

Efficacy and ease of use of AI applications among teachers in Serbian HEIs

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Abstract: The rapid diffusion of artificial intelligence in higher education is reshaping teaching practices, yet its acceptance among university teachers remains uneven and insufficiently understood. This study provides a descriptive and exploratory analysis of lecturers' perceptions of the usefulness and ease of use of AI applications in higher education institutions in Serbia, with particular attention to gender differences. Based on a survey of 312 lecturers, the study examines perceptions of AI in relation to teaching competencies, the organization of instructional and assessment materials, productivity and professional support, ease of use, broader pedagogical activities, and adaptation to AI-supported teaching. The findings show no statistically significant gender differences in self-assessed AI knowledge, but they do indicate gender-related variation in selected perceptions of AI use. At the same time, respondents' attitudes are generally cautious and mixed rather than uniformly positive. Women more frequently expressed reservations, especially regarding ease of use and broader pedagogical application, while no consistent gender differences were found across all dimensions. Overall, the results suggest that AI in higher education is perceived less as a straightforward driver of improvement and more as a context-dependent tool whose value depends on disciplinary, pedagogical, and professional considerations.

Keywords: *AI applications, educational technology adoption, teaching competencies, teachers' perspectives, HEIs*

JEL Classification: I23, O33

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1. INTRODUCTION

Contemporary research increasingly focuses on the importance and impact of artificial intelligence and its contribution to the development of higher education. The significance and potential of AI are reflected in its capacity to support the development of teachers' competencies using AI tools in lesson planning, implementation, and evaluation. The monitoring and management of teaching activities can be conducted more efficiently and with greater ease through AI applications, which substantially contribute to faster and more accurate processes of student assessment and the evaluation of learning outcomes. Holmes et al. (2019) argue that artificial intelligence cannot replace teachers but rather functions as a supportive tool that facilitates their work and contributes to the development of professional competencies. Similarly, Zawacki-Richter et al. (2019) emphasize that AI improves process organization, enables automation, and supports informed decision-making in student assessment, thereby enhancing teaching efficiency and instructional quality. Ouyang et al. (2022) further highlight the evident contribution of artificial intelligence to teaching processes, particularly in the domains of organization and evaluation, with positive effects on teachers' competencies.

In contemporary higher education, it is essential for educators to continuously follow technological developments and align them with teaching plans, curricula, and learning standards. In this context, AI applications significantly support teaching staff in preparing relevant instructional materials, as well as materials for colloquia and student examinations (Yu & Guo, 2023). Generative AI is particularly valuable in this regard, as it has the potential to enhance the quality of teaching and learning by enabling dynamic adaptation of traditional instructional processes to educational innovations and assessment practices (Rane et al., 2023).

Brynjolfsson et al. (2025) report a positive impact of generative artificial intelligence when used as an assistant, especially among less expe-

rienced employees, as it allows tasks to be completed more quickly and with higher quality. These findings provide strong empirical support for understanding the role of AI in the working environment of educators in higher education institutions, highlighting its contribution to increased productivity and more efficient performance of professional tasks.

AI tools are increasingly being developed in ways that make them a support rather than a burden for teaching staff, as they are designed to be intuitive and easy to use, even for teachers with limited technological knowledge or experience. User-friendly interfaces and positive user experiences enable their rapid and independent application in teaching practice (UNESCO, 2024).

In line with the European Commission's policy on the development of AI skills, the primary objective of introducing AI tools in education is to ensure their accessibility and ease of use for end users, particularly teachers, through the development of practical skills, targeted training, and intuitive digital solutions. This approach seeks to facilitate the adoption and independent use of AI technologies in everyday teaching activities, thereby strengthening positive perceptions of their application (European Commission, 2025). Similarly, the European Commission's Digital Education Action Plan emphasizes that digital tools in education should be intuitive, user-friendly, and easily applicable in teachers' daily work to support their efficient integration into the teaching process (European Commission, n.d.).

The use of AI tools in teaching at higher education institutions enables educators to perform a range of pedagogical activities more efficiently, including addressing diverse learning needs and overcoming challenges related to student motivation and social interaction in both traditional and online learning environments. AI-supported teaching facilitates personalized learning approaches, helping students overcome learning difficulties and select learning styles that best suit their needs (Chiu, 2021; Hwang & Chien, 2022). The ease with which AI tools can be adopted and adapted in educational contexts is strongly influenced by their availability and the provision of supporting resources, which assist both teachers and students in using these tools more effectively. Clear and understandable interfaces further support teaching activities and the assessment of knowledge (Prasad Agrawal, 2024).

Gender is included in this study as a relevant analytical dimension because previous research on technology adoption and digital education has shown that

perceptions of usefulness, ease of use, confidence, and readiness to engage with new technologies may differ between male and female educators (Popović Šević et al., 2025). In the context of AI-supported higher education, gender is therefore important not as a biological determinant, but as a social and professional variable that may shape teachers' experiences, attitudes, and levels of confidence when using emerging digital tools. Examining gender differences can help identify whether AI applications are perceived equally across teaching staff or whether certain groups may require additional institutional support, training, or encouragement. This is particularly relevant because successful AI integration in higher education depends not only on the availability of technologies, but also on teachers' willingness, perceived competence, and ability to use them effectively in everyday academic practice. Therefore, analysing gender-based differences provides a more nuanced understanding of AI adoption and supports the development of more inclusive strategies for digital transformation in higher education.

Understanding the factors that influence the acceptance of AI applications among teachers at higher education institutions is crucial for explaining the dynamics of adopting emerging technological trends in higher education. This study develops a theoretical framework to answer research questions proposing that the use of AI tools enhances teaching competencies, supports the systematization of materials for colloquia, examinations, and projects, increases teacher productivity and professional support, is perceived as easy to use, facilitates broader pedagogical activities, and enables educators to adapt effectively to AI-supported instruction. The aim of the study is to examine potential differences in the factors that influence the adoption of AI applications among teachers at higher education institutions to varying degrees.

The aim of this study is to provide a descriptive and exploratory analysis of lecturers' perceptions of AI applications in higher education. More specifically, the study examines the perceived usefulness and perceived ease of use of AI tools across selected dimensions of teaching practice, with particular attention to possible gender differences in these perceptions. In this way, the study does not seek to identify causal determinants of AI adoption, but rather to explore how lecturers evaluate the role of AI in relation to teaching competencies, the organization of instructional and assessment materials, productivity, broader pedagogical activities, and the capacity to adapt to AI-supported teaching practices. The contribution of the study

lies in offering an empirically grounded account of how AI-related perceptions vary within the higher education context, thereby providing a basis for a more context-sensitive understanding of AI integration in academic work.

Building on the reviewed literature in the introduction and considering the structure of the collected data, the present study does not seek to examine actual effects of AI use, but rather differences in perceived usefulness and perceived ease of use among higher education teachers. Since the empirical analysis is based on comparing the responses of male and female lecturers, the research questions are formulated to explicitly answer whether gender-based differences exist in perceptions of AI applications across selected dimensions of teaching practice.

2. LITERATURE REVIEW

The role of generative artificial intelligence in higher education is becoming increasingly significant. AI is particularly influential in the preparation of teaching materials, including lectures, as well as in teaching evaluation more broadly. Kasneci et al. (2023) emphasize the importance of aligning the use of generative AI tools with pedagogical objectives, as such alignment can positively contribute to the development of teachers' competencies. The authors further note that perceptions of the effects of AI use depend on prior experience, levels of digital literacy, and the degree of institutional support. Accordingly, both contextual factors and individual teacher characteristics shape the extent to which AI tools contribute to the development of teaching competencies.

Teaching and theoretical frameworks are also considered valuable reference points that help educators identify appropriate AI tools for integration into their instructional practices (Ng et al., 2022). Through this process, teaching strategies can be refined and enhanced, thereby reinforcing teachers' professional competence (Dorey, 2024).

At the same time, concerns persist regarding the potential of AI to replace teachers or diminish their role in the educational process. It is often argued that the increasing use of AI technologies could reduce the demand for teaching staff, limit teacher-student interaction and negatively affect pedagogical competence. Additionally, there is a risk that AI-generated learning content may lack the quality, contextual sensitivity, and personal expression provided by teachers, which could ultimately undermine educational quality (Preiksaitis & Rose, 2023).

RQ1: Are there gender differences in lecturers' perceptions of the contribution of AI tools to the development of teaching competencies?

Artificial intelligence is frequently used to support the structuring and organization of teaching materials, which are applied in knowledge assessment, content personalization, and the analysis of students' responses to assigned tasks. These functions of AI systems provide a valuable foundation for the systematic organization of teaching content when preparing examination materials and pre-examination requirements such as tests, colloquia, project work, and final examinations (Hwang & Tu, 2021).

Chen et al. (2020) note that, within educational settings, the most used AI technologies include natural language processing (NLP) and intelligent tutoring systems (ITS). Such applications enable the organization and structuring of instructional content at the level of teaching units. However, empirical evidence on teachers' perceptions of these AI functions remains limited, indicating an underexplored area of research.

Kamalov et al. (2023) highlight the significant potential of artificial intelligence in automated assessment and personalized learning, creating favorable conditions for organizing and structuring materials used in the evaluation of student knowledge. Similarly, Dickey and Bejarano (2023) emphasize that AI tools provide substantial support to teaching staff by facilitating the systematic development and organization of instructional materials and tasks used in the preparation of pre-examination requirements and examinations.

Educator efficiency in teaching, particularly through the application of AI tools, represents a significant area of potential (Xu, 2024). Generative artificial intelligence enables teachers to dynamically design both instructional activities and assessment processes, such as colloquia and examinations, while ensuring that all students have access to the resources necessary for adequate preparation (Chen, 2023).

In educational contexts, AI tools can be used for a variety of purposes, including idea generation, providing feedback to teachers and students, and assessing written assignments and projects (Fuchs, 2023). At the same time, caution is required, as the automated generation of content that closely resembles teachers' work may pose risks to academic integrity and raise ethical concerns (Perkins, 2023).

RQ2: Are there gender differences in lecturers' perceptions of the usefulness of AI tools for systematizing materials for colloquia, examinations, and project work?

In addition to enabling students to participate more effectively in curricular processes using AI tools, these technologies also support teachers by simplifying instructional tasks and assisting with various administrative activities, such as grading and other repetitive paperwork. In this way, teachers become more productive in their work, as AI tools provide practical support for everyday professional activities. Moreover, AI enables educators to adapt teaching materials for use across diverse learning contexts, with the goal of improving learning outcomes (Whitelock-Wainwright et al., 2021).

A review of the literature indicates that the use of generative artificial intelligence is expanding across an increasing number of sectors, including higher education, due to its contribution to improved work productivity and its role in supporting employees' professional development (Al Naqbi et al., 2024). These findings provide a broader foundation for further research into individual users' perceptions of whether and to what extent AI tools enhance productivity and professional support.

Chuang et al. (2025) argue that the use of artificial intelligence can help mitigate technostress, a negative consequence of rapid technological change, while simultaneously improving work productivity, ultimately leading to more effective workplace functioning. Their findings confirm the positive impact of AI use on productivity and overall professional support.

In line with recent technological developments, higher education has been among the fastest sectors to adopt AI applications within curricula, thereby enhancing planning efficiency and instructional coherence (Naznin et al., 2025). Further research supports the use of AI tools in lesson design, highlighting their role in enriching teaching content and improving pedagogical strategies, which contributes to the professionalization of teaching practice (Wang et al., 2024). Contemporary AI-based programs aimed at strengthening teacher competencies facilitate the rapid development of educational processes while simultaneously supporting educators' professional growth (Tammets & Ley, 2023).

Nevertheless, teachers also face significant challenges when introducing AI tools into teaching practice, which may hinder productivity if educators struggle to respond to complex processes and rapidly evolving technological demands (Popović Šević et al., 2025). The need to adapt to AI tools within relatively short timeframes may threaten productivity and contribute to the stigmatization of the teaching profession (Luan et al., 2020). Some studies further suggest that

teaching quality, learning design, and teacher-led assessment may be adversely affected under these conditions (Seo et al., 2021).

RQ3: Are there gender differences in lecturers' perceptions of the usefulness of AI applications for productivity and professional support in work activities?

Perceived ease of use is an important factor influencing teachers' positive attitudes toward the integration of artificial intelligence in the teaching process. Although this perception is generally weaker than perceived usefulness, it remains a relevant consideration from the perspective of teaching staff. This supports the view that educators who use generative artificial intelligence in their work often develop a sense of ease of use due to the intuitive nature of these tools. Importantly, AI applications used in teaching are not perceived by teachers as technically demanding but rather as useful and relatively easy to operate (Miranda & Chamorro-Mera, 2026).

Zhai (2025) similarly notes that teaching staff who employ AI tools in instructional settings perceive them as intuitive, enabling independent use throughout the teaching process. The way AI tools are introduced into teaching practice further shapes their perceived accessibility, particularly when implementation occurs gradually.

Nevertheless, many teachers remain insufficiently prepared or trained to use AI tools for teaching and learning purposes (Seo et al., 2021). Educators often lack prior experience in data analysis or in designing rules for the automated generation of assignments and feedback for students.

For a substantial number of teachers, the use of AI in education represents a first encounter with artificial intelligence in instructional contexts. Limited experience with AI-enabled educational technologies may lead to challenges such as technical difficulties, as well as communication and collaboration issues during implementation (Kim et al., 2022). Teachers who possess stronger AI-related competencies tend to adapt more readily to digital transformation and are better able to support both their teaching and administrative tasks (Huang, 2021).

Not all AI tools are equally easy to use in educational practice. Consequently, educators must carefully select appropriate tools that align with their subject expertise and instructional goals. For example, voice-controlled AI systems such as Siri can be particularly effective in language teaching and interactive learning, while facial recognition technologies are used in assessment contexts to reduce unethical behavior

in learning environments (Pandey et al., 2020). Although AI technologies offer substantial support to educators, continuous teacher training remains essential to ensure effective teaching and sustained pedagogical quality.

RQ4: Are there gender differences in lecturers' perceptions of the ease of use of AI tools in teaching practice?

The OECD (n.d.) highlights numerous advantages associated with the use of AI tools, emphasizing their positive contributions for all participants in the educational process, including both students and teachers. In particular, AI applications are viewed as capable of enhancing a wide range of pedagogical and educational activities, most notably those related to planning, evaluation, and the overall support of the teaching and learning process.

Notably, beyond learning-focused applications, a variety of AI tools also support teachers in their day-to-day pedagogical activities. These specialized platforms primarily enable the monitoring of students' learning progress, the assessment of individualized learning effectiveness, and the adaptation of instructional materials to meet the needs of individual learners (Whalley et al., 2021).

Dwivedi et al. (2023) argue that the use of generative AI holds broader significance for teaching staff beyond its direct application in classroom instruction. The role of generative AI is also evident in pre-instructional and evaluative processes, where it helps alleviate teachers' workloads and supports their overall pedagogical practice, particularly in the areas of organization and assessment. From this perspective, AI tools play an important role outside the classroom as well, especially in relation to planning, evaluation, and teachers' ethical and professional responsibilities. This further underscores the relevance of AI for broader pedagogical activities across diverse educational contexts (Cotton et al., 2023).

RQ5: Are there gender differences in lecturers' perceptions of the contribution of AI applications to broader pedagogical activities beyond direct classroom instruction?

Artificial intelligence has become one of the most prominent and widely adopted technologies among university educators in contemporary teaching practice (European Commission, 2022). However, to effectively develop teachers' competencies through the integration of appropriate AI tools into specific instructional contexts, educators must periodically update their knowledge and skills in this area.

Davis (1989) demonstrates that perceived ease of use is strongly associated with both current and future technological use, suggesting that individuals who find digital tools easy to learn are more likely to accept and adopt them. Moreover, research indicates that perceived ease of use precedes perceived usefulness, implying that the ability to quickly understand and master system functions forms the foundation for subsequent technology acceptance. Similar conclusions are drawn by Venkatesh and Davis (2000).

Teo (2011) emphasizes that the ease with which teaching staff can use various technologies directly influences their willingness to implement new tools in instructional practice. The faster teachers become familiar with technology, the more likely they are to adopt it consistently. Perceived ease of use therefore represents a critical factor in teachers' engagement and sustained commitment to technological innovation in teaching. Scherer et al. (2019) further note that teachers' resistance to adopting new technologies is closely related to the perceived difficulty and complexity of the systems and procedures they are required to master.

RQ6: Are there gender differences in lecturers' perceptions of their ability to adapt to and master the use of AI tools in teaching?

3. EMPIRICAL STUDY

3.1. Survey respondents

The study was based on a cross-sectional survey administered to academic staff employed at state- and privately-owned higher education institutions in Serbia. A total of 312 valid responses were collected. The questionnaire was distributed electronically through institutional mailing lists, direct e-mail invitations, and professional networks. Accordingly, the sample should be understood as a non-probability convenience sample. Because participation was voluntary and anonymous, respondents self-selected into the study.

The questionnaire used in this study was developed by the authors based on the relevant literature on AI adoption in education, perceived usefulness, and perceived ease of use. The items were formulated to capture two broad dimensions examined in the study: the perceived efficacy of AI applications in teaching and the perceived ease of use of such tools. Responses were measured using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree (Likert,

Table 1: Stated AI knowledge level across genders

	Expert	Advanced	Modest	Basic	None	I don't want to answer.	Total
Female	2.9% (5)	14.9% (26)	22.9% (40)	54.3% (95)	4.0% (7)	1.1% (2)	100.0%
Male	8.8% (12)	19.7% (27)	19.0% (26)	50.4% (69)	2.2% (3)	0.0% (0)	100.0%

Source: Authors

1932). A five-point scale was selected because it provides sufficient variation in attitudes while remaining clear and manageable for respondents, especially in survey settings involving multiple perception-based items. In addition, the ordering of the items was randomized to reduce potential response-set effects and halo bias (Wirtz & Bateson, 1995). The questionnaire has been reported in Appendix I. In total, 56.1 percent of the sample is represented by women, while male respondents comprise the remaining 43.9 percent.

To examine whether response patterns differed by gender, the study used the chi-square test of independence for cross-tabulations between gender and each Likert-type item response category. This approach was selected because the primary analytical interest at this stage was whether female and male respondents differed in the frequency distribution of their answers across the five response categories, rather than whether one group had a higher mean score. Where appropriate, likelihood ratio values were compared with Pearson's chi-square as an additional robustness check, and Fisher's exact test was used for sparse binary tables. To complement significance testing, Cramer's V was reported as an effect-size measure indicating the strength of association between gender and the categorical response distribution.

At the same time, the study recognizes that Likert-type items are ordinal rather than purely nominal variables. For that reason, chi-square results should be interpreted as evidence of association in response distributions, not as tests of ordered differences in response intensity. To address this limitation, Mann-Whitney U tests were additionally conducted for item-level comparisons between female and male respondents, since this nonparametric procedure is more sensitive to ordinal ranking differences between two independent groups. These complementary analyses were used to refine the interpretation of gender-related differences across items.

The present study does not examine actual improvements in teachers' competencies, productivity, or professional performance resulting from the use of AI applications. Rather, it focuses on teachers' perceptions of the usefulness of AI tools in different aspects of academic work, as well as their perceived ease of use in

teaching practice. In this sense, the study is concerned with subjective evaluations of AI-supported teaching rather than with objective performance outcomes. Such framing is more consistent with the nature of the collected data, which are based on self-reported perceptions, and with the broader aim of understanding how higher education teachers interpret the role of AI in their professional practice. Accordingly, the research questions are formulated in descriptive terms, focusing on perceived usefulness and perceived ease of use, rather than on causal claims regarding actual pedagogical or professional improvement.

The AI knowledge is reported as basic or non-existent by 55.8 percent of respondents (58.3% among female and 52.6 percent for male respondents - Table 1). The p-value for the chi-squared test of independence is 0.105, so we cannot conclude that there is a difference between the two genders in this comparison. In addition, the Cramer's V-test's value of 0.29 implies that the association is moderate (Kendall & Stuart, 1977).

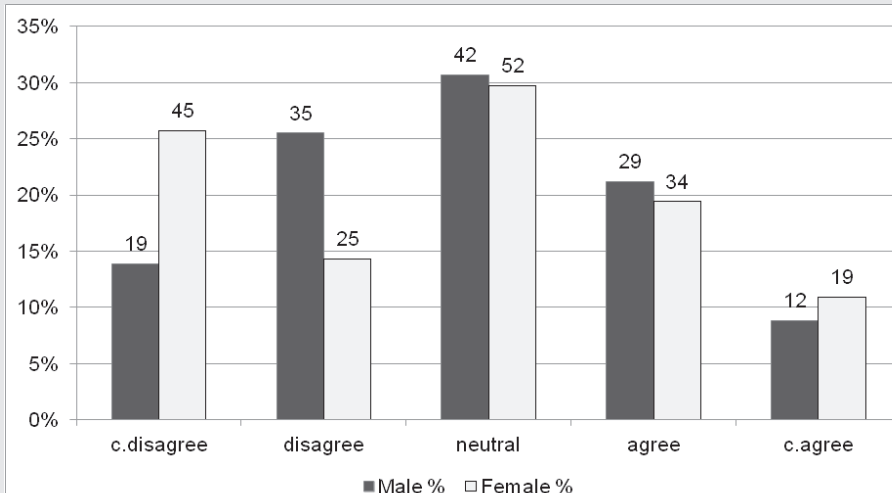
Female respondents use ChatGPT comparatively less (64 percent vs. 51 percent). A chi-squared test confirms that differences exist between genders (p-value = 0.014), which is also corroborated by Fisher's exact test with a p-value of 0.016 (Agresti, 1992). However, Cramer's V-test's value of 0.14 implies that the association is only small to moderate (Kendall & Stuart, 1977).

In our sample, three-quarters (77.1 percent) of all respondents work at universities, followed by colleges (13.2 percent) and vocational academies (9.7 percent). The differences across genders are minuscule and statistically insignificant, with chi-square's p-value = 0.776.

3.2. Efficacy in using AI tools

When responding to „The use of AI tools in teaching improves my teaching competencies“, one quarter of female colleagues strongly disagree, but there are similarities between genders in expressing an agreement with the statement (Figure 1). Both groups disagree more than they agree with this claim. The findings are supported by statistically significant chi-

Figure 1: The use of AI tools in teaching improves my teaching competencies (absolute values are included above bars)



Source: Authors

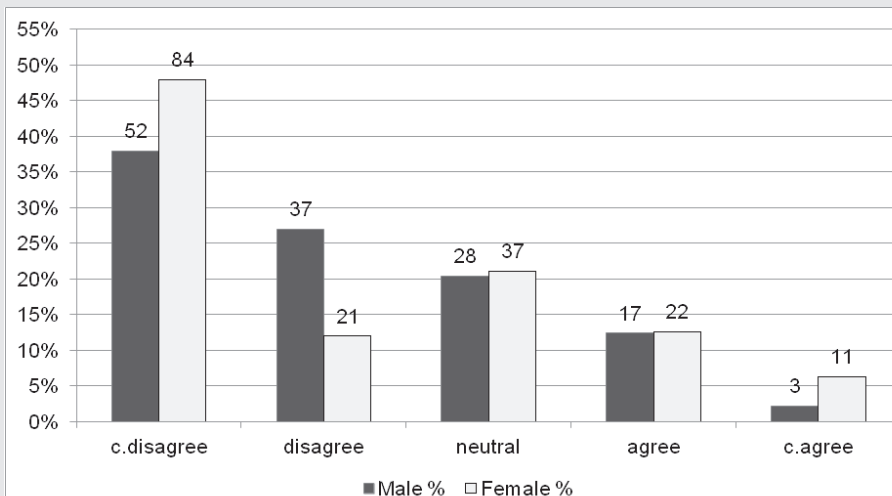
square and likelihood ratio results, with p-values of 0.027 and 0.029, respectively. Cramer's V-test equals 0.186, implying a small-to-moderate association. A Mann-Whitney U test showed no statistically significant difference between female and male respondents ($p=0.515$). Although male respondents had a slightly higher mean rank (160.16) than female respondents (153.63), this difference was not statistically significant.

As far as „AI tools help me systematize material for colloquiums, exams and projects“ is concerned, 48 percent of women strongly disagree with the statement, compared to 38 percent for the other gender; they are as neutral and more positive than men (Figure 2). The chi-square test is statistically significant ($p\text{-value} = 0.002$), indicating a significant associa-

tion between gender and opinions regarding the second statement in the questionnaire. Cramer's V-test is 0.212, thus confirming a low-to-moderate association. A Mann-Whitney U test implied no statistically significant difference between men and women ($p=0.728$). Although male respondents had a mean rank of 158.4, it was only marginally higher than that of women (155.01).

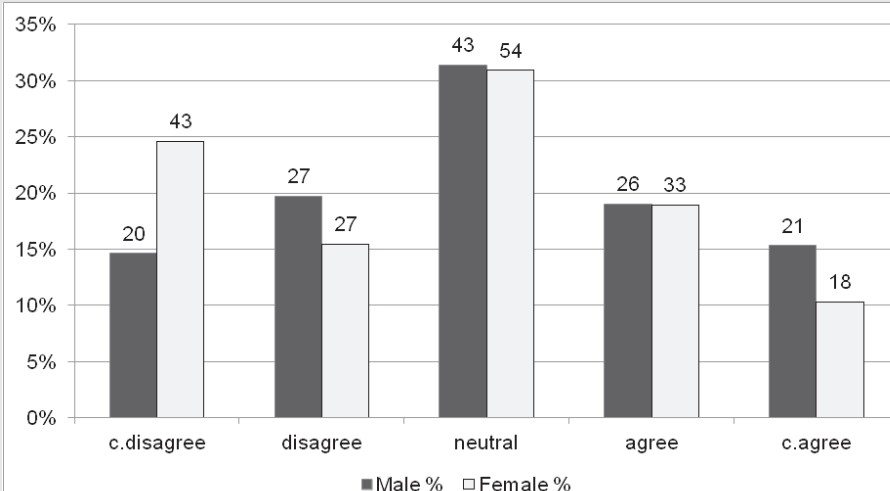
Responses to the statement „Using AI applications in work activities makes me more productive“ confirm that one quarter of female academics are strongly opposed to the claim, but in this case, male respondents expressed comparatively more positive viewpoints (Figure 3). However, the Chi-square test and likelihood ratio results do not confirm this difference, with p-values equaling 0.187 and 0.18, respectively. A

Figure 2: AI tools help me systematize material for colloquiums, exams and projects (absolute values are included above bars)



Source: Authors

Figure 3: Using AI applications in work activities makes me more productive (absolute values are included above bars)



Source: Authors

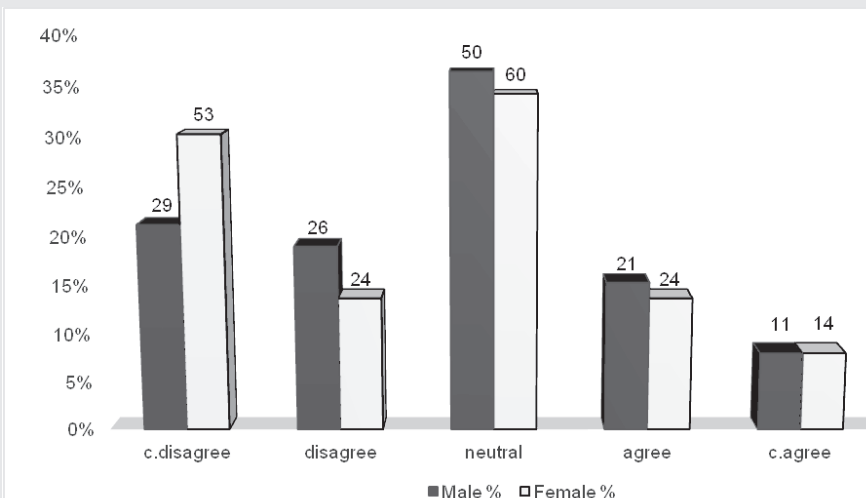
Mann–Whitney U test implied no statistically significant difference ($p=0.098$).

Finally, in examining whether „The use of AI applications in teaching is extremely important for my profession“, female respondents are somewhat more negative and less positive than their male counterparts. However, these results are not statistically significant. The p-values for the chi-square test of independence and likelihood ratios are 0.405 and 0.401, respectively, failing to confirm any association between the two genders and provided responses. Unsurprisingly, a Mann–Whitney U test implied no statistically significant difference ($p=0.295$), with males still reporting a higher mean rank.

3.3. Ease of use

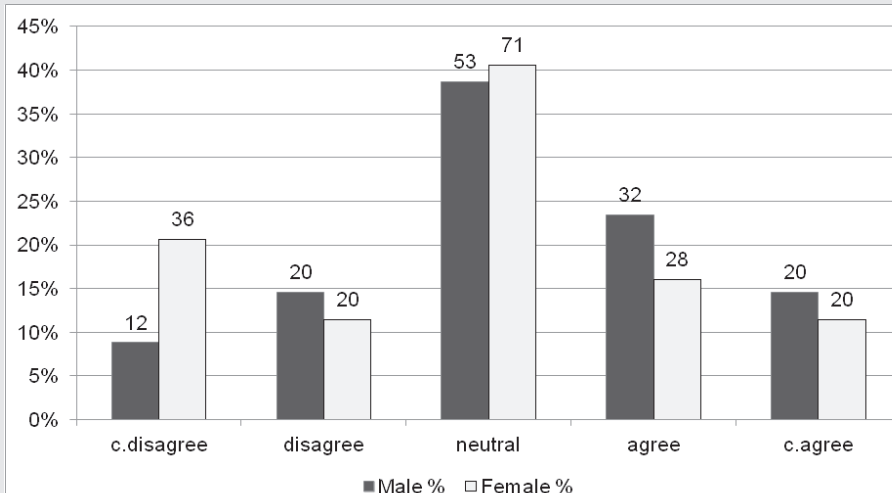
When asked to provide an opinion on „Using AU tools in teaching is very simple for me“, women disagree more (32 vs. 23.4 percent) and perceptibly agree less (Figure 5). Male respondents are clearly more convinced in their mastery of AI tools. The chi-square test and likelihood ratio confirm the statistical significance of these results, with p-values of 0.034 and 0.029, respectively. Cramer’s V-test is equal to 0.183, implying a small-to-moderate association. A Mann–Whitney U test is statistically significant ($p=0.017$). Male respondents had a higher mean rank (169.79) than female respondents (146.16), indicating that using AI tools in teaching is simpler for men than for women.

Figure 4: The use of AI applications in teaching is extremely important for my profession (absolute values are included above bars)



Source: Authors

Figure 5: Using AI tools in teaching is very simple for me (absolute values are included above bars)



Source: Authors

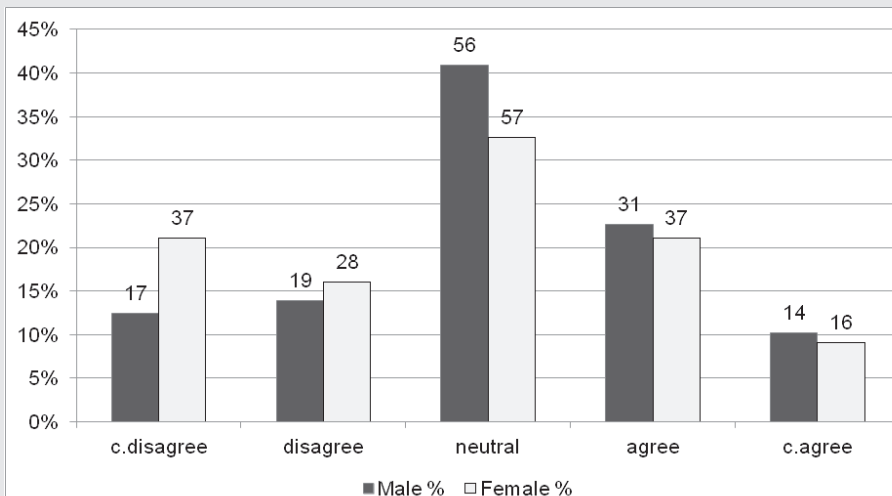
In „I easily master the instruction for using AI tools in class“, we observe the same pattern as in the previous category (Figure 6). Women comparatively disagree more and agree less with this claim. They are also less neutral than male respondents. However, these results are not supported by the Chi-square result (0.262). A Mann–Whitney U test is also not statistically significant ($p=0.109$), with male respondents having a higher mean rank (165.45) than female respondents (149.50).

In „The use of AI applications in teaching also helps me in other pedagogical activities“, one-third of female respondents disagree with this observation, but they also somewhat less strongly agree with this claim when compared to male respondents, who are again percentagewise more neutral in their answers

(Figure 7). The chi-square test and likelihood ratio support these results, with p -values of 0.013 in both cases. Cramer's V-test is equal to 0.201, implying a small-to-moderate association. However, a Mann–Whitney U test implied no statistically significant difference ($p=0.15$).

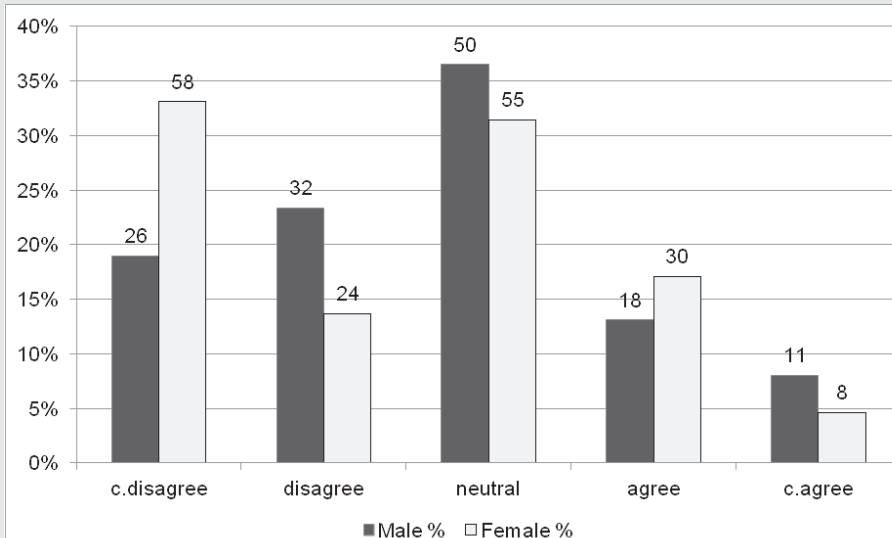
Finally, „I quickly adapt and easily adopt novelties related to the use of AI tools in teaching“, was more positively viewed by both genders (38 percent for men and 34.2 percent for women on the agree side vs 26.3 percent and 27.4 percent, respectively, of gender representatives who disagree to various degrees). The Chi-square test's p -value is 0.429, and we fail to find statistical significance in the variation across responses between these two groups. In addition, a Mann–Whitney U test results are not statistically significant ($p=0.349$).

Figure 6: I easily master the instructions for using AI tools in class (absolute values are included above bars)



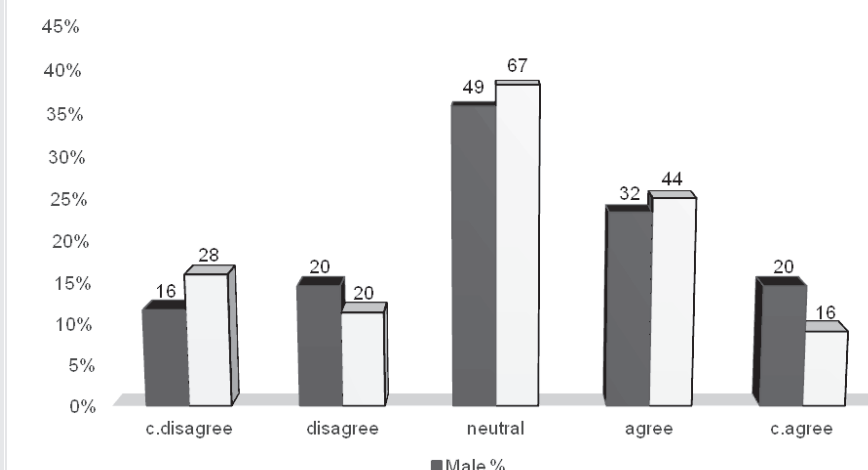
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Figure 7: The use of AI applications in teaching also helps me in other pedagogical activities (absolute values are included above bars)



Source: Authors

Figure 8: I quickly adapt and easily adopt novelties related to the use of AI tools in teaching (absolute values are included above bars)



Source: Authors

4. DISCUSSION

Today, higher education is no longer undergoing a carefully planned and controlled process of modernization. Instead, it is being transformed by rapid technological change, often without clear rules or stable guidelines. It is important to emphasize that these findings reflect teachers' perceptions rather than objective measurements of actual effects of AI tools in practice. Within this context, artificial intelligence is increasingly finding its way into teaching and research practices, although not always in a deliberate or pedagogically grounded manner. AI is often presented as a "logical" ally of teachers — a tool expected to improve teaching quality, increase efficiency, and support the

development of professional competencies. However, everyday academic practice suggests that teachers' attitudes toward these technologies are far more complex and do not always align with the optimistic narratives that dominate academic literature and policy documents.

For this reason, the role of artificial intelligence in higher education cannot be understood solely in terms of knowledge or technical skills. What matters even more is how teachers perceive AI within their own professional practice: whether they experience it as genuine support or as an additional demand within an already overloaded academic environment. From this perspective, perceptions of usefulness and ease of use become particularly important, especially when

viewed through the lens of possible gender differences that may arise not from competence itself, but from professional roles, experience, and value orientations within the academic community.

The findings of this study indicate that there is no statistically significant gender difference in self-assessed knowledge of artificial intelligence ($\chi^2 p = 0.105$), suggesting that male and female teachers begin from relatively similar positions in terms of how they evaluate their own AI-related knowledge. However, when the focus shifts from general knowledge to the perceived usefulness and ease of use of AI tools in everyday academic work, differences become more visible, pointing to a gap between familiarity with AI and confidence in its pedagogical and professional application.

Regarding RQ1, which examined whether men and women differ in how they perceive the contribution of AI tools to the improvement of teaching competencies, the overall response pattern shows that respondents expressed disagreement more often than agreement with the statement that AI improves their teaching competencies (Figure 1). This suggests that, at the level of the total sample, AI is still not widely perceived as a direct factor in the development of teaching competencies. At the same time, the chi-square test indicated a statistically significant association between gender and the distribution of responses ($\chi^2 p = 0.027$; likelihood ratio $p = 0.029$), while the complementary Mann–Whitney U test did not confirm a statistically significant difference in the ordinal intensity of responses ($p = 0.515$). This means that the finding should primarily be interpreted as a difference in the response pattern between women and men, rather than as evidence of a consistent ordinal shift in evaluations. In other words, teachers generally remain cautious about the role of AI in strengthening teaching competencies, while the gender difference in this segment appears mainly at the level of response structure.

The results for RQ1 are consistent with the findings reported by Møgelvang et al. (2024). Although their study supports the view that gender may play a role in how AI is approached in higher education, its primary focus is on patterns of use and their consequences, rather than specifically on lecturers' perceptions of AI as a contributor to the development of teaching competencies. Similarly, Miranda and Chamorro-Mera (2026) do not treat gender differences as a central analytical variable.

Regarding RQ2, which referred to the use of AI tools for organizing materials for colloquia, exams,

and projects, the responses indicate that a substantial proportion of participants, especially women, do not perceive AI as particularly useful in this area. As shown in Figure 2, 48% of female respondents strongly disagreed with this statement, compared to 38% of male respondents. The difference between the two groups was statistically significant according to the chi-square test ($\chi^2 p = 0.002$), with a low-to-moderate effect size (Cramer's $V = 0.212$). These findings suggest that perceptions of AI's usefulness in organizing academic materials are shaped not only by attitudes toward technology, but also by the nature of academic work itself. In disciplines where interpretation, contextualization, and critical reflection are central, teachers may be more reserved toward tools that are often perceived primarily as technical or procedural support. However, since the Mann–Whitney U test did not show a statistically significant difference ($p = 0.728$), this result should mainly be interpreted as a difference in the structure of response distributions rather than as a clear difference in the intensity of attitudes between women and men.

Dickey and Bejarano (2023) directly supports the substantive part of RQ2 because it shows that generative AI can assist in course content development, which is closely related to organizing materials for exams, projects, and teaching activities. It does not directly address gender differences, but it supports the idea that AI can be perceived as useful for academic organization tasks. Tammets & Ley (2023) supports RQ2 by showing that AI tools can be integrated into teacher professional learning and teaching-related work. It is especially relevant for the interpretation of AI as a support tool in academic preparation.

As for RQ3, which examined whether men and women differ in their perception of AI as a source of productivity and professional support, the results show that respondents' attitudes were relatively cautious and that the differences between the two groups were not statistically significant ($\chi^2 p = 0.187$; likelihood ratio $p = 0.180$). Although men expressed somewhat more positive views (Figure 3), neither the chi-square test nor the Mann–Whitney U test confirmed a statistically significant gender difference ($p = 0.098$). The overall pattern therefore does not support the conclusion that gender significantly shapes perceptions of AI as a tool for increasing productivity in this domain. This may indicate that productivity in higher education is not interpreted primarily in terms of speed or efficiency, but rather through broader academic criteria such as teaching quality, student engagement, and adherence to academic standards. This interpretation

is further supported by the finding presented in Figure 4, where the view that the use of AI in teaching is extremely important for one's profession also did not show statistically significant gender differences, suggesting a more cautious and nuanced attitude toward the professional value of AI overall.

The sources that most directly support the finding are Miranda and Chamorro-Mera (2026), because they examine university teachers' adoption of generative AI and indicate that perceptions of AI in academic work are shaped more by perceived professional usefulness than by gender as a central variable, and Zhai (2025), because it focuses on teachers' perceptions, acceptance, knowledge, and practices and therefore supports the interpretation that attitudes toward AI are cautious, profession-based, and context-dependent rather than strongly gender-determined. Møgelvang et al. (2024) is only a partial and indirect support, since it suggests that gender may matter in how AI is approached in higher education, but its focus is on use and consequences rather than specifically on lecturers' perceptions of productivity and professional support. By contrast, the sources that do not directly support this RQ3 finding are Al Naqbi et al. (2024), Brynjolfsson et al. (2025), and Chuang et al. (2025), because they emphasize productivity gains and positive work outcomes of generative AI, which is not fully consistent with our result showing cautious attitudes and no statistically significant gender difference.

Regarding RQ4, which addressed gender differences in the perception of AI tools as easy to use, the findings point both to a cautious overall evaluation and to a statistically significant gender difference. As shown in Figure 5, women more often expressed disagreement with the statement that AI tools are easy to use (32%) compared to men (23.4%), while men expressed agreement more often. The difference was statistically significant both in the chi-square test ($\chi^2 p = 0.034$; likelihood ratio $p = 0.029$) and in the Mann-Whitney U test ($p = 0.017$), with a low-to-moderate effect size (Cramer's $V = 0.183$). This result suggests that men tended to evaluate the ease of use of AI tools more positively than women. At the same time, this should not necessarily be interpreted as a difference in actual ability, but rather as a difference in confidence, prior experience, or self-perception in relation to digital tools, which is consistent with previous research on gendered patterns of technology acceptance. It is also important to note that this pattern does not automatically extend to all indicators of ease of use, since the item shown in Figure 6, which refers to easily master-

ing instructions for the use of AI tools in teaching, did not reveal a statistically significant gender difference. This suggests that the dimension of perceived ease of use within the construction itself is more complex, and that not all of its indicators are equally sensitive to gender differences.

The sources that most directly support the finding are Davis (1989) and Venkatesh and Davis (2000), because they establish perceived ease of use as a core dimension of technology acceptance and thus provide the main theoretical basis for interpreting gender differences in how easily AI tools are perceived to be used; this interpretation is further supported by Scherer et al. (2019) and Teo (2011), which confirm that technology acceptance in educational settings is strongly shaped by perceived ease of use. By contrast, the sources that do not directly support this RQ4 finding are broader, optimistic, or policy-oriented studies, such as Kamalov et al. (2023), Yu and Guo (2023), because they emphasize the general importance and potential of AI in education rather than gendered differences in perceived ease of use.

Regarding RQ5, which focused on gender differences in perceptions of AI use across broader pedagogical activities, the findings indicate that women expressed greater reservations, whereas men showed somewhat more positive attitudes. The association between gender and the distribution of responses was statistically significant according to the chi-square test ($\chi^2 p = 0.013$; Cramer's $V = 0.201$), suggesting that gender-related variation is present in this domain as well. However, these results should not be interpreted as a simple confirmation that AI is broadly accepted as pedagogical support across the entire sample. On the contrary, they indicate that perceptions remain mixed, and that women and men differ in the way their responses are distributed across agreement, disagreement, and neutrality. This pattern may reflect differences in sensitivity to ethical responsibility, teaching quality, and the broader implications of AI use in academic work. However, since the Mann-Whitney U test was not statistically significant ($p = 0.150$), this result should be interpreted cautiously, primarily as a difference in response distribution rather than as a firm difference in the ordinal intensity of attitudes.

Kasneci et al. (2023) and Dwivedi et al. (2023) also provide important support, as they emphasize that AI in education involves both opportunities and challenges, which is consistent with our finding that perceptions remain mixed rather than clearly favorable. By contrast, the sources that do not directly support the RQ5 finding are broader optimistic studies such as

Kamalov et al. (2023), Yu and Guo (2023), and Naznin et al. (2025), because they stress the transformative and beneficial potential of AI in education more generally and do not directly confirm a cautious, gender-differentiated pattern of perceptions in pedagogical use.

Finally, regarding RQ6, which examined whether men and women differ in how quickly they adapt to and adopt novelties related to the use of AI tools in teaching, the findings indicate that there is no statistically significant gender difference ($\chi^2 p = 0.429$). In addition, the Mann–Whitney U test was also not statistically significant ($p = 0.349$). The response pattern points to a relatively neutral to moderately positive orientation toward adapting to AI-related novelties in both groups, which may suggest that readiness to adjust to technological change is increasingly perceived as a general professional requirement in higher education rather than a gender-specific characteristic.

The sources that most directly support the finding are Miranda and Chamorro-Mera (2026), because they examine university teachers' adoption of generative AI and suggest that adaptation to AI depends more on perceived professional relevance and acceptance than on gender itself, and Zhai (2025), because it focuses on teachers' perceptions, acceptance, and practices and supports the interpretation that readiness to adjust to AI-related change is shaped by broader professional and contextual factors rather than by clear gender divisions. Møgelvang et al. (2024) provides only partial and indirect support, since it indicates that gender may matter in some aspects of AI use in higher education, but it does not directly confirm gender differences in speed of adaptation or openness to novelty among lecturers.

Overall, the findings suggest that gender differences in perceptions of the usefulness and ease of use of AI in higher education do exist, but they are neither universal nor equally pronounced across all of the examined dimensions. These findings are consistent with previous studies that emphasize the importance of contextual and pedagogical factors in AI adoption (Holmes et al., 2019; Zawacki-Richter et al., 2019), while also reflecting concerns highlighted in recent literature regarding ethical and disciplinary reservations (Preiksaitis & Rose, 2023). Equally important, the frequency distributions show that respondents are often cautious, ambivalent, or selectively positive in their evaluation of AI's role in teaching and academic work. For that reason, the results should not be interpreted as evidence of either straightforward acceptance or rejection of AI, but rather as an

indication that teachers' perceptions are shaped by the pedagogical context, disciplinary expectations, and professional values within which these technologies are introduced. At the same time, given that the study is based on a convenience, self-selected sample and on multiple item-level tests, these findings should be treated primarily as descriptive and exploratory rather than as a basis for broad generalization to the entire population of higher education teachers. Accordingly, the study points to the importance of institutional approaches that recognize the contextual and gender-sensitive dimensions of AI integration, rather than relying on uniform assumptions about its role in higher education. These conclusions are also supported by recent studies, which show that men generally report higher confidence and usage of AI tools, while women more often express reservations and ethical concerns (Møgelvang et al., 2024; Matobobo, 2026).

5. CONCLUSION

Teaching is expected to become more efficient and less demanding through the use of AI tools. However, the findings of this study suggest that such expectations are only partially reflected in lecturers' perceptions. In line with the current state of artificial intelligence, the replacement of teaching staff is not anticipated; rather, the importance of AI application in teaching is emphasized in the areas of organization and process evaluation, where it can contribute to the development of teachers' competencies (Holmes et al., 2019; Ouyang et al., 2022). Formative and summative assessment can be enhanced through the application of natural language processing and intelligent tutoring systems. However, the extent of their implementation and the variability in their use across the academic community remain insufficiently explored.

Based on a sample of 312 lecturers from public and private higher education institutions in Serbia, this study examined gender differences in perceptions of AI use. The findings reveal that, despite no statistically significant gender differences in self-reported AI knowledge, the role of AI in higher education is not perceived uniformly across the academic community. Rather, perceptions of usefulness and ease of use are shaped by a combination of professional, disciplinary, and contextual factors. In practical terms, this means that higher education institutions should not treat AI integration merely as a matter of technological provision, but as a broader pedagogical and organizational process. Institutional strategies should therefore in-

clude targeted professional development, discipline-sensitive implementation models, and clear ethical and pedagogical guidance for AI use in teaching.

More specifically, the findings highlight the importance of designing AI-related training that is directly connected to teachers' everyday professional tasks, such as preparing teaching materials, organizing assessment activities, planning lessons, and evaluating student work. Training initiatives of this kind may be more effective than general technology-oriented workshops, particularly when they demonstrate how AI can support pedagogical goals without undermining academic standards. At the same time, institutions should consider that perceptions of AI may differ across disciplinary cultures and professional contexts, which suggests the need for differentiated rather than uniform policy responses.

The results also imply that improving teachers' perceptions of AI usefulness requires institutional trust-

building measures. This may include providing examples of effective and responsible AI use, encouraging peer exchange, supporting low-risk experimentation, and clarifying the pedagogical boundaries of AI application in higher education. In this way, AI adoption may become more meaningful, context-sensitive, and professionally acceptable for teaching staff.

Future studies could extend the present analysis by applying logistic regression, particularly ordinal logistic regression, to make fuller use of the ordered structure of Likert-type responses. This would allow a more precise examination of the factors associated with higher or lower levels of agreement regarding the efficacy and ease of use of AI applications.

Eventually, the future of AI in higher education will depend less on its technological capabilities and more on how meaningfully it is aligned with the pedagogical values, professional identities, and everyday practices of educators.

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APPENDIX I

Table 2: Questionnaire

Evaluate your level of AI knowledge	
	Expert
	Advanced
	Modest
	Basic
	None
	I do not want to answer
Efficacy in using AI tools	
Q1	The use of AI tools in teaching improves my teaching competencies.
Q2	AI tools help me systematize material for colloquiums, exams and projects.
Q3	Using AI applications in work activities makes me more productive.
Q4	The use of AI applications in teaching is extremely important for my profession.
Ease of AI use	
Q1	Using AI tools in teaching is very simple for me.
Q2	I easily master the instructions for using AI tools in class.
Q3	The use of AI applications in teaching also helps me in other pedagogical activities.
Q4	I quickly adapt and easily adopt novelties related to the use of AI tools in teaching.

Apstrakt

Efikasnost i lakoća upotrebe aplikacija veštačke inteligencije od strane predavača na visokoškolskim ustanovama u Srbiji

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Brza difuzija veštačke inteligencije u visokom obrazovanju menja nastavne prakse, ali njeno prihvatanje među univerzitetskim nastavnicima i dalje je neujednačeno i nedovoljno istraženo. Ova studija pruža deskriptivnu i eksploratornu analizu percepcija nastavnika o korisnosti i lakoći upotrebe VI aplikacija u visokoškolskim ustanovama u Srbiji, sa posebnim osvrtom na rodne razlike. Na osnovu anketne sprovedene među 312 nastavnika, istraživanje ispituje percepcije VI u vezi sa nastavnim kompetencijama, organizacijom nastavnih i ispitnih materijala, produktivnošću i profesionalnom podrškom, lakoćom upotrebe, širim pedagoškim aktivnostima i prilagođavanjem nastavi podržanoj VI alatima. Nalazi pokazuju da ne postoje statistički značajne rodne razlike u samoproceni znanja o VI, ali ukazuju

na rodno uslovljene razlike u pojedinim percepcijama nje primene. Istovremeno, stavovi ispitanika su uglavnom oprezni i podeljeni, a ne jednoznačno pozitivni. Žene su češće iskazivale rezerve, posebno u pogledu lakoće upotrebe i šire pedagoške primene, dok dosledne rodne razlike nisu utvrđene u svim dimenzijama. Ukupno posmatrano, rezultati sugerišu da se VI u visokom obrazovanju doživljava manje kao jednostavan pokretač unapređenja, a više kao alat čija vrednost zavisi od disciplinskog, pedagoškog i profesionalnog konteksta.

Ključne reči: *primena veštačke inteligencije, usvajanje obrazovnih tehnologija, nastavne kompetencije, stavovi nastavnika, visokoškolske ustanove*

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