group.
- H1.2: At the end of the research, the children of the EP1 group will show

better results in terms of creative development than the children of the KP group.

H1.3: At the end of the research, the children of the EP1 group will show better results in terms of formal development than the children of the KP group.

H2: At the end of the research, the children of the EP2 group will show better results in artistic expression than the children of the KP group.

H2.1: At the end of the research, the children of the EP2 group will show better results in terms of optical-thematic development than the children of the KP group.

H2.2: At the end of the research, the children of the EP2 group will show better results in terms of creative development than the children of the KP group.

H2.3: At the end of the research, the children of the EP1 group will show better results in terms of formal development than the children of the KP group.

H3: At the end of the research, the children of the EP1 group will show better results in artistic expression than the children of the EP2 group.

H3.1: At the end of the research, the children of the EP1 group will show better results in terms of optical-thematic development than the children of the EP2 group.

H3.2: At the end of the research, the children of the EP1 group will show better results in terms of creative development than the children of the EP2 group.

H3.3: At the end of the research, the children of the EP1 group will show better results in terms of formal development than the children of the EP2 group.

Method

Participants

The experiment measured the impact of the light research programme on the artistic development of children aged five and six years. It was conducted using two variants of the pedagogical approach, applied to children from eight educational groups (four EP1 and four EP2). Four control educational groups also participated in the study.

Table 1
Number (f) and percentage (f%) of participating children regarding gender and group

Gender / Groups	Female		Male		Total	
	f	*f%*	*f*	*f%*	*f*	*f%*
EP1	23	44.2	29	55.8	52	100
EP2	28	44.8	32	55.2	58	100
KP	24	47.1	27	52.9	51	100
Total	73	45.3	88	54.7	161	100

The distribution of the sample regarding gender is even. To ensure the required number of participants, the experiment was conducted with 220 children aged 3–7 years, of which 161 aged 5–6 were included in the analysis. Out of a total of 161 children, 73 were female and 88 were male, as shown in Table 1.

Table 2
Number (f) and percentage (f%) of participating children regarding the kindergarten location

Location / Groups	Urban		Rural		Total	
	f	*f%*	*f*	*f%*	*f*	*f%*
EP1	30	57.7	22	42.3	52	100
EP2	31	53.4	27	46.6	58	100
KP	25	49.0	26	51.0	51	100
Total	86	53.4	75	46.6	161	100

The control groups (KP) included 51 children: 25 from urban kindergartens and 26 from rural kindergartens. These children were taught according to the regular programme from two urban and two rural educational groups. As shown in Table 2, there was an even distribution of participants regarding the kindergarten location. A total of 12 educational groups were selected by deliberate sampling so as to achieve a balance between kindergartens from urban and rural environments as well as regarding the location of the kindergarten within the region, i.e., the central and coastal regions of Istria. The final sample comprised six urban groups (86 children) and six rural groups (75 children). Furthermore, in cooperation with the professional pedagogical service and the director, and in agreement with the teachers, it was decided whether the group would work according to the programme or freely, considering the previous tendencies of their work.

Instruments

In order to test creativity and artistic ability in this experiment, a test was used that had previously proved to be reliable, valid and sensitive for measuring the artistic abilities of children aged 3–18 years. The test features of the instrument were not measured. These findings were obtained by studying the literature from earlier research (Karlavaris, 1974; Duh, 1996, 1997; Duh et al., 2016; Herzog, 2018). The criteria measured by this test are the optical-thematic (intellectual), creative and formative aspects. With the help of a specific evaluation scale taken from previously conducted research by art methodologists Karlavaris (1974) and Duh (1996), the level of creativity and the artistic abilities of the participating children were determined according to a test drawing produced by each child.

Tests using imagination drawing have been widely used due to their ability to elicit original, free expression (Chan & Zhao, 2010). The test was conducted among the children of the control and experimental groups before the start of the experimental programme (initial test) and after the experiment (final test), in order to gain insight into the initial and final state of their artistic expression and to measure the impact of the experimental approaches. All of the children had the same time, technical means and instructions for the realisation of drawings. The final test drawing for measuring artistic abilities is a variation of the initial test drawing. They are distinguished by a variant of the motif (monster/alien), which serves to give the children the feeling that they are drawing something new, thus enabling them to retain the innovative enthusiasm of a new motif, as in the case of the initial test drawing.

In the optical-thematic aspect, we followed the representation of a human figure: how it is represented, what is shown and in what way. The depiction of the head, the body, the arms, the legs and the clothing, as well as other details, were allocated a specific number of points, with between 1 and 3 points being given for each element. The convincingness of the whole movement was also allocated a specific number of points. Since the children depicted many other objects and animals in the test drawings besides the figures, the criteria scale was adapted to the motif of the test drawing. In the creative aspect, stimulating and enabling aspects of the creativity factor were evaluated: sensitivity to problems, elaboration, flexibility, fluency of artistic ideas with motor dexterity as an enabling factor, originality and artistic redefinition. Formative development refers to the level of mastery of artistic means of expression (artistic language), in order to achieve a suggestive artistic expression, which for this age group means a process from spontaneous mastery of artistic language to conscious use in the form of a multiplication of lines, shapes, textures (colour and valence are not

analysed) and the primary relations between artistic elements, repetition and rhythm for the display of volume, and the relations of size, direction, balance, dominance and unity for the display of space.

In the description of the criterion scale for the assessment of art works, Karlavaris (1974) lists the criteria for variants of deviations, such as deviations of the children's artistic types (described in more detail in the author's book from 1991), methodological-form deviations and the influence of school and preschool teachers, and deviations under the influence of the environment (rural-urban). The latter was, for instance, manifested in the more frequent display of balloons during birthdays among children from urban areas, but this did not affect the scoring. The test drawing assessment team did not observe sociocultural deviations and deviations under the influence of national tradition and contemporary fine art, although there was an evident influence of mass virtual culture. Deviations due to mental disability and giftedness were not recorded from the beginning.

Data Processing Procedure

The test drawings were analysed by a team of experts who assessed each drawing on the basis of 33 different criteria. The drawings of the initial and final test were first evaluated in terms of optical-thematic development, then in terms of design and creative development.

Data processing was done with the help of the statistical software SPSS. Mean values and standard deviations were measured, and statistical differences in the levels of artistic expression were determined by covariance analysis between the groups (EP1, EP2 and KP). Analysis of covariance was used without numerical assumptions, due to the statistically significant difference of the initial state between the experimental groups prior to the start of the research.

Results

Results of the Test Drawings of the Children of the EP1 Group Compared to the Children of the KP Group

Given the statistically significant differences in the initial state between the groups, the difference between the results of children's artistic expression in the test drawings of the EP1 group compared to the KP group was measured by the ANCOVA test without using numerical assumptions. The results show that there is no significant statistical difference between these two groups for optical-thematic development ($F = 1.288$, $P = 0.259$), creative development ($F = 0.381$, $P = 0.538$) or formative development ($F = 0.086$, $P = 0.769$).

Arithmetic means show uniform values, i.e., a higher value of the KP group in the optical-thematic view ($M = 52.50$) and a higher value of the EP1 group in the creative view ($M = 41.13$), while the arithmetic means of the EP1 and KP groups are equal in the formative view (EP1, $M = 18.44$, KP, $M = 18.74$). The results are shown in Table 3.

Table 3
ANCOVA of the results of artistic expression of the children of the EP1 group compared to the children of the KP group

Artistic expression	Groups	*N*	*M*	*SD*	Leven's test				ANCOVA	
					F	*g1*	*g2*	*P*	*F*	*P*
Optical and thematic development	EP1	52	50.44	14.39	0.314	1	100	0.576	1.288	0.259
	KP	50	52.50	15.20						
Creative development	EP1	52	41.13	12.26	2.896	1	100	0.092	0.381	0.538
	KP	50	37.70	10.44						
Formative development	EP1	52	18.44	4.15	3.175	1	100	0.078	0.086	0.769
	KP	50	18.74	4.82						
Artistic development	EP1	52	110.02	24.39	0.343	1	100	0.559	0.334	0.564
	KP	50	108.94	27.84						

Based on these results, hypothesis H1, which assumed that the children of the EP1 group would show better results in artistic expression than those of the KP group at the end of the study, cannot be confirmed, nor can hypothesis H1.1, according to which the children of the EP1 group would show better results than those of the KP group with regard to optical-thematic development. Furthermore, hypothesis H1.2, which suggested that the children of group EP1 would show better results than those of the KP group with regard to creative development (fluency, flexibility, originality, sensitivity to problems, elaborations, redefinitions), and hypothesis H1.3, according to which the children of the EP1 group would show statistically significantly better results than those of the KP group with regard to formative development, are not confirmed either. This is confirmed by the ANCOVA results of the differences between the EP1 and KP groups in artistic development in general, which show no statistically significant differences ($F = 0.334$, $P = 0.564$), with a somewhat higher arithmetic mean for the EP1 group ($M = 110.02$) than the KP group ($M = 108.94$).

What connects groups EP1 and KP is that the children attend a kindergarten without any strict and specific programme. Such uniform results could

be the result of the children and preschool teachers not being burdened, or being less burdened, by a plan and programme that must be satisfied. Their intrinsic motivation for research and attendance resulted in uniform, even higher values (visible in the Table 3), which were due to a calm and familiar atmosphere of cooperation between children and educators.

Results of the Test Drawings of the Children of the EP2 Group Compared to the Children of the KP Group

When comparing the results of the artistic expression of the children of the EP2 group and those of the KP group, measured by ANCOVA (presented in Table 4), statistically significant differences in the creative form of artistic expression are evident (F = 12.970, P = 0.000), with a higher arithmetic mean of the experimental group EP2 (M = 41.06). The results for optical-thematic development (F = 0.310, P = 0.579) and formative development (F = 0.270, P = 0.605) show a higher arithmetic mean of the KP group, although statistically insignificant. Overall, with a large but statistically insignificant difference (F = 2.774, P = 0.099), the EP2 group (M = 110.31) has a higher arithmetic mean than the KP group (M = 108.94).

Table 4

ANCOVA of the results of artistic expression of the children of the EP2 group compared to the children of the KP group

Artistic expression	Groups	*N*	*M*	*SD*	Leven's test			ANCOVA		
					F	*g1*	*g2*	*P*	*F*	*P*
Optical and thematic development	EP2	58	52.48	14.87	0.086	1	106	0.770	0.310	0.579
	KP	50	52.50	15.20						
Creative development	EP2	58	41.06	11.28	0.322	1	106	0.572	12.970	0.000
	KP	50	37.70	10.44						
Formative development	EP2	58	16.75	6.21	4.746	1	106	0.031	0.270	0.605
	KP	50	18.74	4.82						
Artistic development	EP2	58	110.31	26.54	0.774	1	106	0.381	2.774	0.099
	KP	50	108.94	27.84						

It follows from the above that hypothesis H2, which assumed that the children of the EP2 group would show better results in artistic development than those of the KP group, can be partially confirmed. The assumption of hypothesis H2.1, according to which the children of the EP2 group would show

better results regarding optical-thematic (intellectual) development than those of the KP group, cannot be confirmed. Hypothesis H2.2, which assumed that the children of the EP2 group would show better results regarding creative development than those of the KP group, can be confirmed. Hypothesis H2.3, according to which the children of the EP2 group would show better results in formal development than those of the KP group, cannot be confirmed. The large difference in artistic expression is generally an indicator that hypothesis H2 can be partially confirmed, while the statistically significant difference in creative vision showed that the experimental programme carried out with the EP2 group made a contribution to the significant development of creative artistic expression in children aged five and six. From these results, shown in Table 4, it can be concluded that hypothesis H3, which asserted that the children of the EP1 group would show better results in artistic expression than those of the EP2 group, can be partially confirmed.

Results of the Test Drawings of the Children of the EP1 Group Compared to the Children of the EP2 Group

Comparisons of the results of the children of the EP1 group and those of the EP2 group developed from the need to assess whether children develop more artistic expression in a free environment, in which preschool teachers follow their interests and set further stimuli and activities accordingly, or by working according to a predetermined programme.

The results of the ANCOVA test show no statistically significant differences regarding optical-thematic development ($F = 1.992$, $P = 0.161$) and formative development ($F = 0.072$, $P = 0.789$).

The arithmetic mean for optical-thematic vision is higher in the EP2 group ($M = 52.48$), while for the formative aspect it is higher in the EP1 group ($M = 18.44$). A statistically significant difference is evident in creative vision ($F = 7.215$, $P = 0.008$), with a higher arithmetic mean of the experimental group EP1, which indicates that, although the experimental programme contributes to the development of creative vision, as shown in Table 5, artistic expression during the free exploration of light contributes more significantly to the development of creativity.

Overall, the differences in the results between groups EP1 and EP2 are also interesting, as they show an almost statistically significant difference in artistic expression in general ($F = 3.809$, $P = 0.054$), with higher arithmetic means of experimental group EP2 ($M = 110.31$), which worked according to the programme. It can therefore be concluded that the proposed light research programme has a positive effect on the development of artistic expression. These

groups are both concerned with the research of light, but they differ in their approach to activity planning.

Table 5
ANCOVA results of artistic expression of the children of group EP1 compared to the children of group EP2

Artistic expression	Groups	*N*	*M*	*SD*	Leven's test				ANCOVA	
					F	*g1*	*g2*	*P*	*F*	*P*
Optical and thematic development	EP1	52	50.44	14.39	0.011	1	108	0.917	1.992	0.161
	EP2	58	52.48	14.87						
Creative development	EP1	52	41.13	12.26	0.875	1	108	0.352	7.215	0.008
	EP2	58	41.06	11.28						
Formative development	EP1	52	18.44	4.15	13.148	1	108	0.000	0.072	0.789
	EP2	58	16.75	6.21						
Artistic development	EP1	52	110.01	24.39	1.905	1	108	0.170	3.809	0.054
	EP2	58	110.31	26.54						

From these results, shown in Table 5, it can be concluded that hypothesis H3, which suggested that the children of the EP1 group would show better results in artistic expression than those of the EP2 group, can be partially confirmed. The assumption of hypothesis H3.1, according to which the children of the EP1 group would show better results related to optical-thematic (intellectual) development than those of the EP2 group, cannot be confirmed. The results showed a statistically significant difference between the groups with regard to the measure of creative development ($F = 7.215$, $P = 0.008$), with the children who took part in the experimental programme (EP1) achieving a better result. This confirms hypothesis H3.2. Hypothesis H3.3, according to which the children of the EP1 group would show better results with regard to formal development than those of the EP2 group, cannot be confirmed.

Discussion

The results provide a picture of the quality of the experimental programme and its statistically significant impact on the development of creativity in children aged five and six years. In addition to indicating the value of a well-designed creative development programme for preschool teachers who are less inclined to change activities regarding children's interests, the results also

confirm that the topic of light research is an excellent stimulus for creativity. However, the programme still needs to be refined with regard to its initial idea of developing optical-thematic and shape vision through the method of observation and transposing the 'seen' into a richer artistic language when developing shape vision.

The results can be confirmed and enriched by the experience of preschool teacher Uljanić (1999), which we find in the text entitled Project Light. The author describes how it was not easy to lead a project without predetermined topics, activities and goals, where it was necessary to simply leave it to the children to lead and to learn with them. Uljanić describes how the more 'advanced' children attract other children with their results and get them interested in the work, even if only in the form of imitating the 'bigger children'. In the present research, despite the flexibility of the topic itself and the designed programme, it was shown that the children of the EP1 group, whose 'programme' is derived from the children themselves, display more creativity than those of the EP2 group.

Divergent thinking, from which creativity arises, is characterised by research and unpredictability (Kadum, 2019), which is in line with the statistically significantly better results of creative development in the groups that researched 'freely' and unpredictably. In order to achieve this, preschool teachers simply need to be prepared to monitor, coordinate and legitimately respond to children's unpredictability. Preschool teachers who need more specific planning of work with children, and thus greater reliability of high-quality execution of artistic-creative work, can use the light research programme proposed by Merlin (2023). The results of the research show that this programme (EP1) contributes significantly to the development of creativity compared to the control group.

In the research, we were interested in the role of the experimental programmes (EP1 and EP2) in relation to the development of artistic expression. We find that the experimental programmes had a positive effect on the integrity of the children's artistic expression. For those preschool teachers who are closer to the topic and are more inclined to work with children without a predetermined programme, light research can contribute to significant enrichment and release of potential for creative development.

Conclusion

After many years of working with children, light research is a topic that still retains a certain freshness and is an inexhaustible source of research. A great deal of the literature on Reggio pedagogy emphasises the encouragement of divergent thinking that is reflected in the present study. This is confirmed by the statistically significantly better results regarding creative development in all of the experimental groups in the present research, regardless of the approach to planning. Herein lies the significant scientific contribution of this work. The limitations of the study are that the results refer to the narrow region of the Istria County and cannot be extended to a larger area and sample. Moreover, the results refer only to children aged five and six. It would be interesting to see the results of other age groups of children following this experiment.

Since this is a representative sample, it can be assumed that the children's artistic expression, especially creativity, develops significantly through their intrinsic motivation without the burden of 'doing' a programme that is given in advance to the preschool teachers and that the preschool teachers merely assign to the children. It is important that all participants, both children and preschool teachers, approach the research creatively, while developing sensitivity to artistic language, fluency and originality in searching for solutions, redefinition and elaboration in their transposition, and flexibility through mutual listening, adaptation and joint creation.

In the future, the research could be supplemented to include teachers in the measurement, in order to evaluate the types of artistic expression they employ, especially the development of creativity, and to connect these results to those of the children in their group. This connection can only be guessed at by the present research, although it certainly exists. The research could also be extended to measure other developmental skills, as the theme – the motif of light – fits very well with other areas of the preschool curriculum.

In this way, with the already tested programme and research methodology, it is possible to obtain more comprehensive results following the complete development of the child and their active relationship with the environment (Licul, 2020), which is the fundamental goal of raising and educating children today.

Disclosure Statement

The authors have no conflict of interest to declare.

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Biographical note

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Perceived Change in Job Demands and Resources and Teacher Well-Being During the Pandemic

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This study explores the role of perceived change in job demands and resources and socio-demographic characteristics in teacher well-being during the Covid-19 pandemic. We used data from over three thousand Croatian school teachers with at least three years of service. We performed path analysis to test the proposed relationships of socio-demographics (gender, school level and years of service) and perceived change in job demands and resources (work demands, the frequency of student difficulties and the quality of professional cooperation) with teacher well-being (job satisfaction, stress and work-life balance). The effects of the socio-demographic variables on the measures of well-being varied from non-existent to small. The model fitted the data well. However, the parameter values indicated a modest contribution of socio-demographics and perceived change in job demands and resources in explaining teacher well-being during the Covid-19 pandemic. Teachers reported relatively high job satisfaction, low levels of stress, and medium levels of work-life balance. In addition, their experiences of stress and work-life balance were not considerably affected by the perceived increases in job demands. Our results suggest that teachers demonstrated resilience in adapting to challenging circumstances. This capacity should be continuously nurtured in their professional development programmes.

Keywords: Covid-19 pandemic, job demands-resources model, teachers, well-being

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Zaznane spremembe v delovnih zahtevah in virih ter dobro počutje učiteljev med pandemijo

Iris Marušić, Josip Šabić in Jelena Matić Bojić

Ta študija raziskuje vlogo zaznanih sprememb v delovnih zahtevah in virih ter sociodemografskih značilnostih pri dobrem počutju učiteljev med pandemijo covida-19. Uporabili smo podatke več kot tri tisoč hrvaških učiteljev z najmanj tremi leti delovne dobe. Izvedli smo analizo poti, da bi preverili predlagane povezave med sociodemografskimi značilnostmi (spol, stopnja šole in dolžina delovne dobe) ter zaznanimi spremembami v delovnih zahtevah in virih (delovne zahteve, pogostost težav učencev in kakovost strokovnega sodelovanja) z dobrim počutjem učiteljev (zadovoljstvo pri delu, stres ter usklajevanje poklicnega in zasebnega življenja). Učinki sociodemografskih spremenljivk na mere dobrega počutja so bili različni, od neobstoječih do majhnih. Model se je dobro ujemal s podatki, vendar so vrednosti parametrov pokazale skromen prispevek sociodemografskih značilnosti ter zaznanih sprememb v delovnih zahtevah in virih k pojasnjevanju dobrega počutja učiteljev med pandemijo covida-19. Učitelji so poročali o razmeroma visokem zadovoljstvu pri delu, nizki stopnji stresa ter o srednji stopnji usklajevanja poklicnega in zasebnega življenja. Poleg tega na njihovo doživljanje stresa ter usklajevanja poklicnega in zasebnega življenja ni bistveno vplivalo zaznano povečanje delovnih zahtev. Naši rezultati kažejo, da so učitelji pokazali odpornost pri prilagajanju na zahtevne okoliščine. To zmožnost bi bilo treba nenehno gojiti v programih njihovega poklicnega razvoja.

Ključne besede: pandemija covid-19, model delovnih zahtev in virov, učitelji, dobro počutje

Introduction

Schooling during the extended period of the Covid-19 pandemic placed an entirely new set of demands on educational stakeholders worldwide. Educational systems had to establish new forms of teaching and learning in an online environment, with teachers facing the major challenge of increasing workload following a rapid transition to online teaching (Billett et al., 2023; DeCoito & Estaiteyeh, 2022). They had to master new teaching skills and support their students' learning needs in an online environment (Baptista et al., 2023; Jukić Matić, 2021). They also had to balance their increasingly complex work with home responsibilities, often facing conflicting role demands. Increasing demands related to rapid shifts in the teachers' professional role impacted various aspects of teachers' mental health and well-being (Hofmann et al., 2021). A meta-analysis reporting the frequency of symptoms related to impaired mental health reveals the prevalence of symptoms being 30% for stress, 19% for depression, and 17% for anxiety (Ozamiz-Etxebarria, Mondragon et al., 2021). The most common stressors teachers faced were related to difficulties in balancing their personal and professional roles, concerns related to their students' academic functioning and well-being during the pandemic and the increasing demands from school leadership (Robinson et al., 2023). The available data also indicate that stress experiences during the pandemic were related to teachers' gender and age. Female teachers reported higher anxiety and stress than male teachers did, while younger teachers reported higher levels of stress compared to older participants who, in turn, had higher anxiety (Ozamiz-Etxebarria, Berasategi Santxo et al., 2021; Santamaría et al., 2021; Stang-Rabrig et al., 2022).

Experiences of stress were related to the burnout dimensions of emotional exhaustion and depersonalisation. Teachers also experienced increased depersonalisation and a perceived lack of accomplishment in terms of their teaching compared to the pre-pandemic period (Stang-Rabrig et al., 2022). Teacher stress levels were related to anxiety due to the pandemic, entirely online teaching, and communication anxiety in school (Pressley et al., 2021). Teachers experienced increased feelings of exhaustion and cynicism, but, at the same time, they reported an increased classroom management efficacy (Sokal et al., 2020a). A literature review on stress and burnout among teachers around the world revealed that burnout increased during the Covid-19 pandemic (Westphal et al., 2022).

Job Demands-Resources Model

Over the previous two decades, the job demands-resources (JD-R) model has become a leading conceptual framework for explaining burnout

and engagement at work (Bakker & Demerouti, 2007, 2017). The model proposes that job characteristics shape an individual's experiences and well-being at work. Job characteristics are broadly organised into two categories: job demands and job resources. Job demands are physical, psychological, social, or organisational, such as work overload, time pressure, or emotionally demanding client interactions, leading to energy depletion and physical and psychological costs. Job resources are physical, psychological, social, or organisational aspects of the work that facilitate reaching work goals, managing job demands, and achieving personal growth. Job demands and resources initiate two different psychological processes. In a health-impairment process, the intensity of job demands requires increased effort from the employee. This process has a toll on cognitive, physical, and emotional resources that become depleted, leading to job strain, burnout, and health problems. In a motivational process, job resources enable reaching one's work-related goals and satisfying psychological needs, which in turn leads to higher work engagement and well-being. Job resources can also buffer the effects of job demands and reduce physical or psychological costs, such as job-related stress, anxiety, or emotional exhaustion. The role of job resources is particularly important when job demands are high (Bakker & Demerouti, 2017).

A more recent extension of the theory introduced personal resources, which refer to beliefs about being able to control one's environment. Personal resources such as optimism, resilience and self-efficacy interact with job resources in a reciprocal way. Employees with more personal resources tend to have more job resources over time, such as a higher level of autonomy or opportunities for personal growth. As a result, employees with higher perceived work autonomy feel more in control of their work environment and are better able to cope with their job demands. The major strength of the model is its flexibility, allowing it to be applied in a wide variety of work contexts (Bakker et al., 2023).

In recent years, the JD-R model has been recognised as an appropriate theoretical framework to explore factors related to teachers' occupational well-being (Collie, 2023; Collie et al., 2018; Granziera et al., 2021). The research data are generally supportive of the model, indicating that teachers who perceive more personal or institutional job resources report fewer symptoms of stress and burnout when facing challenging classroom situations (Bottiani et al., 2019; Dicke et al., 2018). Evidence also offers a more nuanced view of the interplay between job demands, resources, and outcomes. Different job demands predict different aspects of burnout, with the buffering effects of perceived autonomy and supervisory support as job resources that reduce emotional exhaustion (Skaalvik & Skaalvik, 2018). Teaching is a highly emotionally demanding

profession, which leads to lower teacher well-being, while job resources such as supervisor support, perceived autonomy and development opportunities positively relate to work engagement and job performance (Yin et al., 2016; Bakker & Bal, 2010).

Several studies have used the JD-R theoretical framework to examine experiences related to teachers' mental health and well-being during the pandemic when teacher job demands were enhanced due to the rapid shift to online education, while resources related to digital skills, adequate technical equipment, or collegial support were often limited. A longitudinal qualitative study by Kim et al. (2022) identified the main job demands and job resources related to teachers' mental health and well-being during the pandemic. Factors such as uncertainty, workload, health struggles, and multiple roles were job demands related to reduced mental health and well-being, while job resources such as social support, work autonomy, and coping strategies had a positive role in outcomes related to teachers' mental health and well-being. Job demands such as time management, parental demands, technology use, impaired work-family balance and a lack of resources were all related to teacher burnout during the pandemic (Manuti et al., 2022; Sokal et al., 2020b). Collegial support and leadership appear to be significant job resources associated with positive teacher outcomes during pandemic teaching in various educational contexts. Collegial leadership and collegial support predicted higher job satisfaction and coping among teachers in the USA and Germany (Herman et al., 2021; Stang-Rabrig et al., 2022). Leadership support and participative decision-making indirectly affected emotional exhaustion, mediated by teachers' personal resources of self-efficacy and resilience (Manuti et al., 2022). Self-efficacy appears to be a significant personal resource protecting against teacher stress and burnout during the pandemic (Košir et al., 2020; Daniel & Van Bergen, 2023).

Current Study

The aim of this study was to explore the role of teacher socio-demographic characteristics and perceived change in job demands and job resources in the well-being of Croatian teachers during the pandemic. In response to the pandemic, educational authorities introduced a set of measures at different education levels: primary and lower secondary education existing in single-structure elementary schools and upper secondary education comprising general education and vocational education programmes. ICT tools were introduced at various levels to enable remote teaching and learning in pandemic circumstances (Ristić Dedić & Jokić, 2021). The sudden shift to remote teaching required an entirely new set of teaching skills related to the use of digital technology in

Croatian schools. This shift also altered the communication modes between teachers, pupils, parents, and school leaders, leading to increased teacher job demands. Existing data from various educational contexts indicate that gender and age or years of service might be significant factors in teachers' experiences during the pandemic, with female teachers and younger teachers experiencing more stress, probably due to their multiple roles at home and work. The role of educational level in teacher experiences is worth exploring, given the different ages of students at various levels and, subsequently, different teacher responsibilities. Further, the identification of job demands and resources related to certain aspects of teacher well-being during the crisis in various educational contexts expands the knowledge that could inform the design of possible intervention strategies. Existing studies identified job demands and resources at one point in time during the pandemic, while this study utilises perceptions of change in job demands and job resources regarding pandemic teaching compared to the pre-pandemic period. Perceptions of change in work demands and in the frequency of student difficulties were used as indicators of teachers' job demands during the pandemic, while the perception of change in the quality of professional cooperation was an indicator of job resources. We used three indicators of teacher well-being: current job satisfaction, stress, and work-life balance. Job satisfaction and the experience of stress are the most commonly used indicators of teacher occupational well-being. Work-life balance was a major challenge for teachers during remote teaching and learning.

In line with this, we aim to address the following research questions:

1. Are socio-demographic characteristics (gender, years of service and school level) related to teachers' job satisfaction, stress, and work-life balance during the pandemic?
2. Are perceived changes in work demands, the frequency of student difficulties and the quality of professional cooperation related to teachers' job satisfaction, stress, and work-life balance during the pandemic?

Method

The teacher data were collected using the online survey that took place from June to August of 2022 as part of the 'Changes in the Organization of the Educational Process Caused by the COVID-19 Pandemic: Effects on Educational Experiences, Well-Being and Aspirations of Pupils in Croatia (EWAchange)' research project. The survey included various scales assessing socio-demographic variables, perceived change in work demands, perceived change in the frequency of student difficulties, perceived change in the quality

of professional cooperation, job satisfaction, stress, and work-life balance. The data that support the findings of this study are available from the corresponding author upon reasonable request.

Participants

The dataset contained data from 3634 teachers from a nationally representative random sample of 159 Croatian public schools that carry out regular programmes. The school sample consisted of 77 elementary schools that provide primary and lower secondary education (students aged 7–15) and 82 upper secondary schools that provide grammar and/or vocational education (students aged 15–19); about 8.8% and 22.7% of all schools in Croatia, respectively. In the present study, we used the data from 3385 teachers (93.1% of the total sample) who had at least 3 years of service (i.e., teaching experience), which allowed them to compare their experiences before and during the pandemic. Of these, 1616 teachers (47.7%) worked in elementary schools (class and subject teachers), and 1769 (52.3%) worked in upper secondary schools.

Instruments

Socio-Demographic Variables

The teachers provided information on their gender, years of service and the school level they teach.

Due to the lack of scales assessing perceptions of changes in work demands, in the frequency of student difficulties, and in the quality of professional cooperation, the new scales were designed specifically for this study, aligning with the JD-R model (Bakker & Demerouti, 2007, 2017; Bakker et al., 2023). Their purpose was to evaluate how teachers' job demands (work demands, student difficulties) and resources (quality of professional cooperation) have changed during the pandemic in comparison to the pre-pandemic period. Confirmatory factor analysis (CFA) with three latent factors was employed to test the construct validity of the scales, revealing an adequate fit ($\chi^2 = 2723.694$, $df = 116$, $p = .000$; RMSEA = .082 [95% CI from .079 to .085]; CFI = .897; SRMR = .046). Additionally, exploratory factor analyses (EFA) were conducted to assess whether all scales demonstrate unidimensionality (see below).

Perceived Change in Work Demands

This scale consists of nine items referring to key teacher tasks: teaching, lesson planning, assessment, communication with students and their parents,

supporting students' learning, social and emotional support provided to students, administrative tasks, and professional development activities. Teachers were asked to assess the average time they dedicate to each task during a typical workday compared to in the pre-pandemic period on a 5-point response scale ranging from 1 – significantly less time to 5 – significantly more time. EFA resulted in a one-factor solution that explained 48.1% of the variance (α = .86).

Perceived Change in the Frequency of Student Difficulties

The teachers were asked to assess the change in the frequency of the following student difficulties in comparison to the pre-pandemic period: behavioural problems, attention difficulties, difficulties with learning motivation and social and emotional difficulties. The assessments were given on a 5-point scale ranging from 1 – significantly less frequent to 5 – significantly more frequent. Conducting an EFA yielded a single-factor solution accounting for 69.8% of the variance (α = .89).

Perceived Change in the Quality of Professional Cooperation

The teachers assessed the quality of their cooperation with their colleagues, the principal and the educational specialists at their schools compared to the pre-pandemic period on a 5-point scale ranging from 1 – significantly worse to 5 – significantly better. EFA led to a one-factor solution that explained 73.9% of the variance (α = .82).

Job Satisfaction

The teachers' job satisfaction was measured by means of a four-item scale from Skaalvik and Skaalvik (2013). In addition, two items related to enthusiasm for teaching (Kunter et al., 2008) were added to form a final scale score for the analysis since all six items yielded a one-factor solution. The assessments were given on a 5-point Likert scale ranging from 1 – completely disagree to 5 – completely agree. EFA resulted in a one-factor solution that explained 79.4% of the variance (α = .95). Extremely high values of Cronbach's α may suggest redundancy among scale items. Nevertheless, in this instance, the item variance inflation factors (VIF) were below 5, indicating that none of the items displayed signs of multicollinearity.

Stress

The level of stress was assessed on a four-item scale used in the Teaching and Learning International Survey (TALIS; OECD, 2018). The participants indicated their agreement with each item on a 4-point scale ranging from 1 – not

at all to 4 – a lot. EFA led to a one-factor solution that explained 62.8% of the variance (α = .80).

Work-Life Balance

Work-life balance was measured on a five-item scale adapted from the European Working Conditions Survey (EWCS; Eurofound, 2022). The teachers assessed the frequency of difficulties in achieving a balance between their professional and private lives during the last month. The assessments were given on a 5-point scale ranging from 1 – never to 5 – always. EFA resulted in a one-factor solution that explained 59.0% of the variance (α = .82).

Research Design

The research was implemented according to the ethical guidelines and was approved by the Ethical Committee of the Institute for Social Research in Zagreb. The data were obtained via an online questionnaire. Unique questionnaire links were distributed to schools by email, along with a short description of the study aim and a request to forward the link to the teachers to complete the online questionnaire. This allowed the linking of the teachers' data with their respective schools. The questionnaire was otherwise anonymous. Upon receiving the email invitation to participate in the study, teachers decided to access the online questionnaire on a voluntary basis. The purpose of the study and the confidentiality of the data were again emphasised in the questionnaire itself.

We performed path analysis in Mplus 8.7 (Muthén & Muthén, 2017) to test the proposed relationships between the predictors (gender, school level, years of service, perceived change in work demands, perceived change in frequency of student difficulties and perceived change in quality of professional cooperation) and outcomes (job satisfaction, stress, and work-life balance). The hierarchical nature of the sample and the fact that teachers were nested within schools were accounted for through the TYPE = COMPLEX function in Mplus with the school as the clustering variable. We used maximum likelihood estimation with robust standard errors (MLR) to handle the non-normality of the data.

The results showed that none of the variables displayed signs of multicollinearity, as their VIFs were all below two. Most of the teachers (83.2%) responded to all the items, leading to a mostly complete dataset (96.4% of cells were completed). The missing rates for individual items were low ($\leq$ 4.9%), and because a missing rate of 5% or less is usually considered inconsequential for data analysis (Dong & Peng, 2013; Schafer, 1999), we decided to run a complete case analysis.

Results

Descriptive Statistics

Table 1 displays the descriptive statistics of all the variables used in the study. Most of the teachers were female, as is the case in the population. Roughly equal numbers of teachers worked in elementary and upper secondary schools. On average, they had 18.7 years of service.

On average, the teachers in our sample estimated that their work demands, as well as the frequency of student difficulties, had increased during the pandemic. In contrast, they thought that the quality of professional cooperation had not changed in the same period. On average, they reported high job satisfaction, low levels of stress related to their job and medium levels of work-life balance (i.e., they sometimes experienced difficulties in achieving a balance between their professional and private lives). The internal consistency of the scales was generally high (Cronbach's alphas for all the scales were ≥ .80).

The bivariate correlations between the outcomes and variables denoting perceived changes in job demands and resources were statistically significant but small, whereas the correlations between the outcomes and socio-demographic variables varied from non-existent to small (Table 2). In contrast, Pearson's *r* values between the outcome variables were medium to large (the largest correlation was the one between stress and work-life balance).

Table 1

Descriptive statistics.

	%	*M*	*SD*	Min	Max	Cronbach α
Socio-demographics						
Gender						
Male	19.1					
Female	80.9					
School level						
Elementary school	47.7					
Upper secondary school	52.3					
Years of service		18.71	9.71	3	35	
Perceived change in...						
...work demands		3.76	0.56	1	5	.86
... frequency of student difficulties		3.63	0.66	1	5	.89
... quality of professional cooperation		3.15	0.64	1	5	.82
Outcomes - Teacher well-being						
Job satisfaction		3.92	0.77	1	5	.95
Stress		2.11	0.57	1	4	.80
Work-life balance		3.30	0.71	1	5	.82

Table 2

Correlations between variables (Pearson's r).

	1.	2.	3.	4.	5.	6.	7.	8.	9.
Socio-demographics									
1. Gender	-	**.16****	**-.11****	**-.16****	**-.11****	.01	**-.05****	**-.11****	**.16****
2. School level		-	**-.03***	**-.12****	-.01	**-.06****	**-.07****	-.03	**.09****
3. Years of service			-	.10	.01	-.09	.01	.01	.02
Perceived change in...									
4. ...work demands				-	**.32****	**.10****	**.05****	**.23****	**-.22****
5. ... frequency of student difficulties					-	**-.12****	**-.11****	**.19****	**-.21****
6. ... quality of professional cooperation						-	**.21****	**-.16****	**.10****
Outcomes - Teacher well-being									
7. Job satisfaction							-	**-.47****	**.37****
8. Stress								-	**-.65****
9. Work-life balance									-

Note. Gender (0 = female, 1 = male), school level (0 = elementary school, 1 = upper secondary school); *$p < .05$, **$p < .01$. Significant correlations are shown in bold.

Path Model

We first tested the just-identified path model by specifying all the possible paths between the variables. Paths that were statistically non-significant ($p > .05$) were dropped from the model, and Figure 1 presents the final model showing only the significant paths between the variables. For the ease of the reader, we provide the covariances between variables in a separate table (Table 3). The final model fits the data fairly well, with fit indices as follows: $\chi^2 = 2.344$, $df = 3$, $p = .504$; RMSEA = .000 [95% CI from .000 to .026]; CFI = 1; SRMR = .005.

Although the male teachers were slightly less satisfied with their jobs compared to their female counterparts, they also experienced lower levels of stress and higher work-life balance. Upper secondary school teachers were less satisfied, but they also experienced higher levels of work-life balance in comparison with their colleagues from elementary schools. There was no statistically significant difference between teachers teaching at different school levels in terms of the experienced stress. More experienced teachers had higher levels of work-life balance, although the effect size was very small. Years of service were not related to the other two outcomes.

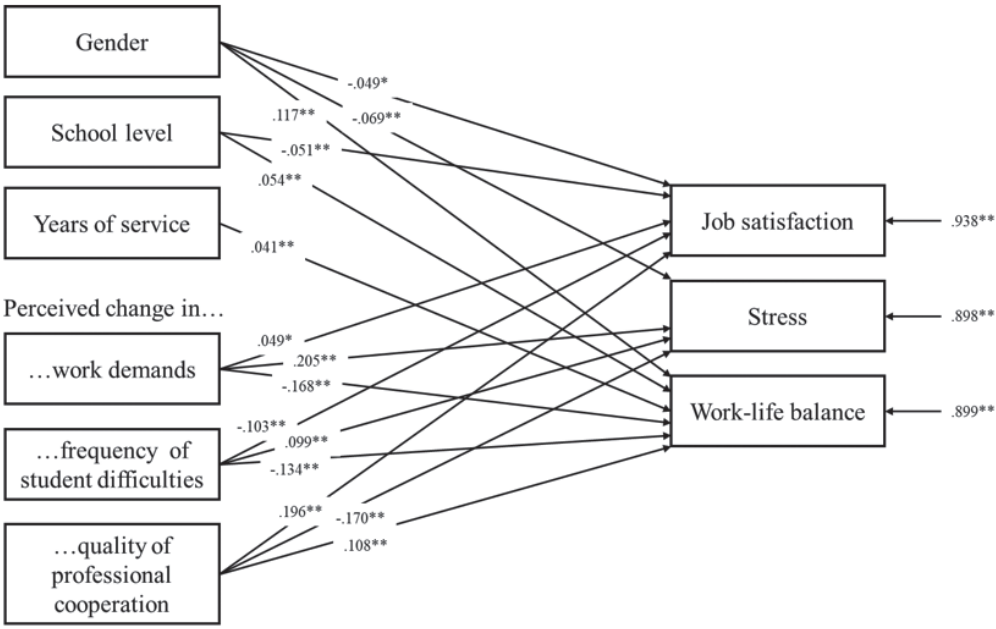
Teachers who perceived more work demands during the pandemic reported higher levels of stress and less work-life balance. Surprisingly, they also reported higher job satisfaction (however, though statistically significant, this effect was negligible in size). The perceived increase in the frequency of student

difficulties was related to lower job satisfaction, higher levels of stress, and lower work-life balance. The perceived improvement in the quality of professional cooperation predicted higher job satisfaction, lower levels of stress and higher work-life balance.

The high values of the residual variances of the outcome variables indicate the modest contribution of the predictive model. The values of the covariances between the variables in the path model were very similar to those of the bivariate correlations (Tables 3 and 2, respectively).

Figure 1

Path model: standardised parameter estimates.



Note. Only significant paths were retained in the model; gender (0 = female, 1 = male), school level (0=elementary school, 1=upper secondary school); *$p < .05$, **$p < .01$.

Table 3
Covariances between the path model variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
Socio-demographics									
1. Gender	-	.17**	-.11**	-.16**	-.11**	.01			
2. School level		-	-.03	-.12**	-.01	-.06**			
3. Years of service			-	.10**	.01	-.09**			
Perceived change in...									
4. ...work demands				-	.32**	.10**			
5. ... frequency of student difficulties					-	-.12**			
6. ... quality of professional cooperation						-			
Outcomes - Teacher well-being									
7. Job satisfaction							-	-.48**	.39**
8. Stress								-	-.62**
9. Work-life balance									-

Note. Gender (0 = female, 1 = male), school level (0 = elementary school, 1 = upper secondary school); *p < .05, **p < .01.

Discussion

In this paper, we analysed if and how teachers' perceptions of change in their job demands and resources during the Covid-19 pandemic contributed to the explanation of their well-being, more precisely to their job satisfaction, stress, and work-life balance. We focused on perceived change in teachers' work demands and perceived change in the frequency of student difficulties (both representing teaching job demands), as well as on perceived change in the quality of professional cooperation (representing a job resource in the teaching profession; cf. Bakker & Demerouti, 2007, 2017).

The present findings demonstrate that male teachers experienced slightly less job satisfaction but also lower levels of stress and higher work-life balance compared to female teachers. It appears that female teachers perceived teaching during the pandemic as more rewarding but also as more demanding, given their roles and responsibilities at home. More experienced teachers had marginally higher levels of work-life balance in comparison to less experienced teachers. This could mainly be due to their age difference and different stages of life (e.g., with younger, less experienced teachers more often being parents of young children), but it could also denote more experienced teachers' development of adaptive strategies to achieving work-life balance. However, teaching experience did not significantly relate to job satisfaction or stress. Regarding

the school level, the results suggest that teachers working in upper secondary schools reported less job satisfaction, but, at the same time, they experienced higher levels of work-life balance compared to their colleagues working in elementary schools. This could reflect the difference in the nature of elementary and secondary education, especially with respect to its relational dimension. Teachers in elementary education had to provide more support to their students compared to their secondary school colleagues, which made their jobs both more demanding and more rewarding during the pandemic. In comparison, teachers in secondary schools were less engaged in providing support to their more mature and autonomous students, therefore having better work-life balance but lower job satisfaction. We found no difference in the experience of stress between teachers working at different school levels.

All three aspects of teacher well-being bear statistically significant associations with all three aspects of perceived change in demands and resources in the teaching profession. Overall, the teachers' perceptions of increased work demand during Covid-19 were related to higher stress, lower work-life balance and (marginally) higher job satisfaction. The teachers' perceptions of an increased number of student difficulties during Covid-19 were associated with lower work-life balance, somewhat higher levels of stress and lower job satisfaction. Finally, the teachers' perceptions of better-quality professional cooperation during Covid-19 were related to higher job satisfaction, lower levels of stress and higher work-life balance. These findings are very much in line with the general conclusions of the previous studies using the job demands-resources (JD-R) model (e.g. Bottiani et al., 2019; Dicke et al., 2018; Herman et al., 2021; Kim et al., 2022; Stang-Rabrig et al., 2022). Considering the model fit of the data from the considerably large and heterogeneous sample of Croatian teachers, it is safe to say that our study provides additional proof that the JD-R model serves as an adequate theoretical framework for teacher experiences during pandemics.

Previous studies on teacher samples revealed gender and age differences in the absolute levels of adverse outcomes, such as stress, anxiety, and depression (Ozamiz-Etxebarria, Mondragon et al., 2021; Santamaría et al., 2021; Silva et al., 2021; Stang-Rabrig et al., 2022). In addition, the present study showed that the relationship between job demands, job resources, and aspects of teacher well-being is maintained after controlling for gender, years of service, and school level (elementary vs upper secondary).

As reported, the coefficients between the variables reveal associations in expected directions. However, most of them are rather small, resulting in large residuals (i.e., large amounts of unexplained variance) regarding all three

of the teacher well-being aspects. Obviously, the perception of more difficult working conditions during the Covid-19 pandemic (i.e., perceived increases in work demands and the frequency of student difficulties), combined with the stable level of cooperation (i.e., no change in the quality of professional cooperation during Covid-19 compared to in the pre-pandemic period), was not strongly related to the teachers' subsequent well-being. We see two possible non-conflicting explanations for this (unfortunately, neither is verifiable with our cross-sectional data). First, it seems very probable that the variables denoting perceived change in job demands during the Covid-19 pandemic would be more predictive of teacher well-being measured at the peak of the pandemic. It is likely that, at the time of our data collection, the teachers' job satisfaction, experience of stress and work-life balance had already returned to their baseline levels or, at least, had somewhat recovered. Second, it is rather probable that some of the more pervasive factors, whether individual (e.g., personality, motivation for the teaching profession) or contextual (e.g., salary, work conditions, family support), determine teacher well-being to a significantly greater extent than the temporary circumstances that were analysed here. This points to a limitation of the present study in that it only focused on variables related to the perceived change in job demands and resources during the Covid-19 pandemic and did not simultaneously include other, more stable determinants of teacher well-being. Another limitation is related to the fact that *perceived* change in job demands and resources during the Covid-19 pandemic was included in the study. The perceived change was assessed directly by the participants at the time of the data collection and was not calculated by the researchers as a departure from the baseline assessments in the pre-pandemic period. This represents a potential gap in the current approach to estimating the baseline dynamics that existed prior to the pandemic. Thus, readers should bear in mind that the current approach might be burdened with the non-negligible level of respondents' bias in assessing actual change.

Conclusion

As previously mentioned, the teachers reported relatively high job satisfaction, low levels of stress, and medium levels of work-life balance. These results, together with the finding that experiences of stress and work-life balance were not considerably affected by the perceived increase in job demands (alongside the stable job resource of professional cooperation), could be attributed to teacher resilience, a capacity that enables them to adapt and thrive in challenging situations (Zhang et al., 2023). We think this notion is worth

exploring in future research. Namely, with longitudinal data, it would be valuable to test the hypothesis that relatively short-term disruptions and crises, such as the Covid-19 pandemic, cannot significantly diminish teacher well-being in the long run and that, in these cases, teachers' resilience or recovery comes to light. This could further be extended to include the hypothesis that crises might not be a valid reason for teachers to rethink their career choices. If established, this would be promising in light of the pressing issue of teacher attrition (see, e.g. Madigan & Kim, 2021).

Societies are likely to face new challenges. Though the pandemic was a rather radical example of the disruption that, among other aspects, affected educational systems and, consequently, teachers' working conditions, it is not unlikely that any emerging global or local challenge will make its way to classrooms. Our results suggest that teachers demonstrated resilience in facing the requirements of teaching in crisis, which has to be systematically supported. In an era of enlarged ambiguity and insecurity, teacher resilience as an important part of their well-being should be a focus of teacher professional development programmes. To raise strong and resilient children, we need to support the advancement of teachers' resilience and place a focus on teacher well-being.

Disclosure Statement

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Teachers' Metaphors and Beliefs About Teaching and Their Relationship With Job Satisfaction

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This research focuses on Estonian teachers' beliefs about teaching, the metaphors of their knowledge base, and the emotions connected with being a teacher. The relationships between these aspects and teacher job satisfaction were explored. In total, 658 mathematics, English language, biology, and class teachers participated in the research. The research applied a mostly quantitative design involving a mixed methods approach. The results highlight the complexity of teachers' understanding of their role. Statistically significant differences were found between the teacher groups participating in the study. The results showed that the affective connotations of metaphors teachers attach to their work are related to teachers' job satisfaction. However, there were no significant differences between teacher groups based on the nature of their metaphor and their beliefs about teaching. However, the results indicate that teachers expressing student-centred beliefs were more satisfied with their job environment than those with teacher-centred beliefs. The study suggests the importance of considering beliefs, knowledge base, and emotions in understanding job satisfaction.

Keywords: beliefs about teaching, emotions, job satisfaction, metaphors, teachers' knowledge base

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Metafore in prepričanja učiteljev o poučevanju ter povezave z zadovoljstvom pri delu

Erika Löfström, Katrin Poom-Valickis in Kirsti Rumma

Ta raziskava se osredinja na prepričanja estonskih učiteljev o poučevanju, metaforah iz njihovih baz znanja in o čustvih, povezanih z delom učitelja. Raziskane so bile povezave med temi vidiki in zadovoljstvom učiteljev pri delu. V raziskavi je sodelovalo 658 učiteljev matematike, angleškega jezika, biologije in razrednega pouka. Uporabljena je bila pretežno kvantitativna zasnova, ki je vključevala pristop mešanih metod. Rezultati poudarjajo kompleksnost učiteljevega razumevanja svoje vloge. Med skupinami učiteljev, ki so sodelovali v raziskavi, so bile ugotovljene statistično pomembne razlike. Rezultati so pokazali, da so afektivne konotacije metafor, ki jih učitelji povezujejo s svojim delom, povezane z zadovoljstvom učiteljev pri delu, vendar pa med skupinami učiteljev ni bilo pomembnih razlik glede na naravo njihovih metafor in prepričanj o poučevanju. Rezultati pa kažejo tudi, da so bili učitelji, ki so izražali prepričanja, osredinjena na učence, bolj zadovoljni s svojim delovnim okoljem kot tisti s prepričanji, osredinjenimi na učitelje. Študija kaže, da je pri razumevanju zadovoljstva pri delu pomembno upoštevati prepričanja, bazo znanja in čustva.

Ključne besede: prepričanja o poučevanju, čustva, zadovoljstvo pri delu, metafore, baza znanja učiteljev

Introduction

Teachers define themselves through their past and current roles, values, and beliefs about the kind of teacher they wish to become in an evolving political, social, institutional, and personal context (Day et al., 2006). Teachers' beliefs function as filters for sifting what is integrated into one's professional knowledge base and what is rejected as unsuitable professional knowledge, competence, and behaviour (Calderhead, 1996; Joram & Gabriele, 1998; Pajares, 1992). Beliefs about teaching are not directly observable behaviours, but they guide a teacher's perception of a situation and mediate teachers' responses to teaching and learning situations and actions taken (Hannula et al., 2013; Lam & Kember, 2006; Pratt, 1992). Teachers' responses to teaching and learning have often been conceptualised through how teachers view their role, whether that of an information transmitter or a facilitator of learning, resulting in teacher-centred and student-centred teaching (see Kember & Kwan, 2000). A teacher with a teacher-centred approach focuses on the subject, whereas a teacher with a student-centred approach focuses on supporting students' learning. Teachers with a student-centred approach are pedagogically aware and vary their teaching methods according to the students' needs and context (Lindblom-Ylänne et al., 2006). Beliefs about teaching must change first for teaching practice to change (Postareff et al., 2008), and here, teacher education plays a crucial role (see Smrtnik Vitulič & Lesar, 2017). Therefore, working with beliefs is crucial for the development of teaching.

Furthermore, the knowledge base influences the teacher's focus and emphasis on teaching and the teacher's role (Beijaard et al., 2000). Beijaard et al. (2000) identify three main knowledge bases: subject matter, pedagogical, and didactic expert (cf. also Shulman, 1986). The forms of expertise co-exist, but there may be individual differences in emphases. An emphasis on subject knowledge means understanding the teacher's role primarily as a subject matter expert. The underlying belief is that teacher expertise equals profound subject competence. An emphasis on subject matter expertise may fail to recognise the learner and to establish relationships that are crucial in pedagogical interaction (Kember & Kwan, 2000). Those who view the teacher's task primarily as that of a pedagogue (Beijaard et al., 2000) emphasise relationships, values, and moral and emotional aspects. According to this emphasis, teaching is more than information transmission; it is a moral and ethical profession involving educating for citizenship and for an uncertain future (Beijaard et al., 2000). The didactic expert role emphasises subject-matter teaching using discipline-specific knowledge. The focus is on the planning and execution of teaching, the creation of a

positive learning environment and the evaluation of learning (Beijaard et al., 2000). Prior research shows that Estonian mathematics teachers view themselves as didactic experts, whereas teachers of English as a foreign language view themselves as pedagogues and didactic experts (Löfström et al., 2010).

Metaphors were used to investigate teachers' knowledge base. Metaphors are a tool for thinking and a means of meaning-making (Lakoff & Johnson, 1980), and have been previously used to access teachers' beliefs about teaching and the teacher's role (Bullough, 1991; Saban et al., 2007; Tobin, 1990), approaches to teaching (Leavy et al., 2007; Marinez et al., 2001; Saban, 2010), and teacher beliefs (Alger, 2009; Leavy et al., 2007; Mahlios et al., 2010; Martínez et al., 2001; Seung et al., 2011). Prior research using metaphor has often been inductively qualitative in nature (e.g., Leavy et al., 2007; Martínez et al., 2001; Martínez-de-la-Hidalga & Villardón-Gallego, 2017; Muñoz-Salinas, 2023; Patchen et al., 2011; Thomas & Beauchamp, 2011; Pinnegar et al., 2011; Tubin, 2005) with a few exceptions (e.g., Alger, 2009; Saban, 2010; Saban et al., 2007). In this study, we attempted to understand the relation of underlying beliefs as 'measured' through metaphor choices to variables identified as important in the teacher profession and retention (e.g., Dreer, 2021; Judge et al., 2001; Klusmann et al., 2008; Moé et al., 2010; Wang et al., 2022).

The emotional climate affects teacher development, as well as attitudes and practices in teaching and learning (Bakkenes et al., 2010). A school's micro-culture, including norms and values, is reflected in the school's teaching practices; however, the micro-culture is transferred to teaching practices through teachers' beliefs (Hannula, Pipere et al., 2013). Teachers' interpretations of the person-environment interaction are ultimately reflected in their teaching-related emotions (Cross & Hong, 2012; Prosen et al., 2011). Job satisfaction as a psychological dimension (OECD, 2020) is a crucial aspect of occupational well-being (Moé et al., 2010) associated with emotions and behaviours in teaching, which can further influence student motivation and learning (Klusmann et al., 2008). In other words, teachers who are more satisfied with their work tend to use more adaptive and engaging strategies in their teaching (Chaaban & Du, 2017) and have more positive teacher-student interactions (e.g., Weiqi, 2007). Teachers also have more energy to deal with challenging situations at work and find solutions when they have positive emotions and feel enjoyment in their work (Wang et al., 2022). Teachers' perceptions of fulfilment in day-to-day work influence their performance, commitment, absenteeism, physical and mental health, and overall well-being (e.g., Judge et al. 2001). Positive emotions play a vital role in teachers' job satisfaction and subsequent retention (Dreer, 2024; Klassen & Chiu, 2011). Teachers who perceive that their work meets their

expectations derive more enjoyment from their role, have stronger self-efficacy and are enthusiastic, whereas dissatisfaction is likely to lead to a lack of motivation (Burić & Moè, 2020).

The Estonian Lifelong Learning Strategy 2020 (Ministry of Education and Research of Estonia, 2014) advocated a shift towards more student-centred teaching. However, the strategy can be successful only if teachers adopt the belief that student-centred teaching is beneficial for learning and develop their pedagogical practice in ways that manifest in student-centred teaching. A cross-cultural study published around the time of the introduction of the Estonian Lifelong Learning Strategy 2020 showed that Estonian teachers were the strongest proponents of traditional beliefs about teaching compared to Latvian and Finnish teachers who exhibited beliefs in line with constructivist teaching approaches (Hannula, Lepik et al. 2013). Now, a decade after the adoption of the strategy, we investigated Estonian teachers' beliefs about teaching and their professional knowledge base. Considering PISA, in which Estonian students are achieving good results, Estonian teachers appear to be doing a good job (OECD, 2015). Learner-centred teaching facilitates conceptual change, specifically higher-order thinking (Prosser et al., 2000; Kember & Kwan, 2000), but while exhibiting traditional beliefs about teaching (Hannula, Lepik et al., 2013), Estonian teachers have been found to design learning activities geared towards higher-order thinking (Henno, 2015). We also addressed how teachers feel about their work and job satisfaction, as teacher-centred or traditional teaching has been associated with negative emotions, which in turn is associated with lower levels of job satisfaction (Kyriacou, 2001; Skaalvik & Skaalvik, 2011).

We posed the following research questions:

1. How do teachers express knowledge base (subject matter, pedagogical, and didactical expertise), and which affective attributes are associated with it?
2. How are teachers' knowledge base and emotions about teaching related to their beliefs about teaching and job satisfaction?

Methods

The study used primarily a quantitative design but also involved a mixed methods approach. To measure beliefs about teaching and job satisfaction, we used survey-type instruments. To access teachers' knowledge base and emotions, we used metaphors, which were analysed deductively and treated as nominal categories in the statistical analyses.

Participants

A total of 887 teachers, selected randomly across Estonian schools, participated in the research. Metaphors were written by 658 teachers, among them 210 class teachers (CL), 156 mathematics teachers (M), 154 English language teachers (E) and 138 biology (B) teachers. Their ages ranged from 22 to 73, and work experience from 1 to 55 years. The most experienced were mathematics teachers, almost half of them (46%) had at least 21 years of work experience. The less experienced were English teachers, as 36% had worked at the school for less than nine years. Table 1 provides an overview of the average age and work experience of the teachers surveyed.

Participation in the research was voluntary and based on informed consent. No personal identifiers were collected. Consequently, we do not have information about the schools that the teachers work in and cannot assess how many schools the participants represent. No incentives for participation were offered. Participants could terminate their participation at any time by discontinuing to respond to the questionnaire. After submitting their response, participation could not be cancelled as there was no way to connect the respondents to their anonymous responses. The study did not require an ethics review in the Estonian context (Centre for Ethics, University of Tartu and the Estonian Research Council, 2017).

Table 1

Teachers' average age and work experience.

Teachers	Average age (Years)	Average work experience (Years)
Mathematics	47	23
English as a foreign language	42	18
Biology	44	19
Class	44	22
Total	**44**	**20**

Instruments

Metaphors. The participants were prompted by the statement 'A teacher is like…', which they were asked to finish and provide an explanation for (see also Saban et al., 2007; Löfström & Poom-Valickis, 2013; Löfström et al., 2010). The unit of analysis was the metaphor with its explanation.

Survey. Parts of the *Teaching and Learning International Survey* (OECD, 2010) were used to measure beliefs about teaching (14 items), the Teacher Burnout Scale (TBS) (Seidman & Zager, 1987), and the Teacher Job Satisfaction

Questionnaire (TJSQ) (Lester, 1987) to measure job satisfaction. Regarding the measurement of beliefs about teaching, the constructivist dimension was strengthened by modifying or adding items central to a constructivist teaching approach, for example, learners constructing knowledge and the introduction of assessment criteria as a mutual agreement between the teacher and the learner. These items are marked * in Table 2. Regarding the measurement of job satisfaction, recognition, and support (e.g., Andrews, 2011; Björk et al., 2019; Yildirim, 2015) and satisfaction with work and career (e.g., Björk et al., 2019; Timms & Brough, 2012) have been identified as indicators of work overall job satisfaction and well-being at work. Consequently, we focused on items to measure these constructs. More precisely, from TBS and TJSQ, we used the following items: 'Teaching encourages me to be creative' (TJSQ), and 'I look forward to each teaching day' (TBS) to measure satisfaction with work and the career; 'No one tells me that I am a good teacher' (TJSQ) and 'In this school, staff members are recognised for a job well done' (own item inspired by Perie & Baker, 1997) for an additional item to measure recognition; and 'I feel that the administrators are willing to help me with classroom problems, should they arise' to measure perceived support. English language items were translated into Estonian.

Analyses

Metaphors. First, we used deductive content analysis (Marshall & Rossman, 1995; see also Saban et al., 2007) based on the knowledge base model by Beijaard, Verloop, and Vermunt (2000). The categories identified were subject matter, pedagogical, and didactics expertise. We labelled combinations of these as 'Hybrids' (see also Martínez et al., 2011). Two additional categories were created, namely 'self-referential' metaphors pertaining to the teacher's personal characteristics (see Leavy et al. 2007) and 'contextual' metaphors describing work settings rather than the teacher's work itself or roles (Löfström & Poom-Valickis, 2013).

In the next phase, the affective connotations of the metaphors were coded as positive, negative, or neutral. Metaphors that included positive adjectives (*good, bright, warm, clever)*, adverbs (*well, happily, gladly, positively*) or verbs with positive connotations (*brighten, enjoy, enthuse*) were coded as conveying positive emotions. The following is an example of a metaphor labelled as positive in terms of emotions: *A teacher is like a sunray that makes others happy, creating a friendly and motivated atmosphere.* Metaphors that included negative adjectives (*poor, bad, tired*...), adverbs (*helplessly, isolated, poorly*...) or verbs with negative connotations (*kill, imprison, hate*) were coded as conveying

negative emotions. The following is an example of a metaphor labelled as negative in terms of emotions: *The teacher is like a fool; everyone can call them names, they need not be listened to, and pupils can disrupt the class.* Metaphors with negative effects illustrate teachers' dissatisfaction with their profession and criticality about the teacher's role and position in society. The third group was coded as neutral in terms of emotion. These metaphors stated something without a positively or negatively connoted vocabulary, such as A t*eacher is like a guide to the world of knowledge at the start of the road trip.* The categorisation of metaphors was judged case-by-case through a procedure in which two authors independently categorised the metaphors. When the categorisations did not match, an agreement was reached through negotiation. The examples of metaphors are presented in italics, and the abbreviation in brackets indicates which subject teacher is involved: M (mathematics), E (English as a foreign language), B (biology), and CL (class teacher). In the end, the authors agreed on all the metaphors. Had there been discrepancies, there were related to whether to categorise a metaphor as a single-category one or as a hybrid. The discussions helped to judge the prevalence of each form of expertise and its 'strength' in relation to the other possible forms of expertise. We were inclusive in our categorisations in the way that if the metaphor and its explanation could be interpreted as a hybrid, we categorised it as such. This decision was also in line with what Beijaard et al. (2000) have noted; the various knowledge bases often feature in parallel. To support our analysis, we utilised a manual to interpret metaphors applying the teacher knowledge base model (Beijaard et al., 2000) compiled by Löfström et al. (2011) for an earlier research project using metaphors as data.

Survey. Statistical analysis included exploratory factor analysis (Principal Components Analysis with Varimax rotation), Cronbach's Alpha, correlation analysis using Kendall's τ, and testing statistical differences between the groups using non-parametrical Chi-Square and Kruskal-Wallis tests. Cronbach's Alphas for beliefs about teaching were .759 for constructivist student-centred beliefs (10 items) and .561 for traditional, teacher-centred beliefs (4 items). As the Alpha for the second factor is low, results should be interpreted with great caution (Table 2). Cronbach's Alpha for job satisfaction was .659 (5 items) (Table 3).

Table 2

Factor analysis for teacher beliefs.

Beliefs about teaching Items	Factor 1 Constructivist student-centred beliefs	Factor 2 Traditionalist teacher-centred beliefs
Teachers should guide students to discover or construct knowledge on their own*	.726	
Students should have the opportunity to work flexibly in small groups with peers to discuss new ideas and listen to their opinions	.681	
Students should be allowed to think of solutions to practical problems themselves before the teacher shows them how they are solved.	.663	
My role as a teacher is to facilitate students' own inquiry	.628	
In order to achieve meaningful learning and understanding for students, teachers should vary their methods in lessons*	.604	
Teaching should make use of knowledge and skills acquired in other subjects*	.559	
Assessment must include practical problems, projects, inquiry*	.546	
Students learn best by finding solutions to problems on their own	.500	
Thinking and reasoning processes are more important than specific curriculum content	.427	
Assessment tools and criteria are developed collaboratively by teachers and students*	.383	
Instruction should be built around problems with clear, correct answers, and around ideas that most students can grasp quickly		.718
Effective/good teachers demonstrate the correct way to solve a problem		.665
A quiet classroom is generally needed for effective learning		.606
How much students learn depends on how much background knowledge they have – that is why teaching facts is so necessary		.599

Note. * Item modified from the original (OECD, 2010).

Table 3
Factor analysis for job satisfaction.

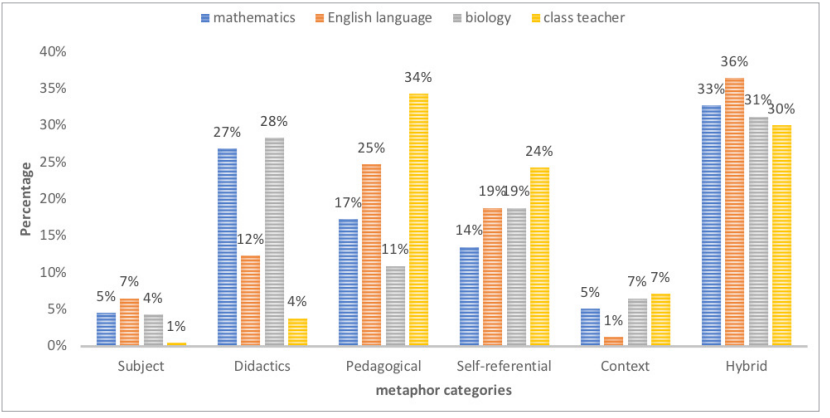
Job satisfaction Items	Factor 1 Job satisfaction
Teaching encourages me to be creative	.516
In this school, staff members are recognised for a job well done	.744
No one tells me that I am a good teacher	-.585
I feel that the administrators are willing to help me with classroom problems should they arise	.730
I look forward to each teaching day	.576

Results

Teachers' Knowledge Base and Affective Connotations Reflected in Metaphors

The largest group of metaphors was that of *Hybrids*, which constituted a third (n = 213) of all metaphors, suggesting that teachers understand their role as complex (Figure 1).

Figure 1
The percentage distribution of teachers' metaphors by different categories.



The following metaphor and its explanation illustrate a combination of expertise and related knowledge bases:

> **A multi-functional wonder machine** – *A teacher must be able to do so many things, such as teaching the subject, being a parent to some kids, being a psychologist, social worker, and whatever else. At the same time,*

the teacher must have a good, warm heart and a patient mind and treat students and colleagues with goodwill and tolerance. (M = Mathematics)

Based on the statistical significance tests, there were no statistically significant differences among teachers based on subject or grade level in their preferences for hybrid metaphors (Kruskal-Wallis $H = 1.76$; $p = .62$).

The most common ***pedagogical expert*** metaphors were *mother*, *friend*, *guide*, and *gardener.* These metaphors emphasised care, guidance, and affect. According to participants, the task of the teacher includes supporting students in and outside class, including social problems. The following is an example of a pedagogical expert metaphor:

Lighthouse. *Shows the light and is a guide, but the captain steers the ship. A lighthouse cannot directly save someone from running aground, but it is helpful in finding the right path.* (M)

Statistically significant differences emerged in this category ($H = 29.53$; $p = .00$). Pedagogical expert metaphors were most common among class teachers (*mean rank* = 366.3) and English language teachers (*mean rank* = 334.7) and least common among biology teachers (*mean rank* = 289.3).

Didactics expert metaphors described the teacher as a facilitator of students' learning through teaching appropriate to field, topic, and context. The didactics expert was described as a teacher who plans learning activities, makes the learning process attractive, and offers students help in that process. Examples of didactic expertise metaphors were *actor*, *conductor*, *chameleon*, *builder*, and *stage director.* The relationship between teaching and learning is emphasised in the following metaphors:

A chameleon. *The teacher must adapt their teaching according to the students so that the students take their learning to the maximum.* (B = Biology)

The orchestra leader. *The teacher must create the necessary learning environment and find various activation activities, which are also a motivating technique in the learning process and lead the class as an orchestra to a successful learning outcome.* (CL = Class teacher)

Statistically significant differences between teacher groups emerged in the use of didactics expert metaphors ($H = 52.78$; $p = .00$). Mathematics (*mean rank* = 364.08) and biology teachers (*mean rank* = 368.48) emphasised this role the highest and class teachers the lowest (*mean rank* = 288.03).

Self-referential metaphors focused on what teaching represented for the respondents as individuals and did not refer to teaching, students, or classroom instruction. The positive characteristics depicted the teacher as a *lifelong learner*, *bee*, *sunshine*, *good wine*, or *candle.* The following metaphor is an example in which the teacher's sentiments are visualised but in which pupils, learning, school subjects or school environments do not feature:

> ***Mountain climber.*** *You begin climbing a peak every autumn with enthusiasm, energy, and hope, but soon, you get tired of reaching some very difficult places that occur on your way, but you can't give in until you have reached the peak. At the peak, you have no energy left, but you feel happy anyway, and you set yourself up on another journey*. (B)

Many self-referential metaphors were focused on negative attributes, such as in the following example, where the teacher is pictured as someone who is tasked with an impossible or unfair burden or who is completely at the mercy of others:

> **A squeezed lemon** – *The teacher has responsibilities, and there are practically no rights; the parent and the student, on the other hand, seem to have only rights and responsibilities as if they do not exist.* (M)
>
> **A puppet**. *To be pushed, pulled, and criticised by everyone. Fortunately, there are only two arms and two legs, so tearing more is impossible.* (CL)

These images connote a lack of power to influence one's situation and work. Self-referential metaphors had a similar distribution in all subject teacher groups, and there were no statistically significant differences (H = 6.80; p = .079). Nevertheless, compared to the other groups, class teachers' metaphors mostly carried positive connotations.

The smallest group of metaphors constituted subject and contextual metaphors. ***Subject expert*** metaphors contained the idea of the teacher as a knowledge source. Metaphors frequently occurring in this category were *book*, *encyclopaedia*, *computer*, or *well of knowledge.* The teacher is mainly seen as a subject specialist possessing a great amount of knowledge that can be transmitted to pupils, as suggested in the following example:

> *A* ***cuckoo*** *laying eggs, i.e., knowledge, in the other birds' nests, i.e., students' heads. Doing so, the students' conceptual thinking will change.* (B)

The results showed that class teachers gave significantly fewer *subject expert* metaphors than other teachers (H = 10.05; p = .018; *mean rank* = 319.07). Statistically significant differences between other groups did not emerge.

Metaphors coded as ***contextual*** described environmental or contextual characteristics. Many metaphors carried negative connotations, expressing dissatisfaction with workload and responsibilities and lacking support. Examples include *slave*, *paper worm*, and *lemon without any juice left*. The explanation focuses on tasks that are perceived as handed over to teachers while not being the core of the activities that a teacher should engage in:

> **Paper moth**. *There is too much bureaucracy at school, and too much energy is spent on various analyses and work plans. At the same time, it could be used for the benefit of the children.* (M)

In the *contextual* metaphors, statistically significant differences between groups were not noted ($H = 6.88$; $p = .076$).

The relationships between metaphors and teachers' age and years of practice were tested using non-parametrical Kendall's Tau correlation. A statistically significant negative relationship emerged only in the *subject expert* category, which shows that proponents of subject expert metaphors were younger ($\tau = -,086$; $p < .01$) and less experienced teachers ($\tau = -,112$; $p = .001$). In numbers, the average age of the respondents who emphasised subject expertise was 38 years compared to 44 years for those who held other views of the teacher's role. On average, the teachers providing subject expert metaphors had 12 years of teaching experience compared to 21 years for all other teachers.

In addition, based on their years of experience, teachers were grouped into six groups (1–3, 4–6, 7–11, 12–20, 21–30, and 31–40 years of experience). A Chi-Square test indicated a statistically significant difference between the providers of *didactics expert* metaphors and all others ($\chi^2 = 12{,}087$; $p < .05$): 1–3 years of experience (didactics 18% of the whole answers *vs.* not didactics: 11%), 7–11 and 12–20 (didactics 12% *vs*. not didactics 20%, and didactics 17% *vs*. not didactics 25%, respectively), and finally 31–40 (didactics 14% *vs*. not didactics 7%). In other words, at the very beginning of the career (1–3 years) and latter end of the career (31–40 years), teachers provide more didactics expert metaphors, while in the middle of their career (7–20 years) they provide didactics expert metaphors to a lesser degree. There is no difference in distribution in the in-between periods (4–6 and 21–30 years of experience).

An analysis of the affective connotations indicated that metaphors with negative connotations were present in all teacher groups. The number of years of professional experience was not a differentiating factor ($\chi^2 = 12.367$; $p = .261$), and the distribution of neutral, positive, and negative metaphors was similar for all groups of teachers (Figure 2). Nevertheless, approximately 15% (ranging from 13% in 1–3 years of professional experience to 19% in the 21–30 year range)

of the teachers in every age group provided metaphors that could indicate dissatisfaction with the teacher role and work conditions. Most of the metaphors expressing negative emotions, such as dissatisfaction with workload, responsibilities, and a lack of support, were contextual. In addition, the category of self-referential metaphors included expressions of negative emotions. Mathematics teachers were statistically significantly less neutral and more positive regarding the emotions conveyed in the metaphors than the teachers of other subjects ($\chi^2 = 108.579$; $p = .000$) (Figure 3).

Figure 2

Distribution of negative, neutral, and positive emotions in metaphors according to years of professional experience.

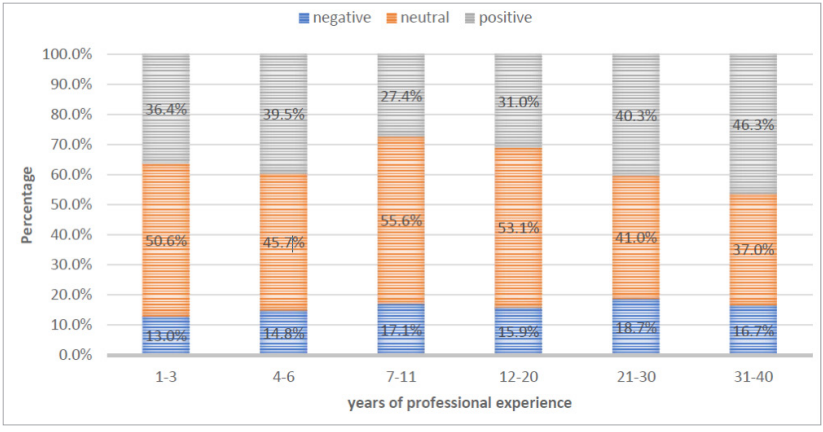
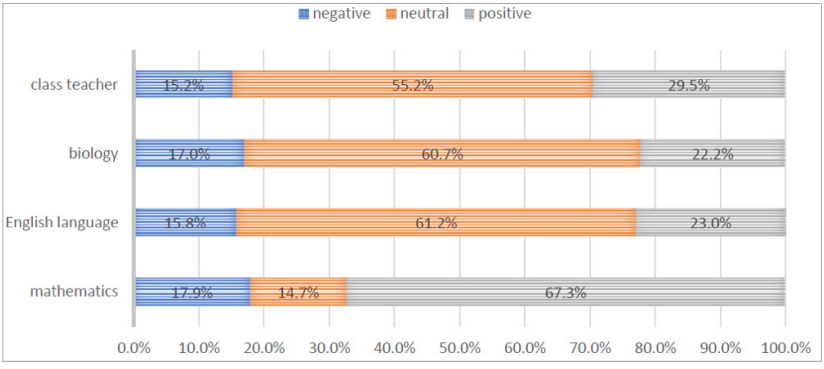


Figure 3

Distribution of negative, neutral, and positive emotions in metaphors.



The Relationships Between Teachers' Knowledge Base and Their Affective Attributes to Beliefs About Teaching and Job Satisfaction

Job satisfaction: The direction (positive or negative) of the affective connotation was associated with job satisfaction or a lack of it (Kruskal-Wallis test $H = 7.777$; $p < .05$). Teachers who expressed more positive emotions in their metaphors were more satisfied with their job conditions (*mean rank* = 346.71) than the teachers who expressed negative emotions (*mean rank* = 285.54 and 282.50, respectively). The Kruskal-Wallis test further indicated statistically significant differences in satisfaction with work conditions ($H = 11.358$; $p < .05$) in various types of metaphor groups. The teachers who expressed contextual metaphors were significantly less satisfied with work conditions (*mean rank* = 255.85). The teachers expressing pedagogue expertise metaphors were most satisfied with work conditions (*mean rank* = 358.64). When comparing job satisfaction ($H = 10.636$; $p < .05$) according to the subject taught, statistically significant differences appeared. English teachers were statistically less satisfied with their work conditions (*mean rank* = 288.76) than others.

Beliefs about teaching: The distribution of negative, neutral, and positive emotions followed a similar pattern among teachers expressing teacher-centred, student-centred, and mixed beliefs (Figure 4). There were no statistically significant differences ($H = 2.090$; $p = .719$). Furthermore, no statistically significant differences emerged concerning teaching beliefs based on the type of metaphors. However, more teachers expressed student-centred and less teacher-centred beliefs among class teachers compared to mathematics teachers ($H = 17.210$; $p < .01$). The difference was statistically significant (Figure 5).

Figure 4

Distribution of negative, neutral, and positive emotions according to beliefs about teaching.

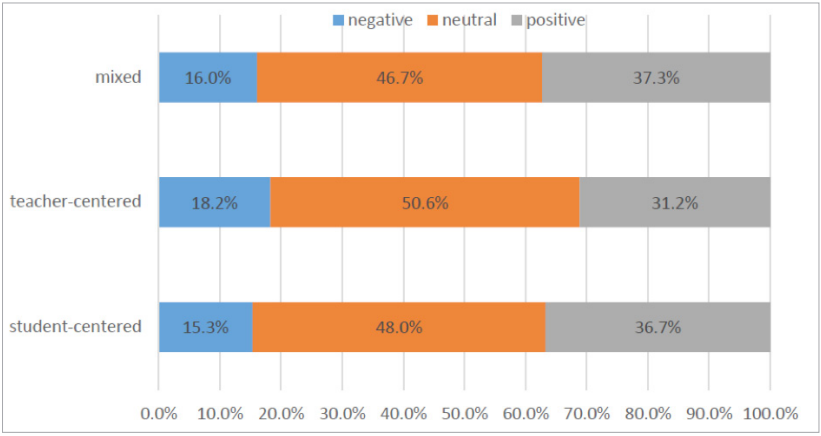
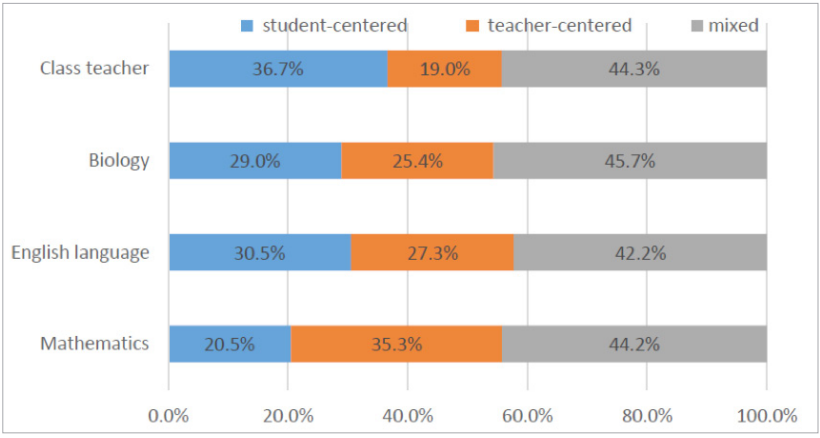


Figure 5
Distribution of beliefs about teaching.



Controlling for the differences between groups of teachers holding different beliefs about teaching, statistically significant differences in job satisfaction (H = 17.429; p = .000) emerged. Teachers expressing student-centred beliefs were more satisfied with their job environment (*mean rank* = 366.18) than their colleagues who expressed teacher-centred beliefs (*mean rank* = 283.85). This difference was statistically significant.

Discussion

This research focused on the relationship between teachers' professional knowledge base and its affective connotations, their perceptions of teaching, and job satisfaction. Many teachers see their professional role as a combination of a subject specialist, pedagogical or didactics expert, indicating a multifaceted conception of their profession (see also Beijaard et al., 2000; Löfström et al., 2010). Prior research suggests that teachers who embrace an expanded role view experience greater satisfaction and professional commitment on the one hand but exhausting and commitment-eroding work overload on the other hand (van Veen et al., 2005).

There were some essential differences between class teachers and subject teachers. Specifically, based on the metaphors, class teachers embraced pedagogical expertise more than subject teachers did. Class teachers also had the most significant number of self-referential metaphors, but compared with subject teachers, their self-referential metaphors were more positive, expressing

self-confidence and belief in their students, reflecting teacher professionalism in student motivating students and supporting their development. Prior research (Day et al., 2006) has shown that primary school teachers' personal and professional identities are intertwined and contribute to motivation and job satisfaction, whereas the subject and its perceived status define the professional identities of secondary school teachers. In our study, mathematics and biology teachers expressed didactic expertise the most. An explanation may be that teaching mathematics and biology requires didactic effort on behalf of the teacher to motivate students. Only a minority of teachers preferred a subject expert role, and when this was the case, the teachers were younger and less experienced. Research (Caleon et al., 2018) has identified more transmission-oriented and teacher-directed instruction in beginning teachers' lessons than experienced teachers. Younger teachers' greater subject-centredness and transmission orientation have been associated with insecurity regarding their competence, lower self-efficacy, and challenges with classroom management (OECD, 2009). This has been explained by experienced teachers having developed more effective strategies (OECD, 2010). Building opportunities to embrace and reflect upon pedagogue and didactics expertise in pre-service teacher education may be helpful for strengthening novice teachers' strategies for overcoming the mentioned insecurities and challenges. Appropriate interventions for developing beliefs, competencies and behaviours involve approaches aiming at conceptual change, coaching, modelling, correcting, and rewarding (contingency management) (Korthagen, 2004).

A result that is a cause of concern is that approximately 15% of the teachers in every age group conveyed dissatisfaction with their roles and work conditions. Most of the metaphors expressing negative emotions were contextual, conveying dissatisfaction with the workload, responsibilities, and lack of support. These metaphors reflected the demands that teachers struggle to meet. These sources of dissatisfaction were like those identified by Alger (2009), including tensions around curriculum, ability levels and the number of students to teach. Research (Day et al., 2006; Prosen et al., 2011) suggests that because of their emotional investment, teachers inevitably experience negative emotions when deeply held beliefs and rooted practices are challenged. This may also happen when professional identity and moral integrity are questioned through policy changes, parents, school leaders, or colleagues and when associated with unrealistic expectations or perceived shortcomings in student learning. Teachers have been found to associate more negative emotions with their beliefs about the teachers' actual roles than with their ideal conception of the teacher (Cabalin & Andrada, 2023). Negative emotions arising from a teacher's work,

including stress, may lead to severe outcomes like burnout, depression, poor performance, absenteeism, and a decision to leave the profession (Kyriacou, 2001).

Teachers who expressed negative emotions were significantly less satisfied with their work conditions. Teachers' job satisfaction influences performance, commitment, absenteeism, physical and mental health, and well-being, and thus, the implications may be substantial (Judge et al., 2001). Our study showed that teachers who expressed positive emotions were more satisfied with their job conditions than those who expressed negative emotions. A positive identification with the subject and supporting relationships are essential for maintaining self-efficacy and commitment to work (Day et al., 2006).

Class teachers expressed more student-centred and less teacher-centred beliefs about teaching than mathematics teachers. This result aligns with the TALIS study (OECD, 2009), in which mathematics and science teachers reported more structuring, fewer student-oriented practices, and enhanced activities. Teachers who aligned their views with student-centred beliefs were more satisfied than teachers who held teacher-centred beliefs. The results corroborate prior research suggesting that there are important relationships between how teachers emotionally experience teaching and their beliefs about teaching, with positive emotions being associated with student-focused teaching approaches and negative emotions with teacher-centred and transmission-oriented approaches (Trigwell, 2012; Chen, 2019). Moreover, teachers who experience anxiety, fear, or stress tend to be more traditional in their teaching approaches (Cansiz & Cansiz, 2019). The present study corroborates the finding that physiological and emotional states are related to teaching beliefs.

Limitations

The study had limitations. The study's results should not be generalised; rather, they should be indicative and require further research. There are approximately 14,000 teachers in compulsory schools in Estonia (Santiago et al., 2016). This means that our sample captured only about 5% of the teachers at most. The sample was not representative of the population. It is possible that those teachers who are the most dissatisfied with their work did not engage with the inquiry. The reliabilities of all the factors were not strong, and one could be considered weak (teacher-centred beliefs about teaching). While an effort was made to create scales that capture dimensions of teaching that can be viewed as locally relevant, the instrument may have benefited from a broader set of items to measure the relevant dimensions. Also, the analysis of metaphors is vulnerable to subjective interpretation and requires a reflective and critical approach

(Löfström & Poom-Valickis, 2013). Double coding by two independent coders was deemed necessary for mitigating threats to reliability. This research did not address the persistence of the researched dimensions over time, which calls for a longitudinal approach.

Conclusions

We end by identifying the policy implications of our research. For teacher education, the research identifies the following areas of development: subject teacher education may benefit from greater emphasis on supporting student teachers in developing a pedagogical knowledge base, while class teacher education may benefit from the contrary, namely, to support the development of didactics expertise in future class teachers. Teachers expressing student-centred beliefs were more satisfied than their colleagues who expressed teacher-centred beliefs. Emphasising student-focused teaching approaches in teacher education could help to work as a buffer against the dissatisfaction of future teachers. Keeping in mind the growing expectations on teachers and the plurality of roles they need to fulfil, it is essential that teachers have access to support for the emotional, intellectual, and social demands. This is particularly important for approximately 15% of teachers who may be in the risk zone of losing their work satisfaction due to stress, demands, and a perceived lack of support. Just as we are discussing the need for a personalised approach for learners, it is also necessary to consider individual teacher beliefs and needs. Sustaining a positive sense of the role of the teacher, learners, and teaching is essential to maintaining job satisfaction. While the results cannot be generalised, they may resonate with those of other European countries, as differences in teachers' job satisfaction between schools and countries are small compared to the variety within schools (OECD, 2009).

The fact that teachers who aligned their views with student-centred beliefs were more satisfied with their work environment than teachers who held teacher-centred beliefs suggests that the policy goals expressed in The Estonian Lifelong Learning Strategy 2020 (Ministry of Education and Research of Estonia, 2014) have been well-informed. Teacher-centred beliefs about teaching still have a strong hold among teachers, and efforts to facilitate renewal and development should be continued. This should be supported through whole-school initiatives focusing on teaching culture and collegial support rather than individual teachers.

Disclosure Statement

The authors have no conflict of interest to declare.

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Teachers' Attitudes Towards Classroom Observations

Melita Lemut Bajec[1]

Classroom observations enable professional growth and are integral to upholding the academic excellence of the school. Prioritising them must become imperative. In this study, geared towards exploring teachers' attitudes towards peer and supervisory observations, we focused on teachers' experiences, perceptions, and expectations of observations, the pivotal criteria for effective observation, the concrete changes made in teaching practice after receiving feedback, and the evolution of teachers' attitudes towards observations throughout their professional careers. The study involved 73 teachers from three primary and one secondary school. A questionnaire was used to collect data. Through qualitative data, employing a coding technique, we gained valuable insights into teachers' interpretations and the development of their attitudes towards them, while quantitative data provided robust support to our descriptive findings. The study revealed a prevalent positive disposition among teachers towards observations. Their expectations focused on receiving constructive feedback, further empowering them with ideas for future work, and facilitating the process of self-reflection. Most of the changes implemented in teaching practices after receiving feedback predominantly revolve around classroom management and changes in teaching methods. However, observations are also related to supervision, bureaucracy, pressure, and stress. Despite these challenges, teachers' attitudes towards observations tend to improve over the course of their teaching careers. While both peer and supervisory observations pose challenges, peer observations emerge as more useful, notwithstanding concerns regarding subjective biases when observing colleagues.

Keywords: attitudes, criteria, feedback, implementations, peer and supervisory observation

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Stališča učiteljev do hospitacij

Melita Lemut Bajec

Hospitacije omogočajo učiteljevo profesionalno rast in zagotavljajo akademsko odličnost šole, zato morajo predstavljati eno izmed njenih prednostnih področij. V raziskavi, katere glavni cilj je bil preučiti stališča učiteljev do kolegialnih in ravnateljevih hospitacij, smo se osredinili na doživljanja, izkušnje in na pričakovanja učiteljev, ki jih gojijo v povezavi s hospitacijami, merila, ki se jim zdijo pomembna za učinkovito izvedbo hospitacije, konkretne spremembe, ki so jih vnesli v svoj pouk na podlagi prejetih povratnih informacij po hospitaciji, ter na razvoj stališč do hospitacij skozi leta učiteljeve profesionalne kariere. V raziskavi je sodelovalo 73 učiteljev iz treh osnovnih in ene srednje šole. Za zbiranje podatkov smo uporabili vprašalnik. Kvalitativni podatki, ki so bili analizirani z uporabo kodiranja, so nam omogočili razumevanje stališč učiteljev do hospitacij, s kvantitativnimi podatki pa smo ugotovitve dodatno podprli. Študija je pokazala, da učitelji na splošno gojijo pozitivna stališča do hospitacij. Njihova pričakovanja se večinoma osredinjajo na povratne informacije, za katere želijo, da so konstruktivne, jih opolnomočijo z idejami za nadaljnje delo in so v pomoč pri samorefleksiji. Večina sprememb, uvedenih v pedagoško prakso na podlagi povratnih informacij, se nanaša na vodenje razreda in spremembo učnih metod. Učitelji hospitacije povezujejo tudi z nadzorom, birokracijo, s pritiskom in stresom. Z leti poučevanja se posameznikov odnos do hospitacij navadno izboljšuje. Kolegialne in ravnateljeve hospitacije so učiteljem v izziv, kljub temu pa so kolegialne hospitacije med učitelji zaznane kot uporabnejše, čeprav je izražen dvom o učiteljevi pristranskosti, ko hospitira kolegu.

Ključne besede: kolegialne in ravnateljeve hospitacije, merila, povratna informacija, spremembe, stališča

Introduction

In pursuit of enhanced results within pedagogical realms, educators make use of classroom observations as they prove to be valuable tools for enhancing teacher efficiency and excellence. Teachers who engage in teacher observations usually wish to understand and improve their teaching practice (Bell et al., 2019), develop and maintain professional expertise (Pollard & Collins, 2005) or deliver their best practice (Santos & Miguel, 2017). Teacher observations, therefore, enhance teacher motivation to persevere in ongoing professional growth by developing the teaching process (Bush & Middlewood, 2013; Klar, 2012). This is why they are not intended just for teacher beginners and those who lack experience but also for the skilled ones with an eye on improving and expanding their abilities (Hinchey, 2010). Moreover, when done and understood correctly, observations result in advanced student performance (Day et al., 2020; Erčulj, 2014; Santos & Miguel, 2017). However, it cannot go unnoticed that they may not always monitor the real in-situ situation as lessons are pre-planned, and teachers might act differently than they normally would (Range et al., 2011). Despite the scientifically proven benefits (Goble & Pianta, 2022), teacher observations are frequently overshadowed by feelings of stress and administrative burden and are perceived as a compulsory check-off procedure (Denton, 2019; Khan, 2019).

The following considerations justify up-to-date research tailored to the nuances of the Slovenian school system: Firstly, there has been limited academic interest in the topic of classroom observations since 2015 (Ambrož, 2014; Debenjak et al., 2012; Erčulj 2014, 2015; Krašna & Gartner, 2008; Oder Grabner, 2010). Furthermore, the TALIS 2018 (OECD, 2020) report, which partially addressed the topic of classroom observations within the overarching topic of teacher professionalism, presented findings obtained from the Slovenian context but also underscored the varied understanding of what classroom observations are across OECD countries as different school systems execute diverse practices and understandings of classroom observations. Lastly, the importance and relevance of this research lies in its potential to shed new light on classroom observations, especially in the aftermath of the coronavirus pandemic, thus encouraging teachers to decide more often and more whole-heartedly for observations and not only when obligated.

Therefore, the main objective of this research was to investigate teachers' attitudes regarding classroom observations as formed through their underlying beliefs concerning the purpose, process, outcomes, effectiveness, usefulness, and importance of classroom observations. Subsequently, our focus extended

to examining the practical changes implemented into teachers' classroom practice following the feedback received in post-observation meetings. Additionally, we wanted to explore the evolving attitudes teachers reported as they progressed in their teaching careers. Furthermore, we were interested in the skills and knowledge expected of observers to facilitate high-quality observation. Lastly, we sought to investigate the distinctions between peer and supervisory observations as perceived by teachers.

Theoretical Background

Classroom observation systems play a pivotal role in professional development within educational settings. The two prevalent approaches are supervisory and peer observations. Peer observations are conducted when teachers act as observers of their colleagues (Santos & Miguel, 2017). They also have the potential to encourage cross-curricular lesson planning and team teaching, reflection, and self-evaluation, thus cultivating a collaborative climate and critical friendship (Debeljak et al., 2012; Erčulj, 2014), and so help teachers identify their strengths and weaknesses (Motallebzadeh et al., 2017). In contrast, supervisory observations as part of instructional leadership are understood as a formative process carried out by principals whose duty is to conduct systematic teacher supervision in the form of a formal (pre-arranged) or informal observation (with the teacher's no prior knowledge of being observed) (Zepeda, 2017). Yet, it must be noted that principals often lack time to systematically conduct instructional leadership and supervision due to numerous administrative duties, jurisdictional policies, external influences, partnerships, and other factors. (Pollock et al., 2015). Consequently, formative supervision in the form of multiple personnel is gaining momentum (Range et al., 2011). In this way, teams are given autonomy to share supervision and so make instructional leadership even more effective, which ultimately results in strong working relationships and high student achievements (Hallam et al., 2015).

To ensure high-quality observations, several criteria have to be fulfilled. First, observations follow specific steps, starting with the pre-observation meeting where the observer and the observed discuss the upcoming lesson(s) as well as set goals as to the categories that will be monitored (Zepeda, 2017). Second, observation criteria must be clearly defined if the observation is to reach its full potential (Sivan & Chan, 2009; Zepeda, 2017). Follows an observation with the help of an observation protocol, after which the findings are analysed, and good practices, as well as places for improvement, are pointed out in an effective, progressive, formative, objective, and respectful manner (Jacob & Lefgen, 2006;

Motallebzadeh et al., 2017; Santos & Miguel, 2017; Zepeda, 2017). An important aspect of quality observation is the professional attitude, which seeks to refrain from too much familiarity as it lessens the seriousness of the performance and its evaluation (Santos & Miguel, 2017). High-quality observations empower teachers to see observations as an ongoing process that needs to be internalised and integrated into their syllabi (Erčulj, 2014).

An important predisposition for an effective observation comprises observation protocols that come as a sheet of paper with categories that speak of different properties and are associated with diverse teaching elements (Bell et al., 2019; Praetorius & Charalambous, 2018; Range et al., 2012, 2013). Overall, it is recommended to collaboratively identify, study, and agree on common criteria and minimum standards that comprise a protocol and refer to measurement issues (Praetorius & Charalambous, 2018), thus fostering a sense of shared purpose (Education First, 2014). Nonetheless, observation protocols are not wholly reliable and accurate as they undergo human evaluation, which is, to some extent, always subjective and, therefore, fallible (Decristan et al., 2015).

As observation protocols always value one way of teaching practices over another, it is important that teachers fully understand the observation protocols they are following (Bell et al., 2019). These can be more generic and strive to identify key aspects of teaching such as classroom management, student-teacher relationship, student motivation and engagement, teacher's professional commitment, instructional delivery, range and nature of didactic activities, teacher efficacy, etc. (Bell et al., 2019; Danielson, 2014; Popp et al., 2011; Praetorius & Charalambous, 2018; Range et al., 2012, 2013) or subject-specific (e.g., the Mathematical Quality of Instruction (MQI), the Protocol for Language Arts Teaching Observation (PLATO), the Quality of Science Teaching (QST), and PISA+ in science education) (Bell et al., 2019, p. 9) that call for observers who are subject experts and can provide content-related feedback (Hill & Grossman, 2013; Mette et al., 2015; Zatynski, 2012; Zepeda, 2017). The research tends to suggest that only teachers of the same or closely related field of expertise can accurately monitor and assess their colleagues as well as provide the most appropriate feedback (Santos & Miguel, 2017).

To summarise, high-quality observations are comprehensive and rigorous, supported by robust rubrics, and conducted by adequately trained teachers. If these criteria are not met, they risk becoming mere obligatory checkboxes and compliance exercises (Denton, 2019; Khan, 2019; Education First, 2014).

Teacher Observations in Slovenia

The Slovenian regulations regarding education require the direct presence of the principal in educational work, stipulating that 'the head teacher shall be the pedagogical leader and management body of a public kindergarten or school and shall be present in the educational work of preschool or school teachers, monitor their work and offer advice' (Organisation and Financing of Education Act, 1996). It is, therefore, not surprising that principals most often link their educational management to teacher observations, as they usually consider their monitoring to have an impact on the quality and efficacy of the teachers' as well as students' performance (Erčulj, 2015).

The TALIS 2018 findings (Pedagoški inštitut, 2020) regarding teacher observations from 136 primary schools and 122 secondary schools in Slovenia show that the vast majority of principals conduct observations and evaluations of each teacher once a year, with peer observation not being standard practice. However, when it happens, it is usually mentors who conduct observations. Half of the teachers report never participating in classroom observations or providing feedback, whereas the rest do so once a year. After the observations, principals most often discuss measures to address shortcomings or ways to improve the quality of the teacher's performance. Feedback is positively accepted as it contributes to a deeper understanding of the subject area, enhances pedagogical competences relevant to one's subject, improves student assessment and evaluation, supports effective classroom management, develops better methods for teaching students with disabilities, and promotes the use of teaching strategies in multicultural or multilingual contexts.

Research Questions

Having laid out the theoretical framework, the study aims to explore teachers' attitudes towards classroom observations. Therefore, to obtain a comprehensive picture of the studied phenomenon, we decided to investigate teachers' current perceptions and expectations arising from their previous experiences towards both types of observations as well as criteria they consider important for effective observations and changes that happened throughout their professional careers regarding their attitudes towards classroom observations.

To this end, an overarching research question was formed:

RQ1: What are teachers' attitudes towards classroom observations?

Method

Participants

The participants were 73 teachers: 43 from three primary schools and 30 upper-secondary teachers from one secondary school (Table 1). The overall proportion of female participants (79%) significantly exceeded that of male participants (21%), with the same trend being observed across primary and secondary school participants. All four schools are situated in the western part of Slovenia, within a radius of 10 km from each other. They were chosen conveniently.

Table 1

Distribution of participants by gender

	Male	Female	Total
Primary school teachers	8 (18%)	31 (82%)	43 (100%)
Secondary school teachers	3 (10%)	27 (90%)	30 (100%)
Total	15 (21%)	58 (79%)	73 (100%)

We did not enquire about the participants' age but instead gathered information on the average number of years of teaching experience (Table 2). We selected this variable as it better aligns with the objectives of our research. The analysis revealed that the average number of years of teaching experience was 17.8 years. Notably, the majority of the participants belonged to the group with the least teaching experience, while the fewest participants were from the group with the most experience, thus, teachers in the latter part of their professional careers, some presumably approaching retirement. This observation potentially indicates that less-experienced teachers were more motivated to participate in the research compared to the more-experienced ones.

Table 2

Distribution of participants by years of teaching experience

Years of teaching	Primary school teachers	Secondary school teachers	Average
Less than 10 years	15 (35%)	9 (30%)	24 (33%)
11–20	13 (30%)	7 (23.3%)	20 (27.4%)
21–30	8 (19%)	9 (30%)	17 (23.2%)
More than 30 years	7 (16%)	5 (16.4%)	12 (16.4%)
Total	43 (100%)	30 (100%)	73 (100%)

We also investigated their areas of expertise and discovered a diverse range of subjects, encompassing languages, mathematics, natural and social sciences, humanities, arts, technology, computer science, and sports.

Instruments

The data collection involved the use of a questionnaire devised by the author, who drew upon an in-depth review of relevant literature and her own familiarity with classroom settings. Additionally, the content validity of the questionnaire was reviewed by a group of secondary school teachers who were well-experienced in conducting teacher observations. They provided comments upon which we paraphrased some of the statements to make them unambiguous and in sync with the research questions. The combination of theoretical insights and practical experience ensured that the questionnaire was well-designed to capture nuanced aspects of teachers' attitudes towards observation practices.

The questionnaire was initially designed in paper format. However, due to a modest response rate of 50% from secondary school teachers, reminiscent of a similar situation in which Slovenian schools needed encouragement to participate in TALIS 2018 (Pedagoški inštitut, 2020), we decided to transfer the content from the paper format to an online questionnaire accessible through an open-source application 1KA and shared it with the primary school teachers.

The introductory part of the questionnaire included comprehensive details about the research, its aims, and objectives. We also ensured anonymity and placed particular emphasis on voluntary participation to foster a sense of encouragement and safety among responding teachers, enabling them to participate with confidence and assurance of their privacy.

Furthermore, the questionnaire consists of three parts, providing qualitative and quantitative data. The first part yielded qualitative data through a set of seven open-ended questions, which were crafted to align with the overarching research question. Through the first two questions (*How do you perceive observations based on your previous experience? What do you expect from them?*), we investigated teachers' current perceptions and expectations, which provided a baseline understanding of their attitudes. The subsequent question (*What skills and knowledge does the observer need to possess to conduct quality observations?*) delved into skills and knowledge one needs to possess to conduct a quality observation. This question provided insight into teachers' proficiency in conducting classroom observations. Further, we inquired about concrete changes introduced into their teaching practice (*Have you changed anything in your work as a result of your experience with observations?*) and explored the

evolution of attitudes throughout their teaching careers (*Has your perception of observations changed in any way over the years of your teaching practice?*). The last two questions allowed us to investigate the differences and considerations associated with both types of observations as perceived by the teachers (*How do you experience a supervisory observation compared to a peer observation? What are the disadvantages and advantages of peer observations when compared to supervisory ones?*).

The second part of the questionnaire consisted of three questions following a 5-point rating scale. These were: *How stressful are observations for you?*; *To what extent do you feel that the professionals in your school possess the necessary skills to conduct quality observations?*; *How frequently do you think they should occur?*. They were designed to provide additional insights into responses from the first part and generated quantitative data.

The seven pairs of statements in the final section of the questionnaire required participants to select their preferred option from each pair. Generating quantitative data further contributed to our understanding of the research topic. These were:

- *Observations should be conducted for all teachers, regardless of their years of teaching./Observations should be conducted primarily for teacher beginners.*
- *Observations should be announced in advance./Observations may be conducted unannounced.*
- *Observations should be conducted in all classrooms./Observations should be prioritised in classrooms struggling with management issues.*
- *I prefer to be observed by someone I trust./ I'm indifferent to who observes me during my teaching.*
- *The observer should be knowledgeable about my field of expertise./Anyone can observe regardless of their field of expertise.*
- *I prefer to demonstrate my typical teaching approach during observations./I wish to showcase different teaching methods during observations.*
- *I view observations as an unpleasant aspect of the job./I view observations as an opportunity for professional development.*

The responses to the second and third sets of the questionnaire prompted teachers to reflect and take a stance on various aspects of observations, potentially extending their engagement beyond the answers initially reported in the first part of the questionnaire. By doing so, these sets enriched the qualitative data with additional quantitative data, thereby providing a more comprehensive understanding of teachers' attitudes regarding observations.

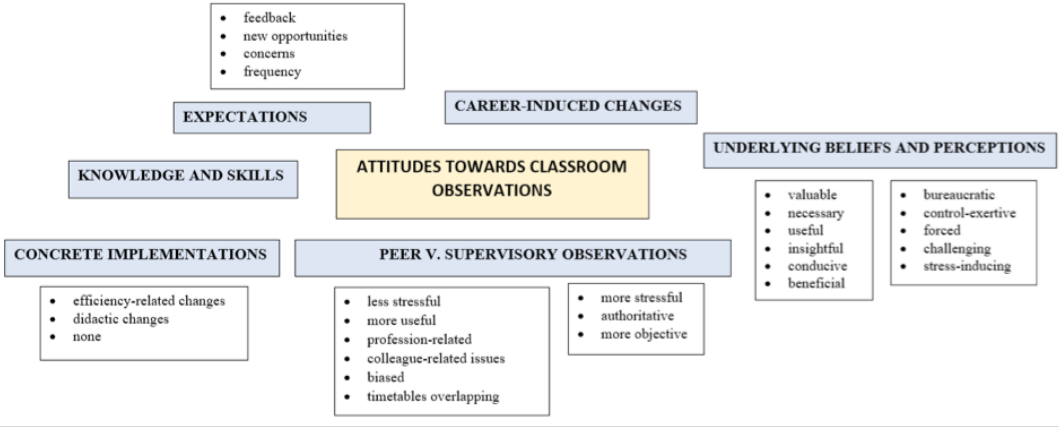
Research Design and Data Analysis

In January 2023, the questionnaire was distributed to the four principals who were asked to share it with their teachers. First, it was disseminated among secondary teachers. Out of 60 teachers, 30 completed the paper format questionnaire. Additionally, 43 primary school teachers out of approximately 150 teachers opted to fill it out in an online format. We decided not to segment the data by primary versus secondary school teachers but to regard it as a unified dataset for two reasons. First, the responses overlapped in terms of topics answered. Secondly, we had in mind that some teachers may be concurrently teaching on both educational levels or have transitioned between the two in the course of their careers.

To ensure the validity, reliability, objectivity, usability, and quality of the research and the obtained results, we employed a mixed-methods approach, using descriptive and causal-non-experimental methods of pedagogical research (Sagadin, 1991). The qualitative data from the first part of the questionnaire was analysed by applying coding, which is a qualitative analysis involving the systemic categorisation of units based on the qualitative material under scrutiny (Kordeš & Smrdu, 2015, p. 53). The entire dataset was carefully examined and first segmented into individual lower-order categories, which were later organised into higher-order categories (Figure 1) (Vogrinc, 2008), answering the research question. Statements from the second and third parts provided quantitative data, which were used to support and clarify the thematic units.

Figure 1

The categorisation of the dataset



Results

The following section presents the findings. We decided on a combined presentation, offering qualitative data supported by quantitative data whenever feasible.

Internalised Beliefs and Perceptions

First, we aimed to understand teachers' current underlying, internalised beliefs and perceptions shaped by previous experiences. Their responses fell into two distinct categories: favourable perceptions highlighted the value, necessity, usefulness, insightfulness, conduciveness, and various other benefits. Less-favourable perceptions centred around challenges, control, bureaucracy, coercion, and stress.

The first group perceived observations as valuable. They pointed out that observations widen their horizons by facilitating the acquisition of new knowledge: 'I always get a new idea that I can take back to my classroom', 'Observations give me a different perspective on an activity', and 'They are useful especially when you want to introduce something new, 'They push me to make progress in my work', and 'They motivate me to show how I work' as well as they 'Require constant engagement and planning and so force the teacher out of his/her comfort zone'.

A few underscored that they are necessary 'because the teacher needs to stay in the learning process for life'. Here, we deem it appropriate to emphasise that as many as 74% of all participants were open to unannounced observations, while 26% preferred advance notice. Moreover, 74% believe all teachers should be observed, not just those facing challenges.

Some responses underscored the utility of observations: 'Observations are useful both for the observers who gain experience by watching and for the observed who receives feedback' because 'more heads know more'. Usefulness was also attributed to 'good', 'concrete', and above all, 'constructive' feedback that follows observation. More responses underscored the value of observations, particularly during the early stages of a teacher's career, 'when the teacher is still learning' and 'gaining experience'. This perspective was further supported by quantitative data, which revealed that 84% of teachers found observations beneficial regardless of the years of experience, while only 16% attributed benefits to teacher beginners.

Another group of teachers saw benefits in the metacognitive processes that observations trigger. 'Observations are an opportunity for self-reflection. They force you to think about your own work and about the relationship with

your students'. In addition, they 'allow for self-regulation' as 'we don't see ourselves well enough', 'a colleague can hold up a mirror to you' and so 'help solve a problem' and 'they make sense when the teacher is dissatisfied with his/her work and would like to make a change'. Individuals further emphasised the relational component, as observations can contribute to 'strengthening relationships'.

For individual teachers, observations only make sense 'when the teacher has a positive attitude towards them', 'when they are spontaneous', and 'when you are being observed by someone you trust'. Quantitative data revealed that 65% of participants feel the observer must be someone they fully trust, irrespective of their function; 58% prefer observers from their field of expertise compared to 42% who believe the field of expertise plays no significance.

On the less favourable side, the fact that as many as 63% of the participants viewed observations as a necessary evil stands out, whereas 37% saw observations as opportunities for professional and personal growth. This fact was aligned to bureaucratic aspects accompanying observations, stating, 'You have to write everything down, which takes a lot of time', 'they are primarily a formality', 'linked to the control of the employee', 'extra work', and 'you have to take care of several factors at the same time'. Some underscored that observations do not mirror the natural learning environment, asserting, 'They are forced because everything is planned, but when you teach, you often encounter unexpected situations which you cannot plan in advance'.

Some teachers found them challenging as 'I want to show different ways of delivering the material'. This perspective was reflected in the corresponding quantitative data, which asked about the types of approaches teachers typically demonstrate when observed. 12% prefer to demonstrate their typical teaching, while 86% prefer to showcase novel teaching approaches.

A considerable number of teachers perceived observations to be stress-inducing. One explained, 'Because you are not very often in this situation', while another commented that they 'cause a lot of worries'. Some say they 'feel uncomfortable in front of the colleagues', 'because I have the feeling that I am being judged' and 'evaluated', which creates 'extra pressure to make the lesson special'. According to quantitative data on stress levels, 16% of teachers perceive observations as extremely stressful, 37% experience high levels of stress, 25% feel moderate levels of stress, and 19% consider observations to trigger minor levels of stress. None of the teachers see observations as stress-free events.

Some teachers justified this surveillance aspect with reference to the principal's evaluation. One wrote, 'They make sense for both the teacher and the principal; in every company, the head manager monitors his/her employees' work, progress, and professionalism'. Moreover, they noted, 'It's also an

opportunity for the principal to get to know the pupils'.

A group of teachers whose answers were only individually represented did not attach any connotation to observations, saying 'They are nothing special', and 'They give information about your work and that's all there is to them'. A few answers referred to the fact that they 'do not show the real situation' and 'in fact, nothing changes because of one observation'.

Career-Induced Changes in Attitudes

We also sought to investigate whether, how, and to what degree teachers' perspectives on observations evolve over the course of their teaching careers. The vast majority indicated a positive shift. Teachers wrote: 'I used to experience them as control, in recent years as encouragement', 'I am more relaxed, I feel more at ease', and 'I panic less also because I feel we are more open to people observing us at work', 'I have more autonomy', 'I trust myself more', 'I no longer experience them as evaluation of my work, but as a collaborative support system', 'now I see them as an opportunity to grow', 'I am calmer because I know I am doing a good job'.

Concrete Implementations

We encouraged teachers to highlight concrete implementations they introduced into their teaching practice in response to feedback they received. Their answers encompassed three groups: efficiency-related changes, didactic changes, and none.

The first set of answers referred to strategies implemented to improve teacher's efficiency or enhance student engagement. 'I slowed down the delivery of the lessons, 'I speak less loudly', 'I focus more on the structure of the lesson', 'I'm more mindful of a student's prior knowledge', 'I put more emphasis on relationships', 'I make sure I cover less material at a time, I give more exercises', 'I give fewer worksheets', 'I changed my attitude towards the student on the advice of a colleague, which turned out to be very positive', 'I introduced music into my lessons', among other responses.

Some were encouraged by their colleagues' didactic approach and wanted to try it out themselves. They wrote: 'I saw a very good lesson on cooperative learning, which encouraged me to start using it more often myself', 'I introduced cross-curricular content', 'I am using more formative monitoring', and similar.

A small group of participants felt that they had not changed anything in their teaching because 'there were no requests for change, but I got confirmation that I was doing a good job', and individual responses referred to the

quality of the observations in the sense of 'I have not had a quality observation so far'.

Specific Skills and Knowledge

Next, we wanted to know how competent teachers feel in conducting observations. Only 5% of teachers feel they are fully competent, 30% feel they are quite competent, 44% feel fairly competent, 16% feel rather incompetent, and 5% feel fully incompetent.

When asked what skills and knowledge are needed by an observer, a long list was compiled, including the ability to provide constructive feedback, being a good listener, having critical thinking skills, possessing didactic knowledge, subject expertise, and expertise in the area of developmental psychology. They wrote: 'The teacher must be able to give quality feedback in a respectful manner', 'critical thinking must be developed', 'he/she must be able to distinguish between facts and inferences', and 'he/she must be able to ask appropriate questions for self-reflection'. They also highlighted 'capacity for empathy', 'well-developed relational competence', 'positive attitude', 'open-mindedness', and 'curiosity'. One commented that the observer needs to 'understand the observation protocol first and foremost'.

In this context, individuals pointed out different deficiencies. They wrote: 'I feel I lack knowledge', 'I'm not skilled enough because we haven't been given much training', 'I don't know how to ask good reflective questions', and 'Observations need to be conducted more often if we want to become more skilled.' The remark that 'more people should participate in an observation and then engage in a post-observation meeting' is also valid as it would bring much-needed experience to the teachers.

Peer v. Supervisory Observations

When exploring peer and supervisory observations, we found that 35% of teachers do not care who the observer is, saying, 'I don't see any difference', and 'I take the supervisor's observations as part of the job, and colleagues' as an exchange of knowledge, ideas, suggestions'.

Overall, peer observations are associated with less stress and anxiety and more trust. Teachers reported that 'peer observations are more pleasant and easier because you are friends with colleagues', 'you trust your colleagues, which makes the situation safer', 'there is no feeling of control', 'you can make mistakes without guilt', 'you can also chat with students in between if that is your habit'. The majority believe that peer observations are more useful and more profession-related: 'My colleague knows my field of expertise and the

curriculum more thoroughly', 'he is more in touch with teaching', and 'he can give me some concrete ideas'. Therefore, it is not surprising that many feel that 'peer observations can lead to concrete changes'.

Although most of the answers seemed to be in favour of peer observations, a few of them wrote that it is more difficult to be observed by a colleague from the same field of expertise because 'I assume that she is better at classroom management and can therefore be more critical' and 'I feel more apprehensive when I am being observed by an experienced colleague in my field of expertise'. Someone pointed out that 'It depends on who of my colleagues is observing me. With some you just simply don't have a good feeling'. Some teachers also doubted the objectivity of peer observations, saying, 'I don't know how much feedback is actually honest for fear of losing the friendship'. Also, 'You don't take the feedback so seriously because there is no distance'. Individuals also feared 'gossiping that might result'. The problem of timing was also stressed, as 'timetables keep overlapping' and 'you just can't find the time as your schedule is too full'.

In contrast, it seems that the supervisory observation is more stressful, as it is experienced as 'control', and it 'affects teachers from the point of view of power'. Someone wrote: 'If the supervisor is there, you try to do everything by the paper', 'You have to prepare more', and 'You are not relaxed, which is also felt by the students, who are also less relaxed and responsive', and 'The class does not function as usual'. Individuals pointed out other benefits of supervisory observation, such as 'the supervisor observes quite different things', and 'he is dedicated to pursuing school-level goals', 'the feedback is more objective, as he can also point out some weaknesses that colleagues dare not'.

Expectations

As current attitudes form one's expectations, we were interested in exploring teachers' anticipations regarding teacher observations. The responses revolved around feedback, opportunities, and concerns.

The majority of the respondents expected feedback to be 'honest', 'constructive', 'point out what is good and tell what to do differently' and give 'a different perspective of my work'. Quite a few teachers wrote that when receiving feedback, they want 'a colleague to point out to me the actions I'm unconsciously performing. That way, I can correct them'.

The second most frequently represented thematic unit centred on opportunities that arise from 'new ideas, which I see as the observer and can later try out myself'. Someone wrote: 'I expect to see some interesting approaches that I can use myself'. Several teachers pointed out that 'observations are an

opportunity for progress', for 'professional growth', and for 'self-affirmation of my work'.

A minority of teachers anticipated concerns, claiming that observations 'bring feelings of fear and uncertainty', 'negative criticism', and 'nothing but unnecessary stress'. Some simply wrote that they do not 'expect anything good' and 'one observation alone does not bring about any change'.

We also aimed to determine how frequently teachers anticipated observations to take place. 35% of teachers believed they should occur once a year, 26% would hold them twice a year, 19% once every two years, 5% expressed a preference to never have them, and the remaining 16% of participants did not identify with any of the provided options.

Discussion

The research concentrated on exploring teachers' attitudes towards classroom observations, considering them indicators of an individual's mental inclinations in assessing a topic, and assigning it different levels of favourability (Johnson et al., 2022). In this context, attitudes reflect teachers' internalised beliefs, opinions, preferences, and expectations towards classroom observations.

Based on the results we obtained, it can be concluded that teachers perceive observations in a dual manner. On the one hand, they hold favourable beliefs and perceptions towards them. This was evidenced by many teachers describing observations as valuable, necessary, useful, insightful, conducive, and beneficial, thus making the findings in line with a considerable amount of literature (Bell et al., 2019; Day et al., 2020; Erčulj et al., 2014; Santos & Miguel, 2017; Motallebzadeh et al., 2017). On the other hand, they associated them with challenges, control, bureaucracy, coercion, burden, apprehension, appraisal, and stress, issues that have also been previously highlighted in research (Denton, 2019; Khan, 2019). Despite the two contrasting viewpoints, it needs to be emphasised that teachers who base their teaching on constructivist theoretical underpinnings tend to perceive observations more positively. They see them as opportunities for growth and improvement, demonstrating an ability to set stress aside and cope effectively (Chen et al. 2022). Given these findings, it would be advisable for teachers to regularly analyse their internal beliefs and current pedagogical practices, with a focus on fostering their own professional growth.

Furthermore, the data also suggests that attitudes toward observations undergo positive shifts as teachers progress in their careers. This was underscored by teachers who noted a stress reduction over time and them gaining

more autonomy with more experience, thus recognising their own self-growth. This is in line with studies emphasising the pivotal role of observations in teacher's professional development and observations functioning as a rewarding and transformative learning experience (Adhikari, 2019; Engin, 2014; Volchenkova, 2016).

Drawing from the results, it can be further inferred that observations contributed to concrete implementations in teachers' daily practices. The outcomes indicate that most of the changes revolved around improvements regarding classroom management and didactic adjustments. However, for these adjustments to be effectively integrated, teachers needed to recognise observations as an impactful aspect of an evaluation and as one of the most important support systems teachers can experience. A similar finding was reached by Taylor and Tyler (2012), who further affirmed that quality observations are based on prompt and actionable feedback, leading to enhanced instruction and improved student achievement. Conversely, inadequate feedback stemming from weak intentions and insufficiently trained observers reduces observations to hollow formalities.

Considering the outcomes, one could reasonably conclude that high-quality observations require knowledgeable and skilled teachers. This was supported by a long list of requirements that observers need to fulfil for an observation to be deemed quality. This perspective aligns with O'Leary (2020) who also contends that engaging in quality teacher observation requires specific skills and knowledge. Teachers need to be given clear criteria for conducting observations (Adhikari, 2019; Engin, 2014; Volchenkova, 2016) and remain mindful of their perspectives, experiences, and intentions. Above all, they must comprehend the underlying rationale behind the concept and undergo specific training to refrain from subjectivity and bias (Sullivan et al., 2000).

Last but not least, based on the findings, it is apparent that both peer and supervisory observations are challenging. While each type has its merits, peer observations emerge as the favourite choice. This acknowledgement, consistent with Barber et al. (2010), advocates for a cooperative work environment where teachers engage in peer observations and regularly perform analysis of classroom efficiency, thus fostering improved teaching skills. Moreover, to meet these requirements, it is essential to establish critical friendships (Šarić, & Šteh, 2017), thus ensuring friendly, open, well-intentioned, encouraging, useful, concrete, positive, and thorough feedback (Bognar & Krumes, 2017). Finally, this aligns with Raiker's (2020) premise that critical reflection not only enhances collaboration and fosters critical thinking skills but also leads to the transformation of pedagogies, individual teachers' professionalism, and improved pupil achievement.

Conclusion

As classroom observations are of crucial importance in fostering ongoing professional growth, it makes sense to explore teachers' attitudes encompassing internalised beliefs, opinions, preferences, and expectations towards classroom observations. The study revealed that teachers generally view classroom observations positively. Their expectations largely focus on feedback that provides a credible reflection of the performance and gives new ideas for improvement of teaching. However, they also link them with control, bureaucracy, pressure, and stress. As teachers advance in their careers, their attitudes towards observations tend to improve. Most of the adjustments introduced into their teaching practice revolve around classroom management and teaching methods. For observations to be of high quality, they depend on knowledgeable and skilled teachers, highlighting the need for adequate training. Both peer and supervisory observations can be of challenge, nonetheless, peer observations tend to be more widely preferred as teachers see them as more functional in everyday teaching practice but complain about logistical challenges. They also raised doubts about the credibility of observations when these are conducted only sporadically. Moreover, the professionalism of an observer's feedback was doubted as it can undergo human subjectivity. In conclusion, we propose that observations are to be integrated as a routine practice, signifying one of the school's priority areas. Advantages and disadvantages need to be continuously addressed, and examples of good practices must be regularly promoted. Teachers should receive ongoing training to facilitate the conduct of quality observations and to encourage continuous reflection on their teaching practice with the aim of continual professional improvement.

The main limitation of this research is a low response rate. Nonetheless, we believe the obtained data gave us valid results, out of which accountable conclusions can be drawn. However, as the situation was similar among the Slovenian schools participating in TALIS 2018, the reasons for teachers' non-responsiveness should be examined in the future, and the factors leading to it should be thoroughly addressed. Additionally, it would be valuable to explore the factors contributing to stress and apprehension, as they seem to hinder teachers' willingness to participate in observations. Moreover, it would be important to devise concrete strategies that can effectively address the issue. Such measures could promote a more adaptable mindset, observations are viewed as constructive challenges and opportunities for growth rather than unpleasant events beyond their comfort zone. It would also be worth investigating the administrative burden that many teachers expressed concerns about and seeking

ways to reduce it. Finally, a point worth investigating would be to explore strategies to overcome logistical challenges, thus making observations more accessible and integrated into everyday teaching practice.

Disclosure Statement

The authors have no conflict of interest to declare.

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Biographical note

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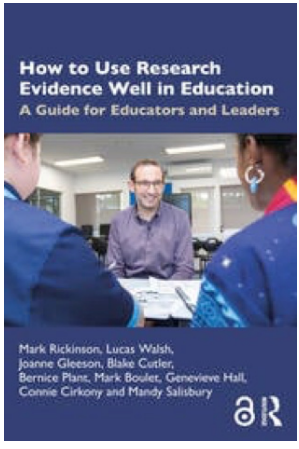
Mark Rickinson, Lucas Walsh, Joanne Gleeson, Blake Cutler, Bernice Plant, Mark Boulet, Genevieve Hall, Connie Cirkony and Mandy Salisbury, *How to Use Research Evidence Well in Education: A Guide for Educators and Leaders* (1st ed.), Routledge, 2025; 214 pp.: ISBN 978-100-337-584-5

Reviewed by Georgeta Ion[1] and Chris Brown[2]



Across education systems internationally, there is now widespread rhetorical commitment to research- and evidence-informed practice. Policymakers, system leaders and professional bodies routinely exhort educators to "use the evidence" to improve teaching, leadership and student outcomes (OECD, 2025). Yet, as a substantial body of scholarship has shown, this ambition has proved far easier to articulate than to realise in practice (Dimmock, 2019). Despite increased access to research summaries, toolkits and intermediary organisations, sustained and meaningful engagement with research remains uneven, fragile and highly dependent on local conditions. It is within this well-established but still unresolved context that *How to Use Research Evidence Well in Education* makes a timely and important contribution.

The book is a practical, accessible guide designed to help educators and school leaders, and researchers as well, use research effectively to improve teaching and learning. Based on a six year study with more than 2,300 educators, the book introduces the QURE Framework (Quality Use of Research Evidence), which defines effective research use as "thoughtful engagement with and implementation of appropriate research evidence".

The book emphasises that using research well is sophisticated – it requires deep, reflective thinking; integrated – research should connect with

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everyday professional practice; developmental – skills grow over time, often hidden and rarely made explicit; and poorly supported – institutions often lack the structures required to do research well.

In order to address these challenges, the authors provide stepbystep guidelines and useful resources, including diagnostic tools, case studies, templates and improvement activities. Each chapter focuses on a key stage of the researchuse process:

1. Identifying a clear purpose
2. Selecting appropriate research
3. Engaging thoughtfully with evidence
4. Implementing researchinformed change
5. Modelling and supporting research use within organisations

Ultimately, the book positions research engagement not as an addon but as an integral aspect of **professional expertise**, similar to how clinicians continually integrate new medical knowledge into practice. It argues that when educators build the mindsets, skillsets and relational capacities to use research well, they create the conditions for:

- More informed decisionmaking,
- Increased professional confidence,
- Stronger collective practices, and
- Improved outcomes for students.

The book makes several contributions to evidence-informed practice in school and the field of research in general. One of its key strengths lies in its clear recognition that the central challenge facing education systems is no longer simply whether research is available, but whether it is *used well*. This emphasis aligns closely with empirical findings suggesting that research use is shaped less by supply than by educators' perceptions of its relevance, costs and professional meaning, as well as by the organisational conditions in which educators work (Brown et al., 2022). Rather than treating research use as a technical act of implementation, the authors frame it as a complex professional practice that involves judgement, interpretation, adaptation and collaboration. This shift in framing is both analytically important and practically generative.

The book is rooted in the state-of-the-art *Quality Use of Research Evidence* (QURE) framework, developed through the ground-breaking Monash Q Project, a conceptual backbone that gives coherence and depth to what might otherwise have become a purely "how-to" manual. Research use is defined not as the mechanical application of findings but as the thoughtful engagement

with and implementation of *appropriate* research evidence, supported by individual and organisational enabling conditions. In this respect, Mark Rickinson and colleagues directly address a longstanding gap in the literature on evidence-informed education, which has often focused either on individual teachers' dispositions *or* on system-level structures, without adequately theorising the interaction between the two. As prior research has shown, educators are more likely to engage with research when they perceive clear benefits, manageable costs and strong professional legitimacy for doing so, and when they are supported by colleagues and leaders who value such engagement (Brown et al., 2022). This book takes these insights seriously and translates them into an integrated, practice-facing framework.

Structurally, the book is exceptionally well designed for its intended audience. Each chapter focuses on a specific aspect of using research well, from identifying a clear purpose, to selecting appropriate research, engaging with it thoughtfully, implementing it effectively, and modelling and supporting research use within organisations. The consistent chapter structure, with the use of case studies, reflective questions and improvement activities, makes the book highly accessible without sacrificing conceptual rigour. Importantly, the authors are explicit that the tools and activities provided are not recipes to be followed uncritically; rather, they are prompts to support professional judgement and contextualised decision-making. This stance thus avoids one of the common pitfalls of the evidence-informed movement: the risk of replacing professional autonomy with technocratic compliance (e.g., Biesta, 2007; Wrigley, 2018).

The book is also notable for what it does *not* do: sidestepping much critique of research-use initiatives but not privileging particular research methods, advocating for narrow definitions of "what works" or promoting research use as a top-down accountability mechanism. Instead, it positions educators as active sense-makers who bring their own expertise, contextual knowledge and ethical commitments to bear on research evidence. This orientation resonates strongly with research suggesting that educators are more likely to use research when it is aligned with their professional identities and moral purposes, rather than imposed as an external requirement (Brown et al., 2022). In this sense, *How to Use Research Evidence Well in Education* offers a corrective to more reductive accounts of evidence-based practice that have sometimes dominated policy discourse.

Another significant contribution of the book is its attention to organisational and leadership conditions. Research use is shown to be a collective and cultural practice, shaped by leadership behaviours, meeting structures, routines and norms. The chapters on modelling and supporting research use make it

clear that leaders play a crucial role not by acting as gatekeepers of evidence but by creating environments in which inquiry, experimentation and reflection are valued and sustained. This focus fills an important gap between individual-level accounts of research engagement and system-level reform efforts, offering a meso-level perspective that is often missing in both research and practice.

The expertise of the authorial team is evident throughout. Drawing on six years of empirical work with schools and systems, as well as collaboration with behavioural scientists, the book combines conceptual clarity with deep practical insight. The writing is clear, measured and refreshingly non-dogmatic. Claims are carefully grounded in evidence, and the authors are transparent about the limits and challenges of using research well. This intellectual humility enhances, rather than diminishes, the book's authority.

The book provides a series of implications for both research and practice. Most importantly, it shows that meaningful engagement with research is essential for strengthening both educational practice and the research that informs it. On the research side, it highlights the need for studies that are not only rigorous but also usable, contextsensitive and accessible to educators. By presenting real school cases and emphasising thoughtful adaptation, the book pushes researchers to describe contexts clearly, identify which intervention components are core or adaptable, and communicate findings in ways that directly support decisionmaking in schools. It also shows that effective research use requires collaboration between researchers and practitioners, encouraging longterm partnerships, codesign of studies and the use of behavioural insights to understand how educators actually engage with evidence.

For educational practice, the book positions research engagement as a core element of professional growth. It provides concrete tools and processes that help educators move from simply accessing research to using it purposefully and sustainably. By guiding readers through identifying a clear need, selecting trustworthy evidence, engaging with it critically, adapting it to context and implementing it thoughtfully, the book offers a practical roadmap for evidenceinformed improvement. It underscores that research use flourishes in collaborative cultures where time, structures, leadership modelling and shared reflection support ongoing learning. Ultimately, the book argues that when schools embed research into everyday routines – through inquiry cycles, collective sensemaking and structured implementation – teachers become more confident, decisions become more justified and student outcomes improve.

Overall, *How to Use Research Evidence Well in Education* is a much-needed contribution to the field of evidence-informed education. It moves the conversation beyond access and adoption, towards a more nuanced understanding

of quality, professionalism and practice. For teachers, school leaders, system leaders and those who work alongside schools, the book offers not only practical guidance but also a compelling reframing of what it means to engage responsibly and productively with research. At a time when calls for evidence-informed practice are louder than ever, this book provides precisely the kind of thoughtful, grounded and enabling support that the field has been lacking.

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