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Uloga visokog obrazovanja u razvoju etičke i bezbednosne svesti za odgovornu primenu veštačke inteligencije

Nataša Sunarić¹, Brankica Pažun², Milena Cvjetković³

¹ School of Engineering Management, University Union - Nikola Tesla, Belgrade, Serbia, natasa.sunaric@fim.rs

² School of Engineering Management, University Union - Nikola Tesla, Belgrade, Serbia, brankica.pazun@fim.rs

³ School of Engineering Management, University Union - Nikola Tesla, Belgrade, Serbia, milena.cvjetkovic@fim.rs

Apstrakt: Brzi razvoj veštačke inteligencije (AI) doveo je do značajnih promena u strukturi i procesima rada, obrazovanju i društvenim odnosima u veoma kratkom vremenskom periodu. Iako primena veštačke inteligencije doprinosi unapređenju efikasnosti, inovativnosti i pristupu informacijama, istovremeno otvara nove rizike u pogledu etike, bezbednosti i zaštite privatnosti podataka. Cilj rada je da analizira ulogu visokog obrazovanja u formiranju bezbednosne i etičke svesti prilikom upotrebe veštačke inteligencije na visokoobrazovnim institucijama. Zadatak celokupne akademske zajednice jeste da kroz svoje kurikule i pedagoške pristupe obezbedi odgovornu, bezbednosno prihvatljivu i transparentnu upotrebu veštačke inteligencije u svakodnevnoj primeni. Zajednički napor istraživačkog sektora, međunarodnih organizacija i akademskih mreža treba da budu usmereni ka kreiranju standarda koji će omogućiti razvoj stručnjaka sposobnih da na bezbedan način i etički prihvatljiv kodeks ponašanja koriste pomoć veštačke inteligencije (AI alata). Rezultati istraživanja pokazuju da većina univerziteta u zapadnoj Evropi već ima uspostavljene programe koji uključuju etičke i bezbednosne aspekte AI-tehnologija, dok univerziteti u jugoistočnoj Evropi tek razvijaju institucionalne politike u tom pravcu. Stoga, ovaj rad ukazuje na model integracije AI etike i bezbednosti u nastavne procese, kao i formiranje etičkih odbora na institucionalnom nivou koji će doprineti odgovornoj primeni veštačke inteligencije na visokoobrazovnim institucijama u budućnosti.

Ključne reči: veštačka inteligencija, etika, bezbednost, visoko obrazovanje, digitalna pismenost

The Role of Higher Education in Developing Ethical and Security Awareness for the Responsible Use of Artificial Intelligence

Abstract: The rapid development of artificial intelligence (AI) has led to significant changes in work processes and structures, educational practices, and social relations within a short period of time. The very application of AI enhances efficiency, innovation, and access to information; however, it also raises serious concerns about ethics, security, and data privacy protection. The aim of this paper is to analyze the role of higher education in shaping ethical and security awareness within academic processes that use artificial intelligence as a tool. The primary task of the academic community is to ensure the responsible, secure, and transparent use of artificial intelligence in everyday practice through curricula design and pedagogical approaches. Joint efforts of the research sector, international organizations, and academic networks towards establishing new standards should focus on creating frameworks that enable the development of academic professionals capable of using AI tools safely and in accordance with ethically acceptable codes of conduct. Survey results show that most universities in Western Europe have already established programs addressing ethical and security aspects of AI technologies, while universities in Southeastern Europe are still in the process of developing institutional policies in this regard. Therefore, this paper proposes a model for integrating AI ethics and security into educational processes in higher education of Southern European countries, as well as the establishment of ethics committees at the institutional level, which would contribute to the responsible use of artificial intelligence in higher education institutions in the future.

Keywords: artificial intelligence, ethics, higher education, digital literacy

1. Introduction

The development of artificial intelligence (AI) represents one of the most significant technological transformations of contemporary society, profoundly affecting the economy, science, education, and everyday life. Over the past decade, particularly between 2020 and 2025, advances in deep learning, large language models, and foundation models have enabled their widespread application across multiple sectors, including higher education. As a result, universities have become central actors not only in the development and adoption of AI technologies, but also in shaping the knowledge, skills, and value frameworks of future generations.

At the same time, the rapid integration of AI into educational processes raises important ethical, security, and regulatory challenges. The use of AI systems in teaching, research, and administration involves extensive data processing, algorithmic decision-making, and shifting responsibilities from human actors to technological systems. Consequently, academic literature increasingly emphasizes the need for responsible and ethically grounded AI use, based on transparency, data protection, fairness, and human oversight (Floridi & Cows, 2021; UNESCO, 2024). In this context, higher education plays a crucial role in fostering ethical and security competencies, with this study examining how institutional policies, curricula, and international guidelines shape responsible AI use, particularly in Western and Southeastern Europe.

2. The Evolution of Artificial Intelligence and Its Ethical and Societal Implications

Artificial intelligence (AI) has evolved from early rule-based systems into a data-driven paradigm that increasingly shapes the economy, science, education, and everyday life. Advances in deep learning - particularly between 2020 and 2025 - have enabled the development of large language models (LLMs), foundation models, and embodied AI systems capable of learning complex patterns and performing tasks such as language understanding, reasoning, and planning.

Contemporary AI relies primarily on data rather than predefined rules, with deep learning architectures supporting large-scale language and multimodal models. Although current systems exhibit improved reasoning abilities, they have not achieved autonomous creativity or general intelligence. Prominent examples include GPT-4 and GPT-5 (Achiam et al., 2024). Foundation models, trained on trillions of tokens, represent a major shift due to their adaptability, while recent literature highlights the need for risk-based governance and specific regulatory obligations for such models (Bommasani et al., 2022; Bommasani et al., 2024). Further developments include specialized LLMs, efficient training methods, and world models that integrate language systems with simulated environments, advancing research toward artificial general intelligence (AGI) (Feng et al., 2025).

Alongside technological progress, ethical and societal concerns have gained prominence. Floridi and Cows (2022) propose a widely adopted framework based on fairness, transparency, safety, and accountability. The State of AI report further identifies persistent risks related to algorithmic bias, misinformation, concentration of technological power, and the environmental costs of large-scale model training (Benaich, 2024). The rapid expansion of AI has significantly affected higher education, positioning universities as key actors in both innovation and the development of ethical and security competencies. European policy initiatives, including the EU Artificial Intelligence Act (2024) and the UNESCO Recommendation on the Ethics of Artificial Intelligence (2021), emphasize education as a central mechanism for promoting responsible AI use. Consequently, higher education institutions play a critical role in ensuring ethically sound, socially responsible, and secure AI deployment (Floridi & Cows, 2021).

Within university environments, security is a core concern, encompassing data protection, privacy, system integrity, and algorithmic reliability. AI-based student analytics and automated assessment involve sensitive personal data, requiring robust safeguards and effective human oversight (Xue et al., 2025). Ethical competencies have therefore become an essential component of AI education. This extends beyond technical skills to include reflection on legal, social, and moral implications. Research supports a multidimensional approach integrating technical understanding, regulatory frameworks, social impacts such as inclusion and equality, and value-based principles including responsibility and transparency (Aler Tubella, 2024).

Researchers and international organizations contribute substantially to shaping responsible AI frameworks in higher education. UNESCO and the OECD provide global standards adaptable to local contexts, while collaborative networks linking academia, industry, and the public sector support the development of tools and

guidelines for responsible AI deployment (Dabis & Csáki, 2024). Higher education thus operates within a global ecosystem that jointly advances ethical and secure AI practices.

3. A Framework for Responsible Artificial Intelligence in Higher Education

The integration of artificial intelligence into educational systems creates significant opportunities, including personalized learning, predictive analytics of student performance, and the automation of administrative processes (Zawacki-Richter et al., 2019). At the same time, it introduces substantial risks related to student surveillance, data misuse, and growing reliance on algorithmic decision-making (Selwyn, 2022). Accordingly, educational systems are required to ensure transparency and meaningful human oversight in all AI-related processes (UNESCO, 2021). AI systems in education process large volumes of sensitive data, such as academic records and behavioral information, making digital security a central element of responsible AI governance (Matei & Bertino, 2023). Despite this, institutional preparedness remains limited, as only a minority of European universities have established formal data protection protocols addressing AI use (OECD, 2024). These challenges underscore the need to conceptualize AI ethics not merely as a technical issue, but as a value-based framework embedded within teaching and learning processes (Aler Tubella, 2024).

Based on international guidelines and relevant scholarly literature, three core principles of responsible AI education can be identified: transparency, ethical responsibility, and data security and privacy (UNESCO, 2024; European Commission, 2024; Floridi et al., 2018; Karran et al., 2024).

Table 1. Key Principles of Responsible AI Education in Curricula

Principle	Description	Examples of Practical Implementation
Transparency	AI systems must be explainable and subject to human oversight.	Use of explainable AI in educational platforms; training educators to interpret algorithmic outputs (UNESCO, 2024; Floridi et al., 2018).
Ethical responsibility	Education should address social impacts, bias, and accountability of AI.	AI ethics modules; interdisciplinary courses combining technology, law, and social sciences (European Commission, 2024; Karran et al., 2024).
Security and privacy	Data processing must comply with legal and ethical standards.	GDPR compliance; data anonymization and clear governance policies (European Commission, 2024; UNESCO, 2024).

The rapid expansion of artificial intelligence in higher education between 2023 and 2025 has intensified challenges related to regulation, ethical governance, and data protection. Empirical studies and international reports indicate that students and academic staff increasingly rely on AI tools in teaching and research, often at a pace exceeding the ability of institutions to establish formal policies and governance mechanisms (UNESCO, 2023; Digital Education Council, 2024). This discrepancy between practice and regulation contributes to uneven AI implementation and heightened concerns regarding privacy, academic integrity, and accountability.

The indicators presented in Table 2 illustrate the gap between widespread AI adoption in higher education and the limited development of institutional policies and governance structures.

International reports reveal significant differences between Western and Southeastern Europe in terms of institutional integration of ethical, security, and regulatory aspects of artificial intelligence in higher education. Universities in Western Europe have made greater progress in developing formal policies, internal guidelines, and curricula addressing ethics, data protection, and responsible AI deployment (European University Association, 2023).

Table 2. Statistical Indicators of AI Use and Regulation in Higher Education (2023-2025)

No.	Indicator / Statistic	Value	Country / Region	Source
1	Students who regularly use AI in their studies (at least once a week)	86% globally, 54% at least once per week	Global	Digital Education Council (2024)

2	Students who use AI daily / weekly	25% daily, ~40% weekly	Germany	CHE Germany (2025)
3	Universities with formal AI guidelines or policies	Limited institutional adoption	Global	UNESCO (2023)
4	Faculty concerned about data privacy and security when using AI	51.2% of faculty	Peru	Marín et al. (2025)
5	Students concerned about data privacy and security when using AI	47.5% of students	Peru	Marín et al. (2025)
6	Institutions with AI ethics boards or committees	~20% of institutions	Europe	European University Association (2023)
7	Faculty using AI tools without institutional guidelines	Majority of faculty	EU	EUA (2023)
8	Students who believe their institution has not provided adequate guidance on responsible AI use	Majority of students	Western Europe	Digital Education Council (2024)

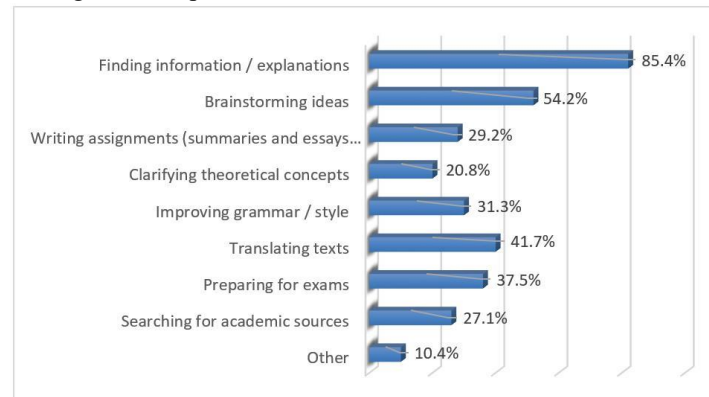
UNESCO findings further confirm that institutions in more developed educational systems establish governance frameworks more rapidly, while progress elsewhere remains fragmented (UNESCO, 2023; UNESCO, 2024). In contrast, Southeastern Europe remains in an early phase of institutional development. OECD and CEDEFOP reports indicate that AI ethics, data protection, and digital responsibility are primarily introduced through pilot initiatives, recommendations, and non-mandatory curricular content (OECD, 2023; CEDEFOP, 2023). In Bosnia and Herzegovina and Montenegro, international organizations play a central role through training programs, workshops, and policy initiatives aimed at strengthening ethical awareness and responsible AI use (UNESCO, 2024; Council of Europe, 2024). Overall, the region is undergoing a gradual process of institutionalization that has yet to reach the level of systematic implementation observed in Western Europe.

4. Findings and Discussion: Patterns, Perceptions, and Challenges of Generative AI Use in English Language Academic Courses

The rapid adoption of generative artificial intelligence (AI) has transformed academic practices in higher education, particularly in English language courses where writing, translation, and textual analysis are central. These courses therefore provide a key context for examining ethical, pedagogical, and security-related implications of AI use. This section presents findings from a questionnaire-based study conducted on a sample of 100 School of Engineering Management undergraduate students in Belgrade during the period from 14 November to 15 December 2025. The research focuses on patterns of AI use, perceptions of academic integrity, and awareness of security and reliability issues.

Regarding the frequency and purpose of AI use, the findings indicate extensive reliance on generative AI tools, primarily ChatGPT. A majority of students report frequent use: 40.8% use AI daily, 32.7% several times a week, and 14.3% once a week, while only 2% report occasional or rare use. AI is predominantly employed for supportive academic activities, including finding information and explanations (85.4%), brainstorming ideas (54.2%), translating texts (41.7%), preparing for exams (37.5%), and improving grammar and style (31.3%). At the same time, a notable proportion of students acknowledge using AI for more advanced tasks, such as writing assignments (29.2%) and searching for academic sources (27.1%). These practices appear to be integrated within students' everyday academic routines, highlighting the blurred distinction between support and substitution of student authorship.

Figure 1. Purposes of ChatGPT Use in Academic Activities



In terms of ethical perceptions and academic integrity, students' views on AI use are markedly divided. While 32.7% perceive AI use as a complete violation and 30.6% as a violation in most cases, 28.6% believe it does not violate academic integrity, with an additional 8.2% reporting no violation at all. Although students generally recognize that limited AI assistance - such as idea generation, information retrieval, and grammatical guidance - is acceptable, they also acknowledge that generating entire essays or falsely claiming originality is unacceptable. Despite this awareness, many students report rewriting AI-generated texts to evade plagiarism detection, revealing a gap between ethical understanding and actual practices. This suggests that students may underestimate how extensive AI reliance threatens academic integrity. While 87.8% of respondents believe that institutional rules regulating AI use exist, only 63.3% consider them clear. The remaining respondents perceive them as insufficiently clear 24.5%, unclear 8.2% or completely unclear 4.1%. This lack of clarity contributes to uncertainty about the boundary between acceptable assistance and unacceptable authorship, fostering confusion regarding intellectual honesty in AI-supported academic contexts.

With regard to security, privacy, and reliability awareness, several critical challenges emerge. Although AI use varies in intensity, ranging from heavy (14.2%) to moderate (42.9%) and limited use (40.8%), with a small proportion of respondents not using AI at all (2%), the majority of students demonstrate insufficient awareness of data protection risks. Many report uploading personal data or institutional materials without considering data storage, ownership, or potential misuse. Most respondents are either unaware of or unconcerned about how their data are processed, indicating low levels of privacy literacy. In addition, students' perceptions of AI reliability reveal further risks. While AI tools are generally trusted, views on accuracy are mixed: 36.7% report that AI is sometimes inaccurate, 28.6% mostly accurate, 18.4% often inaccurate, 12.2% are unsure, and only 4.1% consider it very accurate. This reliance on tools perceived as sufficiently accurate, despite acknowledged limitations and minimal understanding of associated risks, highlights the need for critical evaluation skills and poses a challenge for responsible academic use.

Figure 2. Levels of ChatGPT Use

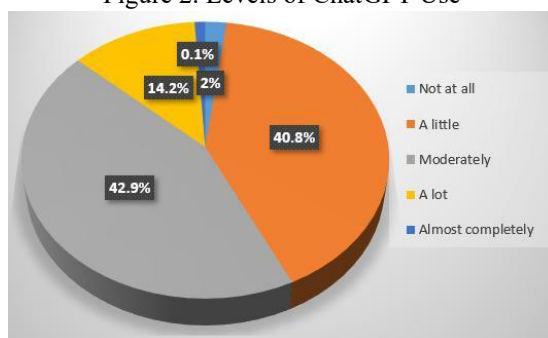
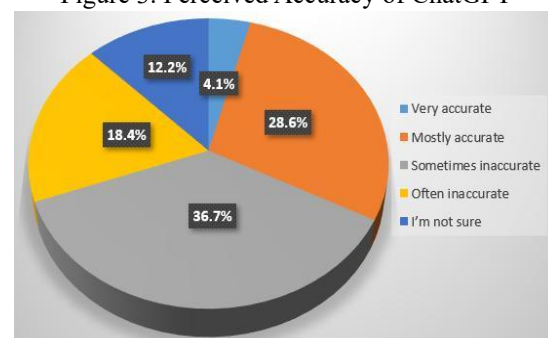


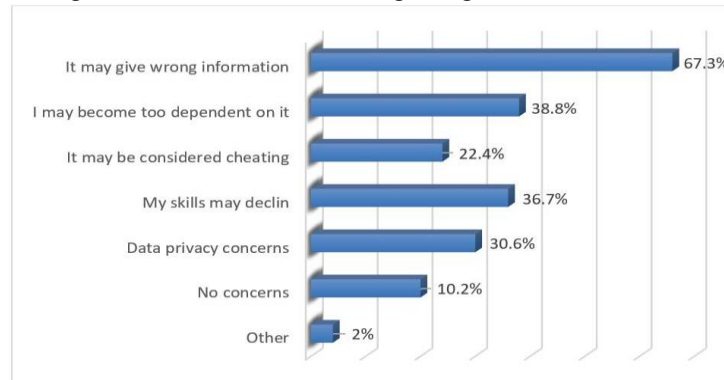
Figure 3. Perceived Accuracy of ChatGPT



From a pedagogical perspective, the findings reveal a significant gap between high levels of AI use and limited institutional guidance. While students often feel confident in using AI tools, they frequently lack the ability to critically assess the quality and reliability of AI-generated output. Given that 30% of respondents find ChatGPT

very helpful, 53.1% helpful, 14.3% are unsure, and only 2% consider it not helpful at all, an important question arises as to how faculty can provide adequate training to support responsible AI integration. Students' main concerns include the risk of receiving incorrect information (67.3%), becoming overly dependent on AI (38.8%), a potential decline in academic skills (36.7%), data privacy issues (30.6%), and the possibility that AI use may be considered cheating (22.4%). In contrast, 10.2% report no concerns, while 2% mention other, unspecified reasons. These findings suggest that a primary responsibility of faculty should be to emphasize clearer rules, enhanced pedagogical support, and structured AI literacy training.

Figure 4. Students' Concerns Regarding the Use of ChatGPT



Concerning responsible AI integration, the findings indicate strong student support for institutional regulation and guidance. A majority of respondents (53%) support the introduction of clear university guidelines defining acceptable and unacceptable AI use, while an additional 38.8% express conditional support; only 8% oppose such measures. Students also expect universities to assume an educational role: 49% believe institutions should definitely teach responsible AI use, and 28.6% agree, whereas opposition remains limited. These results underscore the need for a structured framework for responsible AI integration in English language academic courses, including clearly articulated pedagogical guidelines, mandatory AI literacy training addressing accuracy, bias, and data protection, and institutional support for further development. In addition, assessment practices should be redesigned to encourage authenticity and higher-order thinking through in-class writing, oral defenses, reflective tasks, and comparative analyses of AI-generated and student-produced texts.

5. Conclusion

The analysis of contemporary literature and international reports indicates that artificial intelligence is increasingly integrated into higher education, while levels of institutional preparedness differ substantially across regions. Universities in Western Europe have advanced further in establishing formal governance frameworks addressing the ethical, security, and regulatory dimensions of AI, whereas in Southeastern Europe progress remains slower and more fragmented. These disparities reveal a structural gap in the institutionalization of responsible artificial intelligence within higher education systems. The findings further confirm that ethical and security considerations must be treated as integral elements of educational policy and curriculum design rather than as secondary aspects of technological development. Strengthening collaboration among universities, international organizations, and policymakers, alongside the integration of ethics, data protection, and security into academic programs, is essential for developing coherent standards and fostering the competencies required for the responsible, transparent, and socially accountable use of artificial intelligence in higher education.

The survey results demonstrate that English language academic courses have become key sites of emerging ethical, pedagogical, and security challenges regarding generative AI use. Due to the widespread integration of AI into academic learning, although often without sufficient ethical understanding, security awareness, or pedagogical guidance, AI tools have become an integral yet insufficiently regulated component of academic learning. Higher education institutions must therefore play a central role in shaping responsible AI use, not only through formal regulation but also through systematic education. English language courses are particularly positioned to foster critical, reflective, and ethically grounded engagement with AI, as they directly involve writing, interpretation, and authorship. Responsible AI use should thus be understood not merely as a technical issue, but as an essential educational outcome grounded in informed, transparent, and accountable academic

practice. Without clear institutional frameworks, students are increasingly likely to rely on AI for tasks intended to develop core academic competencies, thereby undermining the educational objectives of higher education.

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