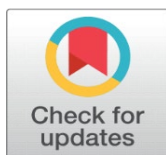
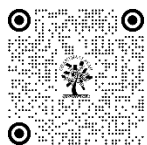


# THE ROLE OF EDUCATORS IN ADDRESSING THE USE OF ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: A NARRATIVE REVIEW

Tlalane Mosae<sup>1</sup>, Dr. Rekha Kaushal<sup>2</sup>

<sup>1</sup>Research Scholar, School of Liberal Arts, GD Goenka University, Gurgaon, India

<sup>2</sup>Assistant Professor, School of Liberal Arts, G.D. Goenka University, GD Goenka University, India



DOI

[10.29121/shodhkosh.v5.i7.2024.4877](https://doi.org/10.29121/shodhkosh.v5.i7.2024.4877)

**Funding:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

**Copyright:** © 2024 The Author(s). This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

With the license CC-BY, authors retain the copyright, allowing anyone to download, reuse, re-print, modify, distribute, and/or copy their contribution. The work must be properly attributed to its author.



## 1. INTRODUCTION

Artificial intelligence (AI) is reshaping higher education, offering both opportunities and challenges. AI is the development of machines that are capable of imitating human intelligence and carrying out tasks that generally require cognitive functions, including learning, problem-solving, perception, and decision-making (Goel, 2023). AI enables personalized learning experiences, helping educators customize instruction to meet diverse student needs. Generative AI tools, like ChatGPT, can assist students in idea generation and feedback, fostering engagement and improving learning outcomes (Almansour, 2024; NAGI et al., 2023). However, their adoption also requires careful planning around ethical issues, curriculum design, and the evolving role of educators.

Moreover, integrating AI technologies can help address challenges in higher education, such as large class sizes and the need for individualized attention. By automating routine tasks and delivering real-time feedback, AI enables educators to devote more time to nurturing critical thinking and creativity in their students. ("The Information Age for Education via Artificial Intelligence and Machine Learning: A Bibliometric and Systematic Literature Analysis", 2024; Kuleto et al., 2021). This shift enhances the learning experience and prepares students for a workforce increasingly influenced by AI technologies.

The growing use of personalized learning platforms marks AI's integration into higher education. Research shows a significant increase in AI adoption since 2010 (Mahligawati, 2023). These platforms use data analytics to monitor

## ABSTRACT

Integrating artificial intelligence (AI) in higher education offers great opportunities but comes with challenges. This study highlights educators' key role in addressing AI in higher education, focusing on four main areas: curriculum development, ethical issues, teaching methods, and challenges in AI integration. It reviews current research to show how educators can teach AI effectively, raise ethical awareness, and adjust teaching strategies to use AI tools well. The results underscore the need for ongoing training for educators, AI literacy, and interdisciplinary collaboration to help educators prepare students for an AI-driven future. The review also offers practical recommendations to ensure AI enhances teaching while keeping it focused on human connections. Moreover, balancing innovation with ethical responsibility is essential to ensure that AI is a tool for empowerment rather than a source of inequity.

**Keywords:** Artificial Intelligence, Educator Role, Higher Education

student progress, creating customized learning experiences. Fields like health professional education and the sciences are also incorporating AI. Almansour (2024) highlights AI's role in enhancing clinical skills and patient education. Moreover, there is an increasing focus on preparing educators and students for the Era of AI. Studies highlight an urgent need for professional development initiatives to provide educators with the necessary skills and knowledge to incorporate AI into their teaching methods effectively (Kranz, 2024; Gagné, 2023). Likewise, programs aimed at enhancing students' comprehension of AI and its practical uses are essential for nurturing a cohort of learners who are not only consumers of technology but also adept critical thinkers capable of leveraging AI in their future careers (Dai et al., 2020).

In conclusion, using AI tools in higher education is evolving and has great potential to improve learning experiences. AI can transform traditional pedagogical practices by delivering individualized learning support, automating administrative tasks, and fostering interdisciplinary approaches. However, educators and institutions must consider the ethical concerns and ensure that AI is used responsibly to promote fairness and inclusiveness in education.

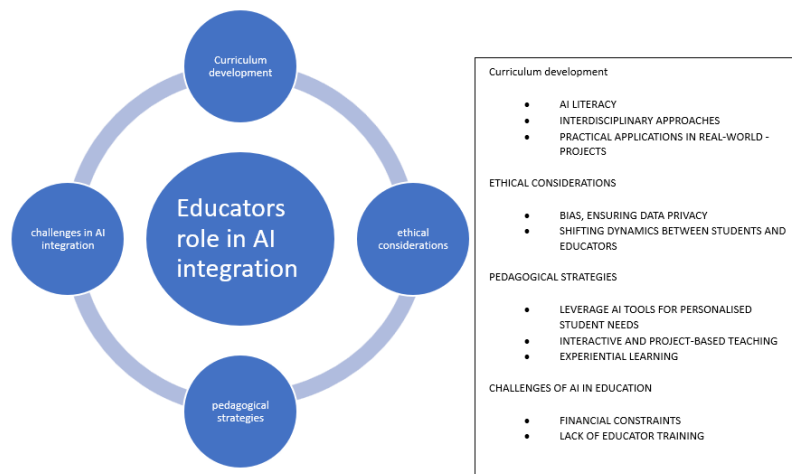
### 1.1. VISUAL REPRESENTATION OF MODEL FRAMEWORK FOR A NARRATIVE OVERVIEW

We suggest the following model framework of the educational landscape. to effectively present the literature findings. This model is presented in Figure 1.

We consider five major parts of Educators' Role in AI Integration:

- Curriculum Development
- Ethical Considerations
- Pedagogical Strategies
- Challenges in AI Integration

**Figure 1**



### 1.2. THE ROLE OF EDUCATORS IN ADDRESSING CURRICULUM DEVELOPMENT IN AI UNDERSTANDING

The role of educators in integrating Artificial Intelligence (AI) into higher education involves creating effective curricula, using interdisciplinary approaches, and incorporating real-world applications. As AI technologies become more common, Shoham et al. (2018) state that fostering AI literacy is important for preparing students to excel in an environment that is becoming more AI-driven. AI literacy is defined as the skill to comprehend, utilize, assess, and ethically manage AI (Long & Megerko, 2020). Educators in higher education hold a key responsibility in integrating an understanding of artificial intelligence (AI) into academic curricula. Ng et al. (2021) emphasize that this understanding

should encompass technical, ethical, and behavioral dimensions, enabling students to grasp AI's far-reaching impact. Dai et al. (2020) highlight that equipping student with AI knowledge significantly enhances their preparedness for the future driven by AI, advocating for the incorporation of AI concepts across diverse disciplines. This viewpoint aligns with Salhab's assertion that AI education should be infused throughout the curriculum (Salhab, 2024; Southworth, Migliaccio, et al., 2023).

Interdisciplinary approaches are fundamental in crafting AI-inclusive curricula, offering insights into AI's influence across various fields. By embedding AI principles into multiple subjects, educators ensure that all students, regardless of their primary field of study, acquire foundational knowledge about AI (Luckin, 2017). Wood et al. (2021) recommend forming multidisciplinary teams to design these curricula, particularly in medical education, where AI has transformative implications. This model also applies to fields such as law, psychology, and social sciences, where understanding AI's role is crucial. For instance, Ibrahim (2024) highlights the benefits of adding AI into arts programs, fostering a synergy between education and technology, and preparing learners to address real-life challenges. In STEM education, teachers can use project-based learning with AI to address real-world issues like environmental sustainability and urban planning (Schleiss, 2023). This approach improves students' problem-solving skills and encourages teamwork among peers with diverse backgrounds, mirroring the collaborative nature of today's workplaces (Alnasib, 2023). This interdisciplinary approach enhances the learning experience and equips students to tackle complex challenges in their respective fields.

Real-world applications are equally important for connecting AI education to practical skills. Educators are tasked with designing curricula that incorporate experiential learning and hands-on projects. Chiu and Chai (2020) propose adopting a self-determination theory framework for sustainable AI education, emphasizing the value of engaging students in meaningful projects that address real-world challenges. Similarly, Zhao et al. (2022) advocate for teachers to foster AI competency through practical applications, such as implementing AI solutions in everyday scenarios, participating in hackathons or coding competitions, and engaging in open-source AI communities (Southworth, Migliaccio, et al., 2023). By providing these opportunities, educators enhance students' understanding of AI and its implications.

In conclusion, educators are vital in addressing the integration of AI literacy into higher education curricula. Their responsibilities encompass curriculum development, interdisciplinary collaboration, and real-world applications. As AI continues to shape various sectors, the need for well-prepared educators who can effectively teach AI concepts becomes increasingly urgent. By adopting a holistic and collaborative approach, educators can prepare students with the knowledge and skills required to excel in an AI-driven world.

### 1.3. ETHICAL CONSIDERATIONS OF AI IN TEACHING AND LEARNING

As artificial intelligence tools proliferate within educational settings, the responsibilities of educators evolve beyond mere instruction to encompass the promotion of ethical awareness, the identification of moral dilemmas, and the support of institutional frameworks that advocate ethical practices. A significant concern pertains to the potential presence of bias within AI algorithms, which may culminate in disparate outcomes for students. Research suggests that AI systems might inadvertently perpetuate pre-existing biases if they are not meticulously conceived and monitored (Zhang et al., 2022; Göçen & Aydemir, 2020). Addressing this concern necessitates the formulation of comprehensive ethical frameworks for AI, which incorporate many perspectives and rigorous evaluation to guarantee fairness and equity in educational applications (Knowles, 2021).

Another critical ethical consideration involves the implications of AI on the role of educators. The incorporation of AI within educational frameworks possesses the capacity to transform traditional teacher-student interactions, with AI systems undertaking responsibilities that have historically been the purview of educators, including grading and feedback provision. This evolution raises apprehensions regarding the diminishing significance of human interaction in learning and the potential for AI to supplant, rather than augment, the educational experience (Ali et al., 2023; Gagné, 2023). To ameliorate this situation, educators must cultivate the requisite skills and knowledge to adapt to this transforming educational environment, ensuring their continued relevance in the teaching process while adeptly utilizing AI tools (Vallis et al., 2023).

The extensive implementation of AI in education necessitates the compilation of substantial quantities of personal data of students. Such data may encompass sensitive information, including academic performance, behavioral

tendencies, and even biometric data, thereby raising considerable privacy concerns (Arvin 2023; Akgün & Greenhow, 2021). The ethical ramifications of data gathering and utilization demand the establishment of a robust framework to guarantee that student privacy is duly respected and safeguarded throughout the process of AI integration.

Notwithstanding the increasing emphasis on ethics in AI education, substantial challenges persist in effectively addressing these matters. The swift progression of technological advancements frequently eclipses the establishment of ethical guidelines, leaving educators and institutions grappling with emerging dilemmas ("Artificial Intelligence in Education: Transformative Potentials and Ethical Considerations," 2023). Klímová et al. (2023) assert that the ethical intricacies associated with AI in education necessitate ongoing dialogue and contemplation among educators and stakeholders. This highlights the critical importance of continuous professional development to assist educators in navigating the shifting ethical landscape of AI within educational contexts.

Fostering ethical awareness among students constitutes a vital obligation for educators in the realm of AI integration. Lee et al. (2021) underscore the importance of AI curricula in undergraduate medical education that encompass not only technical proficiencies but also ethical considerations, such as machine learning literacy and the development of "uniquely human skills" like empathy. This balanced methodology is crucial for equipping students to confront the intricate ethical dilemmas they may encounter in their professional pursuits. These ethical challenges underscore the urgent necessity to acquaint students and educators with the ethical complexities of AI applications in K-12 education and the strategies to address them (Akgün & Greenhow, 2021). In order to meet this imperative, a diverse array of research collectives and nonprofit entities disseminate a variety of open-access resources pertaining to artificial intelligence and ethical considerations (Akgun & Greenhow, 2021). These resources encompass pedagogical materials for both students and educators, including lesson outlines and hands-on activities, in addition to professional development resources for instructors, which feature open virtual learning opportunities (Akgun & Greenhow, 2021). Moreover, D'Souza (2024) underscores the critical importance of securing informed consent from students when incorporating AI technologies within educational frameworks, as this cultivates a collaborative and ethically sound educational environment. By fostering ethical consciousness, educators enable students to identify and confront ethical challenges that may emerge in conjunction with AI technologies.

#### 1.4. PEDAGOGICAL STRATEGIES FOR AI IN HIGHER EDUCATION

AI-powered learning has the potential to revolutionize education by personalizing and enhancing teaching practices. According to Liu (2023), AI tools can adapt teaching strategies to fit individual student's unique learning styles and needs, leading to improved engagement and comprehension. This is particularly effective in fields like language learning, where contextualized teaching such as simulated scenarios helps students apply their skills in meaningful ways (Liu, 2023). Additionally, AI can provide tailored feedback, suggestions, and support to enhance students' self-regulation and metacognitive skills (Jin et al., 2023), creating adaptive learning experiences that address diverse educational requirements.

Additionally, the use of experiential learning can significantly improve students' attitudes and engagement with AI. Kim (2023) elucidates a research endeavor wherein investigators formulated an artificial intelligence educational curriculum predicated on experiential learning tailored for adolescents in middle school. The outcomes indicated that the pupils who participated in this experiential learning-oriented AI education demonstrated enhanced perspectives towards artificial intelligence, thereby underscoring the efficacy of this pedagogical strategy. This methodology enables learners to actively investigate and experiment with concepts related to artificial intelligence, thereby cultivating a more immersive and engaging educational experience.

Interactive teaching methods are important in boosting student involvement and critical thinking. Nguyen et al. (2022) advocate for integrating interactive and adaptive learning platforms to enhance engagement and motivation. Project-based-learning, as highlighted by Xiang (2023), encourages collaboration and innovation while tackling real-world challenges, fostering social awareness and accountability. Similarly, Lin et al. (2022) emphasize the value of interactive design-thinking activities in promoting active participation and problem-solving skills in AI. AI tools such as ChatGPT and Teachable Machine offer additional opportunities for students to engage with AI concepts through practical projects and ethical discussions, enriching their overall learning experience (Jordan et al., 2021; Avsheniuk, 2024).

Finding a balance between technology and human interaction is an important part of teaching with AI. While AI technologies can enhance learning, the human element remains indispensable in fostering meaningful educational experiences. Grunhut et al, (2021), argue that effective human-machine interaction is essential for medical students to utilize AI tools in clinical decision-making. This perspective is echoed by Liu et al, (2022); ("The AI Revolution in Education: Will AI Replace or Assist Teachers in Higher Education?", 2023), that the integration of AI in education should not replace traditional teaching methods but rather complement them, ensuring that students receive guidance and support from educators (Liu et al., 2022). The challenge is combining AI's benefits with the personal connection educators provide.

## 1.5. CHALLENGES IN ADDRESSING AI

Integrating AI into higher education poses several challenges, particularly the necessity for proper training and growth for educators. Lee et al. (2021) highlight that adding AI content to undergraduate medical education requires not just the creation of new materials but also training for teachers to deliver this content effectively. The absence of a clear standard for AI topics makes this harder, as teachers may feel unprepared to teach such a fast-changing subject. Additionally, Sapci and Sapci (2020) stress the importance of ongoing professional development, like workshops and partnerships with industry experts, to help educators stay updated on AI progress and teaching methods. Additionally, Wang, (2023), also attests that educators must continuously adapt their teaching methods to incorporate AI technologies and address the evolving needs of students. Without enough training, teachers may have difficulty using AI tools, leading to a poor learning experience for students.

Furthermore, educators and stakeholders play a key role in creating an ethical framework for AI integration, but they do not have the necessary skills. Educators need to have the knowledge and skills to mitigate challenges and encourage accountable use of AI technologies in their institutions. This includes encouraging awareness of ethical issues and discussing the effects of AI on privacy and data security (Khatri, 2023; Cheng, 2023). Working together, educators, policymakers, and technology developers can establish a strong approach to AI ethics that prioritizes user privacy and builds trust in AI systems.

Another main challenge is resource allocation. Institutions often struggle with budget constraints, making it difficult to allocate sufficient funds for AI initiatives while maintaining essential educational services (Karimi, 2023; Martins et al., 2021). This challenge is compounded by the need for continuous investment in technology, training, and support systems to ensure that faculty and students can effectively utilize AI tools (Li, 2023). Moreover, the implementation of AI-driven solutions requires skilled personnel who can manage and maintain these systems, which may not be readily available in all educational institutions (Karamthulla, 2023). This shortage can lead to an uneven distribution of resources, where institutions with more financial backing can invest in advanced AI technologies, while others may lag, further widening the educational equity gap (Wang, 2020).

Cultural and institutional factors also influence the successful adoption of AI. Teng et al. (2022) found that students' attitudes toward AI depend on their academic backgrounds and career aspirations, highlighting the need for a supportive culture that promotes collaboration among educators, students, and industry stakeholders. Orji (2023) underscores the importance of fostering institutional support for instructors to develop the skills needed to leverage AI tools effectively. Lastly, the lack of standardized guidelines for AI education can lead to inconsistencies in how AI is taught across institutions. Ng, (2023), recommends establishing clear frameworks for AI literacy curriculum design, which can help educators navigate integrating AI into their teaching. Additionally, educators often face barriers related to their preparedness and familiarity with AI technologies. Chiu and Chai (2020) also emphasize the importance of targeted training programs to address gaps in educators' technological knowledge and confidence, ensuring the successful implementation of AI curricula. This pinpoints the need for targeted professional development programs that equip educators with the skills and knowledge required to teach AI effectively.

## 2. DISCUSSION AND CONCLUSION

This study shows how AI can transform education, making learning more effective and engaging while presenting challenges that need careful attention. Creating strong AI literacy programs is key to helping students understand AI and use it responsibly. Approaches like game-based learning and real-world applications make AI concepts easier to grasp, while discussions about ethics, such as data privacy and bias, ensure students think critically about AI's impact



on society. Teachers play a central role in leading these conversations and helping students navigate the complexities of AI.

AI can assist teachers by powering repetitive tasks, allowing them to focus on activities that encourage creativity and critical thinking. However, the human connection that teachers bring such as empathy, understanding, and personal guidance must remain a core part of education. To make the most of AI tools, professional development is essential. Ongoing training can help teachers build confidence and learn how to use AI effectively in their classrooms, ensuring both educators and their students benefit from its potential.

While AI can personalize learning and make it more tailored to individual students, its use must be guided by ethical principles to ensure fairness and transparency. AI should support, not replace, teachers, who remain important for fostering meaningful interactions and guiding critical thinking. By embracing these responsibilities, educators can ensure that AI improves education while keeping its human-centered foundation. Balancing innovation with ethics is important for creating a future where AI supports learning responsibly and inclusively.

### 3. PRACTICAL IMPLICATIONS OF THE STUDY

This study's findings can promote the development of policies and practices that support the use of AI in educational institutions. By understanding the key ethical considerations, curriculum development, and pedagogical strategies, educators, administrators, and policymakers can be more knowledgeable when making decisions about using AI technologies in teaching and learning. Furthermore, considering the role of educators in AI classrooms for ethical AI use through education and training for students, faculties, and staff is crucial for ensuring morally sound and unbiased integration of AI in higher education.

### CONFLICT OF INTERESTS

None.

### ACKNOWLEDGMENTS

None.

### REFERENCES

- Ali, S., Kumar, V., & Breazeal, C. (2023). Ai audit: a card game to reflect on every day ai systems. *Proceedings of the Aaai Conference on Artificial Intelligence*, 37(13), 15981-15989. <https://doi.org/10.1609/aaai.v37i13.26897>
- Akgün, S. and Greenhow, C. (2021). Artificial intelligence in education: addressing ethical challenges in k-12 settings. *AI and Ethics*, 2(3), 431-440. <https://doi.org/10.1007/s43681-021-00096-7>
- Almansour, M. (2024). Generative artificial intelligence and the personalization of health professional education: a narrative review. *Medicine*, 103(31), e38955. <https://doi.org/10.1097/md.00000000000038955>
- Alnasib, B. (2023). Factors affecting faculty members' readiness to integrate artificial intelligence into their teaching practices: a study from the saudi higher education context. *International Journal of Learning Teaching and Educational Research*, 22(8), 465-491. <https://doi.org/10.26803/ijlter.22.8.24>
- Arvin, N. (2023). Teacher experiences with ai-based educational tools. *aitechbesosci*, 1(2), 26-32. <https://doi.org/10.61838/kman.aitech.1.2.5>
- Avsheniuk, N., Lutsenko, O., Svyrydiuk, T., & Seminikhyna, N. (2024). Empowering language learners' critical thinking: evaluating chatgpt's role in english course implementation. <https://doi.org/10.31235/osf.io/fh6v8>
- Cheng, X. (2023). The widespread application of artificial intelligence in education necessitates critical analyses. *Science Insights Education Frontiers*, 16(2), 2475-2476. <https://doi.org/10.15354/sief.23.co081>
- Chiu, T., & Chai, C. (2020). Sustainable curriculum planning for artificial intelligence education: a self-determination theory perspective. *Sustainability*, 12(14), 5568. <https://doi.org/10.3390/su12145568>
- Dai, Y., Chai, C., Lin, P., Jong, M., Guo, Y., & Jian-jun, Q. (2020). Promoting students' well-being by developing their readiness for the artificial intelligence age. *Sustainability*, 12(16), 6597. <https://doi.org/10.3390/su12166597>

- D'Souza, R. (2024). Twelve tips for addressing ethical concerns in the implementation of artificial intelligence in medical education. *Medical Education Online*, 29(1). <https://doi.org/10.1080/10872981.2024.2330250>
- Gagné, J. (2023). The state of artificial intelligence in nursing education: past, present, and future directions. *International Journal of Environmental Research and Public Health*, 20(6), 4884. <https://doi.org/10.3390/ijerph20064884>
- Gagné, J. (2023). Values clarification exercises to prepare nursing students for artificial intelligence integration. *International Journal of Environmental Research and Public Health*, 20(14), 6409. <https://doi.org/10.3390/ijerph20146409>
- Grunhut, J., Wyatt, A., & Marques, O. (2021). Educating future physicians in artificial intelligence (AI): an integrative review and proposed changes. *Journal of Medical Education and Curricular Development*, 8. <https://doi.org/10.1177/23821205211036836>
- Göçen, A., & Aydemir, F. (2020). Artificial intelligence in education and schools. *Research on Education and Media*, 12(1), 13-21. <https://doi.org/10.2478/rem-2020-0003>
- Goel, A. Artificial Intelligence: A Multidisciplinary Perspective. Available online: <https://dypsst.dpu.edu.in/blogs/artificial-intelligence-a-multidisciplinary-perspective/> (accessed on 16 May 2023).
- Holmes, W., Iniesto, F., Anastopoulou, S., & Boticario, J. (2023). Stakeholder perspectives on the ethics of AI in distance-based higher education. *The International Review of Research in Open and Distributed Learning*, 24(2), 96-117. <https://doi.org/10.19173/irrodl.v24i2.6089>
- Ibrahim, A. (2024). Assessing the knowledge and perception of artificial intelligence for teaching and research among lecturers in the faculties of arts in Nigeria. *Journal of Global Research in Education and Social Science*, 18(2), 25-33. <https://doi.org/10.56557/jogress/2024/v18i28671>
- Jin, S., Im, K., Yoo, M., Roll, I., & Seo, K. (2023). Supporting students' self-regulated learning in online learning using artificial intelligence applications. *International Journal of Educational Technology in Higher Education*, 20(1). <https://doi.org/10.1186/s41239-023-00406-5>
- Jordan, B., Devasia, N., Hong, J., Williams, R., & Breazeal, C. (2021). Poseblocks: a toolkit for creating (and dancing) with ai. *Proceedings of the Aaai Conference on Artificial Intelligence*, 35(17), 15551-15559. <https://doi.org/10.1609/aaai.v35i17.17831>
- Karimi, H. (2023). The impact of artificial intelligence on higher education in England. *Creative Education*, 14(12), 2405-2415. <https://doi.org/10.4236/ce.2023.1412154>
- Karamthulla, M. (2023). Optimizing resource allocation in cloud infrastructure through ai automation: a comparative study. *Journal of Knowledge Learning and Science Technology Issn 2959-6386 (Online)*, 2(2), 315-326. <https://doi.org/10.60087/jklst.vol2.n2.p326>
- Khatri, B. (2023). Artificial intelligence (ai) in higher education: growing academic integrity and ethical concerns. *Nepalese Journal of Development and Rural Studies*, 20(01), 1-7. <https://doi.org/10.3126/njdrs.v20i01.64134>
- Kim, S. (2023). Change in attitude toward artificial intelligence through experiential learning in artificial intelligence education. *International Journal on Advanced Science Engineering and Information Technology*, 13(5), 1953-1959. <https://doi.org/10.18517/ijaseit.13.5.19039>
- Klímová, B., Pikhart, M., & Kacatl, J. (2023). Ethical issues of the use of AI-driven mobile apps for education. *Frontiers in Public Health*, 10. <https://doi.org/10.3389/fpubh.2022.1118116>
- Kranz, A. (2024). The impact of artificial intelligence (AI) on midwifery education: a scoping review. *Healthcare*, 12(11), 1082. <https://doi.org/10.3390/healthcare12111082>
- Krutka, D., Manca, S., Galvin, S., Greenhow, C., Koehler, M., Askari, E.: Teaching “against” social media: confronting problems of profit in the curriculum. *Teachers College Record* 121(14), 1–42 (2019)
- Knowles, M. (2021). Five motivating concerns for ai ethics instruction. *Proceedings of the Association for Information Science and Technology*, 58(1), 472-476. <https://doi.org/10.1002/pra2.481>
- Kuleto, V., Ilić, M., Dumangiu, M., Ranković, M., Martins, O., Păun, D., ... & Mihoreanu, L. (2021). Exploring opportunities and challenges of artificial intelligence and machine learning in higher education institutions. *Sustainability*, 13(18), 10424. <https://doi.org/10.3390/su131810424>
- Lee, J., Wu, S, A., Li, D., Kulasegaram, M, k., (2021). Artificial intelligence in Undergraduate Medical Education; A scoping Review. DOI:10.1097/ACM.0000000000000429

- Li, H. (2023). Ai in education: bridging the divide or widening the gap? exploring equity, opportunities, and challenges in the digital age. *Advances in Education Humanities and Social Science Research*, 8(1), 355. <https://doi.org/10.56028/aehtsr.8.1.355.2023>
- Lin, X., Chen, L., Chan, K., Peng, S., Chen, X., Liu, J., ... & Hu, Q. (2022). Teachers' perceptions of teaching sustainable artificial intelligence: a design frame perspective. *Sustainability*, 14(13), 7811. <https://doi.org/10.3390/su14137811>
- Liu, M. (2023). Exploring the application of artificial intelligence in foreign language teaching: challenges and future development. *SHS Web of Conferences*, 168, 03025. <https://doi.org/10.1051/shsconf/202316803025>
- Liu, Y., Chen, L., & Yao, Z. (2022). The application of artificial intelligence assistant to deep learning in teachers' teaching and students' learning processes. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.929175>
- López-Chila, R. (2023). Artificial intelligence in higher education: an analysis of existing bibliometrics. *Education Sciences*, 14(1), 47. <https://doi.org/10.3390/educsci14010047>
- Long, B. Megerko. (2020). What is AI literacy? Competencies and design considerations. *CHI '20: Proceedings of the 2020 CHI conference on human factors in computing systems*, pp. 1-16, 10.1145/3313831.3376
- Luckin, R. (2017). Towards artificial intelligence-based assessment systems. *Nature Human Behaviour*, 1(5), 1-3. DOI:10.1038/s41562-016-0028
- Mahligawati, F. (2023). Artificial intelligence in physics education: a comprehensive literature review. *Journal of Physics Conference Series*, 2596(1), 012080. <https://doi.org/10.1088/1742-6596/2596/1/012080>
- Martins, C., Zaraté, P., Almeida, A., Almeida, J., & Morais, D. (2021). Web-based dss for resource allocation in higher education. *International Journal of Decision Support System Technology*, 13(4), 1-23. <https://doi.org/10.4018/ijdsst.2021100105>
- NAGI, F., Salih, R., Alzubaidi, M., Shah, H., Alam, T., Shah, Z., ... & Househ, M. (2023). Applications of artificial intelligence (AI) in medical education: a scoping review. <https://doi.org/10.3233/shti230581>
- Ng, D. (2023). Design and validation of the AI literacy questionnaire: the affective, behavioural, cognitive and ethical approach. *British Journal of Educational Technology*, 55(3), 1082-1104. <https://doi.org/10.1111/bjet.13411>
- Ng, D., Leung, J., Chu, K., & Qiao, M. (2021). AI literacy: definition, teaching, evaluation and ethical issues. *Proceedings of the Association for Information Science and Technology*, 58(1), 504-509. <https://doi.org/10.1002/pra2.487>
- Nguyen, G., Nguyen, N., & Giang, N. (2022). Situation and proposals for implementing artificial intelligence-based instructional technology in Vietnamese secondary schools. *International Journal of Emerging Technologies in Learning (Ijet)*, 17(18), 53-75. <https://doi.org/10.3991/ijet.v17i18.31503>
- Nguyen, A., Ngo, H., Hong, Y., Dang, B., & Nguyen, B. (2022). Ethical principles for artificial intelligence in education. *Education and Information Technologies*, 28(4), 4221-4241. <https://doi.org/10.1007/s10639-022-11316-w>
- Orji, C. (2023). Application of artificial intelligence and machine learning in diagnosing scaphoid fractures: a systematic review. *Cureus*. <https://doi.org/10.7759/cureus.47732>
- Rütti-Joy, O. (2023). Building AI literacy for sustainable teacher education. *Zeitschrift Für Hochschulentwicklung*, 18(4), 175-189. <https://doi.org/10.21240/zfhe/18-04/10>
- Salhab, R. (2024). AI literacy across curriculum design: investigating college instructor's perspectives. *Online Learning*, 28(2). <https://doi.org/10.24059/olj.v28i2.4426>
- Sapci, A., & Sapci, H. (2020). Artificial intelligence education and tools for medical and health informatics students: systematic review. *JMIR Medical Education*, 6(1), e19285. <https://doi.org/10.2196/19285>
- Schleiss, J. (2023). Ai course design planning framework: developing domain-specific ai education courses. *Education Sciences*, 13(9), 954. <https://doi.org/10.3390/educsci13090954>
- Teng, M, Singla, R., Yau, O., Lamoureux, D., Gupta, A., Hu, Z., Hu, R., Aissiou, A., Eaton, S., Hamm, C., Hu, S., Kelly, D., MacMillan, K.M., Malik, S., Mazzoli, V., Teng, Y., Laricheva, M., Jarus, T., T.S. Field Healthcare students' Perspectives on artificial Intelligence Countrywide Survey in Canada, 8 (1) (2022), Article e33390, 10.2196/33390
- Vallis, C., Wilson, S., Gozman, D., & Buchanan, J. (2023). Student perceptions of ai-generated avatars in teaching business ethics: we might not be impressed. *Postdigital Science and Education*, 6(2), 537-555. <https://doi.org/10.1007/s42438-023-00407-7>
- Wang, S. (2023). Improving college teachers (CT) information-based teaching ability in the era of artificial intelligence (AI). 1188-1192. [https://doi.org/10.2991/978-94-6463-040-4\\_177](https://doi.org/10.2991/978-94-6463-040-4_177)



- Wang, Y. (2020). Educational equity in the age of artificial intelligence—taking the construction of rural teachers as an example. *Us-China Education Review A*, 10(4). <https://doi.org/10.17265/2161-623x/2020.04.005>
- Wood, E., Ange, B., & Miller, D. (2021). Are we ready to integrate artificial intelligence literacy into medical school curriculum: students and faculty survey. *Journal of Medical Education and Curricular Development*, 8. <https://doi.org/10.1177/23821205211024078>
- Xiang, J. (2023). Promoting innovation and practice of introduction to artificial intelligence course with curriculum civics as a handle. *Asian Journal of Education and Social Studies*, 41(3), 30-36. <https://doi.org/10.9734/ajess/2023/v41i3897>
- Zhang, H., Lee, I., Ali, S., DiPaola, D., Cheng, Y., & Breazeal, C. (2022). Integrating ethics and career futures with technical learning to promote AI literacy for middle school students: an exploratory study. *International Journal of Artificial Intelligence in Education*, 33(2), 290-324. <https://doi.org/10.1007/s40593-022-00293-3>
- Zhao, L., Wu, X., & Luo, H. (2022). Developing AI literacy for primary and middle school teachers in China: based on a structural equation modeling analysis. *Sustainability*, 14(21), 14549. <https://doi.org/10.3390/su142114549>