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ARTIFICIAL INTELLIGENCE AND ACADEMIC INTEGRITY IN HIGHER EDUCATION: EVIDENCE FROM STUDENT USE OF AI TOOLS

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Abstrak

Integrasi kecerdasan buatan (Artificial Intelligence/AI) yang berlangsung sangat cepat di pendidikan tinggi telah mengubah cara mahasiswa mendekati proses pembelajaran akademik dan penyelesaian tugas, sekaligus menghadirkan peluang pedagogis serta tantangan etis. Penelitian ini bertujuan untuk mengkaji pola penggunaan AI, manfaat yang dirasakan, serta tantangan yang berkaitan dengan integritas akademik di kalangan mahasiswa calon guru Bahasa Inggris di pendidikan tinggi. Penelitian ini menggunakan desain kuantitatif deskriptif, dengan pengumpulan data melalui kuesioner daring terstruktur yang melibatkan 338 mahasiswa calon guru, dan dianalisis menggunakan statistik deskriptif. Hasil penelitian menunjukkan tingkat adopsi AI yang sangat tinggi, di mana 98,2% responden melaporkan penggunaan AI secara rutin untuk mendukung aktivitas akademik mereka. Temuan ini menunjukkan bahwa AI telah menjadi bagian yang terintegrasi dalam rutinitas pembelajaran mahasiswa sehari-hari. Namun demikian, penggunaan AI cenderung bersifat berorientasi pada efisiensi, dengan 44,1% mahasiswa menggunakan AI terutama untuk menyelesaikan tugas dan 40,8% untuk meningkatkan efisiensi waktu, sementara hanya 15,1% yang menggunakan AI secara eksplisit untuk meningkatkan kualitas akademik. Meskipun berorientasi instrumental, mahasiswa menunjukkan tingkat kesadaran etis yang cukup tinggi, di mana 72,8% responden mengakui bahwa AI berpotensi mengancam integritas akademik, khususnya terkait kejujuran dan orisinalitas karya akademik. Di sisi lain, AI juga dipersepsikan memberikan manfaat yang bermakna bagi pembelajaran. Sebagian besar responden (68,6%) melaporkan adanya peningkatan kualitas hasil akademik ketika menggunakan AI, dengan karya yang dinilai lebih terstruktur, akurat, dan rapi. Selain itu, 77,5% mahasiswa menyatakan peningkatan rasa percaya diri dalam menyelesaikan tugas akademik dengan dukungan AI, yang menunjukkan bahwa AI dapat berfungsi sebagai bentuk cognitive dan affective scaffolding. Secara keseluruhan, penelitian ini menegaskan peran ganda AI dalam pendidikan tinggi, yakni sebagai alat pendukung pembelajaran yang meningkatkan produktivitas sekaligus sebagai sumber ketegangan etis. Temuan ini menegaskan pentingnya pedoman institusional yang jelas, penguatan literasi etis, serta strategi pedagogis yang mendorong penggunaan AI secara bertanggung jawab, reflektif, dan berorientasi pada pembelajaran dalam pendidikan guru.

Kata kunci: kecerdasan buatan, integrasi pembelajaran, mahasiswa pendidikan tinggi, integritas akademik, pendidikan tinggi

Abstract

The rapid integration of artificial intelligence (AI) into higher education has transformed how students approach academic learning and task completion, raising both pedagogical opportunities and ethical concerns. This study investigates patterns of AI use, perceived benefits, and integrity-related challenges among pre-service English teachers in a higher education context. Using a descriptive quantitative design, data were collected from 338 pre-service teachers through a structured online questionnaire and analysed using descriptive statistics. The findings reveal an exceptionally high level of AI adoption,

with 98.2% of respondents reporting regular use of AI tools to support their academic activities, indicating that AI has become embedded in students' everyday learning routines. However, AI use was found to be predominantly efficiency-oriented, with 44.1% of students using AI primarily for task completion and 40.8% for time efficiency, while only 15.1% reported using AI to explicitly enhance academic quality. Despite this instrumental orientation, students demonstrated substantial ethical awareness, as 72.8% acknowledged that AI has the potential to undermine academic integrity, particularly in relation to honesty and originality. At the same time, AI was perceived to offer meaningful learning-related benefits. A majority of respondents (68.6%) reported improvements in the quality of their academic outputs when using AI, describing their work as more structured, accurate, and polished. Furthermore, 77.5% of students indicated increased confidence in completing academic tasks with AI support, suggesting that AI may function as a form of cognitive and affective scaffolding. Overall, the study highlights the dual role of AI in higher education as both a productivity-enhancing learning support tool and a source of ethical tension. These findings underscore the need for clear institutional guidelines, ethical literacy, and pedagogical strategies that promote responsible, reflective, and learning-oriented use of AI in teacher education.
Keywords: *artificial intelligence, learning integration, higher education students, academic integrity, higher education*

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INTRODUCTION

Artificial intelligence (AI) is a rapidly advancing technological field with the potential to transform various aspects of human social interaction (Wang & Yu, 2024). Within the educational sector, AI has begun to offer innovative solutions for teaching and learning processes, which are currently being explored and implemented across diverse contexts (Pedro, Subosa, Rivas, Valverde, & Paula, 2019). In this era of accelerated technological development, particularly in AI (Bates et al., 2020), education is confronted with substantial challenges and shifts (Fuchs & Aguilos, 2023; Hwang & Chang, 2021; Wollny et al., 2021; Popenici & Kerr, 2017; Shukla et al., 2020). Among the most influential AI-based applications with transformative potential in education are ChatGPT and Natural Language Processing (NLP) technologies (Schijven & Kikkawa, 2023; Hill-Yardin et al., 2023; Fuchs, 2023).

AI does not merely redefine the way information is delivered; it also shapes values, ethics, and moral orientations among younger generations (Miswar et al., 2023). To address limitations in conventional education, numerous AI-driven learning tools have been developed to analyze large-scale data, understand individual learning needs, and provide personalized learning experiences (Yousaf, Satti, Khan, & Um-e-Safia, 2025). Initial applications of AI in language education, such as automated grammar correction and basic adaptive exercises, have evolved into advanced platforms capable of real-time interaction, contextual comprehension, and cultural sensitivity. By integrating natural language processing, machine learning, and big data analytics, these systems can simulate human interaction (Fuchs & Aguilos, 2023) while delivering highly personalized feedback and learning support on an unprecedented scale (Bilquise & Shaalan, 2021).

Despite these advancements, AI also introduces significant challenges. While it facilitates information access, task completion, and decision-making (Bilquise & Shaalan, 2022; Pereira & Díaz, 2022; Nirala et al., 2022), the same sophistication may contribute to increased academic dishonesty (Finnie-Ansley, 2022). AI's ability to generate high-quality academic outputs within seconds poses

potential threats to students' academic integrity (Chindia & Wawire, 2024). Furthermore, excessive reliance on AI may diminish human interaction, which remains fundamental to effective education. Teacher–student relationships play a critical role in shaping moral values and character development; thus, technology should not replace meaningful human engagement. Strategic efforts are therefore necessary to sustain academic integrity and ethical educational values amid rapid technological evolution (Fauzi et al., 2022).

This study aims to explore how higher education students adopt and integrate AI as a learning support tool in accomplishing academic tasks. The study is significant given the need to identify key challenges related to maintaining academic integrity in the AI era and to formulate practical solutions within educational environments. A multidimensional approach encompassing educational, technological, and policy perspectives is proposed. Key strategies include developing digital literacy and ethical AI usage programs for students and educators (Gutierrez-Aguilar et al., 2024) as well as designing curricula that foster critical and analytical thinking to prevent overreliance on technology (Selwyn, 2019). Additionally, AI applications can optimize resource distribution and strengthen online learning practices, thereby supporting curriculum development and enhancing teaching quality (Jing, 2023).

METHOD

This study employed a descriptive quantitative approach to identify the use of artificial intelligence (AI) among higher education students. A total of 338 higher education students participated as respondents. Participants were randomly selected from four different academic cohorts, namely the second, fourth, sixth, and eighth semesters. Data were collected using a standardized measurement instrument with an established rating scale (Siroj et al., 2024). The questionnaire was administered via Google Forms, which is considered an effective platform for facilitating data collection without compromising the quality and substance of respondents' input (Sianipar, 2019).

Data were obtained through a structured questionnaire consisting of items related to students' experiences in using AI, ethical considerations in AI utilization, and the perceived impact of AI on the enhancement of learning quality. Descriptive statistical analysis was conducted to summarize and interpret the data. To ensure the accuracy and consistency of the research instrument, both validity and reliability tests were performed on the questionnaire prior to data analysis.

RESULTS AND DISCUSSION

The research findings reveal a complex and multifaceted pattern of artificial intelligence use among higher education students. Rather than reflecting a single, uniform impact, AI adoption appears to shape students' learning experiences through a combination of instrumental practices, perceived benefits, and ethical considerations. The data indicate that AI has become deeply embedded in academic routines, serving primarily as a productivity-support tool while simultaneously influencing students' perceptions of learning quality, academic integrity, and confidence.

Taken together, the findings, as synthesised in Figure 1, depict a coherent pattern of how artificial intelligence is embedded in students' academic practices and how its use translates into both learning-related outcomes and ethical considerations. The framework begins with the exceptionally high level of AI adoption, where 98.2% of respondents reported using AI as part of their academic learning, indicating that AI has become a routine component of students' learning environments rather than a peripheral or experimental tool. This widespread adoption forms the foundation for subsequent patterns of use illustrated in the framework.

As shown by the first directional link in Figure 1, extensive AI adoption is followed by a predominantly efficiency-oriented use orientation. Specifically, 44.1% of students reported using AI primarily to facilitate task completion, while 40.8% relied on AI to enhance time efficiency. In

contrast, only 15.1% indicated that their primary motivation for using AI was to improve the quality of academic work. This distribution suggests that, despite near-universal access and use, AI is largely perceived as a means of reducing cognitive and temporal demands rather than as a tool for deepening conceptual understanding or enhancing learning quality.

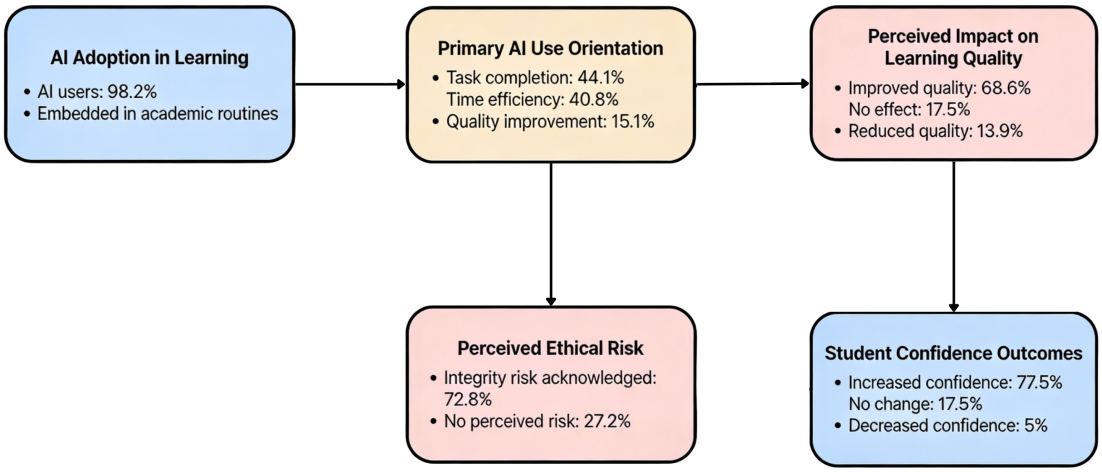

Figure 1. An Integrated Framework of Al Adoption, Use Orientation, and Learning-Related Outcomes

The framework further illustrates two interconnected pathways emerging from this efficiency-oriented use. The downward arrow from AI use orientation highlights its association with ethical awareness, where a substantial majority of students (72.8%) acknowledged that AI use carries the potential to undermine academic integrity, particularly in terms of honesty and originality, while 27.2% did not perceive such risks. This pathway indicates that instrumental use of AI does not occur in an ethically naïve manner; rather, students demonstrate a high level of awareness regarding the ethical tensions inherent in AI-assisted academic work.

Simultaneously, the horizontal progression in Figure 1 links AI use orientation to perceived learning-related outcomes. Despite ethical concerns, a clear majority of respondents (68.6%) reported that AI use improved the quality of their academic outputs, describing AI-supported work as more structured, accurate, and polished. Nevertheless, this positive perception was not universal, as 17.5% of students reported no noticeable impact on learning quality and 13.9% perceived a decline, suggesting variability in how effectively AI is integrated into learning processes.

Finally, the framework shows that perceived improvements in learning quality are closely associated with students' confidence outcomes. As indicated by the final linkage, 77.5% of respondents reported increased confidence when completing academic tasks with AI support, while 17.5% experienced no change and only 5% reported decreased confidence. This pattern suggests that AI functions not only as a productivity tool but also as a form of cognitive and affective scaffolding that can reduce task-related anxiety and enhance students' sense of academic capability when used appropriately.

Overall, Figure 1 illustrates a dynamic and interconnected process in which widespread AI adoption leads to efficiency-driven use, accompanied by heightened ethical awareness and generally positive—though not uniform—learning and confidence outcomes. The following sub-sections unpack each component of this framework in greater detail by examining the prevalence of AI use, students' primary purposes for engaging with AI, perceived risks to academic integrity, perceived impacts on learning quality, and the influence of AI on students' academic confidence.

Prevalence Of Ai Use Among Higher Education Students

The analysis of data from 338 higher education students indicates an exceptionally high level of AI adoption in academic learning. A total of 98.2% of respondents reported having used AI-based tools as learning assistants during their university studies. This finding demonstrates that AI has become deeply embedded in students' academic routines and is no longer perceived as an optional or experimental technology, but rather as a regular component of learning support. This widespread adoption suggests that pre-service teachers possess adequate technological literacy to engage with emerging digital tools. It also reflects their capacity to adapt quickly to technological advancements that offer practical benefits for academic tasks.

Primary Purposes of AI Utilization

The analysis of the data indicates that, although student engagement with artificial intelligence is extensive, its use remains predominantly instrumental in nature. The findings show that 44.1% of respondents reported using AI primarily to facilitate task completion, while an additional 40.8% indicated that AI is mainly employed to improve time efficiency. Taken together, these results suggest that nearly nine out of ten students (89%) rely on AI chiefly for productivity-oriented purposes. In contrast, only 15.1% of respondents reported using AI with the explicit intention of improving the quality of their academic responses. This distribution indicates that AI is largely perceived as a tool for reducing cognitive and time-related demands rather than as a means of enhancing conceptual understanding, learning depth, or academic quality.

Perceived Risks to Academic Integrity

Concerns regarding academic integrity emerged prominently from the data. A substantial majority of respondents (72.8%) acknowledged that the use of artificial intelligence has considerable potential to undermine academic honesty and originality in completing assignments, while 27.2% did not perceive AI as posing such a risk. This finding suggests a high level of ethical awareness among students regarding the implications of AI-assisted academic work. In particular, respondents appear to recognise the ease with which AI-generated content can be submitted as original output, thereby blurring the boundaries between legitimate academic support and dishonest practice. This awareness underscores a fundamental tension between the convenience and efficiency offered by AI technologies and the ethical responsibilities that underpin academic integrity in higher education.

Perceived Impact of AI on Learning Quality

In contrast to concerns surrounding academic integrity, the findings also indicate a generally positive perception of artificial intelligence in relation to academic quality. A clear majority of respondents (68.6%) reported that the use of AI contributed to improvements in the quality of their academic outputs, while 13.9% perceived a reduction in quality and 17.5% reported no noticeable effect. Students who viewed AI positively described AI-supported assignments and assessments as more structured, accurate, and polished than work completed without AI assistance. These perceptions suggest that, when used appropriately, AI can function as a form of cognitive scaffolding by offering structural guidance, feedback, and linguistic support that assist students in meeting higher academic standards.

Influence of AI on Students' Confidence

The data further indicate that AI use has a positive impact on students' confidence levels. A total of 77.5% of respondents reported feeling more confident when completing academic tasks with the support of AI tools. Meanwhile, 17.5% reported no noticeable impact, and only 5% reported a decline in confidence. This increase in confidence shows that AI may reduce anxiety associated with complex academic tasks, enabling students to engage more actively and assertively in their learning processes.

Discussion

AI as an Emerging Norm in Teacher Education

The near-universal adoption of AI among higher education students reflects a broader shift in higher education toward technology-mediated learning. Consistent with previous studies (Falade, 2021; Muritala, 2022), this finding reinforces the view that university students are among the most technologically adaptive groups. For pre-service teachers, early exposure to AI is particularly significant, as it may shape their future instructional practices and attitudes toward educational technology integration.

Efficiency-Oriented Use and Its Pedagogical Implications

Although AI is widely used, the dominance of efficiency-driven motives raises important pedagogical concerns. AI technologies are designed not only to save time but also to enhance analytical depth, provide personalized feedback, and support higher-order thinking (Wang & Yu, 2024; Fuchs & Aguilos, 2023). However, when AI is primarily used to expedite task completion, its transformative potential for learning may be underutilized. This finding invites critical reflection on whether current instructional designs and assessment practices encourage meaningful engagement with AI or merely facilitate surface-level learning.

Academic Integrity in the Age of AI

The strong perception that AI threatens academic integrity aligns with concerns raised in earlier research (Abidin, 2023). AI's ability to generate fluent, contextually appropriate responses complicates the evaluation of students' authentic competencies. When originality becomes difficult to verify, assessment validity is at risk. These findings underscore the urgent need for clear institutional guidelines, ethical frameworks, and assessment redesigns that emphasize process-oriented learning, reflection, and critical engagement rather than solely product-based outcomes.

AI as a Tool for Quality Enhancement

Despite ethical concerns, the perception that AI improves learning quality presents a promising avenue for educational development. When used responsibly, AI can provide exposure to high-quality academic models, support language accuracy, and assist in organizing complex ideas (Nurhalifah et al., 2024). Over time, consistent interaction with such models may contribute to the internalization of higher performance standards among students (Schaap et al., 2021). This suggests that AI should be positioned not as a replacement for student effort, but as a guided support tool embedded within well-designed pedagogical structures.

Confidence Building and Professional Development

The positive relationship between AI use and students' confidence is particularly relevant for pre-service teachers. Confidence plays a crucial role in professional identity formation and instructional readiness. As previous studies indicate, learners who demonstrate higher confidence tend to produce higher-quality work and engage more actively in learning tasks (Schaap et al., 2021). However, it is essential to ensure that this confidence is grounded in genuine competence rather than overdependence on AI. Structured guidance, reflective tasks, and gradual reduction of AI scaffolding may help balance confidence development with skill mastery.

Balancing Opportunities and Risks

Overall, the findings highlight the dual role of AI in teacher education. While AI offers substantial opportunities to enhance learning quality, efficiency, and confidence, it also introduces significant risks related to academic integrity and shallow learning practices. Addressing this tension requires a balanced approach that integrates ethical literacy, pedagogical innovation, and thoughtful

assessment design. Future research should explore how different patterns of AI use influence long-term learning outcomes and professional competence among pre-service teachers, particularly in language education contexts.

CONCLUSION

Based on the analysis of the research data, it can be concluded that AI has been used by almost all respondents. Due to its advanced capabilities, AI provides various forms of assistance that make academic tasks easier and faster to complete. For this reason, it is not surprising that nearly 100% of respondents reported using AI to support their academic work at university.

However, the sophistication of AI also serves as a warning for educational stakeholders, including both lecturers and students. There are several important issues that must be anticipated in the use of AI in academic settings. One key issue is the purpose of AI use. This study found that students tend to use AI mainly to speed up and simplify their work, rather than to improve the quality of their academic performance.

In addition, the study revealed that most students acknowledge that AI has the potential to encourage dishonest behavior in completing assignments or examinations. This finding highlights the need for clear guidance, supervision, and ethical regulations regarding the use of AI by students. Without proper control, AI use may negatively affect academic integrity.

Despite these challenges, the study also confirms the significant potential of AI in supporting student learning. First, AI is believed to help students produce better-quality academic work. This suggests that AI can expose students to higher performance standards that may guide their future work. Second, the findings show that AI use increases students' confidence when completing academic tasks. Most students reported feeling more confident when assisted by AI. This higher level of confidence is expected to encourage students to produce higher-quality work in the future.

REFERENCES

Abidin, A. A. (2023). Dampak penggunaan smartphone pada proses pembelajaran. *Education: Scientific Journal of Education*, *1*(2). https://journal.csspublishing.com/index.php/education/article/view/111/65

Afandi, A. R., & Kurnia, H. (2023). Revolusi teknologi: Masa depan kecerdasan buatan (AI) dan dampaknya terhadap masyarakat. *Academy of Social Science and Global Citizenship Journal*, *3*(1), 9–13. https://doi.org/10.47200/aossagcj.v3i1.1837

Bates, T., Cobo, C., Mariño, O., & Wheeler, S. (2020). Can artificial intelligence transform higher education? *International Journal of Educational Technology in Higher Education*, *17*, Article 42. https://doi.org/10.1186/s41239-020-00218-x

Bilquise, G., & Shaalan, K. (2022). AI-based academic advising framework: A knowledge management perspective. *International Journal of Advanced Computer Science and Applications*, *13*(8). https://doi.org/10.14569/IJACSA.2022.0130823

Bülbül, A. E., & Özelçi, S. Y. (2024). The mediating role of mobile learning motivation in the relationship between pre-service teachers' digital literacy and pre-service teacher identity. *Education and Information Technologies*. https://doi.org/10.1007/s10639-024-12868-9

Eaton, S. E., Pethrick, H., & Turner, K. L. (2023). Academic integrity and student mental well-being: A rapid review. *Canadian Perspectives on Academic Integrity*, *5*(2), 34–58. https://doi.org/10.11575/cpai.v5i2.73748

Falade, A. (2021). Perceptions on the utilization of mobile technologies for learning among postgraduate students. *Indonesian Research Journal in Education*, *5*(1), 159–174. https://doi.org/10.22437/irje.v5i1.9036

Fauzi, E., Sinatrya, M. V., Ramdhani, N. D., Ramadhan, R., & Safari, Z. M. R. (2022). The influence of advances in information technology on accounting development. *Journal of Economic Education Research*, *7*(2), 189–197.

Finnie-Ansley, P. D. R. (2022). The robots are coming: Exploring the implications of OpenAI Codex on introductory programming. In *Proceedings of the Association for Computing Machinery*. https://doi.org/10.1145/3511861.3511863

Fuchs, K. (2023). Exploring the opportunities and challenges of NLP models in higher education: Is ChatGPT a blessing or a curse? *Frontiers in Education*, *8*, Article 1166682. https://doi.org/10.3389/feduc.2023.1166682

Fuchs, K., & Aguilos, V. (2023). Integrating artificial intelligence in higher education: Empirical insights from students about using ChatGPT. *International Journal of Information and Education Technology*, *13*(9).

Hill-Yardin, E. L., et al. (2023). A chat (GPT) about the future of scientific publishing. *Brain, Behavior, and Immunity*, *110*, 152–154. https://doi.org/10.1016/j.bbi.2023.02.022

Hwang, G. J., & Chang, C.-Y. (2021). A review of opportunities and challenges of chatbots in education. *Interactive Learning Environments*, 1–14. https://doi.org/10.1080/10494820.2021.1952615

Jing, H. (2023). Artificial intelligence in higher education. In *Advances in computer and electrical engineering*. https://doi.org/10.4018/978-1-6684-6937-8.ch014

Koul, A., Bawa, R. K., & Kumar, Y. (2023). Artificial intelligence techniques to predict airway disorders illness: A systematic review. *Archives of Computational Methods in Engineering*, *30*, 831–864. https://doi.org/10.1007/s11831-022-09818-4

Labajová, L. (2023). *The state of AI: Exploring the perceptions, credibility, and trustworthiness of users towards AI-generated content* (Master's thesis). Malmö University. https://urn.kb.se/resolve?urn=urn:nbn:se:mau:diva-1772553

Mhlanga, D. (2023). *ChatGPT in education: Exploring opportunities for emerging economies to improve education with ChatGPT*. University of Johannesburg. https://doi.org/10.2139/ssrn.4355758

Miswar, et al. (2023). *HMI leadership roadmap*. Nas Media Pustaka.

Muritala, N. (2022). Pre-service teachers' integration of mobile learning technologies for instruction. *Indonesian Journal of Educational Research and Review*, *5*(1), 158–168. https://doi.org/10.23887/ijerr.v5i1.46159

Nisa, K., Ramadhan, S., & Thahar, H. E. (2023). Assessing undergraduate students' perspectives on lecturers' technology, pedagogy, and content knowledge competency. *Cypriot Journal of Educational Sciences*, *18*(1), 146–157. https://doi.org/10.18844/cjes.v18i1.8364

Oravec, J. (2022). AI, biometric analysis, and emerging cheating detection systems: The engineering of academic integrity. *Education Policy Analysis Archives*, *30*, Article 175. https://doi.org/10.14507/epaa.30.5765

Nurhalifah, Rizaldi, D. R., Muktopan, & Nilwan. (2024). Dampak positif dan negatif penggunaan smartphone terhadap prestasi belajar siswa. *Action Research Journal*, *1*(1), 10–17. https://ejournal.lembagaeinsteincollege.com/ARJ/article/view/22

Pedro, F., et al. (2019). *Artificial intelligence in education: Challenges and opportunities for sustainable development*. UNESCO Education Sector. https://hdl.handle.net/20.500.12799/6533

Pereira, J., & Díaz, Ó. (2022). Struggling to keep tabs on capstone projects: A chatbot to tackle student procrastination. *ACM Transactions on Computing Education*, *22*(1), 1–22. https://doi.org/10.1145/3469127

Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning*, *12*, Article 22. https://doi.org/10.1186/s41039-017-0062-8

Salmi, J., & Setiyanti, A. (2023). Persepsi mahasiswa terhadap penggunaan ChatGPT di era Pendidikan 4.0. *Jurnal Ilmiah Wahana Pendidikan*, *9*(19), 399–406. https://doi.org/10.5281/zenodo.8403233

Schaap, H., van der Want, A., Oolbekkink-Marchand, H. W., & Meijer, P. C. (2021). Changes over time in the professional identity tensions of Dutch early-career teachers. *Teaching and Teacher Education*, *100*, Article 103283. https://doi.org/10.1016/j.tate.2021.103283

Schijven, M. P., & Kikkawa, T. (2023). Why is serious gaming important? Let's have a chat! *Simulation & Gaming*, *54*(2), 147–149. https://doi.org/10.1177/10468781231152682

Selwyn, N. (2019). *Digital technology and the contemporary university*. Routledge. https://doi.org/10.4324/9781315768656

Sianipar, A. Z. (2019). Penggunaan Google Form sebagai alat penilaian kepuasan pelayanan mahasiswa. *Journal of Information System, Applied, Management, Accounting and Research*, *3*(1), 16–22. https://journal.stmikjayakarta.ac.id/index.php/jisamar/article/view/72

Siroj, R. A., Afgani, W., Fatimah, F., Septaria, D., & Salsabila, G. Z. (2024). Metode penelitian kuantitatif pendekatan ilmiah untuk analisis data. *Jurnal Review Pendidikan dan Pengajaran*, *7*(3), 11279–11289. https://doi.org/10.31004/jrpp.v7i3.32467

Wang, M., & Yu, L.-J. (2024). Digitalization's impact on Chinese higher vocational teachers: Identity, satisfaction, resignation. *Journal of Information Systems Engineering and Management*, *9*(4), Article 27356. https://doi.org/10.55267/jisem.07.15438

Pratiwi, W. R. (2023). *Pemanfaatan artificial intelligence (AI) dalam dunia pendidikan*. PT Radar Makassar Intermedia. https://www.pratiwiwidyarizky.my.id/

Williamson, B., & Eynon, R. (2020). Historical threads, missing links, and future directions in AI in education. *Learning, Media and Technology*, *45*(3), 223–235. https://doi.org/10.1080/17439884.2020.1798995

Wollny, S., et al. (2021). Are we there yet? A systematic literature review on chatbots in education. *Frontiers in Artificial Intelligence*, *4*, Article 654924. https://doi.org/10.3389/frai.2021.654924

Yousaf, F., Satti, S. M. J., Khan, Z., & Um-e-Safia. (2025). AI-powered personalized learning: Advancing language education in the digital era. *Journal of Social Signs Review*, *2*(4), 730–740. https://socialsignsreview.com/index.php/12/article/view/71

Zawacki-Richter, O., Marín, V. I., Bond, M., et al. (2019). Systematic review of research on artificial intelligence applications in higher education: Where are the educators? *International Journal of Educational Technology in Higher Education*, *16*, Article 39. https://doi.org/10.1186/s41239-019-0171-0