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Review

Opportunities and challenges in higher education arising from AI: A systematic literature review (2020–2024)

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Abstract: With society's continuous development and progress, artificial intelligence (AI) technology is increasingly utilized in higher education, garnering increased attention. The current application of AI in higher education impacts teachers' instructional methods and students' learning processes. While acknowledging that AI advancements offers numerous advantages and contribute significantly to societal progress, excessive reliance on AI within education may give rise to various issues, students' over-dependence on AI can have particularly severe consequences. Although many scholars have recently conducted research on artificial intelligence, there is insufficient analysis of the positive and negative effects on higher education. In this paper, researchers examine the existing literature on AI's impact on higher education to explore the opportunities and challenges presented by this super technology for teaching and learning in higher educational institutions. To address our research questions, we conducted literature searches using two major databases—Scopus and Web of Science—and we selected articles using the PRISMA method. Findings indicate that AI plays a significant role in enhancing student efficiency in academic tasks and homework; However, when considering this issue from an ethical standpoint, it becomes apparent that excessive use of AI hinders the development of learners' knowledge systems while also impairing their cognitive abilities due to an over-reliance on artificial technology. Therefore, our research provides essential guidance for stakeholders on the wise use of artificial intelligence technology.

Keywords: artificial intelligence; AI; ChatGPT; educational institution; higher education

1. Introduction

The integration of AI in education has evolved significantly over the past decade. Initially, AI applications were limited to basic administrative tasks; however, advancements have led to more sophisticated uses, such as personalized learning platforms and intelligent tutoring systems. Artificial intelligence (AI) has become integral to scientific and technological advancements, leading to a surge in the development of AI-integrated products (Patel, 2023). While AI offers transformative opportunities in education by enhancing learning and teaching methods, it also presents significant challenges that require careful consideration and regulation (Jaikumar et al., 2023). It is essential to acknowledge that the AI technology has created numerous opportunities and methodologies for educational implementation, thereby facilitating deeper and broader knowledge dissemination (Zobel et al., 2023). In essence, initially, AI was widely accepted and utilized in education.

It is undeniable that artificial intelligence technology has become an integral component of social development, and its emergence undoubtedly facilitates the

advancement of other technologies (Liu et al., 2020). Despite the intricate process and numerous challenges, the remarkable impact of artificial intelligence in various domains, particularly education, cannot be overstated (Jain et al., 2023).

1.1. How is AI technology utilized in the field of education?

As AI technology continues to permeate all facets of education on a larger scale, it becomes imperative to thoroughly examine its benefits and opportunities, while also addressing the educational issues and challenges it presents (Stromholt et al., 2023). Such research endeavors will significantly contribute by providing valuable insights or recommendations for researchers involved in relevant fields as well as policymakers and participants in the realm of education. Blended learning and AI-based learning have emerged as pivotal topics within education due to ongoing societal progress (Kung et al., 2023). Particularly noteworthy is how AI has provided learners with more choices in learning methods, facilitating easier acquisition of required knowledge across various domains, including complex areas like image design or text creation.

Artificial intelligence's profound sensation stems from its exceptional learning and cognitive abilities, which completely revolutionize human perception of machines (Abdullah et al., 2022). Moreover, the widespread adoption of artificial intelligence has led to rapid advancements in the field since its inception. ChartGPT exemplifies how artificial intelligence continues to evolve dynamically (Buholayka et al., 2023).

AI technology requires specific skills to achieve desired reslults. Artificial intelligence provides users with the simplest method to achieve more complex and desired outcomes (Pavlik, 2023). However, users must ask the right questions and have specific skills to operate this advanced technology effectively (Ivanov et al., 2023).

1.2. The impact of artificial intelligence technology on higher education

Artificial intelligence demonstrates unparalleled computational power even in areas traditionally associated with human expertise, such as critical thinking. Presently, it can engage in communication and interaction akin to humans (Christie et al., 2021). The popularity of artificial intelligence in higher education stems from its efficacy in effectively assisting learners with diverse academic tasks and assignments. The powerful algorithms inherent to AI enable learners to efficiently tackle complex cognitive tasks while facilitating data organization and analysis for academic research (Farooq et al., 2024).

Although artificial intelligence provides learners with very convenient methods and convincing results in most cases, scientists and managers need to avoid unfavorable factors, such as simply being a substitute for completing tasks (AI-Tkhayneh et al., 2023). Otherwise, the public will have significant doubts about the quality of education (Shah, 2021). Artificial intelligence technology has undoubtedly brought new teaching and learning methods to the education sector, but the associated challenges are also evident (Tlili et al., 2023). The most worrying issue is that artificial intelligence, as a "servant" of learners, can be ready at any moment to

provide academic services to this "master" and replace learners in accomplishing the complex task of learning (Casnesi et al., 2023). This raises a social ethical question, namely whether the results of these artificial intelligences can determine if learners have improved their academic skills and knowledge while completing assignments (Balan, 2023). Another question is whether the learners' learning outcomes can be assessed as high-quality or superior (Cooli, 2023).

From this perspective, academic and educational institutions worldwide should consider introducing safety measures to regulate the use of AI technologies in education. Policies should also be developed to prevent students from misusing these tools and ensure that AI serves as a helpful tool rather than a crutch (Roldan et al., 2022).

2. Research questions

To effectively address the research issues, we must first clearly define the specific problems related to AI's impact on higher education. This clarity helps researchers focus their literature search and refine their research objectives. The research questions of this paper are based on the written objectives of the paper and raise four questions about the relationship between artificial intelligence and education stakeholders. After evaluation, the four questions meet the standards and requirements for writing literature reviews in quantity and quality, which can also ensure that the paper's research findings have strong feasibility. The specific research questions can be found in **Table 1**.

Table 1. Analysis of specific research questions and reasons for raising them.

General research questions	Specific research questions	Reasons and intentions for asking the question
What opportunities and challenges do the development of artificial intelligence technology bring to higher education?	Q1: How are AI tools currently being utilized by stakeholders in higher education, and in which specific areas are they most commonly applied?	Assess the current applications of AI in higher education, providing a foundational understanding of its integration.
	Q2: What specific opportunities does AI present to higher education institutions, and how can these be leveraged to improve educational outcomes?	This is one of the critical issues that this study will solve. We cannot deny the advantages of artificial intelligence and to explore the benefits AI offers, which is crucial for identifying areas of improvement and development.
	Q3: What are the primary risks and challenges associated with the integration of AI in higher education, and how can these be mitigated?	The paper will address potential risks, ensuring a balanced view of AI's impact. Finding the challenges and risks of artificial intelligence in higher education can provide a valuable reference for scholars and decision-makers.
	Q4: What broader impacts does AI have on the various components of higher education, including teaching, learning, and administration?	Evaluate the overall effects of AI, offering a comprehensive analysis of its role in education.

Table 1 outlines the research questions this study addresses and provides the rationale for each question. It details how these questions align with the overall research objectives and their importance in evaluating AI's impact on higher education.

3. Methodology

3.1. Research methods

In order to investigate and analyze the development process and future development tendency of a research object, researchers have developed a specific literature review method over a long period (Moreno et al., 2018). This study employs a systematic literature review methodology to explore the opportunities and challenges of AI in higher education. We will search for relevant articles in Scopus and Web of Science using predefined keywords. The review process will follow the PRISMA framework, which includes identification, screening, eligibility assessment, and inclusion of literature. Such a research method is a research method confirmed and recognized by researchers, which is quite convincing (Lund et al., 2023).

After consulting with research experts, this study chose to search for articles in two major databases, Scopus and Web of Science. These well-established databases offer a vast collection of articles, ensuring a sufficient source of literature on related topics for the research. By using carefully selected keywords, it is possible to locate numerous relevant documents, which provide the necessary foundation for conducting the study (Singer, 2009).

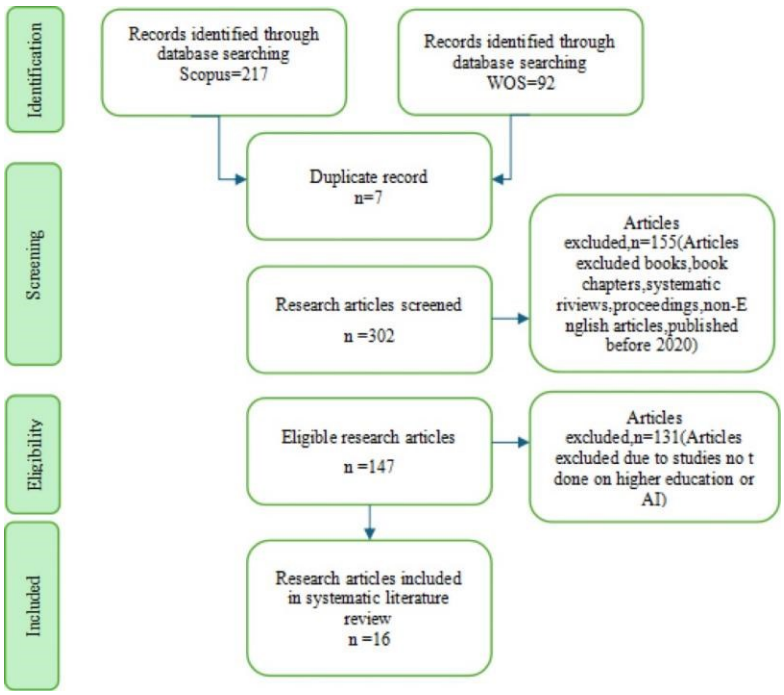

Figure 1. Flow diagram of the study.

PRISMA is a research method frequently used in systematic literature reviews and has a relatively high status among the research methods trusted by scientists (Moreno et al., 2018). This research method essentially involves four important steps: identification, Screening, Eligibility, and Inclusion, as shown in **Figure 1**. PRISMA is widely used by researchers because of its comprehensive and adaptable framework. Based on this premise, the aims and procedures of this systematic review are

outlined as follows. The PRISMA framework will guide our literature review process through the following steps:

1) Identification: Search for relevant articles using keywords in Scopus and Web of Science. A total of 309 academic papers were retrieved.
2) Screening: Evaluate articles based on title and abstract to filter out irrelevant studies. A total of 155 papers were excluded.
3) Eligibility: Assess the full text of articles to ensure they meet the inclusion criteria. A total of 131 papers were excluded.
4) Inclusion: Select articles that are most relevant and of high quality for detailed analysis. A total of 16 papers were selected for analysis.

3.2. Keywords and paper selection criteria

Scopus and Web of Science were selected due to their comprehensive coverage of academic literature in the field of education and technology. These databases provide access to a wide range of high-quality research articles, which is crucial for conducting a thorough and reliable literature review. The core of systematic literature research lies in the precise selection of keywords (Badali et al., 2022). A well-considered selection of keywords is essential for identifying both quantitatively and qualitatively satisfactory studies within the database (Almurashi, 2022). Inadequate keyword selection can result in retrieving a large volume of articles from unrelated fields, necessitating substantial effort to locate the relevant literature (Islam and Uddin, 2023). Following a thorough design and careful consideration, the keywords in **Table 2** were selected for this study:

Table 2. Database and literature search keyword string.

Database	String
Scopus	TITLE-ABS-KEY ((“AI” “artificial intelligence” “AI tool” OR “AI technology” OR “AI assistance” OR “AI application” OR “generative AI” “artificial intelligence”) AND (“education” OR “learning” OR “e-learning” OR “learning assistent” OR “higher education” OR “Higher education institutions” OR “educational services”))
Web of Science	TS = ((“AI” “artificial intelligence” “AI tool” OR “AI technology” OR “AI assistance” OR “AI application” OR “generative AI” “artificial intelligence”) AND (“education” OR “learning” OR “e-learning” OR “learning assistent” OR “higher education” OR “Higher education institutions” OR “educational services”))

We will likely encounter numerous articles on related topics when searching the database using the specified keywords. However, although the retrieved works may pertain to the research topic, not all will be relevant. To address this, the study proposes specific criteria for the further selection of articles, drawing upon the methodologies of previous researchers. These criteria are designed to exclude documents that, while related to the topic, significantly differ in content. This approach aims to enhance research efficiency and achieve the study’s objectives

(Pavlik, 2023). We have developed selection criteria for the papers based on the research requirements. Refer to **Table 3**.

Table 3. Article acceptance criteria.

Guidelines	Standard Description	Inclusion and exclusion status
Language	Written in English	include
Year of publication	Published in the past five years	include
Field	The paper belongs to the category of education	include
	The paper is about learning types, learning processes, and other learning-related	include
	Non-educational papers	exclude
Contents of the document	No artificial intelligence research content is involved	exclude
	The paper does not involve any AI-related content	exclude
	The content of the papers has a high similarity	exclude
	The source of the paper data is unknown	exclude
Relevance of content	The papers discuss different places where AI is used	include
	The paper examines the uses of AI outside of education.	exclude

We searched and found the above keywords and then used the established standards to scrutinize the research content of the papers. We finally decided to examine 16 articles in total. The database sources for this specific number of articles are shown in **Figure 2**.

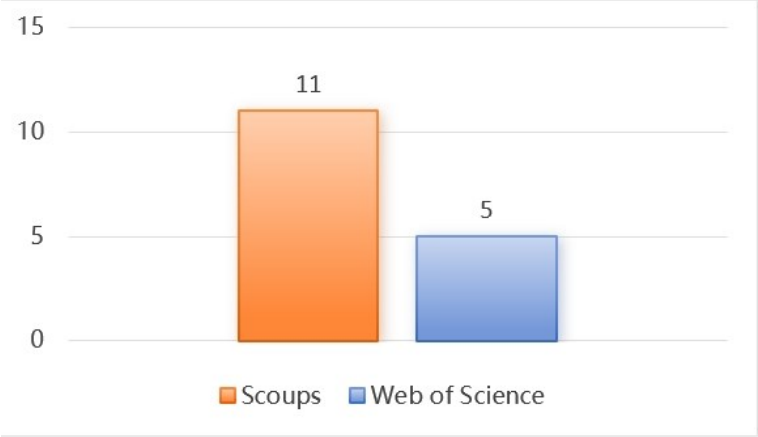

Figure 2. Database sources of the papers (Total = 16).

Applying the PRISMA method of literature selection can help researchers reduce useless or irrelevant papers, improve research efficiency and achieve research goals. After strictly following this scientific research method, the target articles were finally selected in this study, laying the foundation for the next research step. The information of each article can be found in **Table 4**.

Table 4. List of specific information of the paper.

Title	Authors/Year of Publication	Research Objective	Type of Research	Conclusion
Challenges and Future Directions of Big Data and Artificial Intelligence in Education	Luan et al. (2020)	To study the impact of artificial intelligence and big data in scientific research in higher education and policy formulation and implementation of higher education	qualitative	The development of higher education activities is inseparable from artificial intelligence. Artificial intelligence is an crucial way to promote the personalization and diversification of higher education.
Game of algorithms: ChatGPT implications for the future of tourism education and research	Ivanov and Soliman (2023)	Analyze the application of ChatGPT in tourism education in higher education	qualitative	In terms of tourism education in higher education, ChatGPT will provide teachers and students with more ideas and innovative approaches.
Exploring Opportunities and Challenges of Artificial Intelligence and Machine Learning in Higher Education Institutions	Valentin et al. (2021)	To explore the risks and challenges that AI brings to higher education, and through what ways and ways these effects occur	quantitative	The field of higher education needs to adopt AI technology with an inclusive attitude and positive actions to meet the innovation that technology brings to higher education and the expectations of teachers and students
The Utilization of ChatGPT in Reshaping Future Medical Education and Learning Perspectives: A Curse or a Blessing?	Breeding et al. (2023)	Summarize what possible opportunities ChatGPT will bring to the education of medical students	quantitative	ChartGPT brings potential benefits to medical students on how to do good research work
How to teach responsible AI in Higher Education: challenges and opportunities	Aler Tubella et al. (2024)	To explore the challenges that AI brings to the educational strategy and resource allocation of higher education	qualitative	The paper proposes some strategies in policy making and resource allocation to meet the series of challenges brought by AI to the cultivation of the next generation in higher education
ChatGPT in nursing education: opportunities and challenges	Athilingam and He (2023)	Explore the challenges and opportunities of AI technology in nursing education in higher education	qualitative	ChatGPT Although the widespread use has brought a lot of controversy, but the higher medical education still needs to explore and innovatively use this advanced technology, can not deny the advantage of advanced technology
The State of Artificial Intelligence in Nursing Education: Past, Present, and Future Directions	De Gagne (2023)	Combing the development process of AI in higher nursing education	qualitative	The use of AI technology does promote the development of higher medical education in a certain sense, but users need to avoid its adverse factors
Reflection on whether Chat GPT should be banned by academia from the perspective of education and teaching	Yu (2023)	Chat GPT What aspects will affect higher education	qualitative	Strict regulation of Chat GPT use is a wise choice
Exploring the Potential Impact of Artificial Intelligence (AI) on International Students in Higher Education: Generative AI, Chatbots, Analytics, and International Student Success	Wang et al. (2023)	To study the impact that AI has on international students' education	qualitative	Although AI can significantly improve the learning efficiency of international students and provide many favorable support, the uncertainty and potential errors of AI conclusions should be eliminated

Table 4. (*Continued*).

Title	Authors/Year of Publication	Research Objective	Type of Research	Conclusion
Chatting and cheating: Ensuring academic integrity in the era of ChatGPT	Cotton et al. (2024)	Explore the relationship between ChatGPT and academic integrity	qualitative	Teachers and students in universities should take the initiative to avoid using AI to complete academic tasks to avoid the vortex of academic cheating
Chatbots in education and research: A critical examination of ethical implications and solutions	Kooli (2023)	To study the use of AI technology in academic fields and the impact of the use of AI on higher education	qualitative	They believe that higher education should adapt to the AI era and has become a necessary part of higher education. The paper also gives corresponding suggestions on how to solve the ethical problems arising from the use of AI
Can an artificial intelligence chatbot be the author of a scholarly article?	Lee (2023)	Analyze whether an AI chatbot can become an academic paper writer	qualitative	Although AI technology has demonstrated its superhuman ability in paper writing, it cannot become an academic author
Time to Revisit Existing Student's Performance Evaluation Approach in Higher Education Sector in a New Era of ChatGPT — A Case Study	Chaudhry et al. (2023)	ChatGPT Have an impact on the evaluation of learners' performance in higher education	empirical	The ability of ChatGPT to complete jobs was obtained experimentally and compared with non-AI assistance
Artificial intelligence in higher education: The three paradigms	Ouyang and Jiao (2021)	Summarize the three paradigms of AI in higher education	qualitative	By meeting the personalized needs of college students, AI provides learning resources in full accordance with their learning wishes, and provides learning reflection procedures, to realize college students' learning advancement
Embracing the Wave: The Disruption of Conversational Artificial Intelligence toward English for Specific Purposes (ESP) Teaching Transformation	Ningsih et al. (2023)	To study what effects Chat GPT has on English for Specific Purposes (ESP) and what are the main modes of impact	qualitative	ChatGPT In ESP teaching, it provides personalized learning experience, and also provides rich learning resources, but it still cannot replace the position of teachers in teaching
Exploring college Students' Perceptions of ChatGPT: Thematic Analysis and Follow-Up Survey	Shoufan (2023)	Analyanalyze their role in higher education by understanding students' perception of ChatGPT	qualitative and quantitative studies (Mixed studies)	College students have a very optimistic attitude towards Chat GPT, and they are generally willing to accept the new feelings brought by new things, but also to prevent the dependence on the use of ChatGPT

4. Results and discussion

In order to clearly understand the current state of research and scholars' opinions on the relationship between artificial intelligence and higher education, we decided to conduct a scientific investigation through a literature review. A literature review is a research method that has proven to be very effective in collecting data and understanding the state of development of the industry (Chaudhry et al., 2023). So we need to collect a large amount of relevant literature and conduct a careful analysis.

Analyzing each article's content helps resolve the issues raised in this study, which is also a necessary procedure for conducting the research. The specific content analysis and induction are presented in the following article.

4.1. The use of artificial intelligence in higher education

Artificial intelligence has gained significant attention since its emergence, and its applications extend to higher education (Ivanov, 2023). In the field of higher education, artificial intelligence, with its super learning ability and super data support, can help teachers with lesson preparation, lesson delivery, lesson summarization, and other connections and content, and help students with data collection, knowledge retrieval, and question answering (Kovačević, 2023). A surprising aspect for higher education users is artificial intelligence's ability to facilitate human-computer interaction and respond to queries, which increases its appeal (Bubaš and Čižmešija, 2023). Moreover, the advanced cognitive and expressive capabilities of artificial intelligence can substitute for student efforts in complex tasks, which is highly appealing to students (Eysenbach, 2023). It is essential to recognize that, despite the versatile and multi-layered support artificial intelligence offers in higher education, it remains fundamentally a machine without human consciousness (Deng et al., 2023). Therefore, when humans use it to complete a task, users must spend time verifying the authenticity and effectiveness of its content (Butakor, 2023).

The use of new technologies, such as artificial intelligence, has now fully embraced the field of higher education (Ivanov and Soliman, 2023). Teachers and students have learned to use such tools to make their work and studies easy and convenient. Replacing oneself with technology has become an ethical behavior that makes people think (Cotton et al., 2024). Because learners do not even have to do their homework themselves, they can get satisfactory answers in no time just by clicking on the screen (Li et al., 2020). The key to the problem is that the answers given by these machines are far beyond the processing capabilities of humans themselves, which will increasingly keep users away from artificial intelligence and form an irreplaceable dependency (Luan et al., 2020).

Among the content that connects the field of artificial intelligence to higher education, language and word processing skills are the most popular among higher education participants (Kocaman, 2022). Faculty and students can use artificial intelligence's super language and word processing skills to push themselves to a reasonably high level (Tubella et al., 2023). Artificial intelligence has improved personal work skills to a certain extent and can also surprise those around them (Degidi and Daprile, 2023). However, some scientists have noticed the consequences of academic misconduct through the use of artificial intelligence tools, as this does not reflect the academic researchers' abilities, and the results obtained are not based on facts and lack explanatory power and credibility (Thurzo et al., 2023).

Therefore, everyone now knows that the publishers of scientific papers have developed applications that can detect AI traces, such as Turnitin's document duplicate detection function, which not only enables the detection of duplicates of ordinary text content but can also accurately detect whether it is an AI creation or what content is the product of AI, which is an excellent way to prevent scientific

severe plagiarism (Ningsih et al., 2023). Such operations will also help academic research return to normality so that academic researchers understand that the true meaning of academic research is not at all to put words together and deceive the world (Sun, 2023). From another perspective, the right way for the world is to use artificial intelligence technology scientifically and rationally (Ouyang et al., 2021). For example, scientists use artificial intelligence to search and answer knowledge questions, find new ideas for their work, and correct and error-check their texts. These behaviors are recognized by humans (Wang et al., 2023). We are conducting ethical deliberations on the role of artificial intelligence so that more users or those who rely on artificial intelligence technology will realize that artificial intelligence can be used wisely but must not be abused (Saeed and Taqa, 2022). It is wise to control the use of artificial intelligence to the extent permitted by law (Radutniy, 2024).

Artificial intelligence's widespread use and proliferation have led academics to look more closely at its impact on higher education (Wang, 2023). Some believe that artificial intelligence has many advantages, can further promote educational equity, and break the original educational pattern; other scholars believe that using artificial intelligence will affect the quality of higher education and the creativity and innovation awareness that students should cultivate in the learning process (Shoufan, 2023). For some students, using artificial intelligence can provide immediate relief in completing their studies and is greatly appreciated by them (Degidi and Daprile, 2023). However, the excessive use of artificial intelligence causes learners to become highly dependent and gradually lose motivation and passion for the pursuit of innovation (Athilingam and He, 2023). Even if different opinions clash, artificial intelligence will still be able to constantly update and iterate itself in the coming period, continuing to innovate and becoming more and more human (Slimi, 2023).

Some scientists who are skeptical about artificial intelligence believe that it can deliver the desired results very efficiently in a short time regarding its relevance to higher education (Shoufan, 2023). However, since it is still essentially a machine, it is far removed from human thinking and consciousness, so the stated results are only partially credible (Ott, 2023). This shows that artificial intelligence still has significant limitations at this stage (Scott et al., 2023). Compared to human thinking and logic, machines with artificial intelligence still have a long way to go (Scott et al., 2023). Help for teachers in teaching, such as lesson preparation, lesson innovation, lesson reference, and lesson inspiration, can provide some support (Yu et al, 2020). Artificial intelligence technology is generally not omnipotent and entirely credible at this stage (Jennie, 2023). Users must analyze the context and objectives of use and be aware of the uncertainties and risks associated with use to achieve the goal of using the software according to their talents (De Gagne,2023). The nature of the use requires college managers and decision-makers to make their decisions after careful thought and consideration (Zeijlemaker et al., 2022).

4.2. Opportunities brought by artificial intelligence in higher education

In higher education, where large amounts of text are frequently handled, artificial intelligence excels in providing users with diverse insights through its powerful computing and search capabilities (Breeding et al., 2024).

While excessive reliance on artificial intelligence can lead to concerns such as academic fraud or plagiarism, the technology's benefits should not be overlooked (Te et al., 2023). So, we only need to evaluate and regulate its use effectively in higher education.

AI is a product of scientific and technological development (Halaweh, 2023). In higher education, teachers and students can use AI tools to find the knowledge or literature they need to assist in their research work (Buriak, 2023). However, artificial intelligence should be used without severe dependence. Many teachers are also trying to use AI tools to explain their teaching better or to assist in presenting more effectively to improve teaching effectiveness (Surovkova et al., 2023). In these aspects, the role and benefits of artificial intelligence for teachers and students are positive and beneficial.

Although the large-scale use of AI in higher education raises concerns about its negative impact, it is impossible to stop this advanced technology from being widely adopted and used rapidly (Takur et al., 2023). In the foreseeable future, AI will continue to advance in more sophisticated directions (Alahi et al., 2023). Therefore, we must learn to use these AI tools, coexist with them, and find the right balance. This way, we can leverage its strengths, avoid weaknesses, and create a new model (Kasneci et al., 2023). The higher education sector should cultivate teachers' ability to guide students in using AI appropriately and responsibly (Fink et al., 2023). The most crucial step is supervising students' use to ensure they reasonably use artificial intelligence (Strzelecki, 2023).

4.3. Challenges brought by artificial intelligence to higher education

Artificial intelligence significantly impacts higher education, particularly in academic research (Alenezi, 2023). Academic research is a critical component of higher education and is deeply respected by scholars due to its complexity, difficulty, monotony, and challenges (Sallam, 2023). One reason for the emergence and popularization of artificial intelligence is its ability to perform challenging text-based tasks that humans would otherwise handle (Ali et al., 2024). Experts express concern that AI could compromise academic integrity and diminish the sanctity of academic research (Lee, 2023).

Practitioners from various fields have enthusiastically embraced this new technology, using it extensively and treating it as their closest work partner (Anagnostou et al., 2022). This widespread use raises concerns about the potential problems and damage it could bring to higher education (Qi et al., 2023). The most worrying aspect is likely its impact on academic research, which could significantly affect academic practitioners' creative thinking and research motivation, corrupt the spirit of academic research, and even lead to unhealthy competition (Wolniak et al., 2022). As it becomes difficult to distinguish the authenticity of academic achievements, the standard academic evaluation process is disrupted. Behind two different academic research results, one might be a genuine creation and invention, while the other could be the product of machine assistance (Breeding, 2024).

AI technologies, such as ChatGPT, have undergone numerous updates and iterations, but society's response could have been faster compared to technological advancements (Pavlik, 2023). Due to intense public interest and high expectations

for AI, relevant R and D companies continue to invest heavily in developing more sophisticated products. Currently, many AI products are readily accessible through a simple online search (Zhang et al., 2024). Besides ChatGPT, there are Wenxin Yiyan, Tongyi Qianwen, KIMI, and others.

In higher education, experts and scholars are most concerned that educators' reliance on artificial intelligence will not only undermine the fundamental principle of academic integrity but may also lead to mental inertia, ideological degradation, and a lack of innovation awareness due to long-term reliance on AI technology (Moreno et al., 2018). Imagine if our college students are content to use AI technology, they will no longer be willing to invest the necessary time and energy in innovation and hard work because those who strive may receive the same grades as those who rely on AI or even lower grades (Wei, 2024). One of the essential purposes of higher education is to cultivate students with innovative and critical thinking skills (Li and Liu, 2022). The most vulnerable in this scenario may be the outstanding students in top universities.

While scholars and students in higher education are enjoying the immense benefits of AI assisting in work and study tasks, there is also a hidden concern: students are using the time they should spend thinking about problems and developing their thinking skills to research instead which AI software is the best, which software can help them complete homework most effectively, and which AI product can better achieve the answers and results they want (Lund et al., 2023). These concerns are not unfounded and require us to reflect and seek solutions to prevent more severe dangers from arising (Choi, 2023).

Academic plagiarism is one of the most concerning issues for scholars in higher education. Undeniably, AI technology has brought significant benefits to participants in higher education. However, when students use AI programs to complete homework in large quantities, they often engage in little to no critical thinking, leading to mental inertia. As a teacher, we should encourage students to think and complete tasks independently in class (Cheatham et al., 2023). It is essential to remind students that submitting homework is not the ultimate goal; instead, the process should be about accumulating knowledge, developing critical thinking, and enhancing intelligence (Yu et al., 2020).

While we are concerned about a series of potential problems brought about by artificial intelligence, we should not ignore that AI is also promoting the development of higher education in its unique way (Kovacevich, 2023). Although we must prevent the issues we are worried about from arising, we cannot halt the continued development of AI technology, nor can we stop teachers and students from using it (Igeta et al., 2023). Therefore, we need to develop a scientific framework for AI usage that can leverage its powerful advantages, meet the needs of teachers and students, and minimize negative impacts (Choi et al., 2023).

Some scholars have bluntly stated that artificial intelligence has become essential to people's lives today (Yoganingrum et al., 2022). In higher education, AI can encourage students to complete their homework to a certain extent (Cooli, 2023). This helps students gain more extraordinary courage to face challenges related to learning, thereby improving their academic success rate (Khan et al., 2023). However, this does not mean that students can use AI technology to cheat on

homework, exams, and studies, which is unacceptable according to academic ethics (Salo-Pöntinen, 2021). Moreover, we need to understand that as a machine technology, AI does not possess the precise logic and comprehensive thinking of the human brain (Ettari et al., 2022). Its solutions and answers may need to be revised, and some could contain fatal errors (Casnesi et al., 2023). Therefore, in actual application, AI users should conduct scientific evaluations to determine how to use the software and to what extent its conclusions should be adopted (Sutherlin, 2023).

Although we are all wary of the potential risks that artificial intelligence may bring, the general trend and direction indicate that the powerful computing capabilities of AI have brought many visible benefits to participants in higher education across various application scenarios (Joiner, 2023). While AI tools cannot yet perform more complex literature analysis and academic discussions—due to their limitations in profound logic and conscious thinking—no one can deny that such AI technology will likely be developed shortly (Athilingam, 2023).

4.4. The overall impact of AI technology on higher education

The rapid development of AI technology has impacted the traditional education model of higher education to a certain extent, introducing new directions for the evolution of higher education (Joyner, 2023). Especially in the era of "AI + education", higher education teachers are required not only to master sufficient knowledge and advanced experience but also to focus on effectively imparting this knowledge to students (Haraway, 2023). This requires effective mediums, and technological advancements provide multiple options, such as projectors and bright screens (Singh et al., 2024). Thus, all higher education teachers must learn to use AI to impart knowledge and experience to students efficiently and this requires specific prerequisites: teachers must be open to continuous learning and keep up with the times (Ivanov et al., 2023). Otherwise, in this era of rapid technological development, past teaching methods, and even the teaching profession itself, may be threatened by artificial intelligence (Yang et al., 2023).

Higher education has broken away from the traditional model of teaching confined within walls, allowing it to extend beyond campuses and even borders (Eisenbach, 2023). Today, the globalization of higher education intersects with artificial intelligence, shifting its developmental focus from broad expansion to individualized learning (López-Chila et al., 2023). This personalized education method better meets students' needs and improves learning outcomes (Indriastuti et al., 2023).

Another significant impact is the democratization of educational opportunities (Nykyporets et al, 2023). Many students need more resources or other reasons to access high-quality education in some areas (Costa et al., 2021). AI can provide opportunities for these students through online learning platforms and innovative educational tools (Tzoneva, 2023). Adopting this technology will help reduce educational resource inequality and promote the democratization and fairness of education (Guo and Lok, 2023).

In summary, the impact of AI on education is multifaceted. While this technology brings numerous opportunities and benefits, it poses challenges and risks. Educators and policymakers must carefully consider how to utilize AI best to

maximize educational quality and ensure students' benefit. Only by fully understanding the potential and limitations of AI can we better respond to the challenges facing the education sector and achieve a more inclusive and innovative education system.

5. Conclusions

Since its introduction, artificial intelligence (AI) technology has rapidly garnered widespread attention, particularly in higher education, where it is increasingly integrated into various processes to achieve desired outcomes (Benuyenah, 2023; Lin and Yu, 2023). AI has quickly gained the trust of higher education institutions due to its extensive knowledge base, comprehensive thinking methodologies, structured logical reasoning, and advanced human-computer interaction capabilities (Arif et al., 2023). Currently, AI tools are among the most frequently utilized applications in the academic and administrative functions of higher education institutions (Gnoh et al., 2024). The continued development of AI is expected to lead to the creation and adoption of even more advanced technologies, making it evident that resisting AI would hinder historical progress (Dankwa-Mullan et al., 2021; Mannuru et al., 2023). Therefore, it is crucial to consider the implications of AI in advance and prepare for its future impact (Breeding et al., 2024).

In the context of higher education, educators must use AI technology responsibly, setting a positive example for their students (Al-Rahmi et al., 2022). It is essential for teachers to guide students in differentiating between AI-generated inspiration and the formation of original thought, helping them understand the appropriate boundaries for AI usage (Wan Ismail et al., 2023).

In conclusion, AI has the potential to revolutionize education by making learning more personalized and efficient. However, to harness these benefits, educators and policymakers must address the ethical and practical challenges posed by AI. Future research should focus on developing frameworks that balance innovation with the preservation of human judgment in educational contexts.

6. Recommendations

Based on the above studies, policymakers should consider developing guidelines for AI usage in education to ensure ethical practices and mitigate risks. Educators are encouraged to embrace AI tools that enhance teaching and learning while remaining vigilant about potential challenges. Future research should focus on developing and establishing guidelines for the ethical and effective use of AI technology. As AI becomes more widely adopted and publicly accepted, the formulation of universally recognized rules will enable society to fully leverage AI for the betterment of humanity without attracting undue controversy (Lund et al., 2023). This study aims to contribute to this effort by informing AI users about acceptable and unacceptable practices, ultimately fostering a set of standards that promote the comprehensive development of society through AI.

7. Limitations

There were several challenges and limitations identified when conducting this study. This study only examined 16 articles which were taken from Scopus and Web of Science. One potential limitation of our methodology is the risk of publication bias, as the review will be limited to articles available in the selected databases. If more data on the actual use of AI in higher education can be collected in the study, it will be more helpful for the development of this study. Additionally, variations in the quality of included studies may affect the overall findings.

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