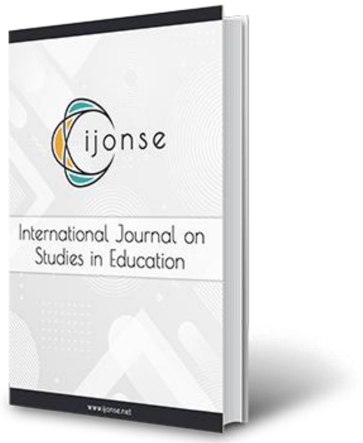

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Teachers' Perspectives on Chatbots and AI Agents in Primary and Secondary Education

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Abstract

The integration of AI tools in education is gaining momentum, yet research in Serbia remains largely limited to descriptive analyses, lacking in-depth statistical examination of factors influencing AI adoption among teachers. This study addresses this gap by employing advanced statistical methods to explore the relationships between teachers' familiarity with AI tools, perceived challenges, and attitudes toward AI in education. A sample of 135 primary and secondary school teachers in Serbia participated in the study, with data collected via an online survey and analyzed using exploratory factor analysis, correlation tests, and non-parametric statistical methods. The results confirm that greater AI familiarity is associated with more positive attitudes toward AI adoption, while heightened concerns about AI-related challenges reduce willingness to integrate AI into teaching. However, no significant correlation was found between AI familiarity and concerns, suggesting that perceived challenges stem from broader systemic and institutional factors rather than personal experience. These findings underscore the need for professional development initiatives alongside structural reforms to facilitate AI integration in Serbian education. Future research should further examine institutional barriers and policy frameworks to support the ethical and effective adoption of AI tools in teaching.

Introduction

Artificial Intelligence in Education (AIED) has emerged as a dynamic and evolving field over the past four decades, encompassing a broad spectrum of pedagogical, social, economic, and cultural considerations (Castañeda & Selwyn, 2018). While early research primarily explored AI's potential to enhance learning models and even substitute teachers in certain capacities, such approaches often underestimated the irreplaceable role of educators. Teachers bring not only subject expertise but also critical interpersonal and instructional skills that facilitate meaningful learning experiences, which cannot be fully replicated by AI (Holmes et al, 2019). As a result, contemporary AIED research has shifted its focus towards the integration of AI as a complementary tool rather than a replacement, emphasizing its potential to support teachers, enhance student engagement, and optimize educational processes.

The rapid advancement of AI technologies, driven by industry leaders such as OpenAI, has led to the widespread availability of AI-powered educational tools. These tools are designed to be intuitive, cost-effective, and accessible, catering to users with varying levels of technical expertise. Their integration within educational systems streamlines administrative tasks, facilitates personalized learning, and fosters a more interactive and inclusive learning environment. Rather than diminishing the role of human educators, AI serves to enhance the teaching and learning experience by providing students with new ways to explore complex concepts, conduct research more efficiently, and engage with course material in a more adaptive manner.

This study builds upon the evolving discourse on AI in education by examining how Serbian primary and secondary school teachers perceive and engage with AI-driven tools in their professional practice. Through a detailed statistical analysis, the research aims to uncover attitudes, challenges, and expectations regarding AI adoption in the classroom, contributing to the broader conversation on the role of technology in modern education.

Theoretical Framework

The integration of AI in education is reshaping teaching and learning by enhancing personalization, automating administrative tasks, and optimizing instructional strategies (Zawacki-Richter et al., 2019). Significant investments in AI-driven tools underscore their growing potential to facilitate student collaboration, tailor learning experiences, and provide adaptive feedback in real-time (Luckin et al., 2016; Koedinger et al., 2012). Additionally, AI is increasingly employed to predict academic success, track student progress, and automate assessment processes (Popenici & Kerr, 2017; Cohen et al., 2017; Swiecki et al., 2019). These applications enable individualized learning recommendations, helping students focus on key concepts while maximizing educational outcomes (Bhutoria, 2022; Chen et al., 2020).

Despite these advantages, concerns persist regarding student overreliance on AI tools, which may hinder the development of critical thinking skills. Grassini et al. (2023) emphasize that AI should be integrated alongside traditional teaching methods to maintain a balance between automation and cognitive skill development. Similarly, Crompton and Burke (2023) argue that while AI supports personalized learning and administrative efficiency, it should serve as a supplement rather than a replacement for human instruction. Among AI applications, automated essay grading and AI-driven tutoring systems have gained prominence, offering increased efficiency and adaptive instruction (Okada et al., 2019; Vij et al., 2020; Yuan et al., 2020; Woolf, 2010).

One of the most widely adopted AI-driven tools in education is the chatbot, an interactive conversational agent that engages students in dialogue-based learning (Khanna et al., 2015). Chatbots, dating back to Mauldin’s work (Molnár & Szűts, 2021), simulate human-like conversations and provide contextually relevant responses through advanced machine learning models (Khanna et al., 2021; Labadze et al., 2023). Early models such as ELIZA (Weizenbaum, 1966) and ALICE (Wallace, 1995) laid the foundation for contemporary AI chatbots like ChatGPT and Bard, which are now integrated into various learning environments to provide homework assistance, personalized instruction, and immediate feedback (Kasneci et al., 2023; Labadze et al., 2023).

Despite their potential, AI chatbots pose challenges related to pedagogical alignment, ethical concerns, and technological limitations. One significant issue is commercialization, where AI tools prioritize profit over educational effectiveness (Luckin & Cukurova, 2019). Many AI applications are developed without direct input from educators, resulting in tools that may not align with curriculum needs (Cukurova & Luckin, 2018). Additionally, chatbots often struggle with evaluating complex student responses, particularly in critical thinking and conceptual reasoning (Nghi et al., 2019). Ethical concerns, such as data privacy, algorithmic bias, and decision-making transparency, further complicate AI's educational integration (Holmes et al., 2019; Selwyn, 2019). While research underscores chatbots' potential to enhance adaptive tutoring, studies indicate that they cannot fully replace the emotional support and mentorship provided by teachers (Labadze et al., 2023).

Beyond technical limitations, structural and pedagogical barriers hinder AI's effective adoption in education. Many teachers lack technical expertise to integrate AI tools effectively (Chiu & Chai, 2020), while insufficient school infrastructure further exacerbates challenges (McCarthy et al., 2016). Delayed AI-generated feedback has been reported as a source of frustration among educators (McCarthy et al., 2016). Moreover, while AI-based systems reduce teachers' workloads, current models often fail to provide adequately personalized responses that cater to individual students' needs (Burstein et al., 2004). For AI to be successfully implemented in education, teachers must possess adequate AI literacy (Häkkinen et al., 2017; Kirschner, 2015). However, research suggests that many educators lack formal training in AI applications, limiting their ability to leverage AI's pedagogical benefits (Dillenbourg, 2016; Seufert et al., 2020). Labadze et al. (2023) emphasize the need for empirical research on teachers' engagement with AI, as their perceptions and competencies directly impact AI's effectiveness in the classroom.

Research on teachers' attitudes toward AI highlights both enthusiasm and skepticism regarding AI's role in education. Aghaziarati et al. (2023) identified four key themes in teachers' perceptions of AI: pedagogical benefits, ethical concerns, technological challenges, and professional identity. Teachers recognized AI's potential to personalize learning and enhance curriculum delivery, yet expressed concerns about data privacy, security risks, and algorithmic bias. A notable gap in AI literacy was also observed, with educators feeling uncertain about AI's long-term implications.

Similarly, Bergdahl and Sjöberg (2025) examined self-efficacy in AI adoption, finding that prior AI experience and institutional support significantly influenced teachers' confidence in integrating AI. Teachers with stronger AI self-efficacy demonstrated greater willingness to use AI tools, while concerns about ethics, data privacy, and pedagogical impact remained major barriers. Chounta et al. (2022) explored AI adoption in Estonia, where teachers generally viewed AI as an opportunity rather than a threat. However, despite Estonia's high digital literacy ranking, teachers lacked practical AI knowledge and expressed concerns over fairness, transparency, and accountability in AI decision-making.

Expanding on these concerns, Celik et al. (2023) introduced the Intelligent-TPACK framework, emphasizing the need for a balance between technological, pedagogical, and ethical knowledge in AI adoption. The study highlighted that AI literacy alone is insufficient, and that teachers must also develop ethical awareness regarding AI's impact on educational equity and inclusiveness. Further, Yim and Wegerif (2024) examined teachers' acceptance of AI learning tools, identifying five key factors influencing AI adoption: teachers' AI knowledge and experience, technical challenges and stakeholder acceptance, user-friendliness of AI tools, school infrastructure and budget constraints, and potential student distraction or emotional disengagement. Additionally, Galindo-Domínguez et al. (2024) found that higher digital competence correlates with more positive attitudes toward AI, suggesting that teacher training programs should focus on AI-related digital skills. Yue et al. (2024) explored K–12 teachers' AI readiness, highlighting significant gaps in technological and content knowledge. The study emphasized the need for professional development initiatives that bridge this knowledge gap.

The successful integration of AI tools and chatbots in education requires collaboration between educators, AI developers, and policymakers. Addressing gaps in teacher training, ensuring ethical AI implementation, and adopting a user-centered approach to AI development will be critical for maximizing AI's benefits while mitigating potential challenges (Selwyn, 2019; Holmes et al., 2019). Educational institutions must focus on digital literacy, ethical AI use, and continuous professional development to support AI's sustainable integration into teaching and learning (Baidoo-Anu & Owusu Ansah, 2023).

Serbian Educational Landscape and AI

The framework for AI in education in Serbia is outlined in the *Ethical Guidelines for the Development, Application, and Use of Reliable and Responsible Artificial Intelligence* (Government of the RS, 2023). These guidelines, based on the *Strategy for the Development of Artificial Intelligence in the Republic of Serbia (2020–2025)* (Government of the RS, 2019) and its accompanying *Action Plan* (Government of the RS, 2020), provide foundational recommendations, though they are not legally binding. In contrast, the European Union is developing a more comprehensive regulatory framework, which could influence Serbia's evolving policies (Government of the RS, 2023).

Several recent studies have explored AI adoption in Serbian education. Tomić and Radovanović (2024) examined the potential of ChatGPT-3.5 for preparing Orthodox Catechism lessons in Serbian primary schools. Their findings indicate that ChatGPT-3.5 can generate structured and methodologically sound lesson plans. However, AI-generated responses varied with repeated prompts, requiring educators to refine inputs and review content carefully. Importantly, this study focused solely on lesson planning and did not assess AI's effectiveness in classroom teaching or student interaction. Ružičić et al. (2024) surveyed 140 primary and secondary school teachers regarding their attitudes and preparedness for AI use in education. While many educators were familiar with chatbots and smart content creation tools, their ability to integrate AI into teaching remained limited. The study identified key challenges, including low technological literacy, data privacy concerns, resistance to change, and ethical considerations. A major limitation of this research is its geographic scope, as data were collected from only three schools in two towns, making it less representative of the broader teaching population.

Furthermore, the study relied on self-reported data, which may introduce response bias. Stanković et al. (2024) investigated AI perceptions among 953 students from primary, secondary, and university levels in Serbia. University students demonstrated a higher level of AI awareness compared to younger cohorts, yet there was a general interest in AI education across all levels. Students viewed AI tools positively, particularly chatbots such as ChatGPT, Bing Chat, Perplexity, Gemini, and PI.

In higher education, the ADA chatbot, developed by the Belgrade Business and Arts Academy of Applied Studies, represents one of the few AI-driven initiatives in Serbia (Vukomanović et al., 2022). Initially designed to assist with communication and e-learning administration during the COVID-19 pandemic, ADA now facilitates exam registrations and academic support, with over 60% of exam registrations conducted via chat. Despite its administrative success, its role as an interactive learning tool remains an area for future development. Šijan et al. (2025) conducted a bibliometric analysis of AI applications in higher education using data from the Web of Science database. Their study, covering research from 1996 to 2024, identified Serbia as one of the top ten global contributors in this field, ranking ninth. This finding underscores Serbia's impact on AI research despite its relatively small research capacity.

While interest in integrating AI tools into education is growing in Serbia, most existing studies have relied on descriptive statistics, offering only a general overview of teachers' attitudes and experiences. Few, if any, have conducted in-depth statistical analyses to examine how key factors such as AI familiarity, perceived challenges, and teaching experience – correlate with teachers' attitudes, expectations, and willingness to integrate AI into instruction. As a result, the specific factors shaping AI adoption in Serbian education remain underexplored. This study seeks to address this gap by employing a rigorous quantitative approach to provide a deeper, data-driven understanding of teachers' perspectives on AI in education.

Method

Research Objectives

The objective of this study is to explore the attitudes, perceptions, and willingness of primary and secondary school teachers in Serbia regarding AI tools and chatbots in education. Specifically, it aims to investigate the relationship between teachers' familiarity with and experience using AI tools and their attitudes toward AI integration, examine teachers' perceptions of the usefulness and challenges of AI tools in teaching, analyze how perceived challenges and issues influence teachers' willingness to adopt AI tools in their classrooms, and determine whether teachers, regardless of AI experience, exhibit similar attitudes toward AI-related challenges.

To achieve the study's objectives, the following research questions were formulated:

1. How does teachers' experience with AI tools and chatbots influence their attitudes toward their use in teaching?
2. Is there a significant relationship between teachers' familiarity with AI tools and their perceived usefulness of AI in education?
3. How do teachers perceive the challenges and potential issues of AI implementation in teaching?
4. Does a higher perception of challenges and issues related to AI negatively affect teachers' willingness to use AI tools in the classroom?
5. Do teachers, regardless of their AI knowledge and experience, share similar attitudes toward the

challenges and issues associated with AI use in education?

Research Hypotheses

H1. Teachers with greater experience in using AI tools and chatbots exhibit more positive attitudes toward their application in education. Additionally, the perceived usefulness of AI tools (teachers’ expectations of AI) is positively associated with their experience. In other words, there is a significant relationship between teachers' knowledge of AI tools, their experience in applying them, and the extent to which they perceive these tools as beneficial for teaching.

H2. Teachers who perceive more challenges and issues related to the use of AI tools in education are less willing to integrate them into their teaching. In other words, the stronger their concerns about potential challenges and difficulties, the lower their perceived usefulness of AI tools for educational purposes.

H3. Regardless of their knowledge of AI tools and experience in using them, teachers exhibit similar attitudes toward the challenges and issues associated with AI implementation.

Research Design

This study employs a quantitative, non-experimental survey research design to investigate the attitudes, experiences, expectations, challenges, and willingness of primary and secondary school teachers in Serbia regarding the use of AI tools in education. Data were collected through a structured survey questionnaire, distributed online via Google Forms, ensuring accessibility and broad participation. The questionnaire utilized a Likert scale to measure teachers’ levels of agreement or disagreement with various statements, ranging from "Strongly disagree" (1) to "Strongly agree" (5).

Population and Sample

The population for this study consists of primary and secondary school teachers in Serbia who teach various subjects across different school settings. Given the focus on teachers' attitudes, experiences, and expectations regarding the use of AI tools in education, the sample includes 135 teachers from urban, suburban, and rural schools across different regions of Serbia. The sample was designed to ensure diversity in terms of teaching experience with AI tools, subject areas taught, and demographic characteristics (gender, age, location, years of work experience, and education level).

Research Instrument

A structured Google Forms questionnaire was used to explore teachers' perspectives on AI integration in education (see Appendix for the questionarrie). The anonymous survey conducted over a one-week period in January 2025 consisted of 25 questions, divided into two sections: socio-demographic data (8 questions), which collected information on gender, age, location, teaching experience, and education level, and AI-related perspectives (18 questions), which are measured using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) and structured into five themes: attitudes toward technology in teaching, familiarity with and experience using AI tools, expectations regarding AI and chatbots in teaching, challenges and potential issues of AI integration, and willingness to use AI and chatbots in teaching.

Data Analysis

Data preparation and storage for statistical analysis were conducted using MS Excel 2019, while data processing was performed with IBM SPSS Statistics v29.0.2. The results are presented in both tabular and graphical formats. The following statistical procedures were applied:

- Descriptive statistics to calculate the mean and standard deviation.
- Exploratory factor analysis to identify underlying factors.
- Cronbach's Alpha to assess the internal consistency of items within each factor.
- Kolmogorov-Smirnov test to evaluate the normality of data distribution.
- Spearman's rank correlation coefficient to analyze relationships between variables.
- Mann-Whitney U and Kruskal-Wallis tests to determine statistically significant differences between groups.

Results

Descriptive Statistics

The sample (N=135) consists of 36 male participants (26.7%) and 99 female participants (73.3%), reflecting the gender distribution within the teaching profession. Participants are distributed across three age groups, with 15 respondents (11.1%) under 35 years old, 56 respondents (41.5%) between 35 and 44 years old, and 64 respondents (47.4%) aged 45 or older. Regarding educational qualifications, 51 respondents (37.8%) hold a bachelor's degree, 79 respondents (58.5%) have a master's degree, and 5 respondents (3.7%) hold a doctoral degree (Ph.D.). The data indicate that the majority of participants (62.2%) hold a postgraduate degree (Master's or Ph.D.), reflecting a highly educated sample.

In terms of work experience, 14 respondents (10.4%) have less than 5 years of experience, 19 respondents (14.1%) have between 5 and 10 years, 43 respondents (31.9%) have between 11 and 15 years, and 59 respondents (43.7%) have more than 15 years of teaching experience. The majority of participants (75.6%) have over 10 years of experience. Regarding location, most participants (79.3%) work in urban areas, while 14.8% are from suburban areas, and 5.9% work in rural settings.

Exploratory Factor Analysis

During the exploratory factor analysis (EFA), several assumptions must be met. These assumptions are tested as follows.

The determinant (found in the correlation matrix) should be greater than 0. In this case, the determinant is 4.011E−6, indicating that the assumption is met.

The Kaiser-Meyer-Olkin (KMO) test assesses whether the variables are sufficiently correlated for factor analysis, ensuring that each factor adequately predicts the corresponding items. KMO measure should be greater than 0.70 to be considered adequate, while values below 0.50 are deemed inadequate. According to Hutcheson & Sofroniou (1999), KMO values between 0.5 and 0.7 are considered mediocre, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are great, and values above 0.9 are superb. In this analysis, the KMO value is 0.874, confirming that the data is suitable for factor analysis, as shown in Table 1.

The Bartlett's test of sphericity should be significant (i.e., $p < 0.05$) to confirm that the variables are sufficiently correlated for factor analysis. In this study, Bartlett's test yielded $\chi^2 = 1580.225$, df = 153, $p < 0.001$, indicating that the correlation matrix is statistically significantly different from the identity matrix (see Table 1). This result confirms that the data are suitable for factor analysis.

Table 1. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.874
Bartlett's Test of Sphericity	Approx, Chi-Square	1580.225
	df	153
	Sig,	0.000

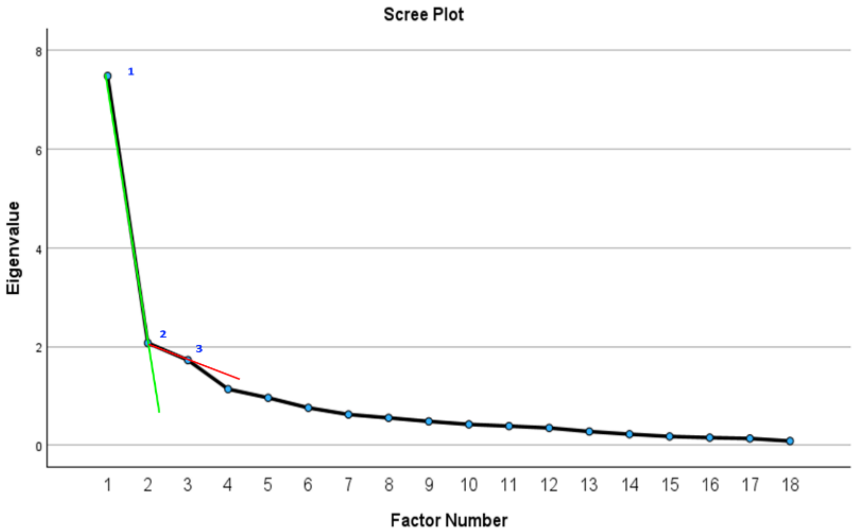
Table 2 shows the proportion of variance in the data explained by the factors obtained through factor analysis. The analysis focuses on three sets of values: initial eigenvalues, values after factor extraction, and values after factor rotation. The first three factors explain approximately 55.803% of the total variance, which is a good indicator of factor analysis.

Table 2. Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.483	41.573	41.573	7.152	39.733	39.733	5.628	31.264	31.264
2	2.072	11.509	53.083	1.738	9.655	49.388	2.218	12.321	43.585
3	1.724	9.578	62.661	1.155	6.414	55.803	2.199	12.218	55.803

After rotation, the factors are more balanced, meaning they better reflect the substructures in the data. The initially strong dominance of the first factor (41.573%) was reduced to 31.264%, while the other two factors gained more significance, improving the model's interpretability. This indicates that the factor analysis successfully identified the key latent factors that structure the data.

For factor extraction, the common factor method, specifically Principal Axis Factoring (PAF), was used. Although both Principal Component Analysis (PCA) and PAF are widely employed, PAF was chosen for its focus on shared variance among items. The extracted factors were then Varimax rotated with Kaiser Normalization to simplify interpretation. Initially, using the Kaiser criterion (eigenvalues > 1), four factors were suggested. However, Cattell's scree plot suggests an inflection point after three factors, which does not align with the Kaiser criterion results. Ultimately, based on the scree plot interpretation, three factors were extracted, accounting for 55.803% of the total variance. Graph 1 shows an inflection point after three factors, supporting the researcher's decision to extract three main factors in the analysis. This indicates that these three factors are the most relevant for explaining the variance in the data, while the remaining factors contribute significantly less and can be disregarded.



Graph 1. Cattel's Scree Plot

Table 3 presents the Rotated Factor Matrix, which shows the distribution of variables across the factors obtained through factor analysis. The factors were extracted using the principal axis method, while rotation was performed using the Varimax method with Kaiser normalization. The rotation converged after five iterations. The variables are grouped into three factors:

1. Attitudes and expectations regarding the use of AI chatbots in teaching,
2. Challenges and potential issues in using AI agents and chatbots, and
3. Familiarity and experience with AI agents and chatbots.

Each variable has a factor loading that indicates its association with a particular factor, with only significant values displayed in Table 3. A Principal Axis Factoring (PAF) analysis with Varimax rotation was conducted to examine the underlying structure of the 17 questionnaire items. After rotation, the factors accounted for the following proportions of variance:

- Factor 1: 31.264%
- Factor 2: 12.321%
- Factor 3: 12.218%
- Total explained variance: 55.803%

Table 3. Rotated Factor Matrix

	Factor		
	1	**2**	**3**
	S1-Attitudes and Expectations Regarding the Use of AI Chatbots in Teaching	**S3-Challenges and Potential Issues with using AI agents and Chatbots**	**S2-Familiarity and Experience Regarding the Use of AI agents and Chatbots**
1.2. Chatbots and/or AI agents can be useful tools for engaging students.	0.883		
1.1. I believe that the use of chatbots and/or AI agents can enhance the teaching process.	0.855		
5.1.I am willing to try using chatbots and/or AI agents as teaching tools	0.799		
5.3. I want to learn more about the use of chatbots and/or AI agents in education.	0.793		
3.3.I believe that chatbots and/or AI agents can support students in independent learning.	0.768		
1.3. Chatbots and/or AI agents can help in personalizing teaching according to the needs of the students	0.761	-0.313	
3.2.I expect that chatbots and/or AI agents can increase students' motivation to learn.	0.756		
3.1. I expect that chatbots and/or AI agents can help in providing quick answers to students' questions.	0.661		
5.2.I believe that I can successfully implement chatbots and/or AI agents into my teaching.	0.621		0.336
4.5. The use of chatbots and/or AI agents in the classroom will change your profession and the			

	Factor		
	1	**2**	**3**
	S1-Attitudes and Expectations Regarding the Use of AI Chatbots in Teaching	**S3-Challenges and Potential Issues with using AI agents and Chatbots**	**S2-Familiarity and Experience Regarding the Use of AI agents and Chatbots**
educational process in the future.			
4.2.I believe that students may become overly dependent on chatbots and/or AI agents in their learning.		0.704	
1.4. I am concerned that the use of chatbots and/or AI agents may disrupt the traditional teaching process.		0.638	
4.1.I am concerned about the potential misalignment of chatbots and/or AI agents with the curriculum.		0.516	
4.4. I have concerns regarding student privacy protection when using chatbots and/or AI agents.		0.451	
4.3.I am concerned about the accuracy and reliability of the information provided by chatbots and/or AI agents.		0.395	
2.1. I am familiar with the basics of working with chatbots and/or AI agents.			0.849
2.3. I know how to integrate chatbots and/or AI agents or similar tools into my lessons.			0.822
2.2. I have had the opportunity to use chatbots and/or AI agents for educational purposes.			0.684

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

The decision to retain three factors was based on an in-depth analysis of the questionnaire, interpretation of Cattell's Scree plot, and Cronbach's Alpha, which confirmed the existence of three distinct factors (i.e., scales). As a result, all 17 items were retained in the final model.

Cronbach's Alpha was used to assess the reliability of the measurement scales and the internal consistency of the items within each scale. Cronbach's Alpha coefficient (α =) can range from 0 to 1; the closer it is to 1, the more reliable the measurement scale is (Tavakol & Dennick, 2011). Regarding the reliability criteria for measurement scales, Kline (1998) notes that if the reliability coefficient (including Cronbach's Alpha) reaches a value of around 0.9, the reliability can be considered excellent. If it is around 0.8, the reliability is considered very good, and if it is around 0.7, the reliability is deemed acceptable.

The scales were constructed based on Exploratory Factor Analysis (EFA) and include:

- S1– Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching
- S2– Familiarity and Experience Regarding the Use of AI agents and Chatbots
- S3– Challenges and Potential Issues with using AI agents and Chatbots

Table 4 below presents the Cronbach's Alpha coefficients for each scale, along with the number of items included in each. The table displays reliability statistics for three scales that measure different aspects of AI agents and chatbots in education. It includes the values of Cronbach's Alpha coefficient, which assesses the internal consistency of the scales, as well as the values of Cronbach's Alpha based on standardized items. For each of the listed scales, the number of items included in the analysis is also provided.

Table 4. Scale Reliability and Number of Items

Scale	**Cronbach's Alpha**	**Cronbach's Alpha Based on Standardized Items**	**N of Items**
S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching	0.947	0.946	9
S2-Familiarity and Experience Regarding the Use of AI agents and Chatbots	0.829	0.846	3
S3-Challenges and Potential Issues with using AI agents and Chatbots	0.704	0.706	5

Based on the obtained Cronbach's Alpha values obtained:

- S1 - Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching (α = 0.947, 9 items) exhibits excellent reliability, indicating a high level of internal consistency among the items.
- S2 - Familiarity and Experience Regarding the Use of AI agents and Chatbots (α = 0.829, 3 items) demonstrates good reliability, suggesting that the scale is sufficiently reliable for measuring familiarity and experience with AI tools.
- S3 - Challenges and Potential Issues with using AI agents and Chatbots (α = 0.704, 5 items) has acceptable reliability, meeting the minimum threshold for reliability.

The Cronbach's Alpha values confirm that the applied measurement scales possess an acceptable to excellent level of reliability, making them valid instruments for assessing participants' attitudes, familiarity, and perceived challenges regarding AI.

When the sample size NNN exceeds 50 (in this study, N=135N = 135N=135), the Kolmogorov-Smirnov test is used to assess normality, as reported in the Tests of Normality table. The results indicate a significant deviation from the assumptions of a normal distribution for the examined variables. Given this violation of normality assumptions, non-parametric statistical methods were applied. Specifically, the Mann-Whitney U test and Kruskal-Wallis test were used to analyze differences between groups, as they are more suitable when normality cannot be assumed. Although our sample size (N=135) exceeds the threshold (N>50) for applying Pearson's correlation coefficient, the data do not follow a normal distribution. Therefore, we employed Spearman's rank correlation coefficient as a more appropriate non-parametric alternative.

Table 5 presents the Spearman correlations between the three examined scales. The table displays the correlation coefficients (rho) and p-values (p), which indicate the statistical significance of the observed correlations. Two asterisks ($p < 0.01$) denote highly significant correlations, while one asterisk ($p < 0.05$) indicates significant correlations at the 5% level. Diagonal values of 1.000 represent the perfect correlation of each scale with itself.

Table 5. Correlation Matrix of Variables

N=135			**S1-Attitudes and Expectations Regarding the Use of AI Chatbots in Teaching**	**S2-Familiarity and Experience Working with AI Tools**	**S3-Challenges and Potential Issues AI**
Spearman's rho	S1-Attitudes and Expectations Regarding the Use of AI Chatbots in Teaching	rho	1.000	.364**	-.456**
		p		0.000	0.000
	S2-Familiarity and Experience Working with AI Tools	rho	.364**	1.000	-.196*
		p	0.000		0.023
	S3-Challenges and Potential Issues AI	rho	-.456**	-.196*	1.000
		p	0.000	0.023	

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

*. Correlation is significant at the 0.05 level (2-tailed).

Statistically significant correlations are marked with * ($p < 0.05$) and ** ($p < 0.01$). The results in Table 5 reveal several key relationships:

- A moderate positive correlation was observed between attitudes and expectations regarding the use of AI agents and chatbots in teaching (S1) and familiarity and experience regarding the use of AI agents and chatbots (S2) ($\rho = 0.364$, $p < 0.01$), suggesting that greater familiarity and experience regarding the use of AI agents and chatbots is associated with more positive attitudes and expectations.

- A moderate negative correlation was found between attitudes towards AI agents and chatbots (S1) and perceived challenges and potential issues with using AI agents and chatbots (S3) ($\rho = -0.456$, $p < 0.01$), indicating that individuals with more positive attitudes tend to perceive fewer challenges related to the use of AI tools.
- A weak but statistically significant negative correlation was detected between familiarity with AI agents and chatbots (S2) and perceived AI challenges (S3) ($\rho = -0.196$, $p < 0.05$), suggesting that greater experience with AI tools is linked to a lower perception of AI-related difficulties.

To examine Hypothesis H1, which posits that teachers with greater experience in using AI tools and chatbots exhibit more positive attitudes toward their application in education, a Kruskal-Wallis H test was conducted due to the non-normal distribution of data. The mean values indicate that participants generally hold positive attitudes towards AI agents and chatbots in teaching (Mean = 3.83, SD = 1.090) and have a moderate level of familiarity with AI agents and chatbots (Mean = 3.55, SD = 1.157).

The distribution of responses shows that among participants who strongly agree that they are familiar with AI agents and chatbots (S2 = 5), 57.1% strongly agree that AI agents and chatbots are beneficial in teaching. As familiarity with AI tools decreases, there is a notable increase in respondents who are unsure or disagree about the benefits of AI agents and chatbots. Participants with low familiarity (S2 = 1 or 2) tend to have lower attitudes toward AI agents and chatbots, with a higher proportion reporting uncertainty or disagreement.

Table 6 presents the relationships between attitudes and expectations regarding the use of AI agents and chatbots in teaching (S1) and familiarity and experience with AI agents and chatbots (S2). The table shows the distribution of responses in absolute frequencies (N) and percentages (%) for each combination of responses on these two scales.

Table 6. Descriptive Statistics for Attitudes and Familiarity with AI agents and Chatbots

S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching	**S2-Familiarity and Experience Regarding the Use of AI agents and Chatbots**	**N**	**%**
1 - Strongly disagree	1 - Strongly disagree	1	11.1%
	2 - Partially disagree	3	33.3%
	3 - Unsure	1	11.1%
	4 - Partially agree	3	33.3%
	5 - Strongly agree	1	11.1%
2 - Partially disagree	1 - Strongly disagree	2	11.1%
	2 - Partially disagree	3	16.7%
	3 - Unsure	4	22.2%
	4 - Partially agree	8	44.4%
	5 - Strongly agree	1	5.6%

S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching			
S2-Familiarity and Experience Regarding the Use of AI agents and Chatbots		**N**	**%**
3 - Unsure	1 - Strongly disagree	1	3.8%
	2 - Partially disagree	1	3.8%
	3 - Unsure	4	15.4%
	4 - Partially agree	16	61.5%
	5 - Strongly agree	4	15.4%
4 - Partially agree	1 - Strongly disagree	1	1.9%
	2 - Partially disagree	4	7.4%
	3 - Unsure	7	13.0%
	4 - Partially agree	25	46.3%
	5 - Strongly agree	17	31.5%
5 - Strongly agree	1 - Strongly disagree	1	3.6%
	2 - Partially disagree	2	7.1%
	3 - Unsure	2	7.1%
	4 - Partially agree	7	25.0%
	5 - Strongly agree	16	57.1%

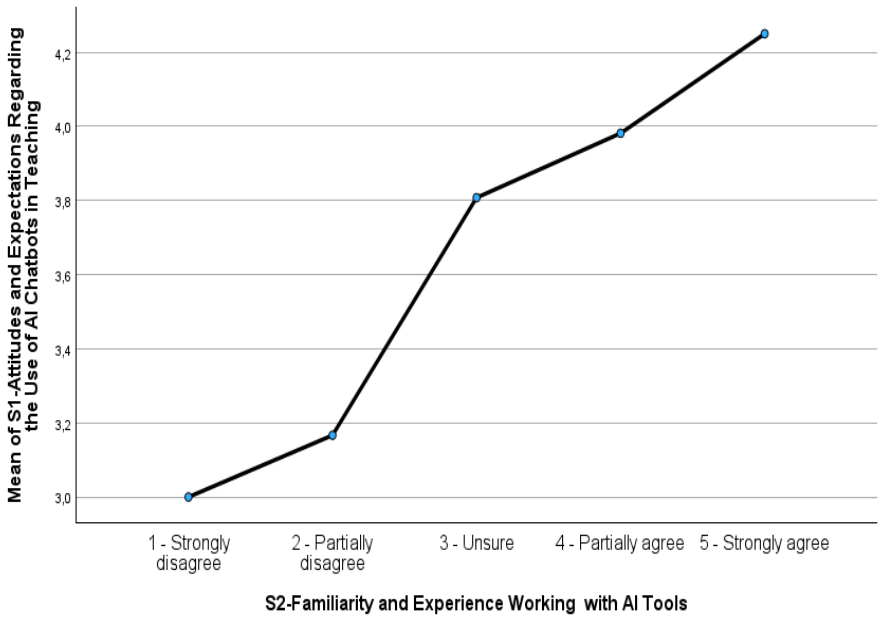
The Kruskal-Wallis H test results indicate that the observed differences between groups are statistically significant ($H(4) = 18.804$, $p = 0.001$). Since $p < 0.05$, we reject the null hypothesis and conclude that familiarity and experience with AI agents and chatbots have a significant impact on attitudes toward AI agents and chatbots in teaching.

Table 7 presents the response ranks for different levels of attitudes and expectations regarding the use of AI agents and chatbots in teaching (S1), in relation to familiarity and experience with AI tools (S2). For each response category on the Likert scale, the table displays the number of respondents and the average rank of their responses.

Table 7. Rank Analysis of Familiarity with AI Agents and Attitudes Towards AI in Teaching

S2-Familiarity and Experience Regarding the Use of AI agents and Chatbots		**N**	**Mean Rank**
S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching	1 - Strongly disagree	9	43.11
	2 - Partially disagree	18	45.11
	3 - Unsure	26	64.10
	4 - Partially agree	54	72.26
	5 - Strongly agree	28	86.13
	Total	135	

The data presented in Graph 2 indicate that respondents with greater experience and familiarity with AI tools hold significantly more positive attitudes toward their use in teaching. As the level of familiarity increases, so does the perceived usefulness of AI agents and chatbots in education.



Graph 2. The Influence of S2 – Familiarity and Experience on S1 – Attitudes and Expectations (Mean Values)

The findings confirm Hypothesis H1, indicating that teachers with greater experience and familiarity with AI tools exhibit significantly more positive attitudes towards their use in education. This suggests that familiarity with AI tools may enhance teachers' confidence in their usefulness and effectiveness. Additionally, the results support the assumption that perceived usefulness of AI tools (teachers' expectations of AI) is positively associated with their experience.

To test Hypothesis H2, which suggests that teachers who perceive more challenges and issues related to the use of AI agents and chatbots in education are less willing to integrate them into their teaching, a Kruskal-Wallis H test was conducted due to the non-normal distribution of data. The mean values indicate that participants have moderately positive attitudes toward AI agents and chatbots in teaching (Mean = 3.83, SD = 1.090), while their perception of challenges and potential issues is also relatively high (Mean = 3.73, SD = 0.821).

Table 8 presents the relationships between attitudes and expectations regarding the use of AI chatbots in teaching (S1) and the perception of challenges and potential issues in using AI agents and chatbots (S3). For each response category on scale S1, the table displays the number of respondents (N) and the percentage (%) of their responses across different levels of scale S3. This tabular representation provides insight into the distribution of respondents based on their attitudes toward the benefits of AI chatbots and their perceptions of potential issues. By analyzing these patterns, it is possible to identify areas of agreement or disagreement between these two dimensions.

Table 8 shows that the distribution of responses suggests that participants who strongly disagree with AI-related challenges (S3 = 1 or 2) tend to have higher agreement with the usefulness of AI agents and chatbots in teaching. Conversely, those who strongly agree with AI-related challenges (S3 = 5) show lower agreement with the usefulness of AI agents and chatbots, with a significant portion being unsure or disagreeing. The mean rank values indicate a clear trend: as concerns about AI challenges increase, the perceived usefulness of AI agents and chatbots decreases. The Kruskal-Wallis H test results indicate that the observed differences are statistically significant ($H(4) = 31.400$, $p < 0.001$). Since $p < 0.05$, we reject the null hypothesis and conclude that perceived AI challenges have a significant effect on attitudes toward AI agents and chatbots in teaching.

Table 8. Descriptive Analysis of S1-Attitudes and Expectations, and S3-Challenges and Potential Issues

S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching			
S3-Challenges and Potential Issues with using AI agents and Chatbots		**N**	**%**
1 - Strongly disagree	5 - Strongly agree	1	100.0%
2 - Partially disagree	3 - Unsure	1	14.3%
	5 - Strongly agree	6	85.7%
3 - Unsure	2 - Partially disagree	3	7.3%
	3 - Unsure	3	7.3%
	4 - Partially agree	18	43.9%
	5 - Strongly agree	17	41.5%
4 - Partially agree	1 - Strongly disagree	4	6.3%
	2 - Partially disagree	4	6.3%
	3 - Unsure	7	10.9%
	4 - Partially agree	34	53.1%
	5 - Strongly agree	15	23.4%
5 - Strongly agree	1 - Strongly disagree	2	9.1%
	2 - Partially disagree	6	27.3%
	3 - Unsure	7	31.8%
	4 - Partially agree	7	31.8%

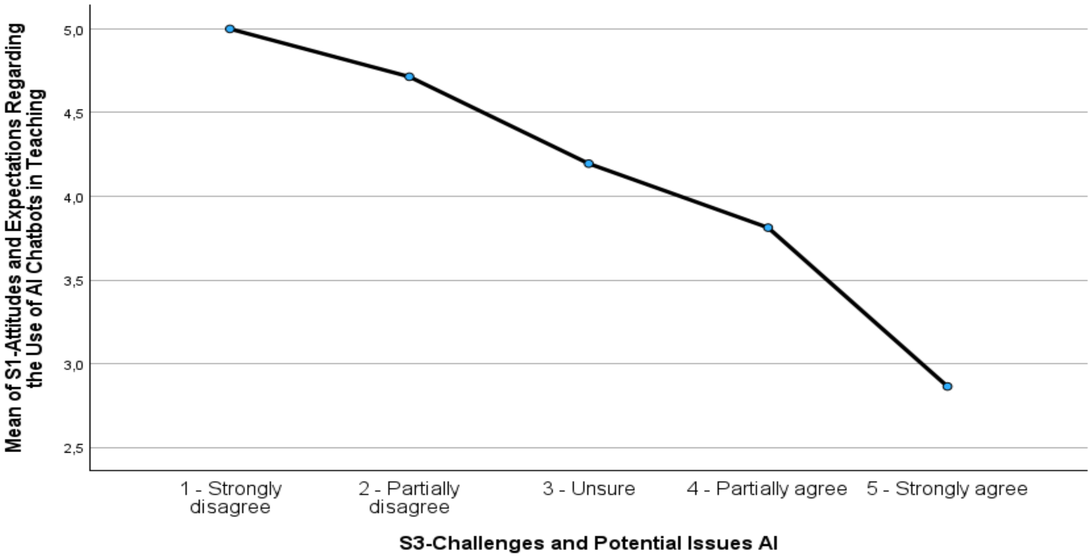
Table 9 presents the response ranks for attitudes and expectations regarding the use of AI chatbots in teaching (S1) in relation to the perception of challenges and potential issues in using AI agents and chatbots (S3). For each level of agreement with statements about the usefulness of AI chatbots in teaching (S1), the table displays the number of respondents and their average rank concerning the perception of challenges (S3).

Table 9. Mean Ranks for S1-Attitudes and Expectations Based on S3-Challenges and Potential Issues

S3-Challenges and Potential Issues with using AI agents and Chatbots		**N**	**Mean Rank**
S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching	1 - Strongly disagree	1	116.00
	2 - Partially disagree	7	103.50
	3 - Unsure	41	80.55
	4 - Partially agree	64	66.93
	5 - Strongly agree	22	34.25
	Total	135	

The results indicate that respondents who express greater agreement with positive attitudes toward AI chatbots tend to have lower ranks regarding challenges and issues. Conversely, those who disagree more strongly with the benefits of AI chatbots tend to have higher ranks, suggesting that individuals who perceive AI chatbots as useful tools generally see fewer challenges in their implementation.

The data presented in Graph 3 indicate an inverse correlation: teachers who perceive more challenges and issues with AI tools tend to have less positive attitudes toward their use in teaching. This confirms that fears and uncertainties related to AI are key factors hindering its wider adoption in education.



Graph 3. The Influence of S3-Challenges and Potential Issues on S1-Attitudes and Expectations

The findings confirm Hypothesis H2, demonstrating that teachers who perceive more challenges and issues related to AI tools are less inclined to integrate them into their teaching. This supports the assumption that higher levels of concern about AI challenges correlate with lower perceived usefulness of AI tools in education.

To test Hypothesis H3, which states that regardless of their knowledge of AI tools and experience in using them, teachers exhibit similar attitudes toward the challenges and issues associated with their implementation, a Kruskal-Wallis H test was conducted due to the non-normal distribution of data. The mean values indicate that participants perceive a moderate level of challenges and potential issues related to AI (Mean = 3.73, SD = 0.821), while their familiarity with AI agents and chatbots is slightly lower (Mean = 3.55, SD = 1.157).

Table 10 presents the relationships between familiarity and experience with AI agents and chatbots (S2) and the perception of challenges and potential issues in their use (S3). For each combination of responses on scale S2, the table displays the distribution of respondents in percentages (%) based on their responses to scale S3. The data reveal different patterns of challenge perception depending on the level of familiarity and experience with AI tools. For instance, respondents more familiar with AI tools exhibit varied responses regarding challenges, while those with lower levels of familiarity and experience may have different views on the challenges associated with using AI tools.

Table 10. Descriptive Statistics for S2-Familiarity and Experience Based on S3-Challenges and Potential Issues

S2-Familiarity and Experience Regarding the Use of AI agents and Chatbots			
S3-Challenges and Potential Issues with using AI agents and Chatbots		**N**	**%**
1 - Strongly disagree	5 - Strongly agree	1	100.0%
2 - Partially disagree	3 - Unsure	1	14.3%
	4 - Partially agree	3	42.9%
	5 - Strongly agree	3	42.9%
3 – Unsure	1 - Strongly disagree	3	7.3%
	2 - Partially disagree	3	7.3%
	3 - Unsure	8	19.5%
	4 - Partially agree	18	43.9%
	5 - Strongly agree	9	22.0%
4 - Partially agree	1 - Strongly disagree	4	6.3%
	2 - Partially disagree	9	14.1%
	3 - Unsure	13	20.3%
	4 - Partially agree	27	42.2%
	5 - Strongly agree	11	17.2%
5 - Strongly agree	1 - Strongly disagree	2	9.1%
	2 - Partially disagree	6	27.3%
	3 - Unsure	4	18.2%
	4 - Partially agree	6	27.3%
	5 - Strongly agree	4	18.2%

The distribution of responses suggests that participants with higher familiarity and experience with AI tools (S2 = 5) are distributed across different levels of agreement regarding AI challenges, showing no clear trend that familiarity reduces concerns. Similarly, those with lower familiarity (S2 = 1 or 2) do not consistently report higher levels of concern about AI challenges. The mean rank values vary across groups but do not indicate a significant pattern correlating familiarity with AI tools to concerns about AI-related challenges. The Kruskal-Wallis H test results show that the observed differences are not statistically significant ($H(4) = 7.167$, $p = 0.127$). Since $p > 0.05$, we fail to reject the null hypothesis, indicating that familiarity and experience with AI tools do not have a statistically significant effect on teachers' perceptions of AI-related challenges and issues.

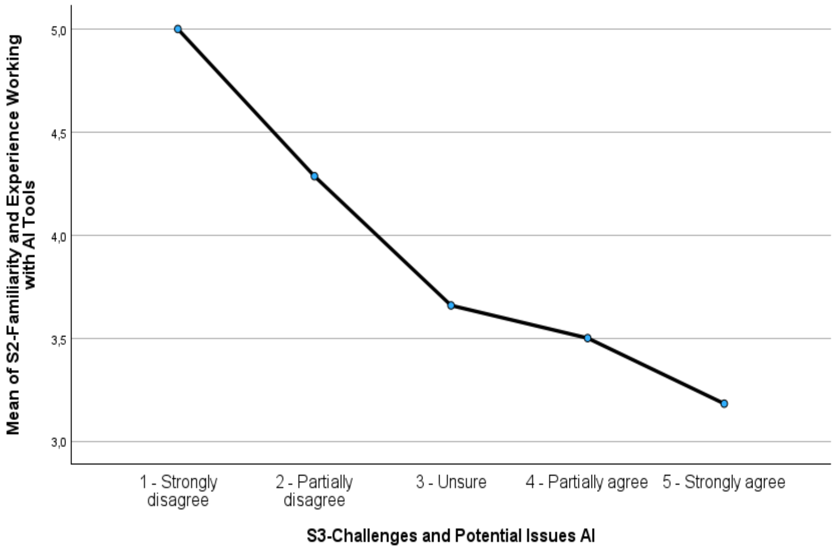
Table 11 presents the response ranks on scale S3 in relation to the level of S2. For each response level on scale S3, the table displays the number of respondents and their average rank in terms of familiarity and experience with AI tools (S2).

The data indicate that respondents who agree more strongly with the challenges and issues related to AI tools (higher rank on S3) tend to have lower ranks in terms of familiarity and experience with AI tools (S2). Conversely, those who perceive fewer challenges (lower rank on S3) generally have higher ranks regarding experience and familiarity with AI tools.

Table 11. Rank Ordering of S2-Familiarity and Experience Based on S3-Challenges and Issues

S2-Familiarity and Experience Regarding the Use of AI agents and Chatbots		**N**	**Mean Rank**
S3-Challenges and Potential Issues with using AI agents and Chatbots	1 - Strongly disagree	9	73.56
	2 - Partially disagree	18	87.08
	3 - Unsure	26	69.02
	4 - Partially agree	54	64.53
	5 - Strongly agree	28	59.70
	Total	135	

The data presented in Graph 4 do not show a clear trend in the relationship between AI familiarity and the perception of challenges. This suggests that knowledge and experience with AI tools do not necessarily reduce concerns about their use. Instead, the sources of concern are likely linked to institutional, ethical, and systemic factors rather than individual user experience.



Graph 4. The Influence of S3-Challenges and Potential Issues on S2-Familiarity and Experience

The findings confirm Hypothesis H3, demonstrating that S2-Familiarity and Experience with AI Tools and S3-Challenges and Potential Issues AI are not significantly correlated. This suggests that teachers' concerns about AI implementation are not influenced by their level of familiarity or experience with AI tools.

Discussion

The demographic composition of the sample aligns with broader trends in the Serbian education sector. The predominance of female respondents reflects the general structure of the teaching workforce, where female educators outnumber their male counterparts. Additionally, the majority of participants are experienced teachers, with a substantial portion over the age of 35 and holding postgraduate qualifications. This suggests that the sample consists primarily of educators who may critically evaluate AI's pedagogical potential. While experienced teachers may approach new technologies with caution, their deep understanding of educational methodologies allows for a nuanced assessment of AI's role in the classroom. Furthermore, the fact that most respondents work in urban areas suggests that the study primarily captures perspectives from better-equipped schools, while teachers in rural areas—who may face infrastructure limitations—are underrepresented. Future research should explore AI adoption challenges in under-resourced educational settings.

The findings confirm that teachers with greater experience and familiarity with AI tools exhibit significantly more positive attitudes toward their use in education. As shown in Graph 2, there is a strong association between AI familiarity and teachers' expectations of AI's usefulness. Participants who reported higher familiarity were also more likely to strongly agree that AI chatbots and agents are beneficial for teaching, while those with low familiarity showed higher levels of uncertainty or skepticism. These findings highlight the importance of professional development and training programs, as increasing familiarity could foster more positive attitudes and greater acceptance of AI chatbots in teaching. The results of this study align with prior research, such as Yim and Wegerif (2024) and Galindo-Domínguez et al. (2024), which found that higher AI knowledge and digital competence correlate with more positive attitudes toward AI adoption. Similarly, Bergdahl and Sjöberg (2025) emphasize that teachers with greater exposure to AI tools demonstrate higher confidence and willingness to integrate AI into classrooms, reinforcing the relationship between AI experience and positive attitudes. However, while their study highlights peer support and professional development as key adoption factors, this study quantifies AI familiarity as the primary influence, offering a more structured statistical validation.

At the same time,the results reveal that teachers who perceive more challenges and issues related to AI tools are less inclined to integrate them into their teaching (Graph 3). The negative correlation between AI attitudes and perceived challenges suggests that concerns about AI's ethical implications, technical difficulties, and workload demands remain key obstacles to adoption. Participants who strongly disagreed that AI posed challenges were more likely to support AI integration, whereas those who strongly agreed with AI-related concerns expressed greater reluctance to use AI in education. This is consistent with findings by Yue et al. (2024), who identified knowledge gaps as a major factor influencing AI adoption, as well as with Chounta et al. (2022) and Celik et al. (2023), who reported that concerns over ethical issues, bias, and transparency hinder teachers' readiness to integrate AI tools into their teaching. Furthermore, Aghaziarati et al. (2023) found that, while teachers recognize AI's efficiency, they remain skeptical due to concerns over data privacy and the potential for biased AI decision-making—challenges similarly highlighted in the present study. These results suggest that addressing teachers' concerns about AI challenges through training, support systems, and clearer implementation strategies may be crucial in increasing AI adoption in education. Future research should explore specific barriers that contribute to these concerns and how they can be mitigated to enhance AI acceptance among educators.

The findings of Ružičić et al. (2024) further reinforce this perspective, as their study revealed that Serbian teachers perceive insufficient digital competencies, increased workload, and technical difficulties as major obstacles to AI integration. Their research highlights that only 10% of teachers have received formal AI training, with the majority expressing a lack of preparedness, similar to the trends observed in this study. However, unlike Ružičić et al., who primarily employed descriptive analysis, this study provides statistical validation that perceived challenges significantly reduce willingness to use AI tools in teaching. While Ružičić et al. suggest that low AI familiarity contributes to skepticism, this study confirms statistically that AI experience does not necessarily reduce concerns about AI challenges (H3). This discrepancy suggests that broader institutional, ethical, and policy-related factors may shape AI skepticism beyond personal experience. Future research should explore these influences in more depth to develop strategies for addressing teacher concerns effectively.

Unlike previous research, this study provides unique insights into the relationship between AI familiarity and concerns about AI-related challenges. While prior studies have suggested that greater AI experience reduces skepticism (Galindo-Domínguez et al., 2024; Bergdahl & Sjöberg, 2025), this study statistically confirms that AI familiarity does not necessarily alleviate teachers' concerns about AI-related challenges. The absence of a significant correlation between familiarity with AI tools and concerns about AI challenges suggests that perceived challenges may be shaped by broader factors such as institutional policies, ethical concerns, resistance to change, or lack of AI integration in the curriculum, rather than personal experience with AI tools. This is particularly relevant in the context of Serbia, where AI implementation remains in its early stages, and clear institutional policies regarding AI adoption are still lacking.

Moreover, these findings highlight the complexity of AI adoption in education. While teachers’ experience with AI fosters more positive attitudes, perceived challenges significantly reduce willingness to integrate AI into teaching. However, the lack of correlation between AI experience and perceived challenges suggests that familiarity alone does not eliminate concerns, pointing to the need for holistic strategies that address not only teacher training but also policy, ethics, and institutional support. Unlike Bergdahl and Sjöberg (2025), who emphasized social persuasion and collegial support as factors influencing AI adoption, this study demonstrates that external factors such as curriculum integration and administrative policies may play an equally – if not more – significant role.

Conclusion

These findings offer valuable insights for educational policymakers and institutions in Serbia, where AI adoption in schools is still in its early stages. While professional development initiatives aimed at increasing AI familiarity among teachers are essential, they must be accompanied by broader systemic reforms to address infrastructural limitations, ethical concerns, and institutional resistance. Given that perceived challenges significantly reduce willingness to integrate AI into teaching, developing clear national guidelines on AI use in education – aligned with Serbia’s existing digitalization strategies – would help foster a more supportive environment for AI adoption. Furthermore, efforts to improve technological infrastructure, particularly in rural and under-resourced schools, will be crucial in ensuring equitable AI integration across the education system.

In addition to technical training, policy frameworks should focus on building teachers' AI literacy in an ethically responsible manner, addressing concerns related to data privacy, algorithmic bias, and the pedagogical implications of AI tools. Collaboration between government bodies, educational institutions, and technology developers is necessary to ensure that AI applications are not only accessible but also aligned with teachers' needs and pedagogical goals. _By taking a well-rounded approach that blends teacher training with necessary structural changes, Serbia can overcome the challenges of AI integration and make the most of its benefits for both educators and students.

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Appendix. Questionnaire for Teachers' Perspectives on AI Integration in Education

Dear Sir/Madam,

The first part of the questionnaire aims to determine the socio-demographic characteristics of the overall sample of respondents. Please select one of the offered answers.

The second part of the questionnaire presents statements regarding the use of artificial intelligence tools in teaching.

Based on your personal opinions, please indicate the degree to which you agree with each statement, using the following scale:
1 - Strongly disagree
2 - Partially disagree
3 - Unsure
4 - Partially agree
5 - Strongly agree
The survey is completely anonymous; your data is protected, and the results will be used solely for scientific purposes.
Thank you for your cooperation!

FIRST PART: Socio-demographic Characteristics of the Sample Respondents

1. Gender:
Male
Female

2. Age:
Under 25
25-34
35-44
45-54
55+

3. Level of education
College (of Applied Sciences)
Bachelor studies
Specialist academic studies
Master's
Doctoral studies/Ph.D

4. You teach at:

Primary school (grades 1-4),

Primary school (grades 5-8),

Primary art school,

Secondary school – Gymnasium,

Secondary school – Specialized Gymnasium,

Secondary school – Specialized Gymnasium (7th and 8th grade),

Secondary vocational school,

Secondary art school,

Primary and/or secondary school for children with special needs,

Other

5. Years of work experience:

Less than 5 years,

5-10 years,

11-15 years,

More than 15 years

6. Location:

Urban area,

Suburban area,

Rural area

7. Region:

Belgrade,

Central Serbia,

Eastern Serbia,

Southern Serbia,

Kosovo and Metohija,

Vojvodina,

Western Serbia

8. You teach:

- Teachers select the option "Teacher"
- Educators teaching in schools for children with special needs select the option "Teacher/Professor in a school for children with special needs"
- Professors in vocational secondary schools select the option "Other" and write the subject(s) they teach
- Professors and teachers in specialized gymnasiums may write the subject in "Other" if their subject is not listed in the available options
- Professors and teachers in primary and secondary art schools may write the subject in "Other" if their

subject is not listed in the available options
Mathematics,
Physics,
Chemistry,
Biology,
Computer Science and Information Technology,
Engineering and Technology,
Serbian Language and Literature,
Serbian as a non-native language,
Foreign language – English,
Second and third foreign languages (French, German, Russian, Spanish, Italian, Greek, Latin...),
Native language,
History,
Geography,
Sociology,
Philosophy,
Psychology,
Music,
Visual Arts,
Physical Education,
Mandatory elective subject,
Elective subject,
Teacher (grades 1-4),
Teacher/Professor in a school for children with special needs,
Other

SECOND PART: Use of Artificial Intelligence Tools in Teaching

1. Attitudes towards the Use of Technology in Teaching

1.1. I believe that the use of chatbots and/or artificial intelligence agents can enhance the teaching process.

1 - Strongly disagree
2 - Partially disagree
3 - Unsure
4 - Partially agree
5 - Strongly agree

1.2. Chatbots and/or artificial intelligence agents can be useful tools for engaging students.

1 - Strongly disagree
2 - Partially disagree

3 - Unsure

4 - Partially agree

5 - Strongly agree

1.3. Chatbots and/or artificial intelligence agents can help in personalizing teaching according to the needs of the students.

1 - Strongly disagree

2 - Partially disagree

3 - Unsure

4 - Partially agree

5 - Strongly agree

1.4. I am concerned that the use of chatbots and/or artificial intelligence agents may disrupt the traditional teaching process.

1 - Strongly disagree

2 - Partially disagree

3 - Unsure

4 - Partially agree

5 - Strongly agree

2. Familiarity with Artificial Intelligence Tools and Experience Working with Them

2.1. I am familiar with the basics of working with chatbots and/or artificial intelligence agents.

1 - Strongly disagree

2 - Partially disagree

3 - Unsure

4 - Partially agree

5 - Strongly agree

2.2. I have had the opportunity to use chatbots and/or artificial intelligence agents for educational purposes.

1 - Strongly disagree

2 - Partially disagree

3 - Unsure

4 - Partially agree

5 - Strongly agree

2.3. I know how to integrate chatbots and/or artificial intelligence agents or similar tools into my lessons.

1 - Strongly disagree

2 - Partially disagree

3 - Unsure

4 - Partially agree
5 - Strongly agree

3. Expectations from the Use of Chatbots and/or Artificial Intelligence Agents in Teaching

3.1. I expect that chatbots and/or artificial intelligence agents can help in providing quick answers to students' questions.

1 - Strongly disagree
2 - Partially disagree
3 - Unsure
4 - Partially agree
5 - Strongly agree

3.2. I expect that chatbots and/or artificial intelligence agents can increase students' motivation to learn.

1 - Strongly disagree
2 - Partially disagree
3 - Unsure
4 - Partially agree
3 - Strongly agree

3.3. I believe that chatbots and/or artificial intelligence agents can support students in independent learning.

1 - Strongly disagree
2 - Partially disagree
3 - Unsure
4 - Partially agree
5 - Strongly agree

4. Challenges and Potential Issues

4.1. I am concerned about the potential misalignment of chatbots and/or artificial intelligence agents with the curriculum.

1 - Strongly disagree
2 - Partially disagree
3 - Unsure
4 - Partially agree
5 - Strongly agree

4.2. I believe that students may become overly dependent on chatbots and/or artificial intelligence agents in their learning.

1 - Strongly disagree

2 - Partially disagree
3 - Unsure
4 - Partially agree
5 - Strongly agree

4.3. I am concerned about the accuracy and reliability of the information provided by chatbots and/or artificial intelligence agents.

1 - Strongly disagree
2 - Partially disagree
3 - Unsure
4 - Partially agree
5 - Strongly agree

4.4. I have concerns regarding student privacy protection when using chatbots and/or artificial intelligence agents.

1 - Strongly disagree
2 - Partially disagree
3 - Unsure
4 - Partially agree
5 - Strongly agree

4.5. The use of chatbots and/or artificial intelligence agents in the classroom will change your profession and the educational process in the future.

1 - Strongly disagree
2 - Partially disagree
3 - Unsure
4 - Partially agree
5 - Strongly agree

5. Willingness to Use Chatbots and/or Artificial Intelligence Agents

5.1. I am willing to try using chatbots and/or artificial intelligence agents as teaching tools.

1 - Strongly disagree
2 - Partially disagree
3 - Unsure
4 - Partially agree
5 - Strongly agree

5.2. I believe that I can successfully implement chatbots and/or artificial intelligence agents into my teaching.

1 - Strongly disagree

2 - Partially disagree

3 - Unsure

4 - Partially agree

5 - Strongly agree

5.3. I want to learn more about the use of chatbots and/or artificial intelligence agents in education.

1 - Strongly disagree

2 - Partially disagree

3 - Unsure

4 - Partially agree

5 - Strongly agree

*Do you want to add anything?