

A SYSTEMATIC LITERATURE REVIEW ON THE INTEGRATION OF AI IN HIGHER EDUCATION

J. Priyanto Widodo (prowidodo18@gmail.com)¹
Hariyanto (hariyanto.mpd@petra.ac.id)²
Anggun Purnomo Arbi (anggunpurnomo58@gmail.com)³

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ABSTRACT

This research presents a literature review on the integration of artificial intelligence (AI) in the context of higher education. This study uses a systematic literature review research design. The findings show that AI has the capacity to improve student engagement, critical thinking skills, and teaching effectiveness. In addition, AI contributes to improving language and journalistic writing skills, as well as creating a dynamic learning environment. However, there are moral as well as ethical challenges. These include privacy, algorithm fairness, and over-reliance on this technology. This research ultimately highlights the importance of strategic and ethical application of AI in the context of higher education. It also highlights that there is a need for further research into the long-term impact of the integration of these technologies. The development of more comprehensive AI models and theories is also needed to ensure more responsible and equitable use.

Keywords: *Artificial Intelligence; higher education; integration of AI, systematic literature review*

INTRODUCTION

Educational technology has completely changed the manner that educational information is provided, and it includes a wide range of tools and resources that are intended to improve teaching, learning, and educational administration (Widodo & Slamet, 2020). The adoption of artificial intelligence (AI) technology has spread to a number of industries, including higher learning. A more individualized learning experience, better teaching and learning, and increased student engagement are all possible with the use of AI in education. There are numerous opportunities to enhance teaching and learning across a range of industries, including higher education institutions, with the integration of artificial intelligence (AI) technology in education. As technology evolves, various AI applications such as ChatBot, predictive analysis, and adaptive learning have begun to be implemented in educational settings to optimize learning outcomes (Arbi, 2024). However, while many studies have discussed and challenged AI integration, there are still various aspects that require continuous exploration to understand its impact and implementation in a comprehensive manner.

This research focuses on identifying and analyzing the existing literature on AI integration in higher education. AI integration offers various opportunities in improving personalized learning, learning methods, and addressing gaps in learning (Nkechi et al., 2024). Although AI has shown great potential in improving the quality

¹ Lecturer, Universitas PGRI Delta, Sidoarjo, East Java

² Lecturer, Petra Christian University, Surabaya, East Java

³ Student, Universitas PGRI Delta, Sidoarjo, East Java

and efficiency of education, there are several issues that need to be considered. These issues include the readiness of educational institutions to adopt AI, the impact of AI on teaching and learning, and the ethical and privacy issues arising from the use of this technology. By addressing these challenges and issues, educators can maximize the potential of AI to improve the quality and efficiency of education (Sytnyk & Podlinyayeva, 2024). Currently, there is a lack of research that comprehensively reviews how AI is being implemented and what its impact is in the context of higher education.

Nowadays, there is a lot of research focusing on AI in the education sector, however, most research is still focused on case studies or specific applications such as the research conducted by Mustika et al., (2024), Maulana et al., (2024), Putri et al., (2023), and Mujiadi et al., (2024). Thus, there is a gap in the literature that addresses the integration of AI in higher education. This research aims to fill this gap by presenting a study that uses a systematic literature review design. Thus, this research is expected to be able to enrich the literature on the integration of AI technology in higher education by presenting the results of a review of relevant studies.

This research offers a novel contribution by combining findings from previous studies in a comprehensive systematic literature review. It will help provide insights into how the integration of AI in higher education can provide significant benefits. It also gives insights into the opportunities and challenges of using this technology in the context of higher education. The justification for this research has been based on the need to provide evidence-based guidance for policy makers and educational practitioners in adopting AI technologies in an optimal, effective, and responsible manner.

This research has the objective of conducting a systematic literature review on the application and impact of artificial intelligence (AI) integration in higher education.

RESEARCH METHODS

This research uses a systematic literature review method to identify, evaluate and synthesize relevant research on the integration of artificial intelligence (AI) in higher education. This process included several main steps. Firstly, inclusion and exclusion criteria were established. These criteria were used to ensure the relevance and quality of the selected studies. The inclusion criteria included: (1) articles published in the last 10 years (2014-2024), (2) peer-reviewed journal articles, 3) conference proceedings, and 4) research focusing on AI integration in higher education. Exclusion criteria included: 1) studies that did not focus on higher education, 2) articles without clear research design or methodology, and 3) sources that were not peer reviewed.

Literature searches were conducted in various databases such as Google Scholar, SINTA, and other academic databases. The researchers used a wide variety of keywords such as ‘AI integration’, ‘AI in higher education’, ‘use of AI for education’, ‘utilization of AI in the classroom’. After the initial screening by analyzing the titles and abstracts, the researchers have analyzed the articles based on the inclusion criteria. Articles that met the inclusion criteria were reviewed in depth to assess their relevance and quality. Articles that did not meet the criteria were removed and those that did were further analyzed. Data from the articles were extracted and presented in tables. The findings were then synthesized to identify common themes, trends and gaps in literature.

FINDINGS AND DISCUSSION

Finding

The research findings are presented in a table containing information about the author and year, research design, and synthesized research findings. The studies reviewed were journal articles and conference proceedings published in the last 10 years, however, the most significant studies to the inclusion criteria were found by

researchers in the period 2023–2024. The studies were relevant to AI integration in higher education. The reviewed studies should also include information on the research design used. Based on the selection results, 16 studies relevant to the topic were found.

Table 1. A Comprehensive Review of Studies on the Integration of AI in Higher Education

No.	Author	Research design	Finding
1.	Olatunde-Aiyedun (2024)	Mixed-methods approach (qualitative and Quantitative data)	<i>“This study demonstrates how incorporating artificial intelligence (AI) into the classroom enhances academic comprehension, learning outcomes, and student engagement. A dynamic learning environment is produced by real-world scenarios and interactive AI applications. To fully utilize AI in the classroom, educators also emphasized the significance of ongoing training. PjBL is one example of a student-centered teaching strategy that has been shown to be successful in raising student engagement and excitement.”</i>
2.	Huang et al. (2024)	Quantitative	<i>“This study found that the use of artificial intelligence technology such as ChatGPT has a positive impact on students' learning effectiveness. After using ChatGPT, students showed improvements in knowledge acquisition, problem solving, and critical thinking”</i>
3.	Al-Shallakh (2024)	Mixed method	<i>“Based on favourable responses from learners acquired through questionnaires and statistical studies, the seven-week intervention using Elsa Speak shows a considerable increase in pronouncing skills. The results show the useful effects of these applications on language learning, particularly pronunciation development in higher education, and they add to the growing conversation about artificial intelligence in education. The findings support further research into the thoughtful incorporation of AI tools—like Elsa Speak—into methods for teaching languages.”</i>
4.	Aljuaid (2024)	Desktop Research Design	<i>“The findings indicate that although AI can assist with syntax and style, concerns concerning its effects on critical thinking and originality still need to be addressed. Artificial intelligence isn't taking the place of college writing courses, though. Artificial intelligence lacks the critical thinking, research, citation, argumentation, creativity, originality, and ethics that these courses impart. Courses on academic writing provide a comprehensive educational experience. While academic writing may benefit from artificial intelligence, traditional courses are unlikely to be soon replaced by it. For students to be prepared for a variety of writing issues, a balanced strategy that integrates Artificial Intelligence support while maintaining essential components of academic writing instruction seems to be the most effective.”</i>
5.	Bibi et al. (2024)	Mixed method	<i>“The study discovered that although AI in education has advantages including personalized instruction and one-on-one support, there are moral issues that must be resolved. The impact on human abilities, algorithmic justice, and privacy are these challenges. Procedural transparency, independent accountability, and equality should be used to address these.”</i>
6.	Hidalgo Suarez et al. (2023)	Quantitative	<i>“The study's findings contribute to our understanding of the advantages and difficulties of teaching computer programming using the CSCL and AI approaches. These include identifying specific tactics and resources to enhance the learning process in programming courses (e.g., applying CSCL approach strategies for group formation, evaluation, and feedback); controlling the process and gauging student performance through the use of virtual judges for automatic code evaluation, profile identification, code analysis, teacher simulation, active learning activities, and interactive environments, among other things. There are still unanswered scientific questions for each step, though.”</i>

No.	Author	Research design	Finding
7.	Yusuf, (2024)	Qualitative	<i>“The study's findings indicate that integrating AI into the classroom has a significant chance of boosting inclusion, efficacy, and efficiency. This demonstrates how implementing AI technology can improve undergraduates' academic performance and equip them to handle challenges in the future.”</i>
8.	Acosta-Enriquez et al. (2024)	Quantitative	<i>“According to this study, even while college students were aware of ChatGPT and had positive sentiments toward its use, acceptance and use were not certain, and there were serious ethical issues with depending too much on the technology. According to the findings, there are no differences in ethical perceptions of ChatGPT use based on gender or age. Therefore, to promote ethical use, higher education institutions should create thorough training programs, policies, and guidelines that address concerns like academic integrity, privacy, and misinformation.”</i>
9.	Kennedy (2023)	Qualitative	<i>“Higher education can use artificial intelligence (AI) to enhance learning outcomes through more engaging curriculum, more effective operations, and real-time student performance monitoring. Even though there has been progress in the application of AI, there are still some issues and shortfalls. These include the paucity of AI theories and models in the educational system, resistance to implementing AI in teaching and learning, and limited AI research in fields other than STEM (science, technology, engineering, and mathematics). In order to optimize the educational system going forward, higher education institutions must include more AI into the teaching and learning process and train faculty and students.”</i>
10.	Subiyantoro et al. (2023)	Mixed method	<i>“The findings of the study indicate that artificial intelligence (AI) has altered the way English is taught and learned in higher education. Furthermore, future English language instructors and lecturers will face both opportunities and challenges because of artificial intelligence (AI). These days, millennials are used to utilizing different kinds of artificial intelligence (AI) programs on their own for a variety of everyday tasks, such as tertiary English language acquisition. Therefore, in order to suit the demands and preferences of students learning English in the future, English teachers and lecturers are always enhancing their digital literacy, particularly in the area of artificial intelligence (AI).”</i>
11.	Putri et al. (2023)	Literature Review	<i>“The examination of the data shows that there is a great deal of promise for raising educational standards through the application of AI to student learning. But concerns about dependency, moral dilemmas, and the value of interpersonal relationships must all be taken into consideration. The results reached in this article are mostly dependent on solutions like AI ethics education, strict laws, and the integration of AI with human contact. In the age of digital transformation, improving educational quality and equipping students for a future driven by technology require a deep understanding of artificial intelligence (AI). This is especially true when it comes to chatbots for academic guidance, online learning platforms, and automated assessments.”</i>
12.	Mahmudi et al. (2023)	Quantitative	<i>“The majority of students regularly use AI technology, particularly many times per week, according to survey data, and they are generally quite satisfied with its application to distant learning. Even though all respondents encountered difficulties or barriers while utilizing AI technology, virtual reality or augmented reality learning experiences were thought to offer the most benefits.”</i>
13.	Irfan et al. (2023)	Mixed method	<i>“Results indicate that using ChatGPT-3 significantly improves students' journalistic writing and critical thinking abilities. The use of AI tools in the classroom promotes critical thinking and teamwork, which improves students' writing abilities. The findings highlight the value of teaching</i>

No.	Author	Research design	Finding
			<i>journalism students about artificial intelligence (AI) in order to better equip them for the quickly evolving, AI-focused media field.</i>
14.	Wang et al. (2023)	Literature Review	<i>“According to this study, the use of AI in education can improve the quality of education by giving international students access to personalized and adaptable learning opportunities. However, there are dangers and restrictions that must be properly taken into account, like linguistic and cultural obstacles. In order to provide international students with a more effective and inclusive educational experience, this research highlights the significance of striking a balance between the risks and benefits of using AI and recommends that higher education institutions keep developing and researching AI applications.”</i>
15.	Wahyuddin et al. (2023)	Descriptive Quantitative	<i>“The study discovered that there are several benefits and use when employing ChatGPT to help students write essays in upper-level English classes. Essay writing performance is improved by ChatGPT. By using ChatGPT, students can improve their ability to express themselves clearly and understand the structure and style of their essays. Students can be creative in refining and extending their English language proficiency, especially in writing.”</i>
16	Harahap et al. (2023)	Qualitative	<i>“The use of artificial intelligence (AI) technology has become apparent as a potential remedy to assist lecturers in overcoming some difficulties. This article lists some of the ways that lecturers might use AI: creating lecture materials, evaluating university data, personalizing lectures, and more effective assessment methods. On the other hand, implementing AI calls for a thorough comprehension, suitable training, and strong ethical standards. When applied intelligently, artificial intelligence (AI) holds great promise for raising the standard of higher education, equipping students with more knowledge and skills for the future, and supporting professors as they navigate the challenges of an increasingly disruptive higher education landscape.”</i>

DISCUSSION

Research Design Trends

Based on the 16 studies reviewed, various research designs were used to explore the integration of artificial intelligence (AI) in higher education. The most frequently used research design was mixed-method research. Mixed-method studies accounted for five studies or approximately (31.25%) of the total. Studies that include mixed methods include Olatunde-Aiyedun (2024), Al-Shallakh (2024), Bibi et al. (2024), Irfan et al. (2023), and Subiyantoro et al. (2023). This design provides a more comprehensive view of the topic as it combines qualitative and quantitative data. In addition, a quantitative design was used in five studies (31.25%). Quantitative studies were conducted by Huang et al. (2024), Hidalgo Suarez et al. (2023), Acosta-Enriquez et al. (2024), Mahmudi et al., (2023), and Wahyuddin et al. (2023). Qualitative designs were used in four studies (25%), they were Yusuf (2024), Kennedy, (2023), Harahap et al., (2023), and Aljuaid, (2024). Two studies (12.5%) used a literature review approach, which conducted by Putri et al. (2023) and Wang et al., (2023).

However, the researchers found that there were no studies that utilized a longitudinal research design. This suggests that there is room for further research applying these methods to understand the longitudinal and causal impacts of the integration of AI technologies in higher education.

Interpretation of Research Findings

The use of AI in learning has shown significant benefits. According to Huang et al. (2024), the use of AI technologies such as ChatGPT has a positive impact on the effectiveness of learning that occurs in higher

education which refers to critical thinking skills, problem solving, and knowledge acquisition processes. Wahyuddin et al. (2023) found that ChatGPT has the ability to help students when they write essays, according to his research, ChatGPT has improved expression skills and understanding of writing structure and style. AI also makes a positive contribution to the development of language skills. Al-Shallakh (2024) showed that AI applications such as Elsa Speak significantly improved students' pronunciation skills through a 7-week intervention. Subiyantoro et al. (2023) stated that AI has changed the way English is taught and learnt, demanding increased digital literacy among teachers. In addition, AI integration also plays a role in increasing learner engagement. Olatunde-Aiyedun (2024), revealed that AI integration improves academic understanding, student engagement, and learning outcomes by creating a dynamic learning environment through real-world scenarios and interactive AI applications.

In the context of language and journalism education, AI has also shown positive results. Irfan et al. (2023) found that the use of ChatGPT-3 improved students' journalistic writing and critical thinking skills. This emphasizes the importance of teaching students about the integration of AI technologies. This aims to prepare students for the fast-evolving media field.

However, there are ethical and moral challenges that need to be addressed. Bibi et al. (2024) and Acosta-Enriquez et al. (2024) highlight ethical issues such as algorithmic fairness, privacy, and over-reliance on these technologies. They emphasize the importance of procedural transparency, independent accountability, and equity in addressing these challenges. Putri et al. (2023) also noted concerns about reliance on AI, moral dilemmas, and the value of interpersonal relationships in education.

On the other hand, some constraints and opportunities were also identified. Kennedy, (2023) noted several challenges to the application of AI. These include the lack of AI theories and models in the education system, limited research outside of STEM fields, and resistance to AI in teaching. Harahap et al., (2023) mentioned that the application of AI offers great potential to improve the quality of higher education, but requires deep understanding, proper training, and strong ethical standards.

Implication

The practical implications of this study suggest that higher education institutions need to strategically adopt AI technologies to improve learning outcomes and student engagement. The application of AI in learning can be done through the integration of interactive applications and AI tools in the curriculum as well as continuous training for teachers to maximise its use. Theoretically, this research highlights the importance of developing more comprehensive AI models and theories in the educational context, as well as the need for further research to explore the long-term impact of AI use. In addition, this research also underscores the need for strong ethics and transparency in the use of AI to ensure that these technologies are used fairly and responsibly.

Strengths and limitations of the study

This research has several strengths. The use of the systematic literature review method allowed the researcher to identify, evaluate, and synthesize various studies relevant to AI integration in higher education. This method provided a comprehensive and thorough understanding of the topic. The research set strict inclusion criteria so that only relevant studies were included. However, research limitations in the availability and accessibility of literature may result in some important studies not being identified or included in this review.

CONCLUSION AND SUGGESTIONS

This study offers insightful information about the use of artificial intelligence (AI) in higher education,

demonstrating how it can enhance student engagement, critical thinking abilities, and the efficacy of instruction. The examined research demonstrates a range of advantages of AI, such as enhanced language proficiency and journalistic writing. Furthermore, AI helps to create a dynamic learning environment. But there are also moral and ethical issues that must be addressed, like algorithmic fairness, privacy, and excessive dependence on technology. Nevertheless, there are still challenges in using AI technology. These include a lack of research outside of STEM subjects and opposition to change. Nevertheless, if AI is used appropriately and morally, it has the ability to significantly raise the standard of higher education.

In order to fully capitalize on the advantages of AI in higher education, academic institutions must strategically implement AI technologies by incorporating interactive apps and AI tools into the curriculum and offering teachers and students ongoing training. To further comprehend the long-term effects of AI use, further study is required as well as the development of more thorough AI models and theories in the context of education. To guarantee equitable and responsible use of these technologies, it's also critical to make sure that AI is used in accordance with strict ethical guidelines and openness.

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