INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN PROGRESSIVE EDUCATION & DEVELOPMENT

OPEN ACCESS JOURNAL

Vol 14, Issue 3, (2025) E-ISSN: 2226-6348

A Systematic Review of Systematic Reviews in Teaching and Learning in Higher Education with AI

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To Link this Article: http://dx.doi.org/10.6007/IJARPED/v14-i3/25822 DOI:10.6007/IJARPED/v14-i3/25822

Published Online: 13 July 2025

Abstract
With the rapid development of artificial intelligence (AI) technology, its application in the field of higher education is becoming more and more extensive. This study uses the method of systematic literature review to search the Scopus database for systematic literature reviews on AI and higher education from 2020 to 2025, selects 15 classic documents, and comprehensively analyzes the trends and gaps in the current systematic literature review research on AI and higher education. It aims to provide comprehensive information reference for researchers and practitioners in the field of higher education.
Keywords: AI in Teaching and Learning Higher Education Systematic Review

Introduction

Artificial Intelligence (AI) as a cutting-edge technology is profoundly transforming every aspect of education. Higher education, as a crucial domain for cultivating innovative talents and promoting knowledge innovation, is facing both significant challenges and opportunities in digital transformation (Ouyang et al., 2022). In recent years, the application of AI technology in higher education has gradually transitioned from the conceptual exploration phase to the practical application phase, attracting widespread attention from the academic community and educational practitioners. Therefore, systematically reviewing and analyzing the current status, impact, and challenges of AI applications in higher education is of great significance for promoting the healthy development of AI technology in the field of education.

There have been numerous literature review studies on this topic. Many scholars have used systematic literature review methods to explore the development trends of AI applications in higher education over the past 20 years, as well as the advantages and challenges of using AI in higher education (Zawacki-Richter,2019; Salas-Pilco,2022; Memarian & Doleck, 2023; Batistaet al., 2024). However, these studies have mostly focused on analyzing a single aspect, such as improving learning efficiency or ethical issues. In contrast, comprehensive analysis studies on the application of AI in higher education in recent years are relatively rare.To address this gap, this study takes the Scopus database as an example and is committed to searching for systematic literature reviews on this topic published in the Scopus database from 2020-2025, aiming to answer two research questions:

1. What are the main focuses of systematic literature reviews on teaching and learning in higher education with AI in the current Scopus database?
2. What research gaps exist in the current studies?

Methodology

The purpose of a systematic review is to answer specific questions, based on an explicit,systematic and replicable search strategy, with inclusion and exclusion criteria identifying studies to be included or excluded (Pahlevan-Sharif et al., 2019). Data is then coded and extracted from included studies, in order to synthesise findings and to shine light on their application in practice, as well as on gaps or contradictions (Higgins, 2008). This research maps 15 systematic articles on the topic of artificial intelligence in higher education.

Search Strategy

The initial search string (see Table 1) and criteria (see Table 2) for this systematic review included peer-reviewed systematic review articles in English, reporting on artificial intelligence within education at higher education level from 2020-2025, and indexed in Scopus (covering titles, abstracts, and keywords).

Table 1
Initial search string

Topic	Search terms
Artificial intelligence	“Artificial intelligence” OR “AI”
AND	
Teaching and learning	“Teaching and learning”
AND	
Higher education	“Higher education”OR “College”OR “University”

Table 2
Final inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Published 2020 – May 2025	Published before 2020
English	Not in English
Higher Education	Not Higher Education
Systematic review research	Not Systematic review research
Indexed in Scopus	Not a journal article
Artificial intelligence use in education	No learning setting
Citations above 30 times	Citations less than 30 times

Selection Process

The search was undertaken in June 1, 2025, with an initial 1926 records identified on the topic of AI in teaching and learning in higher education were searched in the Scopus database from June 2020 to June 2025. There were 123 reviews articles on this topic. After excluding non-systematic reviews, 48 systematic literature reviews remained, from which 15 articles with more than 30 citations were selected.

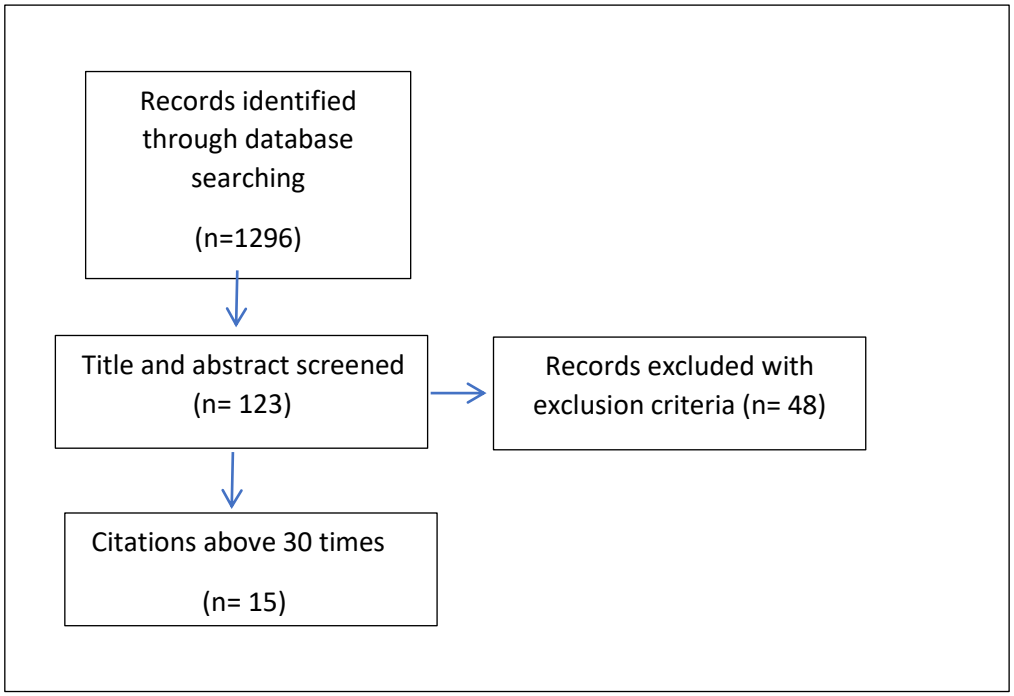

Fig. 1 *PRISMA flow chart of study selection process*

Findings

This study classified and analyzed 15 systematic review papers on the application of artificial intelligence in higher education, focusing on their research focus, findings, sample characteristics, time span, data sources, and publication time, aiming to reveal the overall development trend and existing problems in this research field.

Table 3
Reference information

	Main Focuses	Findings	Sample	Time Span	Databases	Author and Year
1	AI impacts on teaching , learning, assessment, future careers, education quality, and ethics in higher education. education.	1.AI can improve the quality of education. 2. Many studies focus on the relationship between AI and higher education, without delving into specific areas. 3. There is a lack of research on the application of AI in student review, ethics, and future career development.	56 English-language academic journals	1900-2021	WOS Scopus	Slimi et al., 2023
2	The integration of AI and challenges in higher education.	1. The rapid development of artificial intelligence technology has brought not only opportunities but also some challenges. 2. This field needs more empirical research rather than just relying on conceptual and theoretical papers.	44 peer-reviewed English journals	2013-2022	Springer, Science Direct IEEE Xplore Taylor and Francis ERIC Google Scholar	Agostino Marengo, 2024
3	The benefits and challenges of the use of AI in higher education.	A critical and innovative perspective is needed to utilize AI resources such as ChatGPT so that they can be used only as auxiliary tools to ensure the rigor and quality of scientific texts.	85 peer-reviewed English-language journals	2020-2024	Scopus WOS	Isolda Margarita Castillo-Martínez et al., 2024
4	Current application of AI technology in learning, teaching, and administration in higher education institutions in Latin America	1. Future research should pay close attention to AI development in Latin America and include content analysis and in-depth quantitative analysis of relevant research. 2. The adoption of AI in education remains slow compared to fields such as medicine, industry, and finance.	31 journals in English, Spanish, and Portugue-se	July 2016 to June 2021	WOS IEEE Xplorer Scielo CAPES Portal	Salas-Pilco et al., 2022
5	Definitions and studies on FATE and AI in higher education literature.	1. Fairness, Accountability, Transparency, and Ethics (FATE) is becoming a cornerstone of ethical considerations in AI Education. 2. Minimal work in conducting a systematic review of the FATE terms in higher education. 3. Future work can study accountability and transparency further and make the study of FATE terms more longitudinal, open-access, and reproducible.	33 English Publicati-ons	2015-2023	Scopus WOS	Memarian & Doleck, 2023

6	Digital Transformation In Higher Education	1. More in-depth research is needed on DT frameworks so that it can help in the development of a comprehensive framework that is right for the application of DT in higher education.	66 journals in English	Before 2023	IEEE Xplore ScopusWOS Springer Link ScienceDirect	Aria et al., 2023
7	Mobile Learning in Higher Education	1.M-Learning encompasses more than just learning on a mobile phone. It extends to any device that can connect to the internet and facilitate communication with others. 2.There is a lack of consistent definitions and frameworks for M-Learning behavior. 3.The use of M-Learning may pose risks. These risks relate to the confidentiality, integrity and privacy of data in mobile learning experiences.	116 journals in English	2016-2022	Scopus, WoS,	Quadri et al., 2023
8	The trends and challenges of using LLMs in Higher education within the context of Education 4.0's pedagogical approaches	1.Using LLMs can improve critical thinking skills. However, the introduction of language models into higher education also raises ethical and legal challenges regarding privacy.	83 journals in English	2018-2023	Scopus, WOS	Peláez-Sánchez IC et al., 2024
9	The current scholarly landscape concerning the use of ChatGPT within higher education.	1.The further study and future analysis need to address variations in results based on different prompts or words used with ChatGPT and the potential impact on student satisfaction and effectiveness.	28 journals in English	2022-2024	Scopus IEEE ScienceDirect Wiley Pubmed Sage Journals	Zuñiga-Rojas et al.,2024
10	The research focus of the top 50 highly cited AI in higher education studies in the WoS database	1.AI technologies have considerable potential for development in higher education.	50 journals in English	1966-2020	WOS	Chu et al., 2022
11	Implementation and influence of XR and AI on online higher education after the COVID-19 pandemic outbreak	1. Nowadays, implementing key emerging technologies have a critical role in shaping the future of online higher education.	107 publicati-ons	March 2020- 6 June 2022	Scopus, WOS, EBSCO Education	Rangel-de Lázaro et al., 2023
12	Factors influencing the acceptance of AI applications in university contexts through the UTAUT2 model	1. AI integration in higher education cannot follow a one-size-fits-all approach but must be tailored to the specific characteristics of each discipline and institution.	50 journals in English	2018-2023	Scopus, WOS, ScienceDirect, ProQuest:	B.G.Acosta-Enriquez et al.,2024
13	The impact of GAI on teaching,	1.While GAI tools like ChatGPT offer transformative	37	2023-2024	Scopus WOS	Batista et al.,2024

	learning, and institutional practices.	opportunities for higher education, their integration must be carefully managed. 2. By addressing ethical concerns, fostering stakeholder acceptance, and continuously refining pedagogical approaches, higher education institutions can fully harness the potential of GAI technologies.	journals in English			
14	The impact of AI and learning management system sintegration on educational quality, student success, and institutional performance in higher education.	1.AI–LMS integration can significantly enhance educational quality and student performance when implemented thoughtfully. 2.Challenges such as data privacy concerns, algorithmic bias, and the need for faculty training were also identified.	60 journals in English	2014-2023	Scopus	Alotaibi, 2024
15	AI applications in online higher education	1.AI is proved to be positive to enhance online instruction and learning quality by ofering accurate prediction, assessment and engaging students with online materials and environments.	32 journals in English	2011-2020	Scopus, WOS, ACM, IEEE, Taylor & Francis, Wiley, EBSCO	Ouyang Etal., 2022

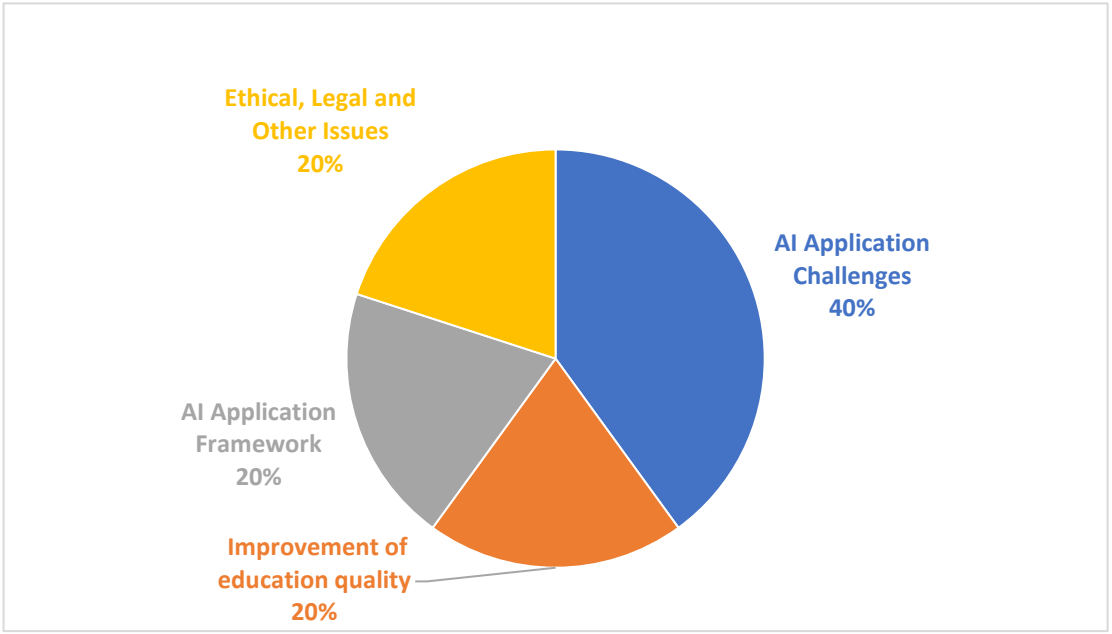

Fig.2 *Distribution of main research focuses*

From the research findings, AI has been recognized in many papers for improving the quality of education, such as literature 1, 14, and 15, accounting for 20%. However, the lack of research on AI applications, the challenges brought by development, and the slow application are also prominent, which are reflected in literature 1, 2, 3, 4, 14, and 13, accounting for 40%. The importance of FATE in AI education and the lack of research on the digital transformation framework, mobile learning definition, and framework are also mentioned in literature 5, 6, and 7, accounting for 20%. In addition, the ethical and legal challenges of LLMs application (literature 8), the influence of prompt words in ChatGPT

application (literature 9), the potential of AI shown in highly cited research (literature 10), the importance of emerging technologies to online education (literature 11), the need for customization of AI application acceptance (literature 12), and the need for careful management of the integration of GAI tools such as ChatGPT (literature 13) also provide important references for the application and development of AI in higher education.

In terms of sample characteristics, the sample size of the 15 reviews is mainly concentrated between 30 and 90 articles, with an average of about 60 to 70 original studies analyzed in each review. The sample time span is mainly 2015-2024, and 60% of the studies cover more than 10 years of literature, showing good in-depth coverage. In terms of database use, Scopus (80%) and Web of Science (66.7%) are the most frequently cited data sources, showing the high academic authority of the selected literature, but also exposing the dependence of the research discourse structure on English publications.

In terms of publication time, 73.3% of the systematic reviews are concentrated after 2020, showing the peak of academic attention caused by the explosive development of AI technology, especially after the advent of ChatGPT， the number of related literature has increased significantly, reflecting the cutting-edge and continuity of this topic. Despite this, most studies still focus on descriptive induction, lack a standardized and unified research framework and methodological system, and there are still research gaps in specific areas (such as AI applications in non-English education systems or developing countries).

Research Gaps and Future Directions

Although the above systematic literature review studies have sorted and synthesized multiple literatures in the field of AI application in higher education, laying a good foundation for us to understand the current application and development trend of AI in higher education, there are still some research gaps and deficiencies that need to be filled in future studies.

First, in terms of the writing standards of systematic literature reviews, the methodological norms are not unified. The current systematic reviews lack consistency in retrieval criteria, screening process, quality evaluation and subject coding methods. For example, no detailed search terms are listed, the inclusion and screening process is not transparent enough, the selected databases and journal categories are limited, some systematic literature reviews lack the use of PRISMA protocol (reference 3,4,5 is not explained), and the research process is not rigorous enough. Some studies use the model and protocol of systematic research reviews, but do not state that they are systematic literature reviews in the title or abstract (reference 14). It is recommended that future studies follow international standards such as PRISMA or JBI to improve the transparency and credibility of review studies.

Second, there is a lack of research on specific contexts and populations. Most reviews focus on college students and general educational technology environments in high-income countries, and there is a serious lack of research on groups such as developing countries, non-English contexts, and college teachers (Zawacki-Richter et al., 2019). Attention should be paid to variables such as the background of technology introduction, policy environment, and cultural differences to promote the development of contextualized systematic reviews (Rangel-de Lázaro et al.,2023).

Third, there is a lack of meta-systematic reviews. Although some studies (such as Pahlevan-Sharif et al., 2019) have attempted to construct a systematic review of systematic reviews (SR of SR), such methods have not been systematically applied to the field of AI education. In the future, a knowledge map of AI education research can be drawn through meta-reviews to extract dominant discourses, knowledge structures, and research gaps.

Finally, research on ethics and governance dimensions is missing. Most reviews do not fully discuss key issues involved in AI education, such as ethical boundaries, data privacy, and teacher substitutability (Slimi et al.,2023； Salas-Pilco et al., 2022). In the future, we should strengthen the systematic sorting from the perspective of the three-dimensional linkage of technology-ethics-governance (Peláez-Sánchez IC et al., 2024).

Conclusion

This systematic review reveals the structural characteristics and development trends of systematic review literature in the field of artificial intelligence in higher education research. From the perspective of research topics, most literature still focuses on macro and empirical issues, such as teaching effectiveness, learning motivation, and evaluation tools (Rangel-de Lázaro et al., 2023), while discussions on deep-level issues such as AI in knowledge construction, teacher identity reconstruction, and educational ethics and governance are relatively scarce (Chu et al., 2022; Batista et al., 2024). This shows that current AI education research is still in the stage of instrumental rationality and lacks sufficient critical reflection and theoretical deepening.

In addition, although the sample size is representative in most reviews, there are two noteworthy issues. First, the sources of literature are mainly concentrated in English-dominated databases such as Scopus and Web of Science, and there is a lack of systematic retrieval of databases in other languages, which easily forms a single knowledge bias (Ouyang et al., 2022). Second, although some reviews span a decade, research that can truly systematically portray the relationship between AI technology iteration and the evolution of educational concepts is still relatively rare, and time sensitivity analysis is still insufficient (Alotaibi, 2024).

At the methodological level, some reviews still misuse the systematic standard, lack clear exclusion/inclusion criteria, and method transparency (Memarian & Doleck, 2023). This reflects that in the field of educational technology, the research standards of systematic reviews need to be strengthened.

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