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Exploring AI Literacy Levels Among University Students Through the Lens of Self-Efficacy: A Case Study From a Historically Disadvantaged University

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Abstract:

Artificial intelligence (AI) is increasingly embedded in higher education, yet the role of psychological factors such as self-efficacy in shaping students' readiness to use AI remains underexplored. This study examines how self-efficacy influences AI literacy levels, defined as students' ability to understand, apply, and critically evaluate AI tools, among university students at a historically disadvantaged South African institution. Guided by Bandura's self-efficacy theory, a quantitative survey was conducted with 153 students using a structured questionnaire measuring mastery experiences, vicarious experiences, social persuasion, and emotional states. Results show that more than 70% of students expressed confidence in understanding AI concepts, while 78% reported being able to learn new AI tools with ease. Patterns in the descriptive statistics further suggest that students who reported prior experience with AI, encouragement from peers and lecturers, and low levels of anxiety tended to express higher confidence in using AI. These findings indicate that self-efficacy is a critical enabler of AI literacy, with psychological readiness complementing technical competence. The unique contribution of this study lies in its focus on students from a resource-constrained, historically disadvantaged university and its integration of Bandura's four self-efficacy dimensions into the study of AI literacy. The results suggest that interventions such as peer mentoring programs, hands-on AI workshops, and structured feedback sessions can enhance both confidence and competence, thereby supporting equitable AI adoption in higher education.

Keywords: *AI Literacy, Artificial Intelligence in Learning, Bandura's Self-Efficacy Theory, Higher Education, Student Readiness*

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Introduction

The rapid pace at which Artificial Intelligence (AI) has been adopted into various sectors has consistently been characterised as transformational (Wamba, 2022). From healthcare to finance, transportation, and creative industries, AI technologies now reshape the approach to performing tasks, making decisions, and solving problems (Xu et al., 2024). For instance, Tshibangu and Thembane (2025) reviewed AI use in STEM education and found that infrastructure deficits, lecturer preparedness, and ethical gaps remain critical barriers. This reinforces the need to study not only access to AI but also students' readiness to adopt such tools. AI is increasingly used in education to facilitate teaching and learning through adaptive learning platforms, intelligent tutoring systems, and automated grading. Dwiantoro, Sujana, and Hatta (2025) also posited that AI programming education can be supplemented with personal collaboration and comments, yet with consideration regarding over-reliance and authorship-related ethical considerations. These studies are testaments to the need for self-efficacy as a mediating variable in students' usage with AI tools.

Another less contentious issue is the AI literacy challenge, and it may be imagined as covering understanding, utilising, and critical analysis of AI technologies. Su et al. (2023) literacy in AI is imagined as moving beyond computer literacy because of the necessity of a wider array of knowledge or skills including knowledge of what is capable and incapable of doing of AI, AI ethics, and capability of utilising AI tools in numerous settings. What is specially distinguishing about AI literacy with regard to digital literacy is an added focus on understanding algorithmic decision-making, machine learning core, and automated systems morality. To Dwiantoro et al (2025) excessive usage of AI and threat of students' critical thinking skills decay and worries about bias and authorship and inability of applying AI-specified solution applied in daily living students, what is integral about AI literacy is providing exercise for students' future potentiality of copping with AI conditions of learning and teaching. Ndlovu and Maguraushe (2025) described a scenario of balance between ethics and privacy in the nexus of AI adoption in higher education settings. They emphasise literacy in AI necessitating moving beyond technological competency and encompassing sensitivity in ethics as seen in our study focus on psychological preparedness and responsible usage of AI technologies. In response, AI literacy is imagined as supporting students' elevated self-confidence and capability of utilising AI tools, expanding enrichment of educational experience and outcomes (Ng et al., 2024).

Despite the increasing interest in AI literacy, there is a clear gap in the existing literature regarding the levels of AI literacy among university students and how these levels impinge on their engagement with AI-driven learning. While extant studies have focused on AI use in education (Holmes & Tuomi, 2022; Zhai et al., 2021; Kizilcec, 2024), very few have considered the role of AI literacy in defining students' experiences with AI-augmented learning environments. This absence bears greater significance as AI tools are increasingly used in higher education institutions where students are expected to apply them in their academic work (Ng et al., 2024). It is difficult to identify students' preparedness in AI-enriched learning settings without understanding students' AI literacy levels.

The integration of AI technologies in educational institutions requires not only technological competence but also psychological readiness for applying such tools. Students must be motivated and confident to explore, study, and actively employ AI systems as part of their learning process. In lieu of the above, the present study aims to fill the gap through examining AI literacy levels of students at the college level from the perspective of self-efficacy. Self-efficacy, according to Bandura in his theory on social cognition, is described as belief in one's capability of taking up a certain task or situation (Ilmiani et al., 2021). In AI literacy, self-efficacy is the most prominent variable determining students' motivation and confidence in employing AI tools. According to Ilmiani et al. (2021), self-efficacious individuals will develop a favorable attitude in employing technology, endure over odds, and remain successful in employing it. In contrast, the contrary scenario is that of people with weak self-efficacy and become frozen with anxieties or desperation upon encountering the technologies with the end being no interest and poor usage. Therefore, this study seeks to analyse AI literacy through the concept of self-efficacy to situate AI-related learning with reference to the various factors that either design or constrain students' engagement in the enhancement of AI literacy and self-efficacy.

The aim of this study is to explore the levels of AI literacy among university students and examine how self-efficacy influences their confidence and motivation to engage with AI tools in academic settings. The primary objective of this study is to explore the relationship between AI literacy and self-efficacy among university students, with the goal of understanding their readiness to engage with AI-driven learning for effective AI integration in higher education. To achieve this aim, the study has the following objectives:

1. To assess the levels of AI literacy among university students, which may affect their engagement with AI-driven learning.
2. To examine the role of self-efficacy in shaping students' confidence and motivation to use AI tools in academic settings.

The significance of this research extends beyond the immediate focus on the tertiary education environment. With AI becoming more integral to various spheres of society, competence in knowing and using AI technologies will become essential for individuals from all walks of life. By developing a better understanding of AI literacy and self-efficacy among students at the university level, this study can play a role in informing more extended efforts towards AI literacy promotion among various sectors and groups. Additionally, the outcome of this research could inform the development of more effective AI integration into universities to help prepare students for dealing with challenges and possibilities offered by AI-facilitated learning environments. An AI literacy understanding of self-efficacy is an ideal opportunity to develop knowledge of students' motivation and confidence-affecting factors for the application of AI tools as well as potential strategies for enhancing their AI literacy. Finally, the study contributes to the grand objective of enhancing AI literacy and self-efficacy among undergraduate learners, practically preparing them for an AI-perscribed future and all the challenges and reward it brings.

Related Work

Incorporating Artificial Intelligence into educational systems has become a new point of interest among researchers, educators and policy makers. The continuing development of AI technologies has made it clear that they can transform teaching and learning. This literature review explores two key themes relevant to the study, namely AI literacy and its importance in education and self-efficacy and its influence on technology adoption. These themes are critically examined, identifying gaps in relevant literature and establishing the theoretical basis for the study.

AI Literacy and Its Importance in Education

With the recent development of AI technology, AI literacy has grown with higher research attention as an area. AI literacy was described as the ability to perceive and exploit AI technologies and judge them with a critical eye (Long & Magerko, 2020). In contrast, Ng et al. (2021) posited that an AI-literate person would therefore require knowledge and competencies in the background so as to judge the strength and weakness of AI as well as the ethical outcomes of applying it in whatever situation. In education, AI literacy of students is very vital and directly connects with students' ability to perform in AI-enacted teaching and learning environments. An understanding of the work of AI algorithms enables students to better interact with the outcomes of AI-enacted teaching and learning processes and perform better, as opposed to those lacking such development. Students with very minimal AI literacy might therefore end up much too often frustrated and withdrawal, prompting them into disengagement with the educational environment (Selwyn, 2019). In an attempt to counter such inhibitions, students must be taken through education concerning AI literacy, especially in post-secondary education, where such AI tools are increasingly incorporated much more frequently for supporting teaching and learning. This is in confirmation with Mutanga et al (2024) study which established that there is rich and complex landscapes of ethics requiring increased institutional guidelines, ethic training, and AI literacy programs so as students may navigate responsible application of AI while maintaining disciplinary integrity. Nevertheless, research covering the framework for improving AI literacy is very minimal, given the recency of the subject. The few studies on AI use in education largely ignore the specific understanding of how students experience AI-enhanced pedagogy based on their level of AI literacy (Zawacki-Richter et al., 2019). Such a gap is significant as higher education institutions increasingly implement AI tools requiring students to engage with such technologies in their academic work. Therefore, knowing that a student's literacy level in AI is unknown makes it very difficult to undertake properly fitted strategies to ensure the best outcomes for students in future AI-enhanced learning environments.

Self-Efficacy and Its Influence on Technology Adoption

Self-efficacy is the concept described in Bandura's social cognitive theory as the belief in one's capacities to act in the world, in a given social situation, or to achieve a goal (Bandura, 1997). Self-efficacy, concerning technology adoption, focuses on individuals' confidence and motivation to use new technologies (Compeau & Higgins, 1995). It has been found that with increasing self-efficacy, individuals are more likely to exhibit positive approaches toward new technologies and to persist through challenges toward achieving higher success and utility of the technology (Venkatesh et al., 2003). With specific reference to AI literacy, self-efficacy comes into play as it will affect students' confidence and motivation to interact with AI tools (Ng et al., 2021). Students with high self-efficacy are more likely to view novel technologies as enhancing their learning, while those with low self-efficacy may feel nervous when presented with these tools (Compeau & Higgins, 1995). This holds significant relevance to the design of AI-infused learning environments, as students' self-efficacy may significantly influence their motivation and learning.

Several factors have been identified as influencing self-efficacy in the context of technology adoption, including mastery experiences, vicarious experiences, social persuasion, and physiological and emotional states (Bandura, 1997). Mastery experiences, or past successes in using technology, are particularly important, as they provide individuals with a sense of competence and confidence in their abilities (Compeau & Higgins, 1995). Vicarious experiences, e.g., seeing others successfully use technology, contribute to self-efficacy by delivering a model for a person to imitate (Bandura, 1997). Social persuasion through positive social referencing and reinforcement from peers and educators can enhance self-efficacy, whereas physiological and emotional factors, such as anxiety or stress, can erode it (Venkatesh et al., 2003).

Although many studies on self-efficacy and technology adoption are available, there is an important gap in the literature concerning the effect of self-efficacy on students' interaction with AI-based tools. Most research focuses on general technology adoption, with limited empirical evidence on AI-specific tools in higher education (Ng et al., 2021). This gap is further problematic because the use of artificial intelligence (AI) tools in higher education is growing, and students' levels of self-efficacy can significantly influence their ability to use AI tools and attain their educational objectives.

The literature review identifies the opportunity for AI to revolutionise teaching and learning practices, the need for AI literacy in education, and the influence of self-efficacy on students' attitudes to using AI tools. Nevertheless, there are substantial deficits in the current literature, specifically in university students' level of AI literacy and the impact of self-efficacy on their use of AI-based teaching and learning. These deficits form the theoretical basis of the present study, which aims to investigate the AI literacy of university students with the conceptual framework of self-efficacy.

Materials and Method

This study employed a quantitative survey design at the University of Fort Hare, a resource-limited institution in the Eastern Cape province of South Africa. The survey design was chosen because it allows for the collection of data from a relatively large number of participants and provides a basis for identifying descriptive patterns, while recognising that the findings are limited to the studied context and cannot be generalised to all higher education institutions.

A structured questionnaire was distributed electronically through the university's learning management system to a pool of 400 students. At the time of the study, the total student population was approximately 9,500. Participation was voluntary, and students self-selected to respond, meaning that the sample was based on convenience rather than random selection. As such, the findings may be influenced by self-selection bias and may not fully represent the broader student population.

A total of 181 students responded to the survey, representing a response rate of 45%. After the dataset was cleaned, 153 valid responses were included in the analysis. Data cleaning involved removing incomplete submissions, cases where respondents skipped more than 20% of the questionnaire items, and duplicate entries. While the response rate is acceptable, it is recognised as modest, and the possibility of non-response bias cannot be excluded. For this reason, demographic characteristics of the sample were compared with those of the broader student population, and no substantial deviations were observed.

The questionnaire contained two main sections: demographic information and AI literacy self-efficacy. The self-efficacy section measured four dimensions drawn from Bandura's framework, namely mastery experiences, vicarious experiences, social persuasion, and physiological and emotional states. Responses were recorded on a five-point Likert scale ranging from "strongly disagree" to "strongly agree." All analyses were conducted in Microsoft Excel. Frequencies and percentages were calculated to summarise student responses across the four self-efficacy dimensions. Findings are presented as descriptive statistics only, and no inferential statistical tests were performed.

The study received ethical clearance from the University of Fort Hare Research Ethics Committee (reference FUN005-24). All participants provided informed consent prior to participation. Anonymity was maintained by ensuring that no identifying information was collected, and confidentiality was preserved by storing the data on a password-protected system accessible only to the research team.

Result and Discussion

The survey findings provide insight into how self-efficacy influences AI literacy among students at a historically disadvantaged university. Overall, the results show a positive orientation toward AI use, with high levels of confidence and motivation reported across the four dimensions of self-efficacy identified by Bandura. The overwhelming majority of the students (92.2%) reported that they had used AI in the past 12 months to complete their academic work. Table 1 below shows the demographic details of the respondents.

Table 1. Demographic information

Variable	Category	n (%)
Gender	Male	69 (45.1)
	Female	84 (54.9)
Age (years)	18–22	70 (45.8)
	23–26	44 (28.8)
	27–32	20 (13.1)
	>32	19 (12.3)
Level of Study	Undergraduate	94 (61.4)
	Honours	29 (19.0)
	Master's	23 (15.0)
	PhD	7 (4.6)

Mastery Experiences

Table 2 below presents students' responses concerning mastery experiences with AI tools. A large majority (70%) reported confidence in their ability to understand basic AI concepts, and nearly 78% indicated that they could easily learn new AI tools when introduced to them. Similarly, 75% agreed that past successes with technology had prepared them for using AI, and 65% felt comfortable troubleshooting basic issues. These results demonstrate that prior experience with AI and related technologies strengthens students' sense of competence, which is consistent with Bandura's emphasis on mastery as the most powerful source of self-efficacy. This pattern supports earlier findings by Ng et al. (2021), who argued that practical exposure to technology fosters confidence in adopting AI tools for learning.

Table 2. Mastery experience

Statement	%				
	1	2	3	4	5
I feel confident in my ability to understand basic AI concepts.	0.7	2.6	26.8	43.1	26.8
I have successfully used AI tools in academic projects, which makes me confident in using them again.	2.6	9.2	27.5	31.4	29.4
I can easily learn new AI tools and features when introduced to them.	2.6	6.5	12.4	47.7	30.7
I believe my past successes in using technology have prepared me well for understanding AI.	2.0	5.9	16.3	50.3	25.5
I am comfortable using AI tools to support my academic work.	2.0	8.5	24.2	45.1	20.3
I feel confident troubleshooting basic issues when using AI applications.	3.3	11.1	28.1	40.5	17.0

Vicarious Experiences

As shown in Table 3, observational learning also played an important role. More than 70% of respondents indicated that seeing classmates or watching tutorials increased their confidence in using AI. In addition, 77% replied that observing what was effective with other individuals motivated them to try AI tools themselves. These outcomes lend credence to the worth of peer modeling and co-learning in enhancing self-belief. This is in keeping with Bandura's theory that self-confidence is vicariously determined, and later research carried out by Mutanga et al. (2024) correlating peer networks particularly with overcoming AI-associated learning issues of an ethical and practical nature.

Table 3. Vicarious experiences

Statement	%				
	1	2	3	4	5
Observing my classmates use AI effectively increases my confidence in using AI tools.	2.6	13.1	17.6	45.1	21.6
When I see others succeed in using AI, I feel more capable of using it myself.	2.6	11.1	14.4	46.4	25.5
Knowing that others use AI tools for learning makes me believe I can do the same.	3.3	9.8	14.4	51.6	20.9
Seeing other students use AI applications successfully encourages me to try them.	2.6	5.9	14.4	52.9	24.2
I feel motivated to learn AI when I observe others using it successfully in their studies.	5.2	5.9	12.4	54.2	22.2
Watching demonstrations or tutorials on AI helps me feel more capable of learning AI skills.	2.0	4.6	18.3	51.0	24.2

Social Persuasion

Summary of responses in Table 4 shows the positive effect of encouragement and praise. About 70% of students felt better able to work with AI when other students or lecturers expressed belief in their potential. Correspondingly, 76% suggested that positive praise motivated them to attempt AI tools more. These findings suggest that social persuasion fosters motivation to work with AI and facilitates persistence in the face of challenges. This supports Venkatesh et al. (2003), who noted that social reinforcement is central in adoption of technologies, and generalises the argument across AI-specific learning settings.

Table 4. Social persuasion

Statement	%				
	1	2	3	4	5
When my peers express confidence in my ability to use AI, I feel more capable of doing so.	3.3	15.0	18.3	40.5	22.9
Positive feedback from peers about my AI skills makes me feel more confident.	3.9	10.5	15.0	47.1	23.5
I am encouraged to learn AI skills when others tell me they believe I can do it.	2.6	10.5	21.6	45.8	19.6
I feel motivated to continue learning about AI when I receive encouragement from my lecturers.	2.6	9.8	17.6	45.1	24.8
When friends or classmates praise my AI skills, I feel more assured in my abilities.	3.3	13.1	26.1	35.3	22.2
Receiving supportive feedback on my use of AI motivates me to explore it further.	2.6	9.2	15.0	52.3	20.9

Physiological and Emotional States

Table 5 highlights students' emotional responses to interacting with AI. Over 60% of students reported feeling calm and focused while using AI tools, and 71% expressed excitement when learning new AI skills. By contrast, only about one-third of students indicated experiencing stress or anxiety during AI-related activities. These findings suggest that positive emotions—such as enthusiasm and motivation—play a more prominent role than negative emotional barriers in students' engagement with AI. Consequently, emotional readiness appears to complement technical skills in fostering AI literacy. This aligns with the findings of Zhai et al. (2021), who observed that reducing anxiety in technology-rich classrooms enhances student engagement with emerging tools.

Table 5. Physiological and emotional states

Statement	%				
	1	2	3	4	5
I feel calm and focused when working with AI tools.	4.6	7.2	28.8	42.5	17.0
Using AI tools does not make me anxious or stressed.	7.8	11.1	22.9	32.7	25.5
I feel excited when learning new AI skills or applications.	2.0	8.5	18.3	43.8	27.5
I approach using AI with a positive attitude rather than worry.	2.6	7.2	15.0	51.6	23.5
Working with AI tools makes me feel capable and confident.	3.3	8.5	24.8	39.9	23.5
I feel motivated and energised when I successfully use AI in my coursework.	3.9	14.4	24.8	34.6	22.2

Overall, the results reassert self-efficacy as an integral condition in achieving AI literacy. Students with strong mastery experiences, opportunities for observational learning, and frequent reinforcement in a social setting volunteered greater motivation and belief in using AI. Interestingly, the results also point out that emotional preparedness engenders persistence and hardiness and renders students correspondingly far more likely to integrate usage of tools based on AI in learning. In a historically disadvantaged college setting, where lack may preclude availability of cutting-edge technologies, psychological preparedness is particularly valuable. Reinforcement of self-efficacy may therefore become a low-cost intervention supporting equitable AI adoption alongside other attempts at raising infrastructural supply.

These findings enrich the research literature by demonstrating the ways in which the four dimensions of self-efficacy outlined by Bandura are evident in AI literacy practices. The study follows on from previous work by Long and Magerko (2020) on AI literacy competencies and reinforces Ng et al. (2024) in asserting the value of planned programs in achieving AI literacy in schools. In contrast with past research, the study demonstrates ways in which psychological and contextual conditions combine in shaping students' readiness for AI adoption in a resource-scarce higher education setting.

Conclusion

This study explored the impact of self-efficacy on AI literacy among university students at a historically disadvantaged South African institution. The findings indicate that students generally exhibited strong confidence and motivation when using AI tools, reflecting the four dimensions of self-efficacy as conceptualised by Bandura. Mastery experiences manifested in students' self-descriptions of their successes with AI and other technologies. Vicariously, learning through one's peers and tutorials reinforced confidence. Social persuasion, acting in the ways of peer and lecturer encouragement, pressed for greater participation. Finally, positive emotional states as excitement and focus dissipated negative emotional states as anxiety and motivated students' readiness for AI application throughout their study.

These results validate the research agenda by demonstrating that self-efficacy is a crucial enabler of AI literacy. The research evidence reveals that psychological preparedness boosts technological competence and, consequently, shapes students' experience with AI-informed learning. It is novel in two respects: it contextualises AI literacy in an historically marginalised university context in which resource shortage is acute, and it uses Bandura's four-dimensional framework of self-efficacy to provide an extensive account of students' preparedness for AI adoption.

Despite these contributions, several limitations should be acknowledged. First, the study was limited to a single institution, which constrains the generalisability of the findings. Second, the reliance on self-reported survey data may introduce bias, as students might overestimate or underestimate their confidence levels. Third, although the sample size of 153 responses is adequate, broader representation across faculties and demographic groups would enhance the robustness of the conclusions. Finally, the descriptive design limits the ability to test causal relationships between self-efficacy and AI literacy.

Future research should extend this work in several directions. Comparative studies across different institutions, including both resource-rich and resource-constrained contexts, would provide insights into contextual influences on AI literacy. Intervention-based studies, such as evaluating the impact of peer mentoring, hands-on workshops, or AI-

integrated curricula, could help establish effective strategies for enhancing both confidence and competence. Longitudinal designs would also be valuable in tracking how self-efficacy and AI literacy evolve over time as students gain more exposure to AI tools.

Practical implications arise from these findings. To promote equitable AI adoption in higher education, institutions should invest not only in infrastructure but also in psychological and pedagogical support. Concrete strategies include creating peer mentoring schemes, offering regular workshops that provide structured practice with AI applications, and embedding constructive feedback mechanisms in teaching. Such interventions can strengthen self-efficacy, build confidence, and help students engage more effectively with AI technologies, particularly in settings where resources are limited.

References

Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.

Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly, 19*(2), 189–211. https://doi.org/10.2307/249688

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage.

Dwiantoro, B., Sujana, Y., & Hatta, P. (2025). The role of artificial intelligence in programming education and its impact on the learning process. *Indonesian Journal of Informatics Education, 9*(1), 53–61. https://doi.org/10.20961/ijie.v9i1.103884

Holmes, W., & Tuomi, I. (2022). State of the art and practice in AI in education. *European Journal of Education, 57*(4), 542–570. https://doi.org/10.1111/ejed.12527

Ilmiani, A. M., Wahdah, N., & Mubarak, M. R. (2021). The application of Albert Bandura's social cognitive theory: A process in learning speaking skill. *Ta'lim al-'Arabiyyah: Jurnal Pendidikan Bahasa Arab & Kebahasaaraban, 5*(2), 181–192. https://doi.org/10.15575/jpba.v5i2.12945

Kizilcec, R. F. (2024). To advance AI use in education, focus on understanding educators. *International Journal of Artificial Intelligence in Education, 34*(1), 12–19. https://doi.org/10.1007/s40593-023-00351-4

Long, D., & Magerko, B. (2020). What is AI literacy? Competencies and design considerations. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (pp. 1–16). ACM. https://doi.org/10.1145/3313831.3376727

Mutanga, B. M., Lecheko, M., & Revesai, Z. (2024). Navigating the grey area: Students' ethical dilemmas in using AI tools for coding assignments. *Indonesian Journal of Informatics Education, 8*(1), 15–24. https://doi.org/10.20961/ijie.v8i1.90385

Ndlovu, B., & Maguraushe, K. (2025). Balancing ethics and privacy in the use of artificial intelligence in institutions of higher learning: A framework for responsive AI systems. *Indonesian Journal of Informatics Education, 9*(1). https://doi.org/10.20961/ijie.v9i1.100723

Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualising AI literacy: An exploratory review. *Computers & Education: Artificial Intelligence, 2*, 100041. https://doi.org/10.1016/j.caeai.2021.100041

Ng, D. T. K., Su, J., Leung, J. K. L., & Chu, S. K. W. (2024). Artificial intelligence (AI) literacy education in secondary schools: A review. *Interactive Learning Environments, 32*(10), 6204–6224. https://doi.org/10.1080/10494820.2023.2255228

Selwyn, N. (2019). *Should robots replace teachers? AI and the future of education*. Polity Press.

Su, J., Ng, D. T. K., & Chu, S. K. W. (2023). Artificial intelligence (AI) literacy in early childhood education: The challenges and opportunities. *Computers and Education: Artificial Intelligence, 4*, 100124. https://doi.org/10.1016/j.caeai.2023.100124

Tshibangu, R., & Thembane, N. (2025). Integrating AI in STEM education in Africa: A systematic review of best practices and perspectives. *Indonesian Journal of Informatics Education, 9*(1). https://doi.org/10.20961/ijie.v9i1.98421

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425–478. https://doi.org/10.2307/30036540

Wamba, S. F. (2022). Impact of artificial intelligence assimilation on firm performance: The mediating effects of organisational agility and customer agility. *International Journal of Information Management, 67*, 102544. https://doi.org/10.1016/j.ijinfomgt.2022.102544

Xu, H., Duan, Y., & Xu, X. (2024). Exploring the integration of a global AI model with traditional data assimilation in weather forecasting. *Environmental Research Letters, 19*(12), 124079. https://doi.org/10.1088/1748-9326/ad93e8

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (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*(1), 1–27. https://doi.org/10.1186/s41239-019-0171-0

Zhai, X., Chu, X., Chai, C. S., Jong, M. S. Y., Istenic, A., Spector, M., & Li, Y. (2021). A review of artificial intelligence (AI) in education from 2010 to 2020. *Complexity, 2021*, 8812542. https://doi.org/10.1155/2021/8812542