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Implications of artificial intelligence chatbot models in higher education

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ABSTRACT

Artificial intelligence (AI) is becoming increasingly influential in the academic sector, which is why it is important to explore the ethical dilemmas and concerns surrounding AI chatbots' design, development, and deployment in educational contexts. Conducted as a thematic literature review, this paper explores existing research on AI in education, AI chatbots, and their integration with higher education to gather evidence and insights that discuss ethical implications and challenges. The study has analyzed several articles on AI chatbots and their integration into academic fields. Significant gaps have been identified, such as the need for more practical implications and the recognition of AI chatbots as a collaborative tool for academic purposes. More AI chatbots should be explicitly trained on data relevant to the learners' study to examine their usefulness properly. The paper discusses the ethical dilemmas and concerns about the design, development, and deployment of AI chatbots in higher education. It seeks to provide insights and recommendations to ensure the ethical use of AI chatbots in higher education by identifying significant gaps in the existing literature and providing scenarios to expect in the development of AI in education.

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1. INTRODUCTION

Artificial intelligence (AI) and similar technologies are becoming increasingly influential in the academic sector for educators and learners alike [1], especially with the emergence of technologies such as the metaverse integerated within Society 5.0 [2], [3]. This has led to much research being conducted for artificial intelligence in education (AIEd) for the past 30 years [4]. Researchers have stated that 'all AI researchers should be concerned with the ethical implications of their work' [5]. Additionally, countries have expressed their concerns over the potential security risks concerning AI and thus have taken steps against it is use [6].

AI can potentially change classroom teaching structurally only by automation, so there are better solutions for more complex tasks. The adoption of AIEd raises ethical considerations. Thus, ensuring AI chatbots' fairness, transparency, and accountability is crucial to prevent bias and discrimination. Ethical governance frameworks should be developed to guide the usage of AI in higher education.

This paper discusses the ethical dilemmas and concerns about AI chatbots' design, development, and deployment in educational contexts. Although educators are making considerable progress in accepting AI chatbots, a better understanding of ethical issues will help design AI chatbots in educational contexts [7]. This study seeks to provide insights and recommendations to ensure the ethical use of AI chatbots in higher education by thoroughly examining existing literature using real-world examples. Moreover, the paper also provides a comprehensive summary of the major findings of prior literature on the topic of AIEd, analysing its major contributions, while emphasizing its future scope.

Chatbots use input from users to learn natural language processing (NLP) and respond to it using machine/deep learning algorithms and AI algorithms. The response constructor produces suitable responses, which are then chosen by the response selector [8]. NLP is used in AI chatbots to process the human language from text or voice and "make sense' of its meaning, noting the user's intent and emotions [9]. NLP technology allows AI chatbots to interpret student input and return suitable responses [8], [10]. Furthermore, these algorithms enable chatbots to analyze large volumes of data and provide tailored recommendations, assistance, and support to students [11], [12]. These algorithms can also identify individual learning needs and provide personalized feedback and recommendations, facilitating adaptive learning experiences [8]. Major AI chatbots in higher education. Ever since the inception of ELIZA, the first AI language model developed by MIT in 1966 [8], [13], AI chatbots have become ever popular, especially considering the rapid progress and open access to the public in recent years. Many AI chatbots are currently being used, such as ChatGPT, Google Gemini, Jasper Chat, Bing Chat, YouChat, Chatsonic, Replika, and Cleverbot-among the many to exist over the years. Among these AI chatbots, ChatGPT, Google Gemini, and Jasper Chat are the most advanced and user-friendly [14].

ChatGPT is an AI model designed and developed by OpenAI, designed initially to learn human language patterns, and carry out natural conversations with humans [15]. ChatGPT-1 was introduced in June 2018, notably only being a closed-access project to researchers at OpenAI [15]. After only a few more iterations, OpenAI finally released a demo of ChatGPT-3 to the public, and very soon, the helpful nature of AI was realized by all. Almost immediately after release, users quickly realized it is potential for academic uses, and thus ChatGPT became almost irreplaceable for finishing academic assignments and project work quickly and efficiently [16]. ChatGPT is notable for its ability to provide asynchronous communication. This feature increases student engagement and collaboration as students can post questions and discuss topics simultaneously [17].

Google Gemini is an experimental conversational AI service developed by Google. It combines extensive knowledge with the intelligence of language models to provide high-quality responses conversationally [18]. Gemini aims to simplify complex topics and engage users in creative and curious ways. Gemini aims to provide users with a collaborative tool powered by generative AI. Leveraging a research large language model (LLM) can boost productivity, spark creativity, and fuel curiosity. Gemini provides multiple response drafts, allowing users to choose the best responses and collaborate further. It is also complementary to the Google Search experience, with the option to explore additional sources [19].

Jasper Chat (https://www.jasper.ai/chat) is an advanced conversational AI system that utilizes NLP and machine/deep learning technology to engage in natural human conversations. This chatbot can improve various aspects of education, including student support, tutoring, and personalized learning experiences [20]. Jasper Chat provides real-time assistance to students. By addressing student queries and concerns, Jasper Chat offers personalized support and guidance, improving student engagement and satisfaction. Such capabilities make Jasper Chat an intelligent tutoring system. Jasper Chat provides personalized learning experiences to help students understand complex concepts and improve their academic performance. Jasper Chat's interactive conversational abilities make it particularly valuable in language learning domains within higher education. It facilitates language acquisition by engaging students in realistic conversations, offering language practice, and providing instant feedback. The human-like responses generated by Jasper Chat enhance language learning experiences.

2. METHOD

The study offers an in-depth analysis of several research articles regarding AI chatbots and their integration into academic fields. The study conducts a comprehensive analysis of relevant literature, examining the subject matter's source, meaning, and characteristics. Additionally, a comprehensive framework for practical application is presented. The article also explores the possible uses, challenges, and prospects for further investigating the AI Chatbots in education. The paper will thus contribute to developing ethical guidelines: i) to understand the challenges that arise with the implementation of AIEd; ii) to understand the ethical issues that arise with the implementation of AIEd; and iii) to propose viable solutions to overcome such challenges and issues to ensure maximum learning gain.

3. RESULTS AND DISCUSSION

3.1. Research gap

Some of the significant gaps in these studies include that the research needs to provide practical implications of AI chatbots in higher education. Instead, it discusses merely the advantages and disadvantages of AI chatbots i.e., answering why but not how [21]. Another gap exists in the practical usefulness of AI chatbots to learners and educators. As no institution has formally recognized AI chatbots as a collaborative tool for academic purposes, this area remains grey as researchers cannot ask questions on the effectiveness of AI integration in the learners' scope of understanding [20]. All the research implies that more AI chatbots should be explicitly trained on data relevant to the learners' study to examine their usefulness properly. Thus, the existing research cannot correctly conclude whether AI chatbots can be a valuable collaborator to enrich the learners' study gain. The following articles have been compiled to give a more thorough idea is shown in Table 1.

Table 1. A review of research articles

Study	Major findings	Future scope
[10]	Education is a human-centric system, not an AI-based solution. AI chatbots can merely be trained to search for grammar mistakes and plagiarism. The role of AIEd is to enhance human thinking and to augment the learning process, not for content delivery, control, and assessment.	Institutions must ensure that the AI chatbots used for academic and research purposes are not controlled directly by tech corporations to establish their agenda. These models must also be free from biases and provide fair results.
[21]	AI chatbots have had a profound influence on helping to overcome student difficulties and enrich their educational experience, although AI will not completely replace traditional educational systems. AI chatbots cannot be accurate in every situation without a human mentor.	AI chatbots can be implemented in many parts of the educational process, including content development, teaching methods, student assessment, and communication between teachers and students.
[4]	There need to be more studies from the technological perspectives of AI chatbots, and quantitative methods are more prevalent in empirical studies. AI chatbots can support students, faculty members, and administrators.	Educators must aim to conduct innovative and meaningful research practices with AIEd, that could have a higher learning impact. AI chatbots might offer flexible, interactive, and personalized learning opportunities by relieving teachers from the burdens of grading assignments.
[22]	AIEd significantly impacted instructors using AI chatbots to achieve greater efficiency on different academic tasks. Students can have a better and richer learning experience with practical or experiential learning. The positive effects of AI chatbots outweigh the adverse effects.	AI chatbots will play a more critical role as learning requirements change. With increasingly frequent interaction in the educational process, AI chatbots will generate more data to provide a clearer picture of the teaching and learning process, enabling more accurate information recommendations.
[20]	Students' interests dropped after one week with AI chatbots, and human-partner conditions were less likely to do so.	More empirical studies are required to examine the effects of AI chatbots in education. Further AIEd research may result in more practical guidelines and examples for educators.
[23]	AI's profound effects on education may not be positive, and educational inequality may widen within the early days of AI chatbots. AIEd has the potential to make significant positive contributions to learning.	AI chatbots should be developed to increase personalization in learning for all students. The number of teaching staff in classrooms may be reduced.
[24]	It is fundamental that the public moves from passively adopting or rejecting technology to being at the forefront of the innovation process. The success of AIEd depends on its effects on human well-being.	Human well-being must be put at the core of development to provide a sure recipe for innovation and set both realistic goals and concrete means to measure the impact of AI chatbots.
[25]	Regulation is required to implement AIEd. Any deployment of AI chatbots in education should reflect the role of education as an engine of equality and development. AI must be driven and controlled by humans. AI chatbots can do a lot of good in education but also scale up poor pedagogical ideas.	A correct and meaningful ethics framework should be developed to implement AI chatbots in education. It needs to start with purpose-asking whether a specific AI Model furthers rather than hinders learning and questions how it does so, the measure of impact. Consultations with students, parents, teachers, and the wider community are recommended.
[26]	AI chatbots can facilitate personalized learning. AI chatbots also have the potential to generate plausible and real-time feedback. However, the extent of the impact of the feedback provided by AI on learning gain remains ambiguous in comparison to other sources of feedback.	Educators must take advantage of AI model's opportunity for education while attempting to minimize its threats to education. The curricula must be adjusted to include learning goals, tasks, and assessment approaches to enhance students' capability to rigorously evaluate, assess, and use these technologies.
[27]	AI chatbots have potential benefits when serving as instructors' assistants and virtual tutors for students. However, it raises concerns such as the generation of incorrect or false information and its threat to academic integrity.	Institutions should update their guidelines and policies for academic integrity and plagiarism prevention. Instructors should be trained to use AI chatbots effectively and detect student plagiarism. Students should also be educated on AI chatbots' ethical use and potential limitations.
[28]	The use of AI chatbots in education is a promising area of research that offers many opportunities to enhance student's learning experiences and support teachers' work. Despite many difficulties and challenges, the discussed risks are manageable and should be addressed to provide trustworthy and fair access to AI chatbots for education.	Approaching AI chatbots cautiously and critically evaluating their limitations and potential biases is crucial. Integrating AI chatbots must therefore be done in conjunction with ongoing human monitoring, guidance, and critical thinking. Further research must explore best practices for integrating AI chatbots with education and mitigate the risks identified.

3.2. The challenges and ethical implications of artificial intelligence

The accessibility and ease of use of most AI chatbots can potentially facilitate plagiarism, thus increasing it is risks. Students may rely on the tool to generate content without proper attribution, leading to the submission of work that is not their own [29]. The unique text generated by the tool may not be easily detected by existing plagiarism detection software, making it harder for educators to identify instances of plagiarism [26]. AI-generated content, such as articles or academic papers, raises questions about proper handling and disclosing AI involvement in research and publication processes. Ensuring transparency and appropriate acknowledgment of AI-generated contributions is crucial to maintaining the integrity of academic publishing [30]. As AI-generated prose becomes increasingly sophisticated, distinguishing between human-written and AI-generated content can pose challenges.

Integrating chatbots with education can increase learning efficiency and strengthen student intelligence, but it also poses ethical concerns [31]. The ethical considerations of AI encompass issues such as data privacy, algorithmic bias, and the potential impact of AI systems on society [16]. AI chatbots may collect private and sensitive information about students [31]. This raises concerns about the type of data being collected, how they were stored, and what the data was used for [32]. Privacy concepts should be considered during the development and adoption of AI chatbots. It is essential to provide transparent information about the limitations of AI chatbots, such as the chatbot occasionally generating incorrect information, biased content, or providing harmful instructions. Proper disclosure and warnings are necessary to manage expectations and mitigate potential risks [33]. The ethical use of AI tools requires human intervention and oversight. Editors, peer-reviewers, and researchers must critically evaluate AI-generated content, supplementing it with their expertise, judgment, and ethical considerations. Human involvement helps ensure accuracy, fairness, and accountability in the outputs generated by AI systems [27].

3.4. Ensuring ethical use of artificial intelligence

Educators and institutions must proactively address academic honesty concerns related to AIEd. This includes promoting students' awareness of the ethical implications of using AI tools, emphasizing originality's importance, and clarifying plagiarism policies [16]. To combat plagiarism facilitated by AIEd, educators can implement strategies such as scaffolding writing assignments, providing clear guidelines on citation and attribution, and promoting the use of library resources [16]. It is crucial to educate students about the responsible use of AI tools. This involves discussing ethical considerations, emphasizing the value of critical thinking and independent work, and encouraging students to engage with AI-generated content critically [30].

Ongoing research and collaboration between academia, AI developers, and educational institutions are essential to address the evolving challenges of academic honesty in the context of AIEd. This includes exploring innovative approaches to plagiarism detection and developing guidelines specific to AI-generated content [26]. Institutions and researchers are actively rethinking assessment methods to make them more plagiarism-proof in light. Exploring innovative assessment approaches that assess critical thinking, problem-solving, and application of knowledge can help mitigate the risk of plagiarism [16], [33].

AI reflects the beliefs of its developers in a position of power [34]. According to researchers, 'whenever people create algorithms, they also create a set of data representing society's historical and systemic biases, which ultimately transform into algorithmic bias' [35]. Thus, it must be stressed that an ethical and practical model must be free from all biases and information errors to make students achieve the maximum learning gain. To ensure an AI model free from these negative externalities, the accountability, responsibility, transparency (ART) model principles for responsible and trustworthy AI [36], was meant for the whole AI socio-technical system instead of just software. The ART of the AI model can be summarized by the following [24]: i) accountability: the models' decisions must be justifiable to users. The decision-making mechanism should explain these decisions to the users. The purpose of the system must be built on moral values and societal norms, and its interpretations must be explained openly; ii) responsibility: the people must play a role in their relationship with AI chatbot models to link a chatbot's decisions to it is input and users' actions; and iii) transparency: the AI chatbot model must be capable of describing, inspecting and reproducing the mechanisms through which they will learn to make decisions and adapt to their environment. This will also improve the users' trust, and it may promote openness as well.

4. CONCLUSION

As AI continues to advance and is integrated into higher education, there is a growing need to address ethical considerations. Given the ethical challenges associated with AI in higher education, developing ethical governance frameworks are essential. These frameworks can guide decision-making, ensure transparency, and establish mechanisms for accountability and responsible AI use. AI can potentially transform teaching and learning experiences in higher education. The increasing utilization of AI chatbots in educational settings has been driven by their potential to support students' learning processes, improve institutional efficiency, and provide personalized educational experiences. Leveraging AI and data analytics offers opportunities for learning analytics in higher education. By analyzing enormous amounts of data, AI systems can identify at-risk students, provide early intervention, and offer insights to optimize teaching strategies and curriculum design. This data-driven approach helps institutions better understand student performance and make informed

decisions to improve educational outcomes. Integrating AI chatbots in higher education requires collaboration between educators, researchers, and AI experts from various disciplines. Interdisciplinary partnerships must be fostered to leverage different fields' expertise and promote innovative AI applications in education. The increasing prevalence of AI chatbots in higher education necessitates the implementation of regulatory and policy initiatives. This study has certain limitations. It does not delve into potential improvements for AI language models, as it relies on past studies rather than experimental findings. Publication bias may exist, as reports with irrelevant conclusions may not have been disseminated. In today's context, one of the critical challenges of successfully adopting AI chatbots in higher education is the knowledge gap between learners and educators. The findings of this paper point to the following issue, which would, in turn, have consequences for future research. AI integration can only be effective if researchers from several different disciplines collaborate. The widespread use of AI chatbots has created new challenges for the developing world, especially in the education sector, as plagiarism and misuse remain rising. Although AI chatbots may threaten learners' unbiased, critical thinking, some of the most popular AI chatbots have yet to be developed by keeping learners and educators in mind. Thus, the study can facilitate and contribute to the growing research of the interests of educators on integrating AI chatbots into teaching methods to improve learner gain. However, as more AI chatbots are trained on existing unbiased data, AI chatbots may benefit learners if only it is trained on the data specific to their educational materials.

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