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Оригинални научни рад

Does Gender Shape AI Adoption? Evidence from Serbian Primary and Secondary School Teachers

***Summary*:** *This paper explores whether gender influences Serbian primary and secondary school teachers' perspectives on AI adoption. Using a quantitative approach, data were collected from 135 teachers across Serbia. Cronbach's Alpha assessed internal consistency, while Mann-Whitney U tests and Spearman's rank correlation examined gender differences in AI-related attitudes, familiarity, and perceived challenges. No statistically significant correlations emerged, suggesting gender is not a key factor in shaping teachers' expectations or concerns about AI. Instead, factors like digital literacy, professional development, and institutional support may play a greater role. These findings contribute to the broader discussion on AI in education, offering insights for future research and policy.*

***Keywords*:** *AI tools, gender differences, teachers' attitudes, primary and secondary schools, AI adoption in Serbian education*

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Introduction

The successful integration of AI in schools depends on educators' technological competence, institutional support, and attitudes toward AI (Popenici & Kerr, 2017). Research highlights AI literacy as a key factor in teachers' willingness to adopt AI tools (Chiu & Chai, 2020). The Technology Acceptance Model (TAM) (Venkatesh et al., 2003) suggests that gender can influence perceptions of technology's usefulness, ease of use, and confidence in adoption. However, empirical research on gender differences in AI adoption among teachers is scarce, particularly in Serbia, where most studies focus on students of higher education (Kovačević & Demić, 2024; Adžić et al., 2024). This study addresses that gap by examining whether gender significantly shapes Serbian educators' attitudes, familiarity, and perceived challenges related to AI.

Literature Review

The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) and the Diffusion of Innovation (DOI) theory (Rogers, 1995) provide key insights into how personal perceptions and institutional factors shape AI adoption in education. UTAUT identifies four core drivers of technology adoption—performance expectancy, effort expectancy, social influence, and facilitating conditions—with demographic variables such as gender, age, and experience moderating these relationships (Dwivedi et al., 2019). DOI theory, as proposed by Rogers (1995), focuses on how innovations spread within a social system and identifies five key characteristics that influence adoption: relative advantage, compatibility, complexity, trialability, and observability. In educational contexts, these dimensions help explain how new technologies like AI are evaluated and implemented by teachers (Tornatzky & Klein, 1982; Sahin, 2006). The model is particularly relevant for analyzing how innovations align with pedagogical values and institutional settings, and how concerns over complexity or perceived risk may delay adoption (Kiwanuka, 2015).

Although UTAUT and DOI theory treat gender primarily as a moderating variable rather than a central explanatory factor, they remain appropriate for this study in terms of their strong emphasis on institutional, experiential, and perceptual drivers of technology adoption. In UTAUT, gender is conceptualized as a variable that can influence how core predictors—such as performance expectancy or effort expectancy—impact actual technology use (Venkatesh et al., 2003; Dwivedi et al., 2019). Similarly, in DOI, gender may indirectly affect the perceived compatibility, complexity, or relative advantage of innovations, but it is not theorized as a primary causal factor (Rogers, 1995; Kiwanuka, 2015). Despite these limitations, these models were selected because the main aim of this study is not to analyze gender as a social construct or power dynamic but to identify patterns of adoption behavior and to explore whether gender-based differences persist when controlling for factors such as professional experience, training, and institutional support.

Nevertheless, beyond theoretical models, it is essential to recognize the broader sociocultural factors that may shape gendered patterns in technology adoption—particularly in educational settings. Historically, men have been more associated with technology, while women were often seen as passive users rather than active participants in technological innovation (Alfadda & Mahdi, 2021). This perception has contributed to the underrepresentation of female educators in technology-related discussions and, at times, a lower inclination to adopt digital tools. The gender digital divide (Cooper, 2006) highlights disparities in digital literacy, access, and societal expectations shaped by parental and educational influences, societal stereotypes, and differing responses to success and failure. Women, for instance, are more likely to internalize failure, leading to greater anxiety when using traditionally male-associated technologies (Acilar & Sæbø, 2023).

Traditional gender roles continue to shape educators' engagement with emerging technologies. Studies consistently show that men tend to be more confident and have more positive attitudes toward AI than women (Sindermann et al., 2021; Grassini et al., 2023). This divide is largely shaped by long-standing cultural norms that link AI and technology with men, while women are often socialized to take a more cautious approach. Research also indicates that men typically report higher self-efficacy in using technology, whereas women experience greater anxiety toward AI-based applications, even when their actual proficiency is similar (Cai et al., 2017). Over time, this reinforces a cycle where women perceive AI tools as more complex or risky, making them less likely to explore or integrate these technologies into their teaching practices.

Recent studies suggest that despite these challenges, women may have greater interest in AI-related professional development. Gjermeni (2024) found that female educators showed a stronger inclination toward AI training, highlighting an opportunity to tailor initiatives that encourage female participation in AI education and careers. Similarly, Bolívar-Cruz and Verano-Tacoronte (2025) found that male university professors were primarily influenced by performance expectancy and external support, while female educators were more affected by AI-related anxiety and concerns about student learning.

The adoption of AI is becoming less hindered by gender-related barriers nowadays. While past studies emphasized disparities, newer findings indicate that women are not avoiding AI but may approach its adoption with different expectations and concerns. Psychological factors such as self-esteem and perceived ease of use play a key role in AI adoption across genders, with institutional support and training acting as equalizers (Nja et al., 2023). Large-scale studies further support this shift. Wardat et al. (2024) found no significant gender differences in recognizing AI's importance among 580 mathematics teachers, though female educators reported facing greater implementation challenges. Similarly, Wang et al. (2023), in a study of over 3,000 primary school teachers, found no gender-based differences in AI readiness, perceived threats, or innovation – challenging earlier research that associated higher technological competence with men. In higher education, Cabero-Almenara et al. (2024) examined AI acceptance among university teachers using the UTAUT2 model and found gender-based differences in expectations and social influence but no impact on actual AI adoption behavior. These findings suggest that institutional policies, access to training, and educational background now play a far greater role in shaping AI adoption than gender alone.

Studies on students reveal persistent but context-dependent gender differences in AI adoption. Møgelvang et al. (2024) found that male students were more optimistic about AI's career benefits, while female students expressed greater ethical and cognitive concerns, despite similar training exposure, suggesting that personal preferences drive these trends more than institutional factors. In some regions, social and cultural norms play a stronger role. Ofosu-Ampong (2023) found that male students in Ghana embraced AI, whereas female students were more cautious, often viewing it as risky. However, Strzelecki and ElArabawy (2024) demonstrated that gender differences are not universal – in Poland, AI adoption was gender-neutral, whereas in Egypt, men were far more likely to adopt AI due to social expectations and perceived effort required. These findings suggest that gender-based differences in AI adoption persist but are shaped by contextual factors rather than inherent tendencies. However, their applicability to educators remains uncertain, as teachers engage with AI in a professional rather than personal context, potentially influenced by institutional policies and teaching demands.

In Serbia, research on AI in education has largely focused on teachers' perceptions and students' experiences with AI-based learning tools, but gender-specific aspects remain understudied. Studies on teachers have primarily examined AI adop-

tion in higher education (Bucea-Manea-Țoniș et al., 2022; Tomić & Radovanović, 2024) or schools without addressing gender differences (Kuleto et al., 2022; Ružičić et al., 2024). Research on students, while more inclusive of gender perspectives, remains limited. Kovačević and Demić (2021) found that male students showed significantly higher interest in AI than females, despite similar knowledge levels, suggesting that interest, rather than exposure, plays a greater role in shaping attitudes toward AI. Similarly, Adžić et al. (2024) found that male university students, particularly in technical fields, had more positive views on generative AI, though prior AI experience was a stronger predictor of attitudes than gender alone. These studies highlight broader trends that may also apply to teachers, particularly the role of interest, experience, and institutional support in shaping AI adoption.

Research Methodology

Research objectives and research tasks

This study examines whether gender influences Serbian primary and secondary school teachers' attitudes, familiarity, and perceived challenges regarding AI tools in education. These three dimensions were chosen to operationalize AI adoption, as they capture core psychological and practical aspects of technology use in teaching. Attitudes and expectations reflect beliefs about the usefulness, motivational impact, and pedagogical value of AI, which are frequently cited as strong predictors of technology adoption (Nja et al., 2023; Cabero-Almenara et al., 2024). Familiarity and experience reflect teachers' prior exposure to AI tools and their confidence in using them—factors found to influence adoption readiness and implementation success (Gjermeni, 2024; Bolívar-Cruz & Verano-Tacoronte, 2025). Perceived challenges and risks address concerns such as student overreliance, data privacy, and curricular alignment, which often shape cautious or resistant attitudes among educators (Wardat et al., 2024; Grassini et al., 2023).

Drawing on Rogers' (1995) DOI theory, which highlights complexity, compatibility, and perceived risk as key barriers to adoption, the study considers whether gender—as a background variable—still shapes how teachers perceive and respond to these factors. It also explores whether male and female teachers differ across these domains, while also considering contextual variables such as professional experience and institutional support. To address these objectives, the study investigates the following research questions:

- Does gender influence teachers' attitudes and expectations regarding AI in teaching?
- Does gender affect teachers' familiarity with and experience using AI tools?
- Are there significant gender differences in teachers' perceptions of AI-related challenges and potential issues?
- If gender is not a significant factor, what alternative variables might explain differences in AI-related attitudes and perceptions?

Main Hypothesis (H1)

H1: Gender does not influence teachers' attitudes, familiarity, or perceived challenges regarding AI tools in education. This hypothesis is tested through three sub-hypotheses:

- H1.1. Male and female teachers hold similar attitudes and expectations toward AI in teaching.
- H1.2. Male and female teachers have comparable familiarity with and experience with AI tools.
- H1.3. Male and female teachers perceive AI-related challenges and potential issues similarly.

Research instrument

A structured survey questionnaire was used to collect data from 135 teachers across urban, suburban, and rural schools in Serbia. The survey was distributed online via Google Forms over one week in January 2025, ensuring accessibility and encouraging broad participation. The questionnaire consisted of 26 items divided into two main sections:

- Socio-demographic data (8 items) – This section gathered information on participants' gender, age, education level, teaching subject, location, years of teaching experience, and school type, enabling analysis of potential demographic influences on attitudes toward AI.
- AI-related perspectives (18 items) – These items —initially organized into five conceptual groups—Attitudes towards the Use of Technology in Teaching (1.1-1.4), Familiarity with Artificial Intelligence Tools and Experience Working with Them (2.1-2.3), Expectations from the Use of Chatbots and/or Artificial Intelligence Agents in Teaching (3.1-3.3), Challenges and Potential Issues (4.1-4.5), and Willingness to Use Chatbots and/or Artificial Intelligence Agents (5.1-5.3)—were designed to reflect the multidimensional nature of AI adoption in education. They were rated on a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree) and grouped into three final scales based on theoretical constructs and results of exploratory factor analysis (EFA). The three extracted factors—Attitudes and Expectations toward AI agents and chatbots, Familiarity and Experience with AI tools, and Perceived Challenges and Risks—were each validated through factor analysis and demonstrated good internal consistency. The factor structure was confirmed using Principal Axis Factoring with Varimax rotation. Detailed loadings are presented in Table 4.

Descriptive statistics

To assess whether gender-based variations exist in attitudes, familiarity, and perceived challenges related to AI in teaching, statistical tests such as the Mann-Whitney U test are applied. 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 (Table 1).

Table 1. Gender Distribution

	N	%
Male	36	26,7%
Female	99	73,3%

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. The data indicate that the majority of participants (88.9%) are aged 35 and above, with the largest proportion (47.4%) being in the 45+ category.

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 the 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 the 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.

Results

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 was met.
- Kaiser-Meyer-Olkin (KMO) test was used to measure sampling adequacy. A KMO value greater than 0.70 indicates that there is sufficient common variance among items, while values below 0.50 are considered inadequate. In this study, a KMO value of 0.874 confirms that the data are well-suited for factor analysis, with enough shared variance among items to support the extraction of reliable factors, as shown in Table 2.
- Bartlett's test of sphericity was used to determine whether the correlation matrix differs significantly from an identity matrix, which would indicate that the variables are sufficiently intercorrelated to justify factor analysis. In our analysis, Bartlett's test yielded $\chi^2 = 1580.225$ with 153 degrees of freedom ($p < 0.001$), confirming that the matrix is statistically significant different from an identity matrix (see Table 2). This result indicates that the data are well-suited for factorization.

Table 2. 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

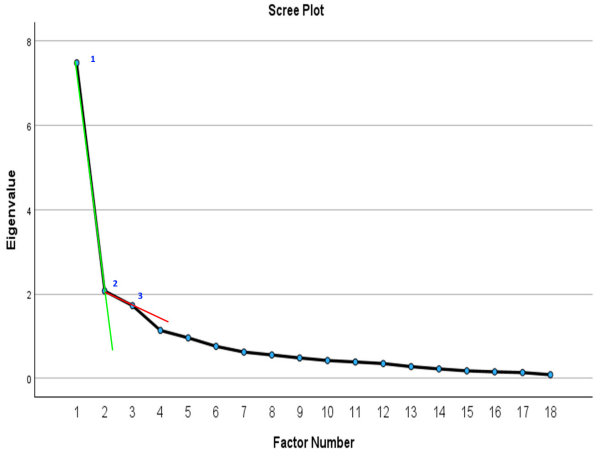
Table 3 presents the results of the factor analysis, which examined three key variables:

- Attitudes and expectations toward AI in teaching (S1)
- Challenges and potential issues related to AI tools (S3)
- Familiarity and experience with AI tools (S2)

The first three factors explain 55.803% of the total variance, indicating a good model fit. After Varimax rotation, the dominance of the first factor (41.573%) was reduced to 31.264%, while the second (12.321%) and third (12.218%) gained significance, improving interpretability. Principal Axis Factoring (PAF) was used for extraction, as it prioritizes shared variance, and three factors were retained based on the Kaiser criterion and Cattell's scree plot (Graph 1).

Table 3. Initial Eigenvalues, Extraction Values, and Values after Rotation.

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



Graph 1. Cattell's scree plot

Table 4 presents the Rotated Factor Matrix, showing that items grouped into three distinct scales, aligning with the study's conceptual structure:

- Attitudes and Expectations toward AI agents and chatbots in teaching
- Challenges and Potential Issues related to AI tools
- Familiarity and Experience with AI tools

Table 4. Rotated Factor Matrix

	Factor		
	1	2	3
	S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching	S3-Challenges and Potential Issues related to AI tools	S2-Familiarity and Experience Regarding the use of AI Tools
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 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.

Reliability Analysis

To ensure internal consistency, Cronbach's Alpha was calculated for each scale (Table 5), confirming acceptable to excellent reliability:

- S1 – Attitudes and Expectations (α = 0.947, 9 items): Excellent reliability
- S2 – Familiarity and Experience (α = 0.829, 3 items): Good reliability
- S3 – Challenges and Issues (α = 0.704, 5 items): Acceptable reliability

These results confirm that the measurement scales are reliable for assessing whether gender influences teachers' attitudes, familiarity, and perceived challenges regarding AI tools in education.

Table 5. Cronbach's Alpha values

Scale	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
S1-Attitudes and Expectations Regarding the Use of AI Chatbots in Teaching	0,947	0,946	9
S2-Familiarity and Experience Regarding the use of AI Tools	0,829	0,846	3
S3-Challenges and Potential Issues Related to AI tools	0,704	0,706	5

For sample sizes exceeding 50 (N = 135 in this study), the Kolmogorov-Smirnov test is used to assess normality. The results indicate a significant deviation from normality, suggesting that the data do not follow a normal distribution. 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 the sample size (N = 135) meets the threshold for using Pearson's correlation coefficient (N > 50), the data do not follow a normal distribution. Consequently, Spearman's rank correlation coefficient was employed as a more appropriate non-parametric alternative for analyzing relationships between variables. The results in Table 6 indicate that gender is not significantly associated with any of the examined variables. All correlations between gender and other variables are weak (rho ≤ 0.113) and not statistically significant (p > 0.05), suggesting that gender does not have a notable impact on attitudes, experience or perception of challenges related to AI tools.

The Mann-Whitney U test was conducted to determine whether there is a statistically significant difference in ranks based on the variable "Gender" (Male/Female).

Table 7 shows that both men and women generally have positive attitudes toward AI in teaching, but women express stronger support. Among men, 55.6% partially agree on AI's usefulness, while 19.4% fully agree. In contrast, 39.4% of women partially agree, but 32.3% fully support AI adoption, indicating greater enthusiasm among women. Regarding familiarity and experience, 47.2% of men and 37.4% of women partially agree that they understand AI tools. However, 23.2% of women fully agree, compared to 13.9% of men, suggesting women may be slightly more confident in their AI experience. Notably, around 19% of both groups provided neutral responses, indicating limited exposure or confidence in AI knowledge. When it comes to perceived challenges, men express less concern,

Table 6. Spearman Correlation Coefficients.

N=135			Gender	S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching	S2-Familiarity and Experience Regarding the Use of AI Tools	S3-Challenges and Potential Issues Related to AI Tools
Spearman's rho	1.Gender	rho	1,000	0,051	0,045	-0,113
		p		0,560	0,607	0,194
	S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching	rho	0,051	1,000	,364**	-,456**
		p	0,560		0,000	0,000
	S2-Familiarity and Experience Regarding the Use of AI tools	rho	0,045	,364**	1,000	-,196*
		p	0,607	0,000		0,023
	S3-Challenges and Potential Issues Related to AI tools	rho	-0,113	-,456**	-,196*	1,000
		p	0,194	0,000	0,023	

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

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

with 41.7% partially agreeing and 25.0% fully agreeing about AI-related challenges. Women, however, show greater caution, with 49.5% partially agreeing and 13.1% fully agreeing on potential issues. Women also have a higher percentage of neutral responses (29.3%), suggesting more uncertainty or hesitation in assessing AI's risks. These findings suggest that while women are more supportive of AI adoption, they are also more cautious about its challenges, whereas men tend to be less concerned about potential issues.

Table 8 presents the ranking of the respondents' answers by gender across the three key variables:

- Attitudes and expectations toward AI (S1): Women have a slightly higher average rank (69.12) than men (64.92), suggesting a marginally more positive attitude toward AI in teaching. However, the difference is minimal.
- Familiarity and experience with AI tools (S2): Women again rank slightly higher (69.01 vs. 65.24), indicating a small self-assessed advantage in AI experience.
- Perception of challenges and issues (S3): Here, men have a higher average rank (74.75) compared to women (65.55), suggesting they express greater concern about AI implementation challenges.

Interestingly, these findings contrast with previous results, where women more frequently reported concerns about AI-related issues. This discrepancy may suggest that while fewer men voiced concerns, those who did had stronger opinions on potential challenges.

Table 7. Distribution of Respondents' Answers by Gender Regarding the Examined Variables.

		S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching		S2-Familiarity and Experience Regarding the Use of AI Tools		S3-Challenges and Potential Issues Related to AI Tools	
1.Gender		N	%	N	%	N	%
Male	1 - Strongly disagree	1	2,8%	3	8,3%		
	2 - Partially disagree	3	8,3%	4	11,1%		
	3 - Unsure	5	13,9%	7	19,4%	12	33,3%
	4 - Partially agree	20	55,6%	17	47,2%	15	41,7%
	5 - Strongly agree	7	19,4%	5	13,9%	9	25,0%
	Total	36	100,0%	36	100,0%	36	100,0%
Female	1 - Strongly disagree	5	5,1%	6	6,1%	1	1,0%
	2 - Partially disagree	10	10,1%	14	14,1%	7	7,1%
	3 - Unsure	13	13,1%	19	19,2%	29	29,3%
	4 - Partially agree	39	39,4%	37	37,4%	49	49,5%
	5 - Strongly agree	32	32,3%	23	23,2%	13	13,1%
	Total	99	100,0%	99	100,0%	99	100,0%

Table 8. Comparison of Average Ranks by Gender for AI-Related Variables.

1.Gender		N	Mean Rank	Sum of Ranks
S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching	Male	36	64,92	2337,00
	Female	99	69,12	6843,00
	Total	135		
S2-Familiarity and Experience Regarding the Use of AI Tools	Male	36	65,24	2348,50
	Female	99	69,01	6831,50
	Total	135		
S3-Challenges and Potential Issues Related to AI Tools	Male	36	74,75	2691,00
	Female	99	65,55	6489,00
	Total	135		

Table 9 presents the results of the Mann-Whitney U test which examines gender differences in attitudes toward AI tools, familiarity with them, and perceived challenges. The p-values for all three variables exceed 0.05 (S1: p = 0.558; S2: p = 0.605; S3: p = 0.193), indicating no statistically significant differences between men and women. The Z-statistic values (S1: -0.586; S2: -0.517; S3: -1.303) further confirm that gender-based differences are minimal and do not reach statistical significance. The results for the three sub-hypotheses are as follows:

- H1.1 – Gender does not significantly impact attitudes and expectations toward AI in teaching (p = 0.558).
- H1.2 – Gender does not significantly impact familiarity and experience with AI tools (p = 0.605).
- H1.3 – Gender does not significantly impact perceived challenges related to AI (p = 0.193).

Since all three sub-hypotheses are confirmed, the findings suggest that gender is not a key factor in shaping teachers' AI-related attitudes, experiences, or perceptions of challenges. Instead, other factors—such as personal interest, prior education, or professional environment—may play a more significant role in AI adoption.

Table 9. The Mann-Whitney U test results.

Test Statistics[a]			
	S1-Attitudes and Expectations Regarding the Use of AI agents and Chatbots in Teaching	S2-Familiarity and Experience Regarding the Use of AI Tools	S3-Challenges and Potential Issues related to AI Tools
Mann-Whitney U	1671,000	1682,500	1539,000
Wilcoxon W	2337,000	2348,500	6489,000
Z	-0,586	-0,517	-1,303
Asymp. Sig. (2-tailed)	0,558	0,605	0,193
a. Grouping Variable: 1.Gender			

Discussion

The gender distribution in this study reflects the actual composition of the Serbian teaching workforce, where female educators significantly outnumber male teachers by approximately 3 to 1. Additionally, most participants were older and highly qualified, aligning with broader trends in Serbian education. These factors likely contributed to the generally positive attitudes toward AI, as prior research suggests that experienced educators with advanced qualifications tend to be more open to adopting new pedagogical tools, particularly when they recognize clear benefits for teaching and learning (Nja et al., 2023; Wardat et al., 2024). Location may have also influenced participants' views, with the majority (79.3%) working in urban schools, where greater access to technology and institutional support likely contributed to the positive attitudes toward AI observed in this study. In contrast, rural teachers may face barriers such as limited infrastructure, fewer professional development opportunities, and less exposure to AI tools.

Unlike much of the existing literature, which highlights gender disparities in technology adoption (Sindermann et al., 2021; Grassini et al., 2023), this study found no statistically significant gender differences in Serbian teachers' attitudes, familiarity, or perceived challenges related to AI integration. This aligns with Wang et al. (2023) and Cabero-Almenara et al. (2024), who found that professional experience and prior exposure to digital tools tend to neutralize gender differences in AI adoption among educators. One possible explanation for these findings lies in the concept of outcome visibility (Kiwanuka, 2015)—the extent to which AI's benefits are clear and measurable. Rather than viewing AI through a gendered lens, both male and female teachers in Serbia appear to assess its practical value, focusing on student learning outcomes and workload reduction.

Although no statistically significant gender differences were found, minor variations provide additional insight. Women expressed slightly stronger support for AI tools, with 32.3% of female respondents fully agreeing on AI's usefulness in education, compared to 19.4% of men. Female teachers also reported slightly higher familiarity and confidence with AI, reflected in their higher average ranks for attitudes (69.12) and experience (69.01) compared to men (64.92 and 65.24, respectively). However, while women more frequently acknowledged potential AI-related challenges, the Mann-Whitney U test showed that men (74.75) had a higher average rank in perceptions of challenges than women (65.55), suggesting that fewer men expressed concerns overall, but those who did had stronger reservations.

These patterns suggest that teachers approach AI adoption primarily through its practical value in education, but that men and women may engage with AI in slightly different ways. The stronger support and confidence expressed by women may indicate a higher level of willingness to integrate AI tools into teaching, possibly because they see it as a beneficial aid in lesson planning and instruction. In contrast, men's stronger reservations about AI-related challenges could reflect a greater focus on potential risks, such as reliability issues or increased workload. However, since these differences were not statistically significant, they should be seen as variations in emphasis rather than fundamental gender-based divisions in AI adoption.

Since both men and women showed engagement with AI tools, albeit with different emphases, factors such as experience, structured training, and pedagogical needs appear to have a stronger influence on AI adoption than gender alone. Ensuring access to training and institutional support may therefore play a key role in encouraging AI integration in classrooms, particularly by addressing concerns and providing teachers with clear strategies for effective AI use.

Conclusion

As a pilot study with a relatively modest sample, these findings should be interpreted with caution. Future research should expand on this by including a larger and more diverse group of teachers, considering factors such as subjects taught, grade level, school type, and regional differences between urban and rural areas. While no direct gender differences in AI adoption were found, subtle influences – such as confidence in technology use, workload concerns, and perceptions of AI's role in teaching – deserve further exploration. A comparative study of student and teacher perspectives could also provide insight into how attitudes toward AI evolve across different stages of professional development.

Expanding this research beyond Serbia could reveal whether regional factors shape gendered attitudes toward AI. A comparative study across the Balkans or similar educational systems could offer valuable context. Additionally, a mixed-method approach incorporating qualitative insights would deepen understanding of teachers' motivations and challenges in AI adoption. Addressing these aspects will help policymakers and educational institutions develop AI training programs that are practical, targeted, and reflective of diverse teaching environments.

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ДА ЛИ РОД ОБЛИКУЈЕ УСВАЈАЊЕ ВЕШТАЧКЕ ИНТЕЛИГЕНЦИЈЕ? ЕМПИРИЈСКИ НАЛАЗИ ИЗ ОСНОВНИХ И СРЕДЊИХ ШКОЛА У СРБИЈИ

У овом истраживању се испитује да ли род обликује усвајање алата вештачке интелигенције (ВИ) међу наставницима основних и средњих школа у Србији. Рад одговара на уочени недостатак у досадашњој литератури, која је најчешће усмерена на ученике или високообразовни контекст, док се питање родних разлика у наставничким приступима интеграцији ВИ у школама занемарује. Док претходна истраживања често истичу родне неједнакости у дигиталној писмености, самоуздању и ставовима према технологији, новија истраживања показују да су професионално искуство, институционална подршка и обуке пресуднији од самог рода. Полазећи од тога, циљ овог рада био је да се утврди да ли род и даље представља значајан фактор у обликовању наставничких ставова, познавања и перцепције изазова везаних за примену ВИ у српском образовном систему.

Теоријски оквир истраживања заснован је на уједињеној теорији прихватања и употребе технологије (UTAUT) и теорији дифузије иновација (DOI). Обе теорије посматрају род као модерирајућу, а не као одређујућу променљиву. UTAUT модел наглашава очекиване перформансе, напор уложен у употребу, социјални утицај и институционалне услове као примарне покретаче усвајања технологије, док DOI теорија истиче релативну предност, компатибилност, сложеност, могућност за тестирање и уочљивост као кључне одреднице прихватања иновација. Ове теоријске поставке коришћене су у операционализацији усвајања ВИ, које је сагледано кроз три димензије: ставове и очекивања, познавање и искуство, као и перципиране изазове и ризике. Ранија истраживања о родном дигиталном јазу указују на културне стереотипе који мушкарце чврше повезују са технологијом, док новија истраживања све чешће показују да жене исказују веће интересовање за стручно усавршавање у области ВИ. Српски образовни систем, у којем већинску наставничку популацију чине жене и у којем родне разлике нису довољно проучене, пружа посебно погодан оквир за преиспитивање ових претпоставки.

Истраживање је спроведено квантитативном методом, уз примену онлајн-упитника који је у јануару 2025. попунило 135 наставника из градских, приградских и руралних школа. Инструмент је садржао 26 питања, укључујући социодемографске податке и 18 тврдњи о ставовима према ВИ. Одговори су мерени петостепеном Ликертовом скалом, а факторском анализом издвојене су три димензије: ставови и очекивања, познавање и искуство, као и перципирани изазови и ризици. Поузданост скала потврђена је Кронбаховим алфа коефицијентом. За статистичку обраду коришћени су Ман–Витнијев У тест и Спирманов коефицијент ранговне корелације.

Резултати су показали да нема статистички значајних разлика између мушких и женских испитаника у погледу усвајања ВИ. И мушкарци и жене изразили су углавном позитивне ставове, умерено познавање и сигурност у употреби ВИ алата, као и свест о потенцијалним изазовима. Ипак, уочене су мање варијације: жене су у већем проценту подржале корисност ВИ и изразиле нешто већу упознатост, док су мушкарци који су истицали изазове то чинили снажније. Ове разлике, међутим, нису достигле статистичку значајност. Уместо рода, пресудним факторима показали су се дигитална писменост, ресурси, институционална подршка и прилике за стручно усавршавање. Ови налази подударају се са новијим међународним истраживањима која показују да видљива практична корист и наставничко искуство умањују некадашње родне разлике.

Педагошке импликације овог истраживања указују на то да се програми за интеграцију ВИ у наставу не би требало усмеравати према роду, већ ка стварању системских услова за подршку наставницима. Како су и мушкарци и жене мотивисани да уведу ВИ онда када препознају јасну наставну вредност, обуке би требало усредсредити на практичне примене у учионици, стицање искуства и ублажавање ризика као што су злоупотреба података или претерано ослањање ученика на технологију. Посебну пажњу треба посветити равномерном приступу између урбаних и руралних школа, јер инфраструктурне разлике могу бити пресудније од демографских фактора.

Будући да је ово пилот-истраживање са релативно ограниченим узорком, добијене резултате треба тумачити са опрезом. Ипак, налази доприносе међународној расправи о ВИ у образовању, показујући да у српском контексту род није препрека усвајању. Уместо тога, наглашава се значај искуства, усавршавања и институционалне подршке за наставнике. Будућа истраживања са већим и разноврснијим узорцима, регионална поређења и комбиновање квантитативних и квалитативних метода могла би додатно осветлити динамику усвајања ВИ у школама. Такви подаци биће кључни за креирање политика и пракси које ће омогућити да се ВИ у образовању примењује ефикасно, инклузивно и одрживо.

***Кључне речи**: алати вештачке интелигенције, родне разлике, ставови наставника, основне и средње школе, усвајање ВИ у српском образовању*