

TEACHERS' PERCEPTIONS OF AI TOOL ADOPTION IN SERBIAN SCHOOLS: IMPLICATIONS FOR EDUCATIONAL MANAGEMENT

DOI: 10.5937/EMC26309V

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ABSTRACT

This study examines primary and secondary school teachers' perceptions in the Republic of Serbia regarding the use of artificial intelligence (AI)-based tools in lesson planning and instruction. The aim of the study was to examine teachers' level of knowledge and experience, their evaluation of the usefulness of AI tools, as well as the factors influencing their motivation and frequency of use in educational practice. The research was conducted on a sample of 167 teachers using a survey questionnaire. The results indicate that teachers generally hold positive views about the potential of AI tools, particularly in terms of facilitating teachers' work, improving lesson planning, and supporting the individualization of learning. A statistically significant relationship was found between prior experience with digital tools and the perceived usefulness of AI, as well as between perceived benefits and motivation to use these tools. However, no significant relationship was found between attending training and the frequency of AI tool usage. The findings highlight the need for a more systematic approach to professional development in the field of artificial intelligence applications in education.

Key words: AI tools, artificial intelligence, education, lesson planning, digital competencies

INTRODUCTION

The growing integration of artificial intelligence (AI) in education is transforming teaching and learning processes, particularly in lesson planning and instructional design in primary and secondary schools. In the Republic of Serbia, unlike in countries where numerous systematic studies have been conducted, research on the application of AI in education remains limited, with most existing studies carried out within projects, pilot studies, or conference papers.

The aim of this paper is to examine primary and secondary school teachers' knowledge and understanding of the application of artificial intelligence in lesson planning and instruction, as well as their perceptions of its usefulness, motivational factors, and barriers to the use of these tools.

THEORETICAL BACKGROUND / LITERATURE REVIEW

Development of Artificial Intelligence

Generative artificial intelligence became widely recognized in late 2022 following the emergence of ChatGPT, an application that, within a very short period, became the fastest-growing application in history. Thanks to its ability to simulate human capabilities and generate various types of content—such as text, images, video, music, and software code—GenAI has attracted significant public attention (Miao & Holmes, 2023). AI systems, based on deep learning and Natural Language Processing (NLP), can communicate with users, understand their needs, analyze choices, and suggest appropriate actions without human intervention (Minić & Deretić, 2024). Large Language Models

(LLMs) are a type of AI designed to understand and generate human-like text, trained on vast datasets to recognize patterns in natural language (Brand et al., 2025).

Teachers' Perceptions and Acceptance of Artificial Intelligence in Education

The results of a study conducted in Malta in 2023, involving 86 mathematics teachers, indicate, similarly to Gill et al. (2024), that mathematics teachers perceive ChatGPT as a tool that can increase student engagement in learning and provide support to students of different levels of knowledge and abilities (Busuttil & Calleja, 2025). However, there is a need for schools and educational institutions to urgently improve teaching and assessment methods in a way that incorporates artificial intelligence, rather than avoiding it. The results of a study conducted in China in 2024, involving 318 primary and secondary school teachers, show that teachers' AI literacy directly influences their perceptions of the usefulness of artificial intelligence for society (PAIS) and their self-efficacy in learning AI, with both factors affecting their behavioral intentions to learn artificial intelligence (Du et al., 2024). Previous studies have also confirmed the impact of self-efficacy on learning intentions (Evans et al., 2020; Kumar et al., 2020). A study conducted in Iran in 2024 examined teachers' attitudes toward artificial intelligence in education and revealed a complex perspective that includes both the benefits and challenges of its implementation. Teachers recognized the potential of AI to enhance personalized learning, improve administrative efficiency, and support innovative teaching approaches, while also expressing concerns related to ethics, infrastructure, and the need for professional development (Aghaziarati et al., 2024).

According to Zhai (Zhai, 2024), teachers' attitudes, knowledge, technology acceptance, and practices represent interrelated factors that determine the successful implementation of GenAI, while the role of teachers evolves from users to collaborators and innovators in its application.

Artificial Intelligence in Education

The application of artificial intelligence in education significantly contributes to improving teaching methods and learning processes. The use of intelligent tutoring systems and automated assessment tools is transforming the interaction between teachers and students, as well as the way educational content is acquired. AI technologies enable the automation of administrative tasks, grading, and data processing, thereby reducing teachers' workload and increasing the efficiency of the educational process (Amin et al., 2025; Belloula, 2025; Erbas & Maksuti, 2024).

Teacher Training

In the current Catalogue of Professional Development Programs* of the Institute for the Improvement of Education and Upbringing, there are 23 accredited professional development programs related to the application of artificial intelligence in the educational process. In addition to these trainings, there are also various informal and non-accredited but high-quality courses available in the Serbian language, as well as training programs offered on platforms such as Udemy, Coursera, edX, and IBM SkillsBuild.

REVIEW OF AI TOOLS FOR LESSON PLANNING AND INSTRUCTION

Many instructional techniques have a proven positive effect on learning, but they are often difficult to implement in practice due to teachers' time constraints. With the support of artificial intelligence, their application becomes simpler and more accessible. Particularly significant are: generating diverse examples, providing multiple explanations, creating practice tests, assessing students' knowledge, and facilitating the acquisition of new concepts (Mollick & Mollick, 2023). Lesson planning is often challenging due to diverse student needs and varying levels of knowledge. Generative AI tools, along with specialized educational AI applications, support lesson planning, content generation, and instructional differentiation while helping teachers save time.

Tools based on generative artificial intelligence can help teachers quickly develop lesson plans by offering suggestions for teaching activities, assessment methods, instructional content, discussion prompts, and homework ideas (Trust et al., 2025).

RESEARCH METHODOLOGY

The research is empirical in nature and was conducted as a descriptive-analytical, quantitative, and cross-sectional study. The aim of the research was to examine teachers' attitudes and perceptions regarding the application of artificial intelligence in the teaching process, as well as to analyze the factors that influence the frequency and manner of its use in educational practice.

The sample consisted of 167 teachers from primary and secondary schools across different regions of the Republic of Serbia. A convenience sampling technique was used, with data collected through an online questionnaire distributed via Facebook groups intended for educators, which introduces potential self-selection bias. The sample included teachers of various school subjects and with different levels of teaching experience. It is possible that the sample includes a higher proportion of teachers with a higher level of digital literacy or a stronger interest in artificial intelligence, which may have contributed to more optimistic results regarding the use of AI and attitudes toward it. Therefore, the results should be interpreted with caution and cannot be fully generalized to all teachers in the Republic of Serbia.

The questionnaire consisted of 21 items, of which one was an open-ended question, 10 were constructed using a Likert scale, while the remaining questions were closed-ended with predefined response options. Cronbach's alpha was calculated to assess the internal consistency of the Likert-scale items measuring teachers' perceptions of AI tool adoption in education. The analysis included 10 Likert-type items, yielding a good reliability coefficient ($\alpha = 0.892$), indicating high internal consistency of the scale.

Research problem

Although AI tools have the potential to improve lesson planning and teaching, there is insufficient information about teachers' perceptions in primary and secondary schools and about the ways in which they use or plan to use these tools.

The research problem is reflected in the lack of knowledge about the extent to which teachers are familiar with and understand the possibilities of applying AI in teaching, how they evaluate the usefulness of these tools, and what motivates or concerns them. Furthermore, it is not sufficiently known to what extent teachers actually use available AI tools, how effective these tools are, and what challenges exist in their practical application. Special attention is also given to the level of teacher training for working with AI tools.

Subject of the research

The subject of the research includes teachers' perceptions in primary and secondary schools regarding the use of artificial intelligence in teaching, as well as an overview of available AI tools that support lesson planning and teaching delivery, along with their practical application in the educational process.

The aim of this research is to examine how teachers in primary and secondary schools perceive the use of artificial intelligence in teaching, to assess their level of knowledge and experience in working with AI tools, and to provide an overview of available AI tools that support lesson planning and teaching delivery, including the possibilities of their practical application.

Research questions

- RQ1: Is there a statistically significant relationship between prior experience with digital tools and the perceived usefulness of artificial intelligence in teaching?
- RQ2: Is there a statistically significant relationship between attending training on AI tools and the frequency of their use in teaching practice?
- RQ3: Is there a statistically significant relationship between the perceived direct benefits of AI tools and teachers' motivation to use them in teaching?

RESULTS AND DISCUSSION

Descriptive statistics

A total of 167 teachers participated in the study, of which 63.5% mainly work in primary schools and 36.5% in secondary schools. Regarding years of teaching experience, 12% of respondents have less than 5 years of experience, 17.4% have between 5 and 10 years, 31.1% have between 11 and 20 years, and 39.5% have more than 20 years of teaching experience. A total of 92.2% of respondents reported using AI in teaching, while 7.8% do not use it. Furthermore, 29.3% of respondents stated that they had participated in some form of training, while the remaining respondents had not.

The results show that teachers, on average, positively evaluate the usefulness of AI tools in the teaching process. The highest mean value was recorded for the statement that AI tools facilitate teachers' work ($M = 4.06$), followed by the statement that they can contribute to better individualization of teaching ($M = 4.04$) and improve lesson planning ($M = 3.95$). Slightly lower, but still positive values relate to the perception that AI tools can increase student motivation ($M = 3.69$). Teachers' self-assessment of their knowledge of AI tools indicates a moderate level ($M = 3.29$). The results obtained through descriptive analysis show that 39.5% of respondents assess their knowledge of AI tools as good, while 18.6% of respondents consider their knowledge to be poor. The largest proportion of respondents (41.9%) expressed a neutral attitude, indicating uncertainty in assessing their own competencies in this area.

When comparing the opinions of teachers working in primary schools with those working in secondary schools, no statistically significant relationship was found in the given sample between the type of school in which respondents work and their self-assessment of knowledge of AI tools ($r = 0.080$, $p = 0.306$).

Relationships Between Key Variables

The results of Pearson's correlation indicate a statistically significant positive relationship between teachers' prior experience with digital tools and their perception of the usefulness of artificial intelligence in teaching. A strong correlation was found between prior experience and the belief that AI tools facilitate teachers' work ($r = 0.664$, $p < 0.01$), as well as a moderate correlation with the perception of improved lesson planning quality ($r = 0.554$, $p < 0.01$) and increased student motivation ($r = 0.507$, $p < 0.01$). This supports the first research question and confirms the relationship between the two stated factors. The findings show that teachers with more experience in using digital tools in teaching are more likely to recognize the benefits of using AI tools.

The obtained chi-square test results ($\chi^2 = 1.10$, $p = 0.294$) do not indicate a statistically significant association between training attendance and the use of AI tools in teaching. This may suggest the importance of other factors, such as personal motivation, interest, and prior experience.

The results of the correlation analysis indicate a statistically significant positive relationship between teachers' motivation to use AI tools and their perception of direct benefits in the teaching process. A strong correlation was found between motivation for using AI tools in lesson planning and motivation for using them in teaching delivery ($r = 0.766$, $p < 0.01$). Furthermore, a significant relationship was observed between motivation and the perception that AI tools facilitate teachers' work ($r = 0.629$, $p < 0.01$ for planning; $r = 0.532$, $p < 0.01$ for teaching delivery). These findings suggest that when teachers

recognize the direct benefits of using AI tools, their motivation increases significantly, supporting the third research question. Teachers most frequently reported using ChatGPT, Gemini, and Copilot for lesson preparation, while Canva AI, NotebookLM, and MagicSchool are used during the teaching process. Responses to the question about the future application of these tools varied—from highly positive and encouraging ones, such as “As a valuable resource for applying various content” and “I believe it will make teachers’ work easier and allow them to devote more time to students,” to expressed doubts about the quality of implementation, along with reported technical difficulties and a lack of necessary resources.

The study found that a high percentage of teachers reported using digital tools in teaching (92.2%), which may not fully reflect the actual situation in Serbia. A substantial proportion of respondents also stated that they regularly or occasionally use AI tools for lesson preparation or delivery; however, this finding should be interpreted with caution due to the data collection method. The use of online professional teacher groups for survey distribution likely introduced self-selection bias, attracting respondents who are already more digitally engaged and familiar with artificial intelligence tools. As a result, the sample may overrepresent teachers with higher levels of digital literacy and more positive attitudes toward AI, which could have contributed to more favorable results. In addition, the relatively small and non-random sample limits the generalizability of the findings. Therefore, future studies should employ systematic sampling approaches across different regions and school types in order to obtain more representative data.

The findings suggest that currently available training programs may not be sufficient on their own to significantly increase the frequency of AI tool use. This may indicate the limited effectiveness of existing forms of professional development or the perception that one-off training sessions are insufficient for the sustainable implementation of new technologies in practice. In this context, a more significant role could be played by continuous support, mentoring, and collaboration with more experienced colleagues in the process of integrating AI tools into teaching practice. These findings suggest that digital literacy and work experience play a more significant role in the adoption and use of AI tools in teaching practice than formal training.

Implications for educational management

The key role of school principals is reflected in recognizing the importance and potential of the proper and ethically acceptable application of artificial intelligence. By providing additional support to interested and motivated teachers, it is possible to highlight the significance and possibilities of its implementation in the educational process. Furthermore, it is necessary to recognize the need for continuous professional development, as the field of artificial intelligence is highly dynamic and subject to rapid changes.

The research results may serve as a starting point for involving teachers in a mentoring process. Through mentoring and differentiated training, it would be possible to adapt the content to teachers with different levels of knowledge and experience in the use of AI tools. Regarding systemic solutions, it is recommended that artificial intelligence be incorporated into the school development plan. In addition, it is necessary to develop guidelines for the ethical and pedagogically justified use of AI in education.

CONCLUSION

A common finding of this study, as well as the studies cited in the text, is teachers’ confirmation that prior experience with digital tools influences their attitude toward the use of AI in teaching, as well as their motivation to learn new technologies. They also believe that its application in teaching can contribute to better individualization of instruction. The main barriers to the effective implementation of AI in teaching are reported to be a lack of training and technical limitations, which is consistent with the findings of the referenced studies. Additionally, 9% of respondents identified ethical dilemmas as a limiting factor, which is also one of the key issues in research on the application of AI

in all fields of work, especially in education. Although the topic is highly relevant, there is still a limited number of studies in the Republic of Serbia that address teachers' perceptions, patterns of use, and the effects of artificial intelligence in the teaching process. The significance of this paper lies in the fact that it may serve as a starting point for future, more comprehensive research with a larger and more representative sample of respondents. Furthermore, it would be important for future studies to include students as well, in order to examine their attitudes and motivations for using AI tools in learning.

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