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Address:	54 Doctor Louis Pasteur str., Bucharest 050536
Webpage:	Digital-Pedagogy.eu
Contact:	office@iEdu.ro, editor@digital-pedagogy.eu +40 722 458 000

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Chatbots in Education: A Dual Perspective on Innovation and Ethics

Sergio Pappagallo

Link Campus University, Italy

M.A. in Philosophical Sciences

s.pappagallo@unilink.it

https://orcid.org/0009-0005-5960-636X

https://www.webofscience.com/wos/author/record/KHW-9593-2024

Abstract: The integration of Artificial Intelligence (AI) in education, particularly through the use of chatbots, has garnered significant attention for its potential to revolutionize e-learning. Chatbots, powered by Natural Language Processing (NLP), offer a promising avenue for personalizing educational experiences and enhancing student engagement (Bradeško & Mladenić, 2012; Anghelescu & Nicolaescu, 2018). This article synthesizes the current literature on the application of chatbots in e-learning, highlighting their benefits, the benefits of sentiment analysis, and the ethical considerations that arise from their deployment. Recent studies underscore the role of chatbots in fostering student engagement and reducing dropout rates in e-learning environments (Labadze, L., 2023; Tapalova & Zhiyenbayeva, 2022). The use of chatbots in adaptive e-learning systems has been shown to dynamically adjust to student needs, thereby reducing anxiety and promoting higher-order cognitive skills (Hsu et al., 2023; Info, A et al., 2024).

On the basis of such proliferation, this article proposes the use of a new Socratic method, applying the traditional Socratic method to interactions with chatbots to further enhance critical thinking and epistemological analysis in students. This method encourages learners to engage in critical dialogue with the chatbot, challenging the information provided. Despite concerns about chatbots' ability to accurately solve complex problems, such as in physics (Gregorcic et al., 2023), their "hallucinations" or errors can be leveraged as educational tools to stimulate critical thinking and identify misconceptions.

Another important innovation in Digital Pedagogy is represented by sentiment analysis. Its deployment leads teachers or even chatbots to understand and respond to students' emotions, aiming to improve engagement and reduce dropout rates (Meroto, M.B. et al., 2024; Pant, H.V., et al., 2023). However, this technology raises ethical concerns related to privacy, data manipulation, and potential biases in decision-making systems (Singh et al., 2024; Susser et al., 2019; Burrell, 2016; Barocas et al., 2023). The ethical challenges associated with sentiment analysis in e-learning necessitate careful consideration and adherence to privacy and consent regulations.

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In conclusion, chatbots in e-learning offer significant potential for enhancing the educational experience through personalized and adaptive learning. However, the ethical implications of their use, particularly concerning sentiment analysis, must be addressed to ensure the protection of student data and the equitable treatment of all learners. Future research should continue to explore the optimization of digital interactions, considering the potential for educational innovation that chatbots bring to the academic industry (Denny et al., 2024).

Keywords: Chatbots in Education, Artificial Intelligence, AI, Natural Language Processing, NLP, E-learning, Personalized Learning, Student Engagement, Ethics of AI, Sentiment Analysis, Privacy Concerns, Socratic Method, Critical Thinking, Digital Pedagogy

Literature Review on Chatbots in E-Learning

There is wide acceptance and turmoil in literature about the use of AI in education. For defining chatbots, it is adopted as a starting point the Oxford English Dictionary definition, which states that a chatbot is “a computer program designed to simulate conversation with a human user, usually over the internet; especially one used to provide information or assistance to the user as part of an automated service” (Oxford English Dictionary, 2023).

The rise of chatbots is a cross-sector phenomenon that affects multiple areas. Thanks to their ability to simulate human interactions through Natural Language Processing (NLP) (Bradeško & Mladenić, 2012), chatbots are already implemented in sectors such as healthcare (Oh et al., 2017), customer service (Xu et al., 2017), education (Anghelescu & Nicolaescu, 2018), and academic advising (Alkhoori et al., 2020), demonstrating a versatility that favours their widespread adoption. Particularly significant is their contribution to the educational sector, where chatbots personalise the educational experience, combining Learning Analytics and Educational Data Mining with techniques such as fuzzy logic, decision trees, Bayesian networks, neural networks, genetic algorithms, and hidden Markov models (Colchester et al., 2017). Recent literature confirms a growing interest in these technologies, which promise to optimize the interaction between students and educational content, outlining new horizons for digital pedagogy (Labadze, L., 2023; Tapalova & Zhiyenbayeva, 2022).

One of the most interesting areas of innovation in this field is the optimization of interactivity, to solve the problem of lack of engagement of students in traditional e-learning. For example, the chatbots can provide personalized support in large classes (Winkler & Söllner, 2018), providing immediate answers on various aspects of the course, such as teaching materials (Cunningham-Nelson et al., 2019) and exercises (Ismail & Ade-Ibijola, 2019). Thomas (2020) and Okonkwo and Ade-Ibijola (2021) have also highlighted the efficacy of chatbots in improving the personalization of learning, a contribution that is expanded upon by Hsu, Huang, Hwang, and Chen (2023), who have observed how adaptive e-learning increases engagement and contributes to reducing anxiety in learners by dynamically adapting to their needs.

In fact, given the limited interactivity in traditional e-learning, the student tends to lose interest in the course, resulting in high dropout numbers. In adaptive e-learning, enhanced with chatbots, not only does the student interact with content suitable to their situation, but the student can also cultivate their own higher-order cognitive skills. A recent study in Zimbabwe revealed that graduate students' perceptions of AI chatbots indicate that chatbots foster the development of higher-order cognitive skills, which are closely related to meta-cognition (Info, A et al. 2024). In addition to the previous benefits, a recent study reports that social robots prove to be a great help for students affected by autism, supporting the hypothesis that learning through AI allows for the establishment of a sense of trust (Vagnetti, R., 2024). In the evolving landscape of educational technology, it is increasingly recognized that the integration of social robots and chatbots into e-learning platforms can significantly enhance the personalization of content delivery. While social robots may not always directly incorporate chatbot functionalities into their physical frameworks, the overarching principle is that both technologies can be leveraged to tailor educational experiences more closely to individual learner needs. This customization is pivotal in elevating the efficacy of traditional e-learning modalities. Furthermore, the fusion of social robots with multimedia-enriched chatbots emerges as a potent strategy for enriching e-learning environments making learning more accessible, personalized, and effective. (Lamerichs, N., 2019)

In recent years, there have been notable exploratory efforts in the domain of educational technology. Specifically, in 2020, a significant experiment was conducted utilizing MathBot (Cai et al., 2020) to investigate the potential of chatbots in replicating the interactive nature of conventional mathematical instruction. Leveraging Amazon Mechanical Turk, MathBot was able to demonstrate its capability to provide learning outcomes that were on par with those

achieved through Khan Academy's videos and tutorials. This finding underscores the potential of chatbots as valuable adjunct tools in the realm of online education. Furthermore, the researchers incorporated a bandit algorithm to customize the conversational pace, thereby adapting the educational trajectory to meet the unique requirements of each student.

However, chatbots used for teaching aims in the mathematic domain usually face a technical challenge. The Mathematical language is not flexible as the Natural one. Natural language, used in everyday communication, is characterized by a degree of flexibility and error tolerance that often does not compromise the understanding of the conveyed message. In contrast, mathematical language is noted for its precision and rigidity, where each symbol, formula, or expression carries a specific and well-defined meaning. A minor error in a mathematical expression can lead to vastly different interpretations, altering the original meaning and potentially leading to incorrect conclusions. For instance, there is a study that underlies the peculiar significance of unambiguity in mathematical domain: when transitioning from a graphical representation to an algebraic one and vice versa (Lo Sapio et al, 2022). Besides, the need for precision in mathematical language is implicit in the discussion on equation-solving techniques, where a minor error can lead to incorrect graphical interpretations or incorrect algebraic solutions. Therefore, the successful communication of mathematical language is different from a successful communication using natural language where context and inferences can help overcome minor grammatical errors without losing the overall message meaning.

Nonetheless, also in the mathematical field chatbots can contribute significantly. In fact. Khan Academy has very recently introduced a notable case of innovation in the field of digital education with the development of Khanmigo, a teaching assistant powered by AI aimed at both students and teachers. This platform stands out for its intelligent tutoring approach, which, instead of providing direct answers, guides users towards self-discovery through questions and suggestions, and for its ability to generate dialogues with historical and literary characters. This innovation allows an LLM to address the teaching of mathematical language, through digital pedagogy and in particular allowing the chatbot to become a tutor. Although Khanmigo is not yet available in Europe, the growing interest in the USA, as reported by journalistic sources (Singer, N., 2023), highlights enthusiasm and challenges, particularly regarding the problem of hallucinations (Bidarian, N., 2023).

As an outstanding result of this literature review emerges that almost every publication consulted reports strong interest and great results in implementing chatbots in the digital pedagogy. Future research could continue to explore ways to further optimize these digital interactions, taking into account the economic implications and the potential for educational innovation that these tools bring to the academic industry, as highlighted by Denny et al. (2024). In this sense, the proposal in the next paragraph will shed light on a possible integration into chatbots starting from a widely recognized issue in the literature: the problem of hallucinations.

The Opportunity of Hallucinations

Gregorcic and Pendrill observed that ChatGPT failed to solve a fundamental physics problem, highlighting a lack of consistency in the responses and a tendency to contradict itself, despite its advanced linguistic skills (Gregoric et al. 2023). This behaviour was compared to the Dunning-Kruger effect, where an individual with limited skills in a certain field overestimates their abilities. The authors suggest that teachers could exploit these characteristics to recognize and address similar behaviours in students. The conclusion of the study is that ChatGPT might not be suitable as a physics tutor for students who use it independently for learning.

The approach and methodology of Gregoric and Pendrill pave the way for an innovative perspective on the use of chatbots like ChatGPT in education. The authors hinted at the possible use of ChatGPT as a useful platform for teachers. In this paragraph we can hypothesize that a ChatGPT-powered chatbot subject to hallucinations can be a very valid support in education, not as a software that holds True Knowledge, but precisely as holder of truth-like knowledge. Interacting with a chatbot in this sense requires a lot of critical thinking and can stimulate the learning of a high level of critical thinking and epistemological analysis. The student can interact with the chatbot starting from an inverted paradigm, aimed at encouraging students to engage in critical dialogue with the machine, challenging the information provided, and refining their analytical and critical skills through a Socratic type of interaction.

Contrary to the conclusions of Gregoric and Pendrill, it is hypothesized that chatbots can be valuable not only for teachers, helping them to recognize students influenced by the Dunning-Kruger effect, but also for the students themselves. The latter can deepen their understanding of the subject and develop more critical thinking by adopting an approach of constructive contradiction, similar to "Obstinate Opposer", establishing a peculiar form of dialogue in a

Socratic manner. Already in 2014, research by Goda et al. (2014) demonstrated that preparation via chatbot can strengthen critical thinking and student engagement, especially in language learning contexts. As far as the author of the article is aware, there are no studies yet focused on the systematic application of the Socratic method via chatbots in higher education (HE), suggesting that this innovation could be relevant in order to optimise even more the digital pedagogy.

The Socratic method, named after the ancient Greek philosopher Socrates, is a dialectical technique that fosters inquiry and discussion through stimulating questions, encouraging critical thinking and self-analysis. It seeks to deepen understanding and facilitate problem-solving by engaging interlocutors in roles that represent opposing viewpoints. The Socratic method applied to interaction with chatbots allows the participants to debate in critical ways. For instance, while the interlocutor may advocate for position "A" the Chatbot might argue against it, position "-A" and viceversa. This method not only strengthens logical argumentation, often employing quantifiers to sharpen the debate, but also enhances judgment by evaluating the coherence of responses and bolsters epistemological inquiry through the critical analysis of information sources of the selected discipline in which the student is involved.

While the Socratic method does not ensure unfettered access to knowledge, it serves as an invaluable adjunct to traditional educational models, enriching the learning experience through the art of dialogue and dialectic. It encourages the examination of the premises and conclusions of opposing arguments, thereby improving analytical skills and critical reflection. The integration of this method with chatbot technology offers fresh avenues for education, tailoring to diverse learning goals. For example, a curriculum might be designed to hone debating skills, urging students to navigate and articulate intricate concepts. Alternatively, it could focus on enhancing logical reasoning or deepening the epistemological understanding of specific subjects, guiding learners in the investigation and assessment of information sources. Incorporating chatbots into Socratic dialogues presents a novel strategy for education, where students engage with contrasting arguments, stimulating them to apply their knowledge critically and respond thoughtfully. This approach not only makes the educational journey more dynamic and interactive but also significantly contributes to the development of a well-rounded intellectual foundation. Additionally, the use of chatbots can play a significant role in teaching the respect for appropriate timing in an interaction within a dialogue. The respect for communication timing in interactions with artificial intelligence systems is mediated by the intrinsic waiting period of the computational process that precedes the response. This dynamic imposes that the interaction with the machine becomes an exercise in respecting communication timing, offering a pedagogical advantage that can also refine the logical-deductive ability in dissecting premises or conclusions of opposing arguments in a specific disciplinary field. Traditionally, the Socratic method is already well known for its potential. As an example of application of the traditional Socratic method we can highlight the experience of the Great Books program at the University of Chicago, which emphasizes the qualities, benefits, and virtues of the Socratic method in contexts characterized by challenges such as pandemics and technological advancements (González Díaz, J.R. 2021).

While the Socratic method is known as an optimal teaching methodology, its application to chatbots is still not implemented in courses. Therefore, the proposal is to enhance the digital pedagogy with the New Socratic Method. In an era characterized by the prevalence of digital technology and post-pandemic challenges, critical thinking proves to be an essential tool for distinguishing between authentic and deceptive information. Critical and reflective skills are particularly important, especially considering that one of the fundamental missions of educational agencies and education, is to propose itself as a facilitator for human reflection, essential for navigating complex contexts (Capogna, 2022).

Ethical Concerns on Chatbots and Sentiment Analysis in Education

Traditional e-learning is often associated with high dropout rates, a problem attributed to a lack of interactivity, personalization, and, consequently, engagement. Unlike the in-person learning environment, where direct observation of the student is possible, traditional e-learning significantly limits the ability to monitor the learner's status and prevent dropout.

In technologies that incorporate General Artificial Intelligence (GAI), sentiment analysis emerges as a promising tool. This technique offers an unprecedented opportunity to understand and respond to students' emotions, with the ultimate goal of enhancing engagement and reducing dropout rates. For example, research on the use of Artificial Intelligence (AI) in Brazilian higher education suggests that AI, including sentiment analysis, can be tailored to

individual student needs, thereby enhancing engagement and reducing dropout rates (Meroto, M.B. et al, 2024). Sentiment analysis thus is an innovative solution to address the challenges of traditional e-learning.

In further support of this thesis, a study on sentiment analysis of student feedback in Massive Open Online Courses (MOOCs) revealed that assessing learners' sentiments can unveil factors influencing course completion rates. These data can be used to develop effective student retention strategies (Pant, H.V., et al., 2023).

As a virtuous example, the approach of Clarizia et al. (2018) for sentiment analysis in the e-learning context is cited. The authors utilized Latent Dirichlet Allocation (LDA) to extract sentiments from student comments, using chats, forums, and emails as data sources. This study highlights the utility of LDA in sentiment classification, offering a probabilistic framework to understand the emotional dynamics of students in digital environments. Through the construction of a Mixed Graph of Terms, Clarizia et al. demonstrate the ability to discriminate between positive and negative sentiments, contributing to a more effective management of the online learning environment. By combining these techniques with learning analytics analysis from platforms like Moodle, Clarizia's article provides a practical overview on the use of sentiment analysis in adaptive e-learning, highlighting how such technology can serve as a thermometer for the emotional climate of the class, allowing teachers or chatbots to adapt content and teaching methodologies based on the emotional feedback of students.

However, sentiment analysis, by collecting sensitive data, requires further examination from an ethical and legal standpoint. First and foremost, by gathering a vast amount of data on learning preferences, progress, and emotional reactions of students, a problem arises regarding the potential manipulation and compromise of student behaviour through mechanisms described by Singh et al. (2024), who discussed the ethical implications of data-driven personalized learning. By subtly influencing the choices and preferences of students, adaptive e-learning could be programmed to promote particular courses or educational materials, modifying the learner's preferences. Examples of this can be found in the works of Susser, Roessler, and Nissenbaum (2019), who examine how digital technologies can subtly influence users' choices, raising issues of autonomy and consent. The problem clearly does not concern e-learning alone but rather a much broader question: how do technologies influence our behaviour, making us dependent and, more importantly, falsifying choices through self-fulfilling prophecies?

Moreover, by operating in ways that are not transparent to students or teachers, a sentiment analysis algorithm could determine a student as frustrated or unmotivated based on the analysis of the language used in their online communications, influencing the type of support offered by the system. Burrell (2016) explored the causes of opacity in algorithmic systems, identifying three main types: intentional, technical, and intrinsic. This opacity can lead to distrust and difficulties in interpreting or contesting the decisions made by AI systems.

Given the probabilistic nature of the outputs and since the engines train using data already present in our society, it is very likely that biases in decision-making systems will manifest, negatively affecting students' educational experience. For example, if a sentiment analysis system is trained on a dataset that does not fairly represent the diversity of the student population, it could misinterpret the emotional expressions of certain groups of students. Barocas, Hardt, and Narayanan (2023) discussed how biases in training data can lead to unfair or discriminatory outcomes in machine learning systems.

From the review of the literature examined, it is clear that although sentiment analysis can innovate and personalize content even for large classes, the ethical challenges could represent significant problems for this form of innovation. Indeed, this approach offers considerable opportunities to tailor the educational experience to the individual needs of students, potentially improving engagement and the effectiveness of learning through more relevant and targeted content. However, the use of sentiment analysis in the educational field raises important ethical issues, such as the privacy of student data, informed consent, and the potential polarization or discrimination that could result from the interpretation and application of the analysed data. Therefore, it is crucial that educators and technologists intending to adopt this technology proceed with caution, establishing clear guidelines and governance mechanisms to ensure that the innovation is carried out responsibly and ethically, with the well-being and rights of students at the forefront.

Classification of Sentiment Analysis under the AIA

Under the proposed EU Artificial Intelligence Act (AIA), the use of sentiment analysis in the field of education would likely be categorized as a "high-risk" application. In fact, the AIA defines four risk categories for AI systems: unacceptable, high, limited, and minimal (European Parliament, 2024). High-risk AI systems are those that pose significant risks to the health and safety or fundamental rights of individuals. Given that sentiment analysis in

education could impact students' privacy, psychological well-being, and educational outcomes, it would be subject to stringent requirements under the AIA that emphasizes the need for transparency and human oversight in high-risk AI systems (Panigutti, C. et al. 2023). Although sentiment analysis requires the respect of high-risk regulation, of course this technology is highly promising. This suggests that while AI is not banning the use of black-box AI systems, it is needed to ensure clear communication about how sentiment analysis is used, what data is collected, and how decisions are made based on the analysis. The importance of documentation and the ability for human oversight to ensure that the systems align with ethical standards and respect fundamental rights are priorities according to the AIA (Panigutti, C. et al. 2023). Therefore, while sentiment analysis can potentially improve educational outcomes and reduce dropout rates, its classification as a high-risk application under the AIA means it must be carefully managed to address ethical issues before being widely implemented in educational settings. While sentiment analysis poses problems and requires close monitoring, the use of chatbots seems to promise, in terms of policy, a significant proliferation and few controls. This could facilitate their installation in the large market of courses. The AIA categorizes chatbots as a tool with limited risks, thus suggesting a proliferation of such technology in Europe.

Conclusions

The comprehensive literature review on the use of chatbots in e-learning environments underscores the transformative potential of AI in education. Chatbots, powered by NLP, have been successfully implemented across various sectors, with their adaptability being particularly beneficial in personalizing educational experiences. The integration of chatbots within digital pedagogy has been shown to enhance student engagement, reduce dropout rates, and foster the development of higher-order cognitive skills.

Studies have demonstrated that chatbots can effectively address the lack of interactivity in traditional e-learning by providing personalized support and immediate feedback. This is crucial in large classes where individual attention is limited. The use of chatbots for personalized learning, as highlighted by Thomas (2020) and Okonkwo and Ade-Ibijola (2021), and the adaptive e-learning models discussed by Hsu et al. (2023), indicate a positive impact on student engagement and anxiety reduction. It is also particularly noteworthy that Chatbots have potential to promote higher-order cognitive. The study by Info, A. et al. (2024) suggests that chatbots can facilitate meta-cognitive skill development, which is essential for critical thinking and problem-solving. Additionally, the use of social robots and multimedia-enriched chatbots, can further enrich e-learning environments, making them more accessible and effective.

Based on the literature review, this article proposed also a methodology that innovates perspective on the use of chatbots for educational purposes. The study by Gregorc et al. (2023) suggests that chatbots, despite their limitations in solving complex problems, can be used to stimulate teachers. In this article it is suggested that chatbots are beneficial also for students through the new Socratic method. This approach encourages students to challenge the information provided by chatbots, thereby refining the analytical skills.

Lastly, we can conclude that the application of sentiment analysis in e-learning raises significant ethical concerns. While sentiment analysis can provide insights into students' emotions and contribute to personalized learning experiences, it also poses risks related to data privacy, manipulation, and bias. The works of Singh et al. (2024), Susser et al. (2019), Burrell (2016), and Barocas et al. (2023) highlight the need for transparency, fairness, and respect for student autonomy in the deployment of AI systems in education.

Further research could focus on the application of the new Socratic method via chatbots exploring a novel approach to promoting critical thinking and epistemological analysis within higher education. Future research should systematically explore the integration of this pedagogical technique with chatbot technology, assessing its impact on student engagement, learning outcomes, and the development of higher-order cognitive skills. This research could lead to the design of chatbots that not only deliver content but also engage students in meaningful dialogue and reflection. Perhaps empirical studies could be lead, to examine the implementation of chatbots across various educational settings to evaluate their practical impact on learning outcomes and student satisfaction. Such research should consider diverse educational contexts, subject areas, and student demographics to gain a comprehensive understanding of how chatbots can be most effectively deployed. These studies will provide valuable insights into the pedagogical benefits and limitations of chatbots, informing their future development and integration.

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Need, Advantages and Capabilities of Learning Analytics in K12 Education: Study Results from Lithuania

Gražina Šmitienė

Department of Pedagogy, Faculty of Social Sciences and Humanities, Klaipeda University

https://orcid.org/0000-0002-3604-7295

Julija Melnikova

Department of Pedagogy, Faculty of Social Sciences and Humanities, Klaipeda University

https://orcid.org/0000-0001-6078-6963

Aleksandra Batuchina

Department of Pedagogy, Faculty of Social Sciences and Humanities, Klaipeda University

https://orcid.org/0000-0003-0012-9421

Gita Šakytė-Statnickė

Faculty of Business, Klaipeda State University of Applied Sciences

https://orcid.org/0000-0002-5320-810X

Abstract: Learning analytics is identified as one of the essential prerequisites for ensuring the quality of learning for each student and is associated with wider opportunities for the organization of individualized, differentiated and personalized learning. One of the focuses - the individualization and personalization of natural science and mathematics education - is connected with one of the priorities of Lithuanian education, recognizing the need to develop students' mathematical, natural science and technological competences, and to foster a culture of innovation in schools. Although the importance of integrated education is recognized for the sustainable improvement of the student's natural science and mathematics competence, there are problems in solving the issues of integrated organization of natural sciences and mathematics in lessons, searching for the most appropriate didactic solutions at the student and class levels. The usefulness of learning analytics in modern education is not in doubt internationally, but the approach to it in educational practice is quite ambiguous: the search for tools of learning analytics, the system of its use, definitions of advantages for the learner – these are the questions that raise researchers' attention. It is recognized that the Lithuanian scientific discourse of the use of learning analytics in science and mathematics education contains little research,

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examples of pedagogical practice that analyse the possibilities of digital platforms with artificial intelligence and learning analytics tools are scarce.

This qualitative study was particularly sought to disclose the possibility of using learning analytics in the science education and math lessons. Focus group participants were teachers and students from general education schools in Lithuania who, in September – December 2021, participated in a project dedicated to the testing of learning analytics tools in science education and mathematics classes. The aim of the investigation was to extract the accumulated experience of teachers and students in working with digital platforms and in applying learning analytics based on artificial intelligence. The results of the study revealed that teachers and students have no doubts about the advantages of digital platforms integrating learning analytics based on artificial intelligence, in identifying student (class) learning gaps, learning characteristics, making data-based decisions regarding differentiation and individualization of learning. Research participants saw the importance of data generated by learning analytics in planning and organizing integrated math and science education lessons.

Keywords: Learning Analytics, Science Education, Mathematics Lessons

Introduction

In recent years, the issue of digitization of education has become more relevant for EU countries in general and Lithuania in particular. The COVID-19 pandemic situation accelerated digitalization, in result, digital technologies have become part of the teaching/ learning process. Moreover, the use of technologies has been proven to be crucial in ensuring better education for learners during a pandemic. Therefore, both schools and teachers have to ensure continuity of education provision and quickly respond to the new teaching and learning scenarios (Cabero-Almenara, 2020; Rupšienė et al., 2021).

The recent trend in digitalisation of education has fostered the rapid development of educational technologies such as computer-based learning environments, adaptive learning technologies, intelligent learning systems, "smart classrooms" and other. These technologies generate a lot of data about learners.

In the scientific literature, the pursuit of using teaching and learning data to improve teaching and learning is defined as learning analytics (Long et al., 2011; Romero, Ventura, 2013). Learning analytics is used in the classroom for a variety of purposes: monitoring and analyzing student learning, learning prognostication, planning teaching and learning activities, personalization, assessment and feedback, etc. (Vourikari, Munoz, 2016; Chatti, Dyckhoff, Schroeder, Thüs, 2012; Moissa, Gasparini, Kemczinski, 2015; Pineda, Cadavid, 2018). The opportunities of learning analytics namely: to provide recommendations for individualized learning (helping the learner to create his own learning path), to help the teacher provide recommendations for further learning or to provide recommendations to the learner himself, are widely presented and have been proved as a means of effective tracking of personal learning progress (Pineda and Cadavid, 2018).

The relevance and benefit of the application of learning analytics for education is also evidenced by the fact that in recent years, an increasing number of digital tools, both commercial, such as: MS Teams, Google Classroom, iSpring Learning, etc., and open source, such as Moodle, etc., intended for various educational sectors, includes data analysis technologies. For learning improvement purposes, learning analytics technologies are integrated into digital education tools or digital learning programs, e.g. Eduten Playground (for teaching mathematics etc.)

Digital teaching and learning platforms based on artificial intelligence and integrating learning analytics provide teachers with the insights needed to make decisions about: improving classroom instruction (Long, Siemens, 2011); on the personalization of training (in order to enable the learners themselves to design their own learning according to how they learn, what learning needs they have) (Mangaroska et al., 2019, Ifenthaler et al., 2020); for effective feedback organization (real-time, reasonable and more effective feedback) (Weber, 2015); regarding the quality of education in order to reduce exclusion, identify groups of students at risk (Kurvinen et al., 2020, Mangaroska and Giannakos, 2018). In order to make these and other decisions in the classroom, it is necessary for the teacher to properly collect and process data, and have enough time to perform these actions. In turn, the data generated by learning analytics tools allows the teacher to: assess the strengths or weaknesses of students' learning much faster, the characteristics of each student's engagement in learning activities in real time (Pardo et al., 2016); consistently see changes in learning activities (knowledge, abilities), make decisions that promote their learning (Admiraal et al., 2017); to critically review the teaching/learning information presented to the students, to correct it (Mouri et al., 2018).

On the one hand, learning analytics tools integrated in digital platforms provide opportunities for teachers to successfully expand, complement teaching and learning in the classroom with virtual environments, use advanced learning environments in lessons (Yacobson et al., 2021; Van Leeuwen et al., 2021), achieve learning quality by reducing differences in student learning (Kurvinen et al., 2020), to individualize and differentiate teaching and learning (Mangaroska et al., 2019). However, the success of using learning analytics tools in schools (lessons) depends on how teachers see the advantages of learning analytics digital tools and how they use them (Mayer, 2019; Zhu, Urhahne, 2018; Scherer et al., 2019). Little is known about how mathematics and science teachers in Lithuanian general education schools value the use of learning analytics tools in their lessons, what are their experiences in teaching mathematics, science (physics, chemistry, biology) in school and decision-making based on learning analytics data. The purpose of this study is to find out for what purpose and how science and mathematics teachers use digital platforms based on artificial intelligence and integrating learning analytics in their lessons.

The Research Design

During the implementation of the project "Artificial intelligence in schools: scenarios for the development of learning analytics in the modernization of general education in Lithuania" (no. S-DNR-20-4) focus group interviews with different groups of teachers were conducted. During the research, it was found that Lithuanian general education schools use the following platforms that integrate learning analytics and artificial intelligence: EdutenPlayground, Matific, Fast ForWord, Egzaminatorius.LT, EduAI (Baziukė, Girdzijauskienė, Norvilienė, 2021). The teachers who participated in the project used the LearnLab digital learning platform in their classes. This article presents a part of a study aimed at revealing the experiences of science and mathematics teachers in using learning analytics in the teaching and learning process.

Table 1

Focus group participants

Focus interview no.	Number of participants during the interview + 1 moderator	Duration of the interview
1	5 (2 science and 3 mathematics teachers)	2 hrs 20 min
2	4 (1 science and 3 mathematics teachers)	2 hrs
3	3 (1 science and 2 mathematics teachers)	2 hrs

In order to find out for what need and how science education (physics, chemistry, biology) and mathematics general education schoolteachers use digital teaching/learning platforms integrating learning analytics tools in their subject lessons, a qualitative research methodological approach was applied. A qualitative methodology was used in this research, as it gives a holistic, in-depth understanding of participants' experiences in real-world contexts, and provides access to what these experiences mean to them (Denzin, Lincoln, 2018). This methodology was used by adopting a constructivist-interpretivist approach. According to this approach, participants construct meanings in interaction with their context. The researcher can uncover the subjective meanings that participants give to their experiences by interacting with them (Denzin, Lincoln, 2018; Merriam, Tisdell, 2016). As in other qualitative studies (Creswell, Poth, 2018), focus group interviews were used as the data collection method. The choice of this method was based on the desire to understand and explain the meanings, beliefs and experiences that influence the feelings, attitudes and behavior of individuals (Wilkinson, 2004; Nyumba et al., 2018). The study was conducted in September - November 2021.

To achieve the purpose of the research, three focus group discussions were conducted with the same group of informants, i.e. as science and mathematics teachers in 2021, who participated in the project dedicated to the development of learning analytics in general education and who worked with learning analytics in the lessons of their subject (Eduten, LearnLab). The teachers represented different school communities (8 schools), different mathematics and science education subjects (physics, chemistry, biology), had various experiences in using learning analytics tools, all teachers worked with general education school students. The choice of teachers with different experiences was

determined by the desire to find out the opinions and ideas of those working in different schools, to see common patterns in their experiences. All science education and mathematics schoolteachers involved in the project participated in the focus group discussions (see table Nr 1). 12 teachers (science education (4 teachers), mathematics (8 teachers) with more than 5 years of experience and work experience with digital teaching and learning platforms that integrate artificial intelligence and learning analytics participated in the study.

The research was conducted in accordance with the principles of respect and impartiality, as well as the confidentiality of the discussion. Consent (written) from study participants to participate in the study was obtained (Rodham and Gavin, 2006; Sim and Waterfeld, 2019). Science and mathematics teachers were informed in advance (in writing) about the purpose of the study and the anonymity of participation. The teachers gave their consent in advance to participate in the study and to record the discussion. The recordings of the focus group discussions are used only for the purposes of data analysis and are stored on the media of the project researchers. The changed names of the informants (M - Mathematics, S-Science) are indicated when the interview quotes are presented in the research results section.

Results of the Study

When analysing the research data, 3 discussion topics of the focus group of science education and mathematics teachers were distinguished (see table Nr. 2): the purpose of using digital platforms integrating learning analytics; the advantages of learning analytics in learning science and mathematics; learning analytics capabilities of integrating science education and mathematics.

The need of using digital platforms integrating learning analytics

By using learning analytics in mathematics and science education classes, teachers first of all aim to determine the learning achievements of students (or each student): "I use learning analytics to find out where students have gaps" (M); "It is very important for me to know what and how much the students have understood" (M); "<...> platform made it possible to reveal the potential of every student, clear and detailed analytics made it possible to see everyone's successes and obstacles" (M); "<...> what the students do well, what doesn't, what should be paid attention to in other lessons" (S). The following issues as learning gaps, students' lack of knowledge and ability to apply knowledge, the situation in the classroom, are the focus of teachers' attention in order to make the most appropriate decisions regarding the organization of teaching in the classroom, the selection and preparation of learning materials. Digital platforms with integrated learning analytics take away a lot of routine teacher activities, allowing mathematics and science teachers to focus more on reviewing learning content and preparing educational tasks.

In analysing the research data, it became clear that in the schools that participated in the study, the use of learning analytics tools in science and mathematics lessons is a priority for identifying gaps in students' learning, teachers aim to assess which subject topics and at what level students know and understand, for which students and what problems of knowledge application have arisen, what skills important for learning (mathematics, physics, chemistry, biology) do the students lack. Equally important for teachers is the ability to differentiate and individualize teaching and learning in classes, to be able to differentiate tasks in classes, to make timely decisions about individual learning problems: "These data (generated by digital platforms) allow us to get to know students better not only according to their knowledge, but also according to their mathematical abilities" (M). "And this allows for proper differentiation and individualization of teaching in the classroom" (S). General abilities are important for teachers and students (ability to cooperate, teach to learn, think critically, etc.). The participants of the discussion noted the advantages of learning analytics in selecting learning tasks for students, the possibility to perform them at an individual pace on digital platforms.

The advantages of learning analytics in learning science and mathematics

Mathematics and science teachers emphasized the advantages of digital teaching and learning platforms based on artificial intelligence and integrating learning analytics tools for the student (groups of students). Even, though, research have showed only some teachers see the benefits of artificial intelligence and integrating learning analytics programmes and often these are the teachers who have a good understanding of how the programme works.

Meanwhile, there is a proportion of teachers using these programmes, but are interested in the programme because of the direct pedagogical benefits for the students, their interest, the improvement of their achievement and so on. In science and mathematics lessons, digital learning tools help not only to personalize and individualize learning content, but also to motivate students to engage in active learning outside of school: "<...> students willingly solve problems at home" (M); "<...> students after classes even spent several hours preparing assignments and discussing among themselves which they presented in class" (M). Students' involvement in learning, their motivation to learn mathematics and natural sciences were singled out as important conditions for ensuring learning results, which are implemented by including virtual learning environments in the teaching process.

In order to ensure deep learning of students in mathematics and science classes, it is important to: "create opportunities to choose an individual learning pace" (S), "help each learner to fully understand and delve into a new topic" (M), "consolidate new knowledge and abilities "(M). Digital teaching and learning platforms with artificial intelligence and learning analytics tools help implement deep learning in the classroom. On the other hand, comprehensive training is also important for ensuring learning success, i.e. students' not only intellectual, but also emotional involvement in a new topic. When learning both natural sciences (physics, chemistry, biology) and mathematics, the individual or group tasks presented on digital learning platforms allow the student(s) "to search and find original ways of performing the task" (S), "to discover the contexts of the newly studied topic and construct their own understanding" (S).

In the digital platform for learning mathematics, great attention is paid to the game elements of tasks: the teacher can assign tasks of different complexity (number of them) individually and to the whole class, which must be completed in order to get a reward (winning the game); tasks are rich in animation elements. These digital platforms, which integrate learning analytics tools, provide opportunities for teachers and students to individualize the tasks of mathematics education, help the student (s) to experience success in performing tasks that are suitable for him/her, increase students' confidence in their own abilities, and motivate them for further learning.

Learning analytics capabilities of integrating science education and mathematics

By sharing their experiences using learning analytics tools in mathematics and natural sciences (physics, chemistry, biology) classes, teachers identified new opportunities for integrated learning. Teachers singled out the possibilities of learning analytics and collaboration by preparing joint (integrated) lessons or integrating the tools of the same digital platform into separate educational subjects in order to achieve synergy of teaching and learning.

A clear trend has been observed – in classes of different subjects (mathematics and natural sciences) using the same digital learning analytics tools, together with colleagues to analyse and interpret students' learning data: „together we see the data provided about the same students, their diligence, responsibility" (S). ; „we reviewed student learning data together and discuss how we see learning in our lessons" (M); „while analysing the data together, attention is paid to students who do better/worse in the next lesson" (S). The participants of the discussion said that by analysing the data together, new ideas for the organization of integrated teaching/learning emerge: „we decided to use the same digital tools in our lessons so that students could pay more attention to deepening the topic, learn collaboratively" (S); „together we saw what general abilities the class has the strongest and after choosing a common topic, we looked for the most suitable methods" (M). The teachers, while presenting their common (science education, mathematics) experience in organizing integrated education, emphasized that joint analysis of learning analytics data was important for the initiation, planning and implementation of joint activities, the opportunity to analyse and interpret the same student learning data together with colleagues, to pay attention to different educational subjects emerging teaching and learning issues. When the teachers analysed the results of the integrated lessons and the students' reflections, it was noticed that the joint decisions on planning and organization of learning made based on the learning analytics data were more effective, had a greater impact on the students than the teachers would have expected in individual lessons, the students' reflections showed not only the positive emotional involvement of the latter in the learning activities, but also better learning results, as evidenced by learning analytics data.

Implications

The results of the focus group discussion of science education and mathematics teachers on the need of using digital teaching and learning platforms integrating learning analytics in lessons revealed that the priority need of learning analytics lessons is to identify and record students' learning achievements, knowledge and skill gaps in a timely manner. The analysis of student(s) learning presented on digital platforms based on artificial intelligence and integrating learning analytics allows teachers to make the most appropriate decisions regarding the organization of teaching in lessons: to differentiate and individualize teaching(s), to consistently develop students' general competencies.

Table 2

Needs, advantages, and capabilities of integrating science education and mathematics

Needs	**Advantages**	**Capabilities of integrating science education and mathematics**
Identification of gaps	Tasks of different complexities	Use of same digital tools
Identification of student‘s potential	Gamification	Joined pedagogical decisions
Differences of students’ achievements level	Individualization of the tasks	Greater impact on the students learning process
Lack of knowledge and ability to apply the knowledge	Differentiation and integration of subjects	Creation of positive emotional involvement
Proper differentiation and individualization of teaching	Joint analysis of the achievements	Evidence of the students’ results is data based.
	Individualisation of tasks	

The results of the discussions highlighted the advantages of learning analytics tools for the student(s): learning analytics tools allow students to see personal progress; receive tasks assigned to them individually; collaborative learning; engage (intellectually and emotionally) in learning activities; learn not only in class.

An important criterion for the integration of mathematics and science education lessons is the use of the same learning analytics tools, the joint work of teachers in analysing the strengths and weaknesses of students' learning, searching for the best learning opportunities, and making similar or different lesson organization decisions by consensus. The participants of the discussion also noticed the synergistic possibilities of learning analytics in organizing integrated mathematics and science education. The results of the conducted research do not allow making generalized conclusions suitable for the whole of Lithuania, but the research results revealed that the development of learning analytics application models and the analysis of their effectiveness are important directions for further research.

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Social Networks and the Development of Students' Social Competences

Marija Marković

Faculty of Philosophy, University of Niš, Serbia

https://orcid.org/0000-0003-3560-9468

Zorica Stanisavljević Petrović

Faculty of Philosophy, University of Niš, Serbia

http://orcid.org/0000-0001-9212-4286

Dragana Pavlović

Corresponding author

Faculty of Philosophy, University of Niš, Serbia

https://orcid.org/0000-0002-5115-8698

Abstract: Social competencies of students are crucial for successful studying and further academic careers, as they encompass communication, teamwork, and collaboration skills. Social networks offer opportunities for interaction and the exchange of ideas with peers and mentors. Therefore, it is important to study the relationship between social networks and social competencies to better understand the opportunities and challenges faced by students.

The primary aim of this research is to examine students' perceptions of the impact of social networks on the development of their social competencies. A descriptive research method was employed, and data were collected using a specially designed assessment scale. The research sample is purposive, comprising students from the Faculty of Philosophy in Niš (N=314). The results indicate that students are generally ambivalent about the influence of social networks on their social development, suggesting the need for a deeper understanding of this relationship. Students primarily perceive social networks as communication channels used for maintaining contact and exchanging information. Additionally, students view social networks as potential platforms for collaboration with peers, as well as friends and other community members.

Keywords: social competencies, social networks, students, communication, collaboration

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Introduction

The development of social networks is one of the most significant phenomena of the digital era, profoundly transforming how people communicate, share information, and establish connections. The origins of social networks date back to the late 1990s, when users first gained the ability to create profiles and add friends (Stokman & Doreian, 2013). In the early 2000s, blogs and forums became popular, allowing users to share their thoughts and ideas with a broader audience (Sajithra & Patil, 2013). The true rise of social networks began in 2003 and 2004 with the launch of LinkedIn, focused on professional networking, and Facebook, which quickly became a global platform for social interaction (Van Dijck, 2013). Following Facebook's success, other networks emerged, such as Twitter in 2006, introducing short messages (Weller et al., 2014), and Instagram in 2010, focused on photo sharing (Ting et al., 2015). With the development of smartphones, social networks adapted to the mobile environment, with apps like Snapchat and TikTok enabling the creation and sharing of short videos (Mittmann et al., 2022). These platforms have further democratized content creation, allowing anyone with a mobile device to become a creator. The development of social networks has facilitated fast and easy communication, global connectivity, and information dissemination, laying the groundwork for future innovations and changes in user preferences (Phua, Jin, Kim, 2017; Carr, Hayes, 2015).

The evolution of social networks has significantly impacted how students develop and utilize social competencies, such as communication skills, teamwork, empathy, and emotional intelligence. Social networks like Facebook, X (formerly known as Twitter), Instagram, and LinkedIn have become platforms where students can connect, communicate, and share information with peers, professors, and professionals worldwide. These platforms allow students to expand their social networks, which is crucial for developing social competencies. Through interactions on social networks, students have the opportunity to enhance their communication skills, as these platforms enable the exchange of ideas, discussions, and real-time collaboration (Hamadi et al., 2022). Presence on social networks helps strengthen relationships by sharing significant life events through status updates, photos, etc., while also enhancing their collaboration (Aichner et al., 2021). For instance, participating in group projects via social networks can improve their teamwork and collaboration skills, as they must coordinate activities, share tasks, and solve problems collectively.

Theoretical Approach

Social competencies are a crucial aspect of individual development, particularly for students, as they play a vital role in academic and professional success. These competencies include a range of skills such as communication, empathy, teamwork, conflict resolution, and emotional intelligence (Ćurić, 2021; Mikanović, Popović, 2021). For students, the development of these skills begins during their education through interactions with peers, professors, and the broader social environment. Participation in group projects, seminars, and extracurricular activities enables students to enhance their social skills. For instance, working in teams requires effective communication, collaboration, and the ability to listen to others, while organizing and leading projects develops leadership abilities (Hughes, Jones, 2011). Empathy and emotional intelligence are particularly important for understanding and responding to the needs and emotions of others, essential for building quality interpersonal relationships. Additionally, conflict resolution through constructive dialogue and negotiation contributes to a more stable and productive work environment. Universities and educational institutions increasingly recognize the importance of social competencies, implementing programs and workshops to help students develop and apply these skills in various contexts. Through these activities, students gain not only academic knowledge but also practical skills essential for success in contemporary society and the labour market. Thus, social competencies become an integral part of their education, preparing them for future career challenges and everyday life.

Social networks offer students the opportunity to engage in various forms of communication, whether through text messages, video calls, or sharing multimedia content. These interactions not only enhance their technical skills but also their ability to effectively convey thoughts and ideas in different ways. In the digital world, where communication is often asynchronous, students learn to express their thoughts clearly and concisely and to respond constructively to feedback (Anderson, 2015).

Through collaborative projects on social networks, students develop skills such as sharing responsibilities, resolving conflicts, and decision-making. These skills are essential for successful teamwork and often overlap with professional

skills needed in future careers. For example, in a study by Hamid et al. (2015), students identified numerous positive outcomes from using social networks to interact with each other and their instructors.

Moreover, social networks allow students to develop professional contacts, which can be crucial for their careers. LinkedIn, for example, enables students to follow professionals in their field of interest, participate in relevant discussions, and access resources that can aid their professional development. These activities not only increase their visibility in professional circles but also provide learning and development opportunities through observation and interaction with more experienced colleagues (Davis et al., 2020).

Social networks can be an important digital tool in the formation of students' social competencies, but they must be used in a balanced and appropriate manner. When used correctly, social networks can play a significant role in building the skills necessary for success in the modern digital world. By providing opportunities for practical application of these skills in real situations and support through structured educational programs, universities can significantly contribute to the development of their students' social competencies. These platforms can enhance collaboration among students, provide access to diverse sources of knowledge, and connect them with experts in various fields, enriching the overall educational experience (Alhabash, Ma, 2017). In this way, social networks not only facilitate social interaction and communication but also contribute to the comprehensive development of students as competent and socially responsible individuals prepared for future professional challenges.

Methodological Approach

The aim of this research is to explore how students at the Faculty of Philosophy in Niš perceive the contribution of social network use to the development of their social competencies. The study involved 314 undergraduate students. The respondents' attitudes were analysed based on:

- study program (Psychology - PSY, Pedagogy - PED, Social Policy and Social Work - SPSW, Communication and Public Relations - CPR, and Journalism - JOU),
- average grade during studies (a) 6.00-6.99, b) 7.00-7.99, c) 8.00-8.99, d) 9.00-10.00),
- duration of presence on social networks (a) no profile; b) less than 1 year; c) more than 1 year, but less than 5 years; d) more than 5, but less than 10 years; e) more than 10 years), and
- frequency of accessing social networks (a) never; b) rarely (a few times a month); c) occasionally (a few times a week); d) often (several times a week); e) regularly (daily).

A total of 314 students participated in the study, with the largest number coming from Psychology (126), followed by Pedagogy (80). The Communication and Public Relations program (46) and Journalism (42) had nearly equal numbers of respondents, while the Social Policy and Social Work program had the fewest (20). In terms of academic performance, ten students had the lowest average grade of 6.00 to 6.99; 78 students had an average grade of 7.00 to 7.99; 149 students had an average grade of 8.00 to 8.99; and 77 students had the highest average grade of 9.00 to 10.00. The majority of respondents have been on social networks for more than 5 but less than 10 years (205), 87 respondents have been present for more than 10 years, while 22 respondents have been present for more than one but less than 5 years. Regarding the frequency of accessing social networks: 272 respondents access their profiles daily, 32 frequently, 6 occasionally, and 4 rarely.

The research posed the following objectives: To examine students' attitudes towards the contribution of social network use to the development of their social competencies.

To determine if there are statistically significant differences in respondents' answers based on the independent variables.

Accordingly, the following research hypotheses were formulated:

- It is assumed that students have positive attitudes regarding the contribution of social network use to the development of their social competencies.
- It is assumed that there are no statistically significant differences in respondents' answers based on the independent variables.

The research utilized a five-point Likert scale specifically constructed for this study, comprising 8 items. The numbers on the scale, titled *Students' Attitudes on the Impact of Social Networks on the Development of Social Competencies*

(SSDINSC), ranged from 1 – complete disagreement, 2 – partial disagreement, 3 – neutrality, 4 – partial agreement, to 5 – complete agreement with the given item. To determine statistically significant differences in respondents' answers based on the independent variables, an F-test was applied.

Results

Table 1 displays the attitudes of students (N=314) regarding the contribution of social networks to the development of their social competencies. For each statement in the study, the mean value of the students' responses (M), the standard deviation from the mean response (SD), and the degree of agreement/disagreement with the given statement are provided.

Table 1

Students' Attitudes Towards the Contribution of Social Networks to the Development of Social Competencies

Items	M	SD	1	2	3	4	5
Using social networks contributes to the creation of an individual's social identity	3.42	1.14	7.0	13.4	2.83	32.8	18.5
I prefer using social networking sites over attending social gatherings	2.26	1.30	37.9	26.1	16.6	10.8	8.6
Using social networks strengthens interpersonal relationships	2.90	1.24	16.6	21.0	29.6	21.7	11.1
Social networks help maintain quality social relationships with relatives and friends	3.20	1.23	11.8	16.6	26.1	30.6	15.0
Social networks can improve communication among students	3.90	1.01	2.9	7.0	17.8	41.7	30.6
Social networks can enhance collaboration among students	3.95	0.96	2.5	5.4	16.9	44.6	30.6
Communication via social networks helps me relieve academic stress	3.33	1.16	8.3	13.4	33.1	27.7	17.5
It is important to me how my profile looks on social networks and how others perceive me in the virtual environment	3.04	1.30	17.2	15.9	27.7	23.9	15.3

Based on the analysis of the mean responses (M) of the respondents, it was concluded that students show indecisiveness regarding five items and slight agreement on two items concerning the contribution of social networks to the development of students' social skills.

The majority of responses (for five items) are concentrated around number 3 on the five-point Likert scale, indicating a neutral stance. There is mild agreement on two items, while the item regarding the preference for using social networking sites over attending social gatherings shows partial disagreement among respondents.

The highest number of respondents expressed agreement (partial 32.8% and complete 18.5%) with the statement that *Using social networks contributes to the creation of an individual's social identity*, with 2.83% undecided, and a small percentage disagreeing (7.0% completely disagree, 13.4% partially disagree).

In contrast to the previous item, the highest percentage of students disagreed with the statement *I prefer using social networking sites over attending social gatherings*, with 8.6% completely agreeing, 10.8% partially agreeing, 16.6% undecided, 37.9% completely disagreeing, and 26.1% partially disagreeing.

An almost equal percentage of respondents have positive attitudes towards the statement that *Using social networks strengthens interpersonal relationships* (11.1% completely and 21.7% partially) and express indecision (29.6%), while slightly more than a third of respondents disagree (complete 16.6% and partial 21.0%).

The majority of respondents have positive attitudes towards the statement that *Social networks help maintain quality social relationships with relatives and friends* - 15.0% completely agree and 30.6% partially agree, 26.1% are undecided, and about a third disagree with the statement (16.6% partially, 11.8% completely).

Most respondents have positive attitudes towards the statement that *Social networks can improve communication among students* (30.6% completely agree, 41.7% partially). Slightly less than one-fifth (17.8%) are undecided, while a smaller number of respondents disagree with the statement (2.9% completely, 7.0% partially).

Respondents similarly assess the statement that *Social networks can enhance collaboration among students*, with 30.6% completely agreeing, 44.6% partially agreeing, 16.9% undecided, 2.5% completely disagreeing, and 5.4% partially disagreeing.

The highest number of respondents expressed agreement (partial 27.7% and complete 17.5%) with the statement that *Communication via social networks helps students relieve academic stress*, 33.1% are undecided, while about a fifth disagree (8.3% completely, 13.4% partially).

Most respondents have positive attitudes towards the statement that *It is important to me how my profile looks on social networks and how others perceive me in the virtual environment* - 15.3% completely agree, 23.9% partially agree, 27.7% are undecided, and slightly more than a third disagree with the statement (15.95% partially, 17.2% completely).

The following tables present data on the statistical significance of students' responses concerning the independent variables: study program, average grade, duration of presence on social networks, and frequency of access.

Table 2

Statistical Significance of Differences in Students' Attitudes Regarding the Study Program

Items	Study program	M	SD	F	df	p
Using social networks contributes to the creation of an individual's social identity	PSY	3.50	1.07	0.81	4	0.52
	SPSW	3.10	1.25			
	PED	3.33	1.08			
	CPR	3.41	1.26			
	JOU	3.55	1.29			
I prefer using social networking sites over attending social gatherings	PSY	2.07	1.20	3.49	4	**0.01**
	SPSW	2.75	1.29			
	PED	2.46	1.35			
	CPR	1.91	1.23			
	JOU	2.60	1.41			
Using social networks strengthens interpersonal relationships	PSY	2.94	1.18	1.10	4	0.36
	SPSW	3.15	1.18			
	PED	2.68	1.16			
	CPR	3.07	1.39			
	JOU	2.90	1.39			
Social networks help maintain quality social relationships with relatives and friends	PSY	3.27	1.23	0.67	4	0.61
	SPSW	3.25	1.02			
	PED	3.01	1.17			
	CPR	3.30	1.21			
	JOU	3.24	1.43			
Social networks can improve communication among students	PSY	4.10	0.90	2.45	4	**0.04**
	SPSW	3.85	0.67			
	PED	3.66	0.97			
	CPR	3.80	1.26			
	JOU	3.90	1.14			
	PSY	4.13	0.83	2.38	4	0.05
	SPSW	3.80	0.77			

Social networks can enhance collaboration among students	PED	3.78	0.89			
	CPR	3.78	1.31			
	JOU	4.00	1.01			
Communication via social networks helps me relieve academic stress	PSY	3.31	1.18	1.39	4	0.24
	SPSW	2.95	1.23			
	PED	3.40	1.05			
	CPR	3.17	1.22			
	JOU	3.60	1.15			
It is important to me how my profile looks on social networks and how others perceive me in the virtual environment	PSY	3.07	1.247	1.08	4	0.37
	SPSW	3.15	1.268			
	PED	2.84	1.326			
	CPR	3.00	1.317			
	JOU	3.33	1.426			

Based on the data presented in Table 2, it can be concluded that the study program variable statistically significantly affects students' attitudes on the examined topic for only two items. Specifically, for the item *I prefer using social networking sites over attending social gatherings*, the calculated Post Hoc Test shows a difference in responses between psychology students and students of social policy and social work, pedagogy, and journalism; and between communication and public relations students and students of social policy and social work, pedagogy, and journalism. For the item *Social networks can enhance collaboration among students*, the calculated p-value is close to statistical significance, while the Post Hoc Test indicates a difference in responses between psychology students, who rate this statement somewhat more positively, compared to pedagogy students.

Table 3

Statistical significance of differences in students' attitudes regarding average

Item	Average grade	M	SD	F	df	p
I prefer using social networking sites over attending social gatherings	6.00-6.99	3.00	1.63	5.29	3	**0.01**
	7.00-7.99	2.51	1.34			
	8.00-8.99	2.30	1.30			
	9.00-10.00	1.81	1.09			

Based on the data listed in Table 3, it can be concluded that even the variable average grade during the course of study does not have a statistically significant effect on students' attitudes about the examined topic, except for one item. Only for the item *I prefer to use social networking sites than to attend social gatherings* was the calculated p-value of statistical significance.

The Post Hoc Test shows that for the mentioned item there is a difference in the answers between students with the highest average grade (9.00-10.00) and students in other categories, where these students evaluate the stated statement more negatively than other students.

Table 4

Statistical significance of differences in students' attitudes regarding duration of presence on social networks

Items	Duration of presence (in years)	M	SD	F	df	p
Using social networks contributes to the creation of an individual's social identity	1-5	3.09	1.38	1.06	2	0.35
	5-10	3.43	1.08			
	More than 10	3.48	1.23			
	1-5	2.18	1.22	0.50	2	0.60
	5-10	2.22	1.28			

I prefer using social networking sites over attending social gatherings	More than 10	2.38	1.37			
Using social networks strengthens interpersonal relationships	1-5	3.00	1.27	0.67	2	0.51
	5-10	2.84	1.24			
	More than 10	3.01	1.23			
Social networks help maintain quality social relationships with relatives and friends	1-5	3.14	1.25	2.90	2	0.06
	5-10	3.10	1.21			
	More than 10	3.47	1.23			
Social networks can improve communication among students	1-5	4.09	1.06	0.69	2	0.50
	5-10	3.86	1.04			
	More than 10	3.95	0.91			
Social networks can enhance collaboration among students	1-5	4.09	1.06	0.57	2	0.56
	5-10	3.91	1.00			
	More than 10	4.01	0.83			
Communication via social networks helps me relieve academic stress	1-5	3.45	1.18	4.80	2	**0.01**
	5-10	3.19	1.13			
	More than 10	3.63	1.15			
It is important to me how my profile looks on social networks and how others perceive me in the virtual environment	1-5	2.55	1.18	11.86	2	**0.01**
	5-10	2.86	1.29			
	More than 10	3.59	1.22			

Based on the data presented in Table 4, it can be concluded that the variable of duration of presence on social networks statistically significantly affects students' attitudes on the examined topic for only two items. Specifically, for the item *Communication via social networks helps me relieve academic stress*, the calculated Post Hoc Test shows a difference in responses between students who have been on social networks for more than 10 years, who express slight agreement, compared to students who have been present for 5 to 10 years, who express indecision. For the item *It is important to me how my profile looks on social networks and how others perceive me in the virtual environment*, the calculated Post Hoc Test shows a difference in responses between students who have been on social networks for more than 10 years compared to students in the other two categories, with students in this category expressing slight agreement compared to the other students who show indecision in their assessment. For the item *Social networks help maintain quality social relationships with relatives and friends*, the calculated p-value is close to statistical significance, while the Post Hoc Test shows a difference in responses between students who have been on social networks for more than 10 years, who express a slightly higher level of indecision in their assessment, compared to students who have been present for 5 to 10 years.

Table 5

Statistical significance of differences in students' attitudes regarding frequency of accessing social networks

Items	Frequency of accessing social networks	M	SD	F	df	p
It is important to me how my profile looks on social networks and how others perceive me in the virtual environment	Rarely	2.25	1.89	3.15	3	**0.02**
	Sometimes	1.67	0.82			
	Often	2.88	1.13			
	Regularly	3.10	1.31			

Based on the data presented in Table 5, it can be concluded that the variable of frequency of accessing social networks during the day does not statistically significantly affect students' attitudes towards the impact of social networks on the development of their social competencies, except for the item *It is important to me how my profile looks on social networks and how others perceive me in the virtual environment*. The calculated Post Hoc Test shows a difference in responses between students who occasionally access social networks (who express disagreement in their assessment – M=1.67), compared to students who access them regularly (who express indecision in their assessment – M=3.10).

Discussion

The results of the study indicate that respondents are generally undecided about the contribution of social networks to the development of their social competencies. The reasons for this could be varied, including individual differences in perception, unclear perception, or scepticism regarding the impact of social networks on their social competencies. However, for some items, such as the statement that using social networks contributes to the creation of an individual's social identity, students expressed agreement (partial 32.8% and complete 18.5%). The data suggest that respondents perceive social networks as platforms for expressing identity, where they can freely express their interests, opinions, and lifestyle. This finding suggests that students largely view social networks as a channel for communication and network-building, which can be significant for the development of social competencies.

Interesting data were obtained regarding the statement that students prefer using social networking sites over attending social gatherings. For this statement, the highest percentage of students expressed disagreement, with 37.9% completely disagreeing and 26.1% partially disagreeing. Disagreement with this statement may indicate that students prefer real-life interaction and are aware of the importance of face-to-face communication for the development of social competencies. On the other hand, it is possible that students are sceptical about the quality of online interactions and believe that deeper social contacts are achieved through direct interaction rather than via media.

The results of the study indicate that most respondents have positive attitudes towards the statement that social networks can improve communication among students (30.6% completely agree, 41.7% partially agree). These findings suggest that the surveyed students perceive social networks as a useful tool for maintaining connections and exchanging information with peers, which is also supported by other studies (Pavlović, Stanisavljević Petrović, Mamutović, 2019; Obradović, Milosavljević, Vujović, 2017). Accordingly, it can be concluded that students consider social networks to be a useful digital tool that can make important information for studying more accessible and communication easier and faster, thereby directly impacting the efficiency of student communication.

Similarly, and in similar numbers, respondents assess that social networks can improve collaboration among students, with 30.6% of respondents completely agreeing, 44.6% partially agreeing, a smaller percentage showing indecision, and an even smaller percentage expressing disagreement with this statement. These results unequivocally indicate that most surveyed students see social networks as a useful tool that facilitates collaboration among students, which is also shown in the findings of other studies (Stanisavljević Petrović, Mamutović, 2018). Improvements in collaboration may relate to the potential of social networks for sharing and exchanging information, organizing group activities, projects, or other study-related activities. Moreover, the findings indirectly suggest that social networks have the capacity to enhance collaborative activities, particularly collaborative learning, as indicated by other research (Ansari & Khan, 2020).

The results show that the majority of respondents agreed (27.7% partially and 17.5% completely) with the statement that communication via social networks helps students relieve academic stress. These findings can be interpreted to mean that students might perceive social networks as a means of taking a break from academic obligations and engaging in informal communication with friends or viewing entertaining content, contributing to their sense of relaxation and stress reduction. Additionally, communication via social networks can help students feel less isolated and lonely, providing them with a sense of connection with others, which also helps reduce academic stress.

Regarding the results related to the appearance of profiles on social networks and the importance of being perceived by others in the virtual world, the findings show varied perceptions among students. While the majority of respondents have positive attitudes towards the statement that *It is important to me how my profile looks on social networks and how others perceive me in the virtual environment* (15.3% completely agree, 23.9% partially agree, 27.7% undecided), slightly more than a third of the respondents disagree with the statement (15.95% partially, 17.2% completely). These findings can be interpreted as reflecting individual differences in students' attitudes, stemming from personal characteristics, value systems, self-confidence, or experiences with social networks. Respondents who have developed a positive relationship with their online identity may tend to support this statement, while those with negative experiences or who are more sceptical may be more inclined to disagree.

The research data indicate that there are no statistically significant differences in students' perceptions concerning the variable of frequency of accessing social networks. Specifically, within this variable, only for the item *It is important to*

me how my profile looks on social networks and how others perceive me in the virtual environment does the calculated Post Hoc Test show a difference in responses between students who occasionally access social networks (who express disagreement – M=1.67) and students who access them regularly (who express indecision – M=3.10). The finding that there are differences in responses between students who occasionally access social networks and those who access them regularly suggests that there is a perception that how they present themselves on social networks is important for how others see them or how they see themselves in the virtual environment. Students who access social networks regularly express indecision about how others perceive them, which may indicate that they are aware of the importance of their social network profiles but are unsure about the exact impact or impression they create with their profiles.

Regarding the variable of average grade during studies, it was shown that there are no statistically significant differences in students' responses, except for the item *I prefer using social networking sites over attending social gatherings*. The calculated Post Hoc Test shows that for this item, there is a difference in responses between students with the highest average grade (9.00-10.00) and students in other categories, with these students rating the statement more negatively compared to other students. These findings can be interpreted as reflecting differences in priorities set by students with high average grades. Students with the highest average grades may place more value on the time spent studying, which may result in a lower desire to participate in social gatherings. Consequently, they may tend to rate the importance of social gatherings lower compared to the use of social networks.

The duration of presence on social networks is a variable with statistically significant differences in respondents' answers for two items. For the item *Communication via social networks helps me relieve academic stress*, the calculated Post Hoc Test shows a difference in responses between students who have been on social networks for more than 10 years, who express slight agreement, and students who have been present for 5 to 10 years, who express indecision. This result indicates that long-term use of social networks can influence the perception of the usefulness of communication through these networks in the context of academic stress, as well as how students express their attitudes on this topic. Differences in responses for the item *It is important to me how my profile looks on social networks and how others perceive me in the virtual environment*, according to the calculated Post Hoc Test, exist between students who have been on social networks for more than 10 years and students in the other two categories, with students in the former category expressing slight agreement compared to other students who show indecision.

The obtained results for the variable related to the study program affiliation clearly show the existence of statistically significant differences in students' responses about the impact of social networks on the development of social competencies. Specifically, for the item *I prefer using social networking sites over attending social gatherings*, the calculated Post Hoc Test shows differences in responses between psychology students and students of social policy and social work, pedagogy, and journalism, as well as between communication and public relations students and students of social policy and social work, pedagogy, and journalism. These findings can be interpreted primarily as differences in digital literacy and technology use across different study programs. Additionally, the findings may reflect the content of the study programs, with communication and public relations students likely having more knowledge about the importance of online presence on social networks due to their curriculum. However, it is surprising that psychology students have a greater tendency for online interaction and using social networks as a means of connection and expression, while students of social policy and social work, pedagogy, and journalism value physical presence and face-to-face interaction more. The existence of these differences can be interpreted in terms of the practical needs of the study programs, suggesting that in social policy and social work, as well as pedagogy and journalism, there is a greater emphasis on real interactions and working with people.

Conclusion

Based on the results of the research, it can be concluded that students are generally undecided about how social networks contribute to their social development. This outcome highlights the complexity of the issue regarding the impact of social networks on individuals' social competencies. However, the findings indicate that the surveyed students perceive social networks primarily as a communication channel, which can indeed be significant for the development of social competencies. This perception suggests that social networks have become an integral part of social interaction, especially among the student population, who actively use them to communicate with peers and the broader community.

Social networks provide students with the opportunity to actively participate in various social situations, such as group discussions, events, and activities, which can contribute to the development of social competencies. According to the research findings, it can be concluded that there is no doubt that social networks offer opportunities to enhance collaboration among students. Such collaboration creates a space for the development of various social skills, including teamwork skills and better adaptation to online environments.

However, the research also shows that the surveyed students approach communication on social networks critically and are aware of the importance of direct communication, which they highly value. Despite the potential of social networks in the realm of communication, a larger number of respondents still appreciate face-to-face interaction, which involves direct contact and presence. It is encouraging that direct communication remains the preferred choice for students, especially considering its contributions to deeper understanding and connection among participants, which are undoubtedly crucial for the social competencies of future academics.

Based on the obtained results, it can be concluded that the independent variables of average grade and frequency of accessing social networks do not have a significant impact on students' perceptions of the influence of social networks on the development of their social competencies. In this regard, the study program affiliation and the duration of presence on social networks have a more significant impact.

The results obtained in this study can be considered valuable as they highlight students' attitudes towards social networks and their influence on the development of social competencies. The findings emphasize students' general perceptions of how using social networks affects their communication and collaboration, which can be useful for understanding general trends and potential impacts on students' social development. However, due to this generality, the research also has certain limitations, as it does not provide a detailed insight into the effects of individual social networks. Individual networks have their specific characteristics and functionalities and can influence the shaping of students' social competencies in various ways. From this perspective, the findings can serve as a good starting point for future research aimed at a more detailed examination of specific social networks and their specific contributions to the development of social competencies in the student population.

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Online Learning in Primary School: Perspectives of Teachers, Students, Parents

Laura Ioniță

Secondary School No. 31, Bucharest

laura.m.ionita@gmail.com

https://orcid.org/0009-0003-6604-3900

Abstract: Part of the life of the society in which it develops and on which it has an impact perhaps not always fully assumed and respected, the school benefits both from the scientific structure and from the tendency - natural and necessary - to investigate the new. So how do we deal with the digital reality that students live in and that even the most conservative of teachers can't dissociate themselves from? Here is the plot of this work!

In this context, the purpose of this work is to investigate and assess the impact of online schooling on Romanian grounds, following the opinions of the three active educational performers immerged in it the most: teachers, pupils, parents. The inquiry has followed the primary education learning path, as part of a deeper concern for this field, with an open eye towards both achievements and challenges. The questionnaires have given the possibility to all three categories to express personal perspectives and conclusions.

The reasonable deduction of the present educational approach is that online courses represent a milestone in the functioning of Romanian schools, providing us with the ability to acknowledge the importance of both direct interaction and need to develop acquires in terms of technology.

Keywords: digital pedagogy, digital technologies, education innovation, online school, primary school level, psychological approach, sociological approach, pedagogical approach

Introduction

The school has been at the heart of many debates in recent years, but even more so during the Covid-19 pandemic. Medical considerations, concerned with the health of the population at the global and local level, the need to adopt restrictive measures to limit the spread of the virus, the gradually acquired knowledge about the susceptibility of

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children and young people to the virus and its transmission capacity have intertwined - and sometimes they faced - the needs of the educational environment.

School, neuropsychiatrists specialized in pediatrics emphasize, represents a fundamental dimension of children's lives, not only as a matter of learning, but also important in socialization, peer comparison, as a reference of significant adults outside the family's comfort zone.

Viewed from a generic perspective, the educational institution is intended to cover and naturally satisfy the requirements of all those it addresses, regardless of origin. Therefore, the educational policies that increase the value that the school has in society are fundamental. Access to education is a tool that must serve us to fight ignorance, discrimination and ensure a better future for children, because "if you have only one block of marble and you use it for a caricature, where else can you carve a Minerva?" (Steinhardt, 1991).

Unlike the previous stages, the current education has come to positively influence various categories of disciples, addressing the disadvantaged as well. In fact, the very operation of educational institutions and those who facilitate this process is statutorily conditioned by the principle of non-discrimination and equal opportunities. This reality represents a huge step in the diversification of the educational field, compared to the situations previously encountered.

We note that the present is characterized by an accelerated expansion of the educational field, in which the central actor - the student - has at his disposal a complex of opportunities: nurseries, kindergartens, schools, institutes, universities, etc. A determining factor of the multitude of educational offers is represented by the increasingly strong rise of the virtual learning environment, which can be included in *the online school*. The options presented in a widened educational field support individual development, but the cumulative effort is greater, due to the volume of activities chosen: the calendar of a current learner may include compulsory lessons imposed by the educational institution in which he works, optional courses, extracurricular sessions, hobbies, etc.

In this context, a *agreement decree* is fundamental, so that there is an interconnection, assumed by all actors, between the educational and social fields. The communication bridge between the two entities will have to cross the virtual realm so feared in the school. The only way is to look at the new technologies of information and transmission of information (ICT) as adjuncts in the educational process - flexible, adaptable, free of conventionalisms, offering openness and freedom to learning options, both for teachers and students. The active involvement of students is essential to their educational process and beneficial to the education system, which pursues the ultimate educational goal: the integration of young people into society. This goal can only be achieved when we abandon the idea that the objects of study are fixed and detached from the children's experience, and that they only have to respond to requests, without participating with their own voice/action. By activating digital practice in the learning process, the development of personalities capable of solving life's problems through association and cooperation, in real contexts, can be supported.

The alarm signals currently appearing regarding online activity demonstrate the need to urgently improve the situation, in the direction of achieving an epistemic and functional reconciliation between school and ICT: "Pandemic pedagogy has placed a great emphasis on the principle of continuity of learning. Let's continue to keep the relationship and the educational community, that's very important". In this sense, it insists on "individual and collective responsibility" alike, to nurture the reality of a transformed classical educational field - the teacher gained pedagogical autonomy, but "lost the school community between the walls". Conjunctural and mandatory alike, it becomes essential for the actors of the educational relationship - teachers, students, parents - to coexist, at a distance, supporting each other with more determination, so that the act of learning can be maintained and continued.

Located in an extremely sensitive generalized context, marked by the persistent problematization of health and personal and community safety, the *online school* phenomenon requires teachers not only to teach, but especially to support the young students emotionally. At an overall assessment and consideration of the increasingly significant technological progress, of the changes in the aspirations of the new generations, it is natural to see the need to develop new ideas, based on the alternation of pedagogical methods. The changes in the living mechanism represented by society outline the new paradigm to be taken into account: the school must recover from this "lack of confidence towards non-formal and informal education, towards its educational-axiological consistency". In conclusion, "it is necessary to achieve a "constructive partnership" between all these new components of the social field of education, under the auspices of the school, which should assume *the leadership* of this partnership" (Păun, 2017). This is, moreover, the direction to which international bodies such as UNESCO are currently urging, showing the "undeniable need for collaboration, solidarity and collective action for the common good", at the centre of which must be "the interests and capacities of the learners" (UNESCO, 2020).

The research, the results of which are presented below, was carried out in early 2023, with specific samples of:

- 50 teaching staff: 74% urban, 26% rural; 50% first professional degree, 32% second degree, 10% final, 6% debutant, 2% substitute; 92% female, 8% male
- 60 students from the primary cycle: during the online school period, students in the 2nd (16.7%), 3rd (41.6%) and 4th (41.7%) grades
- 50 parents: 70% female, 30% male; 12% from rural areas, 88% from urban areas.

Teachers' Opinion about Online School

Specific to human beings especially in terms of "conscious and intentional relationship with otherness", communication represents "the essential process by which (man) becomes what he is and enters into relationship with others" (Sălăvăstru, 2005). In a didactic context, communication situations vary depending on the context created for teaching-learning activities. Perceived and assumed as "a complex set of specific didactic actions and behaviours, intended to produce learning", teaching requires a certain technical skill on the part of the teacher/ student, as well as the mastery of appropriate work tools.

In all its meanings, this essential process in the formative process of students in educational institutions requires, first, the "identification of the role of the teacher" as a determining factor both in the initiation of the cognitive process, and especially regarding the involvement of students in the pedagogical act (Marzano, 2015). By means of high-level cognitive organizers (expository, narrative, illustrative, scriptural) and the "anchors" offered to the class, the teaching staff must ensure students' familiarity with the new information presented (Marzano, 2015). Using the "principle of small steps" (Rosenshine, 2002; apud Marzano, 2015), which allows the division of the subject into easier to assimilate content units, as well as specific macro-strategies, the teacher has the chance to achieve satisfactory results.

On the other hand, however, what may seem natural and constructive - the congruence of the elements that create the educational contexts necessary for the harmonious development of the disciples - can turn into real blockages when intrusions appear that limit the students' freedom of expression. According to the opinion of the majority of 42% of the teaching staff participating in the research, technology perceived as an educational resource represented an impediment rather than an adjunct during the pandemic, the causes being multiple:

- Lack of organization at system level
- Insufficient training of teaching staff for the online scenario
- Insufficient equipment
- Poor internet connection
- Problems with the operation of the national platform
- Problems connecting students to classes
- Background noise from students' homes

At the level of the current development of society, the presence of technology in educational institutions has become a habit, and its integration in the instructive-educational process depends, to the greatest extent, on the desire to use it, on the experience and skills of the teaching staff (Farjon, Smits , & Voogt, 2019). According to the information received from teachers in rural schools, in this environment there is a strong need to have a technical and methodological base adapted to new trends. Only with the right tools and benefiting from the appropriate training, the people from the department believe that the modern technique could be used properly: "If we still have to work with the technology, we should have everything necessary", concludes one respondent.

The open-ended responses reveal another interesting aspect to mention: many of the teachers' impressions refer rather to a moderate positioning in the retrospective analysis conducted in the present study. Some of the indications, surprisingly, reflect a common perspective: *online school as a breakdown solution or compromise solution*. The case deserves to be followed more closely, given the nuances that this subject presents. In this case, we are talking about a 38% share of respondents, who approach the matter from various points of view:

- It is a variant of carrying out the activity.
- It is inappropriate for the primary age segment.
- The online school is a temporary solution – an emergency solution – for emergency situations in case of illness or other issues, school under renovation etc.

The questionnaire dedicated to teaching staff also brings to light a completely antagonistic perspective to the investigative approach, because the respondent we are referring to believes, firmly convinced, that: "We cannot speak of such a concept" - in other words, the online school does not exist! We mention that it is the only voice drastically positioned against the idea of schooling through activities with digital support, but without providing us with details for explanation.

In the context of obvious dissatisfaction with the analysed experience, it is understandable the imperative demand of the teachers to benefit from optimal working conditions. The request becomes imperative in the perspective of a digitized future, according to the trends of society and the improvement directions that teachers are taking. In the words of one survey participant, "We, the more experienced staff in the department, suffered because we didn't get enough digital training." Regarding the distribution by age categories, the questionnaire indicates different weights, with major values in the range of 45-54 years (30%), 55-68 years (28%), 35-44 years (26%), respectively minor in the age categories at the extreme poles: 19-34 years (14%) and over 68 years (2%).

According to the psychology of ages, what we generically call the third age begins after the interval of 64-65 years, approximately, being correlated, most of the time, with the moment of retirement (Thalhammer et al., 2014). This existential point represents, including for teachers, a significant event, on a personal, professional and social level. In terms of enabling a "sense of self-control" (Windsor & Anstey, 2008), some teachers tend to stay in the classroom to maintain a lively connection with the school environment that they say is their source of inspiration. The metaphor is interesting, all the more useful in the context of this research, being used by a lady with significant experience in the field, who agreed to answer the questions on one condition - that her opinion be mentioned by another, younger person: *You write, my dear, I can't handle digital intelligence, I prefer the living one!*

In the light of these words that start from the contradiction person vs. technology, the conclusion of a study that highlights a reality with sociological implications is significant: people who choose to show a positive attitude in relation to technology will resort to it more often, compared to occasional users or those who reject it (Al-Gahtani & King, 1999). The reasons for the reluctance can be found in the answers of the teachers who indicated the connection problems, the minimal or non-existent facilities to be able to connect with the students at home, the absence of specialized training that would allow them to use the technology without problems.

We found that the objective obstacles during the online school period were also mentioned by teachers from younger age groups than the seniors who found the interaction with the virtual environment to be rather difficult. Thus, the results related to the perception of specific aspects denote the degree of personal preparation that each of the respondents considers having achieved:

Table 1

Aspects of the online school, as perceived by primary school teachers

	To a very large extent	To a great extent	To some extent	To a small extent	To a very small extent
This period gave us the possibility of flexible activities - students could learn when and how they wanted	12%	28%	38%	18%	4%
It was more convenient, because I no longer travelled to school	30%	32%	22%	6%	10%
It was easy for me to work exclusively with digital technologies	14%	30%	14%	15%	27%
I think online school is a temporary solution	72%	24%	2%	2%	-

Quite unexpectedly, we find that the share of positive perception on the ease of working with digital technologies is, in fact, at a distance of a few percentages in relation to the negative perception, but unanimity is evident on the temporary nature of schooling in the virtual environment. We also note the high percentage of understanding the situation as an opportunity to stay in the comfort of your own home.

The organization of learning in the exclusively online environment has elicited interesting reactions, especially if we notice the arrangement of the graph in certain points that some of the respondents considered important enough to

mention in the detailed answers: the opportunity for professional development, the learning pace of students, technical resources in the pandemic. The teachers' assessments regarding these aspects were as follows:

Table 2

Primary school teachers' opinions regarding the organisation of learning in the online school period

	To a very large extent	To a great extent	To some extent	To a small extent	To a very small extent
It supports students in maintaining the pace of learning.	14%	30%	28%	21%	7%
Provides the opportunity for professional development through the use of digital technologies.	48%	32%	20%	-	-
Online activities create an impersonal learning environment compared to the classroom.	17%	26%	32%	17%	8%
I have benefited from sufficient resources to be able to support the courses in digital format.	26%	26%	5%	17%	26%

In other words, the teachers' opinion about the exclusively-online school is that it can support the pace of student learning, provide professional opportunities for practitioners, but can create an impersonal study climate compared to the classroom. This is also the reason why, in the free-response section, some have insisted that this type of learning is not suitable for the long-term primary cycle, but rather for certain activities integrated into the lessons. As for the provision of the necessary resources to support online courses, the majority of teachers declared themselves satisfied, which makes us believe that, based on their origin, predominantly from the urban environment, they benefited from the support that their colleagues from the rural area complained about insufficient or even non-existent.

Regarding the general impression on the personal adaptation of the teachers to the conditions characteristic of the period of online studies, the collected information shows us unexpected results, perhaps, if we consider the imputations brought to the system and the organization of the whole context. Thus, out of a total of 51 people, the majority returned to a positive perception of the situation: 47.1% believe that it succeeded, to a large extent, while 17.6% of the teachers declare to some extent satisfaction at the adaptation level; 15.7% announce their adaptation to a very large extent, 13.7% state this to a small extent, and 5.9% indicate to a very small extent self-satisfaction in the new school context.

The teaching staff stated that they suffered quite a lot as a result of technical and organizational inadvertences, they consider the online school a temporary solution, rather a complementary element in the structure of learning in physical format. However, teachers assume the need to adapt to the new, remain consistent with the good of children dependent on the socialization that allows them to develop harmoniously, and consider online schooling at young ages suitable for a well-determined period.

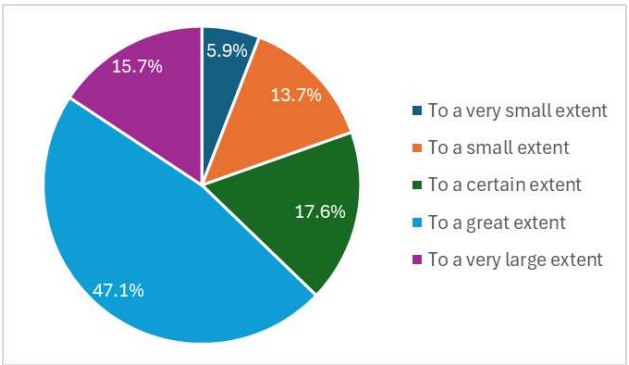

Fig. 1. *Teachers' perception regarding their adaptation to teaching in the online environment (n=51)*

Students in the Virtual Environment

According to specialists, interaction with the class "presupposes a complex set of skills", the most important of which is the teacher's ability to create personal connections with each of his students (Cozolino, 2017). By facilitating a safe attachment, within working circles strengthened on mutual respect, cooperation and empathy, the teacher will gain an important place not only in the educational process, but also outside the physical perimeter of the school, because "emotion determines the quality of the recording" information (Cury, 2018). It is essential, therefore, that every active teacher - or willing to become an involved part of this profession - understands the importance of personal connections in a student's life.

In proportion to 66.7% of the total of 60 respondents in the questionnaire for students, primary school students indicated that they attended all the lessons they were informed about, while 25% encountered technical problems and did not they were able to connect every time. Those who did not show up for any virtual meeting with the class means a percentage of 8.3% in this case.

Online learning activities were considered interesting and useful by 51.7% of respondents, uninteresting and even tiring by 30%, while 18.3% answered *Don't Know/ Not Applicable*. It is worth remembering, at this point, the fact that the teachers affirmed their satisfaction in relation to the activities they were able to develop in the online school, an aspect confirmed by the surveyed students.

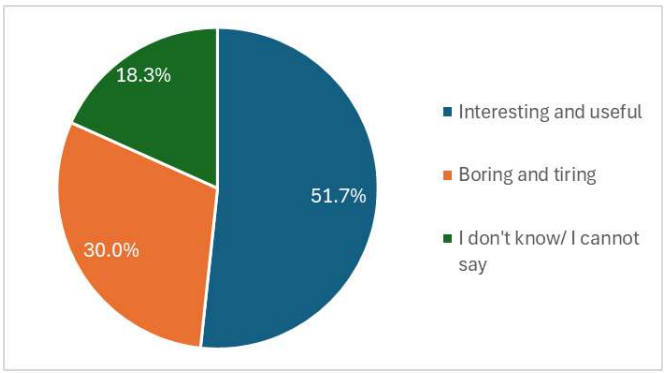

Fig. 2. *Students' view of online school activities (n=60)*

Regarding the preferences related to the learning carried out in the virtual environment, the convenience of working from home meant an impressive majority weight (75%), and the flexibility of activities registered a percentage of 40%. The accessibility of classes and aspects considered to be interesting bring together 38.3% of all respondents, while 5% of them state that involvement in the virtual school was not possible.

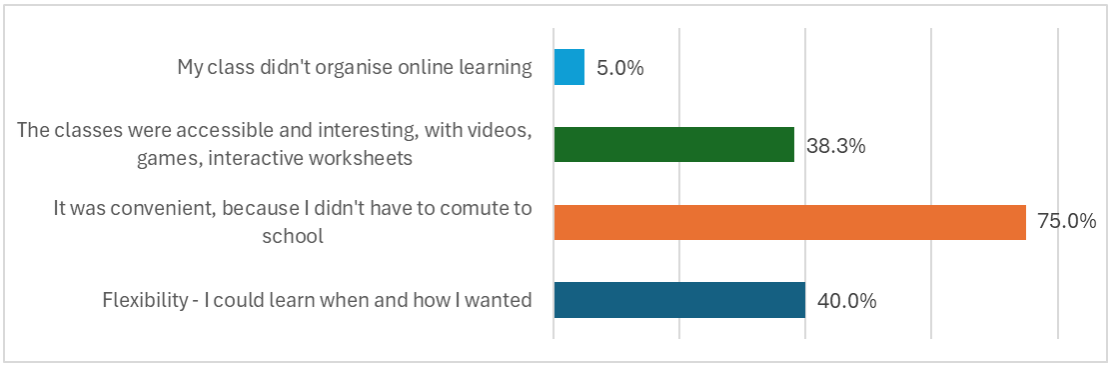

Fig. 3. *The advantages of online school, students' perspective (n=60)*

The emotions felt by the students, whose memory made the following graph possible, clearly cluster around the idea of relaxation during online classes. 80% of the students declared themselves relaxed in the online school, compared to the remaining 20% who responded negatively. Conversely, a percentage of 43.3% specified that they felt frustration, but also confidence that things will turn out well, but the majority of 56.7% said that they did not go through these

states. 70% declared themselves bored with online courses, compared to those interested – 30%; 55% were dissatisfied, 45% – satisfied, but hope was felt by 43.3% of students, compared to 56.7% who declare the absence of this state. However, it seems that staying at home and free activities were more to the liking of the little ones, given that 56.7% felt satisfied with the situation, compared to the difference of 43.3% who denied satisfaction in the analysed period.

Contrary to the opinion of teachers, who considered online school only temporarily useful and unlikely to be effective in the long term in grades I-IV, students seem to prefer (53.3%) rather to stay at home, without classes or homework, in the idea that he recovers later, if he were immobilized or had a contagious disease. In contrast, the difference of 46.7% preferred the proposal to connect online with video in class and attend classes with colleagues.

In the open-answer section, we discovered - similar to the situation in the questionnaire addressed to teachers - varied opinions: 18.3% stated that it was difficult for them, due to connection problems, which indicates a significant difference of 81, 7% who managed to connect to the courses in virtual format. Students also identified the fact that they no longer had to travel to school, 2% emphasizing the convenience of working from home, while the group at the opposite pole (98%) would have preferred to continue attending classes in physical format. It is very interesting to check the correspondence between the teachers' statements - online school is not suitable for young school ages in the long term - and the opinion of the students, who complained about the need to socialize with the class. There were, however, voices (5%) who probably took advantage of the anonymity ensured by the present study (respecting the GDPR rules in force, it did not retain personal data from the respondents), to express their delight in playing on computer during online classes. However, 40% of children declared themselves satisfied with online learning, which they consider interesting, even useful "under certain conditions". Similar to the case of the teachers, one of the respondents wanted to express his opinion by offering an overall perspective: "It was a challenge, sometimes difficult, because it took me a while to understand how to proceed with some topics, then it became very interesting, because the lady gave us all kinds of interesting games and we were able to learn differently than in school". As a continuation of this idea, another student concentrated in a suite of concepts the belonging to Generation Z and the direction towards which society is heading: "Normality - Evolution - New Generation".

Parents during the Pandemic

The presence of the students in the online school was also confirmed by the adults in the family. Out of a total of 50 people, 58% answered yes to the question *During online courses, did your child participate in learning activities?*, compared to 36% of parents who indicated technical problems and partial connection. In fact, this fact was previously discovered in the statements of the teachers and students questioned. In proportion to 4% the children did not participate for other reasons, and for 2% the reason was personal and strong enough to avoid connecting: the activities *did not seem interesting* to one of the students.

The perspective of adults on the new study situation of their own children specifies, in an impressive majority of 80%, the fact that online school is a temporary solution, that the comfortable environment at home has taken them long enough (52%) to reach to appreciate the flexibility of the work schedule (38%). As a result of the lessons being held in a digital format, the family was able to have direct access to the activities by attending the classes, which led some parents to find the lessons accessible and interesting (28%). Some parents, however, said their son/daughter did not participate in online school (4%).

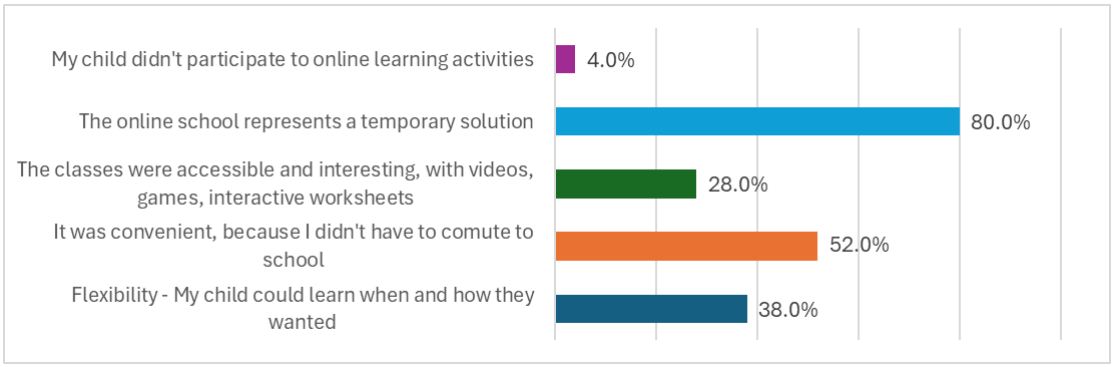

Fig. 4. *Parents' perception of online school (n=50)*

Regarding particular situations, such as: in case of illness, to protect the rest of the class, in case of immobilization in bed after an injury, etc., parents declared in unison - 86% of respondents - that online learning would be useful, compared with 14% negative responses to this question.

The emotions experienced by parents during their children's digital schooling were variously distributed regarding the statistical data. Relaxation was felt as follows: 38% to some extent, 24% to a very small extent, 22% to a small extent, 8% to a large extent, 8% to a very large extent. According to these figures, we can consider that the families did not feel the relaxation to the same extent as their own children, even if they previously stated that they found it convenient for the students to stop going to school.

Frustration affected 28% to some extent, 26% to a very large extent, 20% to a small extent, 16% to a large extent, 10% to a very small extent. It seems that this emotion was also a sensitive point, to which dissatisfaction was added, to a very large extent (38%), with a percentage of 28% to some extent, 14% to a great extent, 12% to a very small extent measure, 8% to a small extent.

In this context, boredom appeared to a very small extent (30%), but 28% declared that they felt it to some extent, 22% to a small extent, 12% to a large extent, 8% to a very large extent. We can therefore deduce that the families did not consider this emotion to be meaningful in the courses in the virtual environment, and perhaps it would be interesting to investigate, precisely, what were the causes for which the present analysis recorded such statistics.

The *positive* emotions experienced by parents indicate a significantly moderate weight (*to some extent*) of the level of: trust (50%), hope (34%), satisfaction (34%). Similar values of 20% were recorded in relation to the minimum levels of trust (*to a small extent, to a very small extent*), instead, differentiation was evident in how people felt the absence of hope (22% to a very small extent; 20% to a small extent). With such benchmarks, we would discover a rather low level of satisfaction during the period under investigation (34% to some extent, 30% to a very small extent, 22% to a small extent).

According to the graphs resulting from the parents' survey, the three emotional benchmarks that support the positive projection of reality show reduced values at maximum levels of perception: 6% answered that they felt trust to a great extent, alongside 4% who declared it very great measure; hope: 14% to a great extent, 10% to a very great extent; satisfaction: 12% to a great extent, 2% to a very great extent.

The opinions identified above culminate in the overall impression of the online school expressed in the free-response section. Thus, in a majority of 44%, parents wanted to sound the alarm about a series of negative aspects such as:

- technical malfunctions;
- the absence of the necessary equipment for each student;
- the state of tiredness/illness that the child accused after being involved in the virtual classes;
- the lack of sufficient training of teaching staff in the online field, which significantly hampered the quality and results of the respective activities.

The moderate impressions referred to the compromise aspect in which the majority of the population was at global level, and the arguments were, on the one hand, the importance of continuing the courses in a suitable form, on the other hand, the need to respect the regulations of the moment. Those who fell into this trend represent 40% of parents, who claim that we are discussing a "viable option only in exceptional situations". For 24%, physical school is oppressive, while 16% believe that online school is "not a beneficial solution" for primary school students.

Conclusion

It is true that interaction in the classroom differs from that conducted digitally, but both environments involve a three-dimensional interaction of students: with the object of study, with the teacher, with the group of peers. According to the verifications carried out through the present research, the difficulty online consisted, as in other corners of the world (Gunawan, Suranti, & Fathoroni, 2020), in: problems of a technical nature, faulty organization of the initial period, as well as in the absence of some previous exercises from the teaching staff. These are, moreover, the first areas of criticism that all three categories of respondents - teachers, students, parents - indicate as urgent for remediation. Practically, "the transfer of the traditional face-to-face learning system to the online environment without proper training was one of the problems of education in this pandemic period" (Ceobanu at al., 2022).

Regarding participation, the availability of students was higher than that of adults, which led to the analysis of a sample of 60 responses compared to 50 for each of the other two target groups. We saw it as a real opportunity to be

able to record the views of the children, who thus had the opportunity to express their ideas in complete freedom – perhaps this is why they explained in less elegant terms their rejection of the online learning context. Further investigations, complementary to the written questionnaire, revealed a reality about which complex strategies of action could be developed: the educational crisis in which students find themselves who prefer to consume their time with anything else besides the educational process. In other words, those who did not want to study in the classroom, much less will look to connect online, in a *window* on the teacher's monitor who must simultaneously manage an entire work group and possible technical syncopes.

On the other hand, however, the voice of those who want to study and openly confess this, suffering from the impossibility of socializing within the student body, is just as real. The open attitude to learning is also openly supported by parents who clearly show their preference for physical school and to avoid the online environment in the long term.

The context opens the way to an approach that some of the teachers interviewed after completing the questionnaire adopted: the caution of using the digital domain in the instructional-educational process. The reasons are related to personal observations and the information that circulates online about the involvement of students in the virtual: "the presence on social networks is one of the factors that can positively or negatively influence the educational performance of students" (Ceobanu et al., 2022). At the level of the three classes discussed in the present research – 2nd, 3rd, 4th – this might be unlikely to happen frequently. But we don't know how valid the assumption remains in the older classes, because middle school students have permanent access to *smartphone devices* from which they completed the questionnaires analysed here...

We mentioned the care for the children's well-being previously and we consider it opportune as a common point of discussion between the two camps: teachers - parents. Obviously, both groups found the difficulty of the students to endure for a long time in the solitude of their own home, without the possibility to socialize with the group and with the others in the educational institution. The desire to physically return to classes was also highlighted by students who declared themselves satisfied with the way the classes were conducted in a virtual format, which confirms the *reconciliation* discourse that the specialists approach: teachers "understand the fact that the generations present shows more and more resistance to the routine promoted by the school, which leads them to reconsider their pragmatic value" (Ceobanu et al., 2022). So, the proposed solution for the good of all is for digital elements to be part of the structure of classroom lessons.

Another common direction of statistics considers the need for online learning to remain possible in exceptional contexts, such as medical problems or any other situation that does not allow a student to travel to school. All three categories showed that there are situations that require material recovery, parents insisting that it would be useful to connect immobilized/ sick children from home to online courses. Here, however, it is interesting to individualize the distinct opinion of the students, who prefer to recover *later* if they stay away from school. The contradiction gives rise to new concerns and the attitude I mentioned above seems to become recurrent, so we can launch a question with potential for new research: *Why do today's students prefer to avoid school?* And, perhaps along with the answer to this, at some point we will also be able to understand how to support their curiosity and motivation to continue learning.

Regarding continuity, it is important to mention that the majority of respondents indicated that there was information from the institution, through the teacher, to the beneficiaries - the students, and the latter were able to get in touch with the class online. The fracturing of this connection is, as we have noted, an *Achilles' heel* in virtual schooling, as "there can be no expectation of learning gains simply by introducing ICT into schools" (Kozma, 2005). This is, moreover, the opinion of the teaching staff, who continue to use technology according to their own level of acceptance and openness to the new, not necessarily due to an expertise based on a suite of specific training activities in the online field.

Technology is a real educational resource, but the direction and extent of openness to integrating it into current learning activities is fundamental – recent research has shown that the success of an integrated approach directly depends on teachers' "willingness to use technology, experience and skills" (Farjon, Smits, & Voogt, 2019).

Resistance to change cannot be considered an impediment to Gen Z disciples, who end up assisting their masters in situations that require digital knowledge – they are teachers who declare themselves equally amazed, pleased and, to some extent, intimidated by the prowess of their students who know how to solve everything *from* or *with the buttons*. Regarding the teaching staff, however, things are completely different, because the large age difference between the teacher and the students seems to be directly proportional to the reluctance in front of *digital intelligence*. It seems that this approach is common to seniors, not only Romanians, but also those from Japanese

countries, for example (Umemuro, 2004). Ultimately, the attitude and comfort felt in relation to any element external to the person are essential predictors regarding the probability of using that object/element. Since both parents and teachers have complained about the need for special pre-training sessions for teachers to use technology, it is obvious that the stringency in this direction should be resolved quickly, so that ICT tools can be used properly in schools.

As a level of general perception, we find a rather open attitude towards new opportunities, with the desire that in the future things will be better organized, so that the online lessons run naturally, without interruptions. Interesting to note, in this context, is the fact that, despite the stated disadvantages, teachers show more confidence in relation to online learning activities, compared to students' parents. The latter approach a mine rather reluctant to directional decisions, which can tilt the balance of interpretation towards the idea of an expectation that, certainly, everyone wants optimal for the good of their own child.

From a psychological perspective, the online school era has raised waves of opinions for and against, and the present research proves, once again, the need for people of all ages to be able to express their opinions and their desire for better. Withdrawal from natural social contexts prior to the onset of this period meant, including for children, an accumulation of behavioural changes, to the point of bursting into tears or refusing to try to connect to online courses.

With real challenges regarding attitudes, reactions and grievances, the digital courses and the isolation in which the educational actors had to remain represented significant moments in the lives of each of the participants in the present study. As a consequence, a new pedagogical approach was imposed as opportune, through which teachers had to recalibrate their approach to the learning-teaching-evaluation process and, in many situations, even navigate into the unknown without a sufficiently powerful compass.

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The Use of E-Portfolios in Working with Pre-School Children

Iva Manić

Faculty of Philosophy, University of Niš, Niš, Serbia

iva.manic@filfak.ni.ac.rs

https://orcid.org/0000-0003-0149-3567

Abstract: The advancement of information technologies has contributed to shaping a different vision of the life of society as a whole. In the age of digitalisation, society faces various changes in communication, as well as in everyday life. In the context of pre-school education and upbringing, the use of technology is on the rise for the purposes of implementing numerous educational activities. Communication with parents, monitoring the children´s personal growth and their behaviour, discovering the talents and abilities of pre-school children, and potential opportunities for preventing undesirable behaviour comprise activities which can be significantly improved by resorting to e-portfolios.

Accordingly, this research aimed to explore the importance and methods of use of e-portfolios in working with pre-school children, as well as to pin down the prevailing type of e-portfolio based on pre-school teachers´ experiences. The research included 138 pre-school teachers from the city of Pirot, Serbia. Research results show that pre-school teachers resort to e-portfolios in pre-school institutions mostly to monitor children´s personal growth and behaviour. Consequently, they use such e-portfolios to prevent undesirable behaviour (with a special focus on aggressive behaviour). Likewise, the results indicate that an in-depth assessment e-portfolio is predominantly used by pre-school teachers, while the least frequently used is the subject-specific e-portfolio.

Keywords: e-portfolio, use, pre-school institution, types of e-portfolio, pre-school teachers

Introduction

The outbreak of COVID-19 contributed to the accelerated advancement of technology and a more widespread use of digital tools in education and upbringing (Slade et al., 2020). In the field of education, an e-portfolio provides one with simple access to all outputs, i.e. school materials important for monitoring the personal growth, learning and behaviour of each child. The use of e-portfolios has quickly prevailed among students and teachers, while on the level of a pre-school institution, e-portfolios started to be implemented somewhat later. Although the available reference literature on the use of e-portfolio in pre-school institutions is rather scarce, the relevant reference literature indicates that research studies do explore the issue of creating individual portfolios, but primarily in a traditional form (printed

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version) (Wortham et al., 1998; Hebert, 2001). The difference between the traditional and electronic portfolios is that the traditional version implies that children perceive their portfolios as projects which have been carried out, presented and filed away (Chang et al., 2014; Lai et al., 2016). A modern version, i.e. electronic portfolio offers the possibilities of continuous personal growth, whereby an e-portfolio is constantly improved and revised depending on children´s personal growth, new knowledge and behavioural changes (Lopez Crespo et al., 2022). An electronic portfolio is a more dynamic tool that creates an opportunity for the application of digital competencies necessary in the process of modern education and upbringing (Xe et al., 2019). For instance, interaction between children and information technology tools can be beneficial for the development of thinking, attention, speech, memory, imagination, perception and the like (Mihăilă-Popa, 2023). Accordingly, including children in the production of personal e-portfolios in a pre-school institution can be both useful and interesting.

Implementation of an e-portfolio at the level of a pre-school institution is based on perceiving its potential advantages (for example, continuous monitoring of personal growth, behaviour and thinking, nurturing self-reflection, learning achievements, preventing undesired behaviour, etc.) (Chang et al., 2018; López-Crespo et al., 2022; Zhang & Tur, 2022). Potential advantages of e-portfolios can be observed in the communication with parents, discovering the talents and abilities of children, monitoring their personal growth and behaviour, collecting materials which can be useful for preventing undesired behaviour, etc. (Dan & Simon, 2021).

According to the current basics of pre-school education programme (Years of Ascent, 2019), keeping an electronic portfolio is a voluntary activity and it depends on teachers´ digital competencies. Considering that changes in the sphere of education primarily entail the staff's professional development, purchasing of equipment, and sufficient time for implementing innovations, this research aimed at considering the situation in practice concerning the use of e-portfolios in a small community in the southeast of Serbia.

Theoretical Framework

The term ***portfolio*** is of Latin origin and it is derived from the phrase ***portafoglio*** which in a loose translation means ***to carry papers***. The traditional, printed version of a portfolio implies a thin, mobile file organiser containing notes, documents, drawings, etc. (Lam, 2018). Rapid technological development as well as digitalisation contributed to the emergence of the e-portfolio which is considered an important tool for studying, monitoring and assessing children (Lam & Lee, 2009). An e-portfolio is interpreted as “a digital version of a profile or a log book about learning which children currently have in pre-school education institutions” (Penman, 2014:10). According to the author Barrett (Barrett, 2007), e-portfolio is a collection of creative materials and activities which shows the progress and achievements in one or more areas. In addition to digital materials, e-portfolios include data important for monitoring children´s personal growth, behaviour and learning process.

E-portfolio is significant for a systematic collection of children´s creative work, drawings, video clips, songs, models, projects and the like, which pre-school teachers observe as an important source of materials useful for monitoring the process of personal growth and learning, setting new educational goals, monitoring behaviour, socialisation, as well as preventing undesired behaviour (Pennazio & Fedeli, 2021). Additionally, in pre-school institutions, e-portfolio is often used as a tool of communication between pre-school teachers and parents (Higgins, 2015). Data obtained through research (Beaumont-Bates, 2017) show that an e-portfolio is well-suited for building the relationship between pre-school teachers and parents, emphasising that online communication fosters the inclusion of parents in the process of education of their children. Likewise, through e-portfolios, parents have the opportunity to monitor the behaviour of their children in the community, their activities in kindergarten, their attitude towards assignments, resourcefulness, etc. (Hebert, 2001). Owing to such practice one can notice different forms of behaviour that diverge from the socially desirable and typical behaviour of pre-school children, and in collaboration with educational specialists one can undertake timely preventive actions.

Taking various criteria, uses and data into account, numerous authors tried to classify e-portfolios according to their types (Halaydina, 1997.; Slater, 1996.; Melograno, 2000). For the purposes of this paper, authors will review those types of portfolios which overlap in the afore-mentioned classifications and which are considered easier to apply in practice. *A comprehensive e-portfolio* should include all children´s works and activities. This type of e-portfolio allows for long-term record-keeping which later provides an insight into the process of a child´s personal growth. *A showcase e-portfolio* comprises only the best child´s works and activities. This e-portfolio is characterised by the fact that each child should be allowed to independently choose a specific creative output or recorded activity for this e-portfolio. The

use of this kind of e-portfolio encourages children to be self-reflective, it motivates them to critically review their achievements and choose those outputs that they deem representative. This method contributes to the development of self-esteem and self-respect in children. *A subject-specific e-portfolio* is used to monitor the progress in a certain domain, and it is used later to consider cognitive and affective skills, as well as a child´s personal growth, learning and behaviour. *A formal documentation e-portfolio* is a kind of e-portfolio which implies a formal record-keeping of a child´s activities such as presence, interest in activities, outputs in different areas suitable for assessing a child´s personal growth, achievements and behaviour. This type of e-portfolio should be subject to assessment by a pre-school teacher, which is not necessary for other previously mentioned types of e-portfolio. *An in-depth assessment e-portfolio* is a type of e-portfolio which enables a long-term collection of detailed materials (child´s activities, works and other materials) which is very important for the latter assessment of a child´s personal growth, learning and behaviour.

Methodological Framework

The goal of this research was to establish the experiences of pre-school teachers in the process of using e-portfolios in working with pre-school children. The defined goal has been achieved based on the following research tasks: to explore the use of e-portfolios at the level of a pre-school institution; and to determine the prevailing type of e-portfolio based on pre-school teachers´ experiences. For the purposes of the research, the following variables have been considered: the number of children in a group (fewer than 20, more than 20); and the years of working experience (fewer than 10, more than 10). The following hypotheses have been defined: It is assumed that pre-school teachers most frequently resort to e-portfolio to monitor children´s personal growth and behaviour; It is assumed that a showcase e-portfolio is the prevailing type used by pre-school teachers in working with pre-school children.

The research included 138 pre-school teachers from the city of Pirot, Serbia. Out of the total number of respondents, 119 pre-school teachers (86,2%) work in a pre-school group with more than 20 children, while 19 pre-school teachers (13,8%) work in groups with fewer than 20 children. The research included 88 pre-school teachers (63,8%) who have more than 10 years of working experience and 50 pre-school teachers (36,2%) with less than 10 years of working experience.

For the purposes of the research, a five-point Likert-type rating scale was constructed in electronic form, divided into two subscales according to the defined research tasks. The scale termed "Educators' Experiences with the Use of E-Portfolios in Working with Pre-school Children," contained 5 categories with which pre-school teachers could express their level of agreement: 1 – strongly disagree; 2 – disagree; 3 – neutral; 4 – agree; 5 – strongly agree. Respondents filled out the scale through the Google Forms application. The calculated value of the Cronbach's Alpha test is ($\alpha > .70$, $\alpha = .81$), which indicates that the constructed instrument is reliable.

For the purposes of data analysis, the statistical programme IBM SPSS Statistics 20 was used. When it comes to statistical parameters, the frequencies of the responses, the arithmetic mean of the responses, the standard deviation, statistical significance, and the t-test have been determined.

The Results

The results obtained by applying descriptive statistics indicate that the arithmetic mean of obtained answers for specific assertions (*I use e-portfolio as a tool of communication with parents; By using e-portfolio in working with pre-school children I discover children´s talents and abilities)* is around 3, and the deviation from the average responses (SD) is around 1. Accordingly, one can assert that pre-school teachers depict their experiences by expressing a neutral attitude towards the afore-mentioned assertions (Table 1). According to results which have also been presented in Table 1, one can assert that the values of arithmetic mean established by analysing the responses to assertions: „*I use e-portfolio to preventively act upon suppressing undesirable behaviour*“ and „*I believe that one can prevent aggressive behaviour based on the data that I record in the e-portfolio*“ is around 4, which means that respondents expressed a high level of agreement with these assertions.

Based on pre-school teachers´ experiences, 42% of respondents use e-portfolios to communicate with parents, while 53,6% of pre-school teachers use e-portfolios to prevent undesirable behaviour, and 60,1% state that the use of e-portfolios are oriented towards monitoring a child´s personal growth and behaviour, which is indirectly useful when it comes to the process of preventing aggressive behaviour

Table 1

Pre-school teachers´ experiences with the implementation of e-portfolios in pre-school settings

Assertion	M	SD	1	2	3	4	5
I use e-portfolio as a tool of communication with parents	3.76	1.40	13.0	7.2	12.3	25.4	42.0
E-portfolio is an important tool for monitoring the overall growth of pre-school children	3.58	1.18	6.5	11.6	26.1	29.0	26.8
By using an e-portfolio in working with pre-school children I discover children´s talents and abilities	3.15	1.09	7.2	19.6	34.8	27.5	10.9
I use e-portfolios to work on the prevention of undesirable behaviour	4.04	1.33	10.9	4.3	8.7	22.5	53.6
I believe that one can prevent aggressive behaviour based on the data that I record in the e-portfolio	4.25	1.17	6.5	3.6	8.7	21.0	60.1

According to the assumption that there are differences in pre-school teachers' responses based on the number of children in the group they work with, in Table 2 one can encounter the obtained results which indicate the differences in respondents´ answers regarding this variable. One can assert that there is a statistically significant difference in pre-school teachers´ responses ($t(38.42) = 3.03$; $p < 0.05$; $p = 0.02$) concerning the use of e-portfolio as a tool of communication with parents. Based on average values of arithmetic mean ($M = 4.37$), one can conclude that pre-school teachers who work with a smaller number of children in a group (fewer than 20) use e-portfolio more frequently to communicate with parents in comparison with pre-school teachers who work with a larger number of children in a group ($M = 3.66$). The results also indicate that pre-school teachers who work with smaller groups of children use e-portfolio more frequently to act in a preventive manner against undesirable behaviour in children ($t(4.45) = 2.31$; $p < 0.05$; $p = 0.00$). Furthermore, pre-school teachers who work with a smaller number of children in a group express a higher degree of agreement with the assertion stating that they use e-portfolios to monitor the personal growth and behaviour of children which in turn enables them to work on preventive measures against aggressive behaviour in children ($t(65.37) = 3.22$; $p < 0.05$; $p = 0.03$) (Table 2).

Table 2

Pre-school teachers´ experiences with the implementation of e-portfolios in pre-school settings concerning the number of children in the group

Assertion	N of children in a group	M	SD	t	df	p
I use e-portfolio as a tool of communication with parents	Fewer than 20	4.37	0.83	3.03	38.42	0.02*
	More than 20	3.66	1.45			
E-portfolio is an important tool for monitoring the overall growth of pre-school children	Fewer than 20	3.84	1.12	1.04	136	0.642
	More than 20	3.54	1.19			
By using an e-portfolio in working with pre-school children I discover children´s talents and abilities	Fewer than 20	3.58	0.91	1.86	136	0.518
	More than 20	3.08	1.10			
I use e-portfolio to work on the prevention of undesirable behaviour	Fewer than 20	4.68	0.47	2.31	4.45	0.00*
	More than 20	3.93	1.40			
I believe that one can prevent aggressive behaviour based on the data that I record in the e-portfolio	Fewer than 20	4.68	0.47	3.22	65.37	0.03*
	More than 20	4.17	1.23			

*There is a statistically significant difference in respondents´ answers

Table 3 shows the results relating to pre-school teachers´ experiences concerning the use of e-portfolios relative to their years of experience. Based on the obtained values (t (136) = 2.03; p < 0.05; p = 0.03), one can assert that pre-school teachers who have less than 10 years of experience use e-portfolios more frequently to communicate with parents. According to the obtained results, no statistically significant differences have been found in other assertions, and the obtained values can be found in Table 3.

Table 3

Pre-school teachers´ experiences with the use of e-portfolios in pre-school settings concerning years of work experience

Assertion	Years of work experience	M	SD	t	df	p
I use e-portfolio as a tool of communication with parents	Fewer than 10	4.08	1.26	2.03	136	0.03*
	More than 10	3.58	1.45			
E-portfolio is an important tool for monitoring the overall growth of pre-school children	Fewer than 10	4.06	1.06	3.74	136	0.11
	More than 10	3.31	1.18			
By using an e-portfolio in working with pre-school children I discover children´s talents and abilities	Fewer than 10	3.48	1.07	2.73	136	0.36
	More than 10	2.97	1.05			
I use e-portfolio to work on the prevention of undesirable behaviour	Fewer than 10	4.22	1.65	1.22	136	0.13
	More than 10	3.93	1.42			
I believe that one can prevent aggressive behaviour based on the data that I record in the e-portfolio	Fewer than 10	4.36	0.94	0.86	136	0.09
	More than 10	4.18	1.28			

*There is a statistically significant difference in respondents´ answers

Concerning the prevailing type of e-portfolio that pre-school teachers use in working with pre-school children, one can notice higher levels of agreement with those assertions which describe the prevailing use of an in-depth assessment e-portfolio which pre-school teachers find useful to monitor children´s personal growth and behaviour (M (1.26) = 4.18), as well as the prevailing use of documentation e-portfolio (formal documentation for each child) (M (1.06) = 4.19). Out of the total number of respondents, 58% strongly agree with the assertion that they use an in-depth assessment e-portfolio, and 50.7% of respondents resort to the documentation e-portfolio to keep formal records for each child in their pre-school group (Table 4).

Table 4

Pre-school teachers´ experiences concerning the prevailing type of e-portfolio

Assertion	M	SD	1	2	3	4	5
I create a comprehensive e-portfolio for each child (collecting all their outputs).	3.20	1.39	10.1	28.3	22.5	10.1	29.0
I prefer a showcase e-portfolio (featuring only the best outputs).	3.60	1.38	12.3	11.6	13.8	18.3	34.1
I maintain a subject-specific e-portfolio (tracking progress in a specific area).	3.35	1.04	5.8	12.3	34.8	34.8	12.3
I keep a formal-documentation e-portfolio.	4.19	1.06	4.3	2.9	13.0	29.0	50.7
I use an in-depth assessment e-portfolio.	4.18	1.26	9.4	2.9	5.8	23.9	58.0

Based on the data presented in Table 5, one can notice that pre-school teachers who work with a smaller group of children (fewer than 20) dedicate more attention to the creation of an in-depth assessment e-portfolio (t (99.72) = 5.17; p < 0.05; p = 0.00), whereby the arithmetic mean of obtained responses is *M* (0.37) = 4.84.

Table 5

Pre-school teachers´ experiences with the prevailing type of e-portfolio concerning the number of children in the group

Assertion	N of children in a group	M	SD	t	df	p
I create a comprehensive e-portfolio for each child (collecting all their outputs).	Fewer than 20	3.26	1.48	0.22	136	0.30
	More than 20	3.18	1.38			
I prefer a showcase e-portfolio (featuring only the best outputs).	Fewer than 20	3.47	1.58	-0.43	136	0.25
	More than 20	3.62	1.35			
I maintain a subject-specific e-portfolio (tracking progress in a specific area).	Fewer than 20	3.73	0.73	1.73	136	0.07
	More than 20	3.29	1.07			
I keep a formal-documentation e-portfolio	Fewer than 20	4.52	0.70	1.50	136	0.13
	More than 20	4.13	1.10			
I use an in-depth assessment e-portfolio	Fewer than 20	4.84	0.37	5.17	99.72	0.00*
	More than 20	4.07	1.31			

*There is a statistically significant difference in respondents´ answers

Statistically significant differences have not been detected when it comes to pre-school teachers´ experiences relating to the prevailing type of e-portfolio applied in their pre-school institution relative to the years of experience.

Discussion

The results obtained in the course of this research indicate that the majority of pre-school teachers who took part in the research believe information collected in the e-portfolio can be used to monitor children´s personal growth and behaviour and, consequently, prevent aggressive behaviour. If one considers the current problem relating to negative forms of behaviour, with special emphasis on aggressive behaviour in pre-school children, one can assert that collecting notes, creative work, drawings, video clips, anecdotal notes and other materials, can be observed as a potential manner of defining and taking preventive measures against negative behaviour. This interesting information in correlation with the variable relating to the number of children in a pre-school group indicates that pre-school teachers who work with a smaller number of children in a group use e-portfolios more frequently to monitor children´s personal growth, learning and behaviour. This information can be interpreted from the standpoint of job overload and the priority work obligations that teachers have. Accordingly, it is believed that when a group is smaller it allows the pre-school teacher to dedicate enough time to create e-portfolios in addition to other mandatory activities, as well as to analyse the material and take potential measures to prevent undesirable behaviour. Previous research studies (for instance, Eynon & Gambino, 2017; Katz et al., 2014), confirm the findings obtained through this research, i.e. they confirm that e-portfolio is a frequently used tool to monitor children´s personal growth, meaningful learning and behaviour in a pre-school institution.

By analysing the research results the authors could infer that younger pre-school teachers (with less than 10 years of experience) use e-portfolio more frequently as a tool of communication with parents. This particular information can be justified if one considers that younger pre-school teachers have more enthusiasm, motivation, and abilities to resort to digital technologies, as well as better organisation skills to work with pre-school children. The results show that pre-school teachers who work with fewer children in a group (fewer than 20) are readier to communicate with parents in such a fashion. Interpretation of this result can be observed from the standpoint of time that a pre-school teacher can dedicate to each child, as well as to each e-portfolio. Considering that a smaller number of children in the group contributes to a better management of time, space and activities through projects, a pre-school teacher during the working day can dedicate more time to updating the e-portfolios of each child.

It is believed that the material introduced to the e-portfolio in a timely fashion provides parents with an insight into activities performed at a pre-school institution, and owing to information technologies parents can maintain communication with a pre-school teacher when it comes to their child´s activities, personal growth, behaviour and overall progress. Similar results have been obtained in some previous research studies (Penman, 2014; Higgings, 2015; Gallagher, 2018). For instance, in the research performed by the author Higgins (Higgins, 2015), the results indicated that the use of e-portfolios significantly helped pre-school teachers to establish and strengthen the communication

between the kindergarten and family. Furthermore, parents and members of the family confirmed that the e-portfolio helped to a large extent to understand children´s activities in kindergarten, to follow their growth and to observe potential risks of undesirable behaviour. Likewise, interesting results obtained through another research indicate that 100% of pre-school teachers recommend the use of e-portfolios (Penman, 2014).

Pre-school teachers who work with a smaller group (fewer than 20 children) most frequently resort to the in-depth assessment e-portfolio. Considering the features of this type of e-portfolio, one can assert that pre-school teachers believe that a minute record-keeping and collection of other sorts of materials with the purpose of introducing them into individual e-portfolios represents an important tool for continuous monitoring of children´s personal growth and behaviour. Accordingly, pre-school teachers invest a lot of time to produce this type of e-portfolio. This information is rather significant for the educational practice and it can be recommended to others as an example of good practice. A detailed record-keeping of the material in an electronic form is easily available to all participants in the process of education (pre-school teachers, educational specialists, parents, children) and they provide a good basis for a discussion on learning, progress and behaviour of each child. Accordingly, updating information and material is rather significant for observing the changes in children´s personal growth and behaviour.

The research has shown that the other prevailing type of e-portfolio used by pre-school teachers is a documentation e-portfolio. It is believed that keeping formal documents on a child´s presence and other supporting data only supplements the in-depth assessment e-portfolio. A larger number of respondents resort to the showcase e-portfolio, i.e. they are dedicated to collecting only the best outputs of each child. Based on the obtained results, pre-school teachers´ experiences show that subject-specific e-portfolios are the least frequently used in practice. Hence, pre-school teachers do not tend to follow a child´s progress in one particular area.

This research has been implemented by resorting to an assessment scale. Hence, the limitations of this research can be perceived in the lack of an interdisciplinary approach to the problem, as well as in the use of a single instrument. Likewise, the number of filled-in instruments encompassed by the research is smaller in comparison with the received responses due to inadequately filled questionnaires. The implications for some future research could be oriented towards exploring the methods of creating an e-portfolio, the inclusion of children in creating the e-portfolio and the like. Furthermore, an e-portfolio could be suggested as the basic manner of record-keeping, should a research study on a sufficient number of respondents establish that an electronic version is easier to apply from the standpoint of pre-school teachers, children and parents.

Conclusion

The digital revolution and its continuous flow resulted in pre-school children being able to easily and quickly interact with digital technology. The use of digital tools in the process of education was a response to a need for a quicker, more economical, safer and modern manner of record-keeping and collecting materials. E-portfolio, as one of the innovative tools represents significant progress in the process of innovation of a pre-school institution because it provides various possibilities, it is a more interesting and easier channel of communication compared to papers and file organisers.

Considering the different experiences and expectations of pre-school teachers, it is important to emphasise that younger pre-school teachers are more dexterous in using digital technologies, as well as more motivated to use e-portfolios. The number of children in the group is also essential. Working in smaller groups gives a pre-school teacher sufficient time to be more thorough in monitoring children´s personal growth, learning and behaviour by resorting to e-portfolios. Although an e-portfolio is not a mandatory manner of keeping records and monitoring children´s personal growth, learning and behaviour, one can assert that pre-school teachers are already using it in practice. Accordingly, one can assert that there is a firm basis for further development of digital competencies of pre-school teachers, as well as a wider use of e-portfolios in working with pre-school children.

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Blended Teaching Mode Based on the "Rain Classroom" Platform – A Case Study of the Course "Basic German Grammar" at Beijing International Studies University

Lu Zou

School of European Studies, Beijing International Studies University, China

zzxp111@126.com

https://orcid.org/0009-0004-6217-9410

Abstract: The blended teaching is an "online + offline" teaching mode that integrates the dual experience of traditional classroom and online learning, which is a hot topic that educators at different levels are currently paying attention to and studying. The "Rain Classroom" is a new teaching platform developed with the support of information technology, which promotes the development of the blended teaching mode, improves teaching effect, monitors teaching process in real time, and enhances the effectiveness of teaching management. This paper takes the academic course of "Basic German Grammar" at Beijing International Studies University as an analysis case. Based on the online courses developed by the lecturer, while according to the characteristics of "Rain Classroom" as well as the principles and steps of the blended teaching, a blended teaching mode is constructed from multiple dimensions. Course design, teaching methods, teaching process and teaching evaluation are the different dimensions that have been developed. Thus forming a teaching system of "self-study before class + practice in class + review after class", which effectively enhances the students' knowledge, self-learning ability, and problem-solving ability.

Keywords: "Rain Classroom", blended teaching mode, "Basic German Grammar" course, hybrid learning, multimodal learning, video in education, flipped classroom, innovative pedagogies

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Introduction

With the further development of the Internet and information technology, all walks of life have begun to use Internet platforms to realize online office work, and the education field has also begun to use network platforms to build online teaching and learning systems. In April 2018, the Ministry of Education of China officially released the "Education Informatization 2.0 Action Plan", proposing to actively promote the development of "Internet + Education" and realize blended teaching with large-scale application of information technology, which opened up a new path for teaching. This coupled with Internet development and technology has become an inevitable trend to reform the teaching mode.

In the past few years since the COVID-19 pandemic began, colleges and universities around the world began to teach online via the Internet. After the pandemic ended, the classrooms that returned to offline teaching still retained the beneficial parts of online teaching. Today, the "online + offline" teaching has become an effective teaching mode. This mode breaks through the limitations of time and space on teaching and learning, and is of great benefit for improving students' autonomous learning ability, innovation and exploration awareness.

The course "Basic German Grammar", as an important basic course for German majors in foreign language universities, aims to systematically build a knowledge framework of German grammar for students, improve their language analysis and application abilities, and impart language learning methods and national cultural knowledge in teaching, so as to cultivate students with cross-cultural communication abilities and international vision, thus playing an important role that cannot be replaced by other courses.

Based on the above considerations, the teacher of the course "Basic German Grammar" at Beijing International Studies University, conducted an in-depth analysis on the reform of the teaching mode of the course, and created the online courses "Basic German Grammar" in 2019. Furthermore, the teacher carried out blended teaching practice. In the meanwhile, the teacher constantly thought about and adjusted her teaching mode, in order to improve the teaching methods and enhance the teaching effects.

1. Goal Setting

The German grammar course is an important part of the undergraduate curriculum system of the German major. The main source of students for the German Department at the Beijing International Studies University are high-level college entrance examination candidates from all over China, who come from different regions and nationalities, such as Han, Uyghur, Tibetan, etc., and their learning needs and habits are also different. In special periods such as the COVID-19 pandemic, students from all over the country have a greater demand for a combination of online and offline teaching mode.

Therefore, the primary goal of the construction of the blended course "Basic German Grammar" is to provide students with convenient learning resources and approaches by creating high-quality online courses. The online courses systematically outline the context of knowledge points, clarify the connections between each knowledge point, and build a complete knowledge framework, which helps students make efficient use of fragmented time and gives them more flexible and effective learning methods to choose from.

The second goal of the construction of the blended course "Basic German Grammar" is to stimulate students' interest and desire to explore German learning by visualizing the vivid and interesting teaching process through online courses, to promote students' learning autonomy, enthusiasm and thinking ability, in order to cultivate high-level, application-oriented talents with international vision and compound abilities.

The online courses "Basic German Grammar" are not only an important, innovative and efficient part of the "online + offline" teaching mode that combines pre-class preparation, after-class consolidation and in-class teaching, but can also be used as independent courses. This is because each grammatical phenomenon forms an independent module, which together form a systematic grammatical map. Therefore, the online courses can be used in conjunction with classroom teaching, or as a systematic independent course for elective courses, minor courses, self-study or other learning purposes. This is the third goal of the blended course construction.

The online courses are open to all undergraduate students majoring in German, as well as students of other majors with German as a second foreign language. It can also be used as a high-quality learning resource for senior students of German major to consolidate what they have learned. The course audience also includes people from all walks of life who are interested in German and plan to study, work or travel in German-speaking countries, providing them with

convenient resources to learn German anytime and anywhere. In short, the complete set of high-quality online courses can be provided as open courses for various universities, enterprises, institutions, etc.

2. Course Design

The offline curriculum for the course "Basic German Grammar" at Beijing International Studies University is as follows: 18 weeks per semester, 2 class hours per week, 1 week for teaching practice and 1 week for review lessons. The online courses design covers a total of 4 semesters for the basic learning stage of the lower grades. In consideration of the offline teaching progress, the corresponding online courses are set to 16 lessons per semester. The main practice objects of the online and offline blended teaching mode are 2 classes of sophomores majoring in German, with about 25 students in each class.

The content of the online courses is mainly derived from the 1st to 4th volumes of the general German textbook "Studienweg Deutsch" for Chinese universities. It takes the grammar progress of the textbook as the guideline, and on this basis, some modular teaching innovation attempts are made, and extracurricular materials are supplemented for the grammar part of the textbook. Because the grammar points of the textbooks are based on text scenes, the division of grammar points is relatively scattered, and the depth of after-class exercises and the breadth of knowledge in the textbook still need to be expanded, so this online courses re-integrates and divides the grammar teaching resources according to knowledge modules to improve the systematicness and effectiveness of grammar teaching.

According to the target groups of the course, the teaching objectives are divided into two categories:

1) For undergraduate students, through learning of the courses, they can reach the B2 level of grammar application of the European Common Language Standards, understand and master all the grammatical phenomena covered by the intermediate German textbooks, and be fully prepared for the Examination of German studies in the basic course (German: Prüfung Germanistik im Grundstudium, *abbr.* PGG-Prüfung).
2) For second foreign language students and self-learners, they can understand the general framework of German grammar, understand grammatical logic, and master basic application approaches, so as to be able to communicate and exchange ideas using correct grammar in daily life and specific occasions.

Table 1

Outline of the online courses "Basic German Grammar", lecturer: Lu Zou

Semester	Week	Grammar point	Video Duration (min)
1	1	Overview of German grammar	10
	2	der Nominativ	18
	3	Verb-Konjugation von regelmäßigen Verben im Präsens	13
	4	Verb-Konjugation von unregelmäßigen Verben im Präsens	22
	5	der Akkusativ	13
	6	der Imperativ	15
	7	das Pęrfekt	17
	8	das Possessivpronomen	13
	9	der Nullartikel und negative Artikel	14
	10	das Modalverb	23
	11	der Dativ	16
	12	Verben mit Dativ- und Akkusativobjekt	12
	13	trennbare und untrennbare Verben	19
	14	Präpositionen mit Akkusativ und Dativ	13
	15	Wechselpräpositionen	21
	16	Satzklammer	8

Semester	Week	Grammar point	Video Duration (min)
2	1	der Genitiv	32
	2	Präpositionen mit Genitiv	15
	3	Deklination der Adjektive	23
	4	Gebrauch des Adjektivs	20
	5	Ordnungszahlen und Interrogativpronomen	17
	6	das Passiv: Satzbau	21
	7	das Passiv: Zeitform und Ersatzform	20
	8	das Präteritum	23
	9	Reflexivpronomen	10
	10	reflexive Verben	14
	11	das Adverb	18
	12	Komparativ und Superlativ	21
	13	der Objektsatz	18
	14	der Subjektsatz	10
	15	der Infinitiv	17
	16	der Finalsatz	11
3	1	der Relativsatz: Relativpronomen (Nom. Akk. Dat.)	15
	2	der Relativsatz: Relativpronomen (Gen.)	14
	3	der Relativsatz: Relativadverbien	18
	4	Konjunktiv II: Konjugation	9
	5	Konjunktiv II: Zeitform und in Passiv	8
	6	Konjunktiv II: Höflichkeit	9
	7	Konjunktiv II: Irrealität	12
	8	Konjunktiv II mit Modalverben	11
	9	der Kausalsatz	8
	10	Ersatzform vom Finalsatz	8
	11	der Konzessivsatz	8
	12	Ersatzform vom Konzessivsatz	8
	13	der Konditionalsatz	9
	14	der Konsekutivsatz	9
	15	der Vergleichssatz	11
	16	der Instrumentalsatz	8
4	1	der Zeitsatz: wenn/als	8
	2	der Zeitsatz: bevor/nachdem	7
	3	der Zeitsatz: während/seitdem	6
	4	Partizip I	10
	5	Partizip II	12
	6	Konjunktiv I: Konjugation	10
	7	Konjunktiv I: Zeitform	13
	8	Futur I	10

Semester Week	Grammar point	Video Duration (min)
9	Futur II	8
10	Indefinitpronomen 1	13
11	Indefinitpronomen 2	8
12	Indefinitpronomen 3	10
13	Demonstrativpronomen	12
14	Valenz des Adjektivs	15
15	Funktionsverbgefüge	9
16	Umformung von Nebensätzen in Präpositionalphrasen	16

Figure 1

Display of "Basic German Grammar"

Furthermore, the online courses "Basic German Grammar" have two supporting courses as preparatory courses. The combination of the three together constructs a complete online teaching system for the basic stage, aiming to cultivate students' ability of independent learning and lifelong learning. The other two courses are as follows:

1) "German Pronunciation for beginners", which is a basic German phonetics course that covers all the phonetics knowledge in the basic stage. There are 25 lectures in total, each lasting less than 10 minutes. It is a necessary course for beginners learning German.

Figure 2

Display of "German Pronunciation for beginners"

2) "Oral German for beginners", which presets 11 common oral scenarios, allowing students to master communication skills in different scenarios, familiarize themselves with the general situation of Germany, and prepare for all-round adaptation and enjoyment of German life.

Figure 3

Display of "Oral German for beginners"

3. Teaching methods

Blended teaching mode combines online with offline teaching. It makes full use of the advantages of modern information technology, combines face-to-face teaching in traditional classrooms with autonomous learning and collaborative learning on the network platform, and makes up for the shortcomings of the traditional teaching mode. Blended teaching mode enriches the teaching content and form by introducing information technology tools such as learning platforms and teaching software, expands the time and space for learning, and makes the learning process more flexible and diverse.

The traditional teaching mode of the course "Basic German Grammar' mainly faces the following problems:

1) The selected textbooks do not have corresponding online resources.

2) The traditional education mode mainly focuses on face-to-face teaching. It fails to reflect the dominant position of students, weakens the process of students' exploratory learning, and fails to fully develop students' autonomy and enthusiasm for learning.

3) Students' ideas cannot be fed back to teachers in a timely manner, and the effect of face-to-face learning cannot be systematically fed back with data. It is difficult to monitor the learning status of each student and to improve the teaching efficiency on a large scale.

4) The assessment and evaluation mechanism is homogeneous. Traditional teaching emphasizes the proficiency of knowledge, the standardization of answering questions and the authority of standard answers. This makes it difficult to comprehensively assess students' skills and qualities in all aspects.

In this regard, based on existing teaching experience, the teacher has developed series of online grammar courses, and used the "Rain Classroom" platform to provide solutions to the problems of traditional teaching mode.

The "Rain Classroom" is a new smart teaching solution that can be used through PowerPoint plug-in and a WeChat official account. The teacher conducts smart teaching by opening a PPT in class and digitizing traditional classrooms, live streaming can also be utilized at the same time. Students can enter the teacher's smart classroom by entering the WeChat public account "Rain Classroom" on their mobile phones. The "Rain Classroom" can also record the big data and provide playback of the teaching contents.

The implementation process of the blended teaching mode based on the "Rain Classroom" includes the following **stages**:

1) Online self-study: The teacher publishes the basic German grammar points to be learned in form of videos and exercises to the "Rain Classroom" platform and publishes preview tasks through WeChat public account. The students then learn online and check the effect of self-study through online tests.
2) Offline cooperation and interaction: In real classrooms, the teacher organizes teaching activities for the key points of grammar courses, including discussions, speeches, scenario simulations, etc., so as to guide students to think deeply through practical applications, and improve their abilities to work in groups and interact with each other.

3) Online expansion and consolidation: Using the online platform, students can repeatedly watch the videos of the teaching process in class, read texts, and complete exercise assignments to strengthen their cognition and consolidate learning effects.

4) Process evaluation and improvement: Based on the teaching data feedback generated by the "Rain Classroom", the students' learning efforts and results in the three stages of before, during and after class are evaluated. The teaching strategies are flexibly adjusted according to the individual characteristics of the students, and the teaching resources and methods are updated in time.

4. Teaching process

1) Preparation before class

Add the "Rain Classroom" through WeChat (mobile) public account, create online classes and courses. Students join the created class through the class invitation code. The teacher publishes tasks before class, which contains online videos courses and simple exercises corresponding to the knowledge points to be taught in class. Through the feedback function of the "Rain Classroom", the teacher can see the length of time each student has watched the videos in preview, and adjust and improve the preview content accordingly as to adapt to the students' preview habits.

2) Activities in class

In class, the teacher opens the PPT to play the courseware, and opens the live streaming of the "Rain Classroom" at the same time, so that students can watch the full playback of the lesson at any time after class. Students can sign in after entering the "Rain Classroom". During the lesson, students can watch the PPT played by the teacher through the "Rain Classroom" (mobile). If they have doubts about the content, they can click the corresponding PPT and click the "Don't understand" button. Students can also raise their own questions through anonymous bullet comments, and the teacher can adjust the teaching rhythm according to the actual real time situation.

The teacher uses the "Rain Classroom" to set some questions in the PPT in advance and attach the answers. During the lesson, the questions can be pushed to students with the help of the question publishing function, and students can submit the answers within the time limit. When the answering time is up, the teacher clicks on the "answer status" and sees the details of the answers (including the number of correct answers, etc.). The teacher can understand the students' answers the first time and adjust the teaching rhythm in time. The notes taken by the teacher using the whiteboard function are also automatically generated as part of the presentation.

3) Follow-up after class

After the class, a summary report will be generated by the "Rain Classroom" and sent to the teacher, including the number and list of students who signed in, who were absent, and who participated in the class discussion, as well as the percentage of answers to class exercises, the completion of exercises, etc. Based on this, the teacher can grasp the learning progress of each student, reasonably select after-class exercises and review materials, and then send relevant learning suggestions and materials to relevant students, so that they can review and consolidate the corresponding knowledge in a targeted and timely manner. After class, students can also discuss with the teacher about the questions and difficulties they have online.

5. Teaching evaluation

The evaluation mechanism is a key part of teaching design. It is necessary not only to evaluate students' learning effect, but also to evaluate teachers' teaching abilities. The two complement each other and promote each other. The evaluation of students' learning effect helps to provide timely feedback on learning status and consolidate learning effect; the evaluation of the teacher's teaching abilities is based on the evaluation of the students' learning effect, and helps the teacher further improve the teaching mode and methods.

In view of the characteristics of the blended teaching mode, the teaching evaluation mechanism should focus on diversity and process. First of all, the teaching evaluation mechanism should be diverse, and the main criteria are whether the students have mastered the knowledge taught in classes, whether the teacher has cultivated students' ability to analyse and solve problems independently, and whether the teacher has enabled students to gain self-confidence and a sense of accomplishment. These factors, in turn, become the evaluation criteria for teachers' course

design, teaching content and teaching methods. Specifically, the evaluation criteria can be set by setting evaluation standards in three stages: before class, in class, and after class.

Firstly, the evaluation of students' involvement before class can be judged by *the number and duration of video courses* watched before class, which also reflects their satisfaction with the content and form of the preview materials provided by the teacher.

Secondly, the evaluation of students' learning effect in class can be judged by *the frequency of participation* in classroom interaction and their *enthusiasm* for it, and their *ability to actually answer questions*.

Thirdly, the evaluation of students' learning effect after class can be judged by *the submission speed* and *quality of homework*, *the content of after-class summary and questions*, which are also the evaluation criteria of after-class teaching effect.

After comparing the teaching practices of sophomores majoring in German for 2 semesters, it was found that **through blended teaching, the learner autonomy and their enthusiasm have been improved, classroom activity has increased significantly, and the average scores of in-class tests and end-term tests have also improved slightly**. In addition, **some introverted students also said that compared with pure offline teaching, the blended teaching mode has made them receive more attention**. In short, developing an effective teaching evaluation mechanism will help to continuously improve teaching methods, enhance teaching quality, better cultivate students' learning ability, creativity and innovation awareness, enable them to gain a sense of accomplishment in the process of online and offline interaction, and make blended learning more valuable.

Conclusion

The practice of the "online + offline" blended teaching mode of the course "Basic German Grammar" achieves the educational goals of stimulating interest, cultivating ability, and improving quality through rich and diverse teaching resources, a step-by-step teaching process, and a multi-dimensional teaching evaluation system. The blended mode takes the video courses created by the teacher as the online resource basis, and the teacher's many years of practical experience as the offline resource support, and the online courses "German Pronunciation for beginners" and "Oral German for beginners" as extracurricular resources, it finally forms a complete online course system to support the basic stage learning of the undergraduate majoring in German.

As a new teaching platform widely used in Chinese universities, the "Rain Classroom" promotes the development of blended teaching mode, improves teaching effect, monitors teaching process in real time, and enhances the effectiveness of teaching management. In the blended teaching mode, the teacher can grasp the real learning effect of students without delay, and students can also understand their real learning effect immediately. In this way, students are more fully prepared in terms of knowledge and psychology, and the teacher' lectures will be more targeted, which is conducive to teaching students in accordance with their aptitude and improving the quality of teaching and learning. In the future, the teacher will continue to improve the course design, teaching methods and teaching evaluation, and polish each stage of the teaching mode "self-study before class + practice in class+ review after class" to promote students' personalized development and deep learning ability, which ultimately promotes the common development of teachers and students.

Further information

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