Artificial Intelligence in Education: Literature Review on The Role of Conversational Agents in Improving Learning Experience

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Abstracts: A growing number of teachers and students are turning to artificial intelligence-powered conversational bots as a means of bolstering and facilitating learning and teaching. Conventional educational agents are intended to do the duties that would normally be carried out by human educators, specifically, providing students with instructions. The purpose of this research is to review the literature on the use of chatbots and conversational agents to promote learning and enhance student engagement. To better understand the complexities of deploying conversational agents for classroom use, it is helpful to first recognize the role that conversational technologies play in facilitating student engagement during learning. The study found credible evidence to support the need for conversational agents in education as teachers grapple with urgency to implement artificial intelligence-based tools and services in classroom and online learning.

Keywords: Conversational Agents, Artificial Intelligence, Personalized Learning, Chatbots.

1. INTRODUCTION

The term "artificial intelligence" (AI) refers to the capacity of a computer or non-human machine to do activities that would typically require the intellect of a human being (Durall et al., 2023). These activities include learning, problem-solving, decision-making, and many more. There are numerous methods for developing AI systems, such as machine learning, in which a system is trained on a dataset and its ability to learn improves over time, and rule-based systems, in which a system makes decisions on the basis of a set of predefined principles. Processing natural language, recognizing images and videos, robotics, and many more fields are just some of the many possible applications for artificial intelligence. The end objective of artificial intelligence research is to develop computer programs that can carry out certain jobs at least as effectively as humans, and ideally even better. Artificial intelligence has the potential to disrupt a wide range of sectors and improve the way we live and work, but it also presents serious ethical and societal problems (Kavitha & Lohani, 2019). The use of artificial intelligence is becoming increasingly significant in the field of higher education. It facilitates personalized instruction, computerized grading, and the development of digital classrooms. AI may also assist teachers in gaining insights on the behavior and performance of their students, which enables them to personalize their instruction and assistance for each individual student.

According to the findings of Ahmed and Ganapathy's research (2021), robots will automate the monotonous and time-consuming aspects of people's occupations, allowing them to concentrate on more significant responsibilities. The use of mainstream educational technology solutions like Blackboard, which include simulations, videos, quizzes, and other tools to enhance the student experience, supports both online learning and learning that takes place in a traditional classroom setting. The capacity of AI to customize a student's educational experience is one of the most significant benefits that it brings to the field of education. Students now have access to educational resources in record time and with greater efficiency than ever before because of advancements in artificial intelligence (AI) technology such as natural language processing, deep learning, and machine learning (Durall Gazulla et al., 2023). Students are able to study at their own pace and in the manner that best suits them because of AI's ability to generate personalized learning paths and deliver customized feedback. Because of this, teachers will be able to tailor their instruction to the specific requirements of each student, which has the potential to

completely transform the way we think about education.

According to Alam (2022), artificial intelligence comprises computer programs that have been artificially created yet have the learning, reasoning, and perceptual capabilities of humans. Machine learning algorithms, which dynamically develop and make use of data-based models, are responsible for the majority of recent applications of artificial intelligence. A computer algorithm known as machine learning is responsible for developing and automatically improving other computer algorithms and methods in order to allow computers to learn. Machine learning algorithms find applications in practically every industry, ranging from the identification of patterns via the examination of large amounts of data, the clustering and sequencing of that data, all the way to the extremely precise prediction of output based on input (Zawacki-Richter et al., 2019). There are no exceptions when it comes to the usage of AI in the sphere of education. Through the analysis of education-related big data gathered from students, teachers, and schools, artificial intelligence in education is particularly useful for assisting teachers in their roles as learning facilitators, academic assessors, and counselors (Huang et al., 2023). This is accomplished through the collection of education-related big data. Another illustration of this would be a chatbot, a piece of software that has been enhanced with AI and is equipped with speech recognition technology. A chatbot is able to offer personalized educational assistance via a variety of platforms, including computers, mobile devices, and speakers. AI-powered chatbots may engage with students in the classroom and play an assisting role in their education, giving a platform for a new learning paradigm in fields such as nursing, physics, and mathematics.

Alam (2021) argued that the study of students' learning patterns based on large amounts of data may be used by AI to provide timely information on students' learning progress, success, or failure. This is accomplished through the use of traditional classrooms. In addition, AI has the potential to enhance assessment methodologies. Taking this into consideration, AI is able to illustrate and convey facts that previously utilized assessment techniques would not have made available: AI makes it feasible to determine if a student has arrived at the proper response while simultaneously supplying the instructor with information about the learner's thought process that led to the correct answer (Kuhail et al., 2023). In addition, AI is able to accurately determine the emotional states of learners and offer assistance that is specifically tailored to each individual circumstance. Kong et al. (2022) observed that chatbots have been employed for the purpose of improving students' skills, notably in the area of language acquisition, such as the development of vocabulary and grammar.

The current study provides an in-depth assessment of AI-enabled conversational bots such as ChatGPT, with the ultimate goal of enhancing the educational opportunities available to students. To this end, this study reviewed the literature on the use of artificial intelligence-powered conversational agents to improve learning experiences in higher education.

2. LITERATURE REVIEW

Barrett et al. (2019) defined learning experience as a methodical strategy for instructing students that entails reorganizing the flow of a curriculum with the purpose of centering attention on its ultimate aims and purposes. In addition to this, it places an emphasis on employing a variety of instructional strategies in order to keep different types of students interested. The use of social involvement, collaborative engagement, multimedia games, and several other modes of instruction contribute to the creation of a holistic experience (Luan et al., 2020). Along with a highly defined path that leads to the accomplishment of particular objectives, there is a higher emphasis placed on the reason why the topic being studied is being pursued in the first place. The setting in which students are being instructed by their teachers is equally important, as it contributes to the development of a more meaningful connection to the material being studied.

According to Kuhail et al. (2023), artificial intelligence performs or helps in the execution of tasks and activities that functionally and historically depend on human cognition, notably in terms of learning and problem-solving. Barrett et al. (2019) noted that educational artificial intelligence refers to a wide variety of technologies, such as algorithms, machine learning, and neural networks, to facilitate teaching and learning. AI-powered conversational agents make use of the concepts of algorithmic machine learning by channeling large amounts of data. This

enables AI to complete tasks, make predictions, and make decisions in a manner analogous to that of a human being through the use of iterative learning and adjustment processes. The use of artificial intelligence (AI) in higher education is on the rise, with more and more AI-related resources being integrated into learning management systems, test generators, plagiarism detection tools, and accessibility solutions (Kong et al., 2022). The utilization of these intelligent resources enables the identification of students who are at risk, the analysis of their metrics, and the development of personalized educational plans that are suited to the requirements of the students as well as their academic trajectories.

Furthermore, Huang et al. (2023) stated that personalized learning is one of the most significant ways that AI is having an influence on the educational system. Platforms powered by AI are able to evaluate student data, such as their preferred learning styles, their strengths, and their limitations, in order to produce individualized educational plans (Srinivasan, 2022). Students are able to learn at their own speed and concentrate on the subject areas in which they have the greatest room for growth thanks to this personalized approach. Students are able to improve their learning outcomes and their ability to remember information as a direct consequence of this. In addition to this, AI is able to give students real-time feedback, which enables them to rapidly remedy their errors and gain knowledge from them (Chhibber & Law, 2019). This immediate feedback is essential for the growth and development of the students since it teaches them where they went wrong and how to improve their performance in the future. In addition, AI is able to recognize trends in the ways in which students learn and give teachers insights, which enables teachers to modify their instructional strategies in order to better meet the requirements of their students.

Ouyang et al. (2022) highlighted that the availability of an intelligent learning tool is a crucial issue when seen from the constructivist and student-centered learning vantage points. Learners are able to concentrate on more important topics or higher-order thinking rather than low-level activities because of the device's ability to assist them in collecting and analyzing data in an efficient and effective manner. Some of these technologies can even do data analysis and presentation in a "smart" fashion, which assists students in thinking more deeply about the data and identifying useful insights that lie under the surface of the data. Traditional mindtools, for instance, like concept mapping tools, assist students in organizing their knowledge by passively establishing the links between different concepts. On the other hand, an intelligent idea mapping tool would be able to provide learners with advice or recommendations while also analyzing the produced concept maps while they were still in the process of concept mapping (Chhibber & Law, 2019). More recently, a prominent topic in recent advances in artificial intelligence known as knowledge graphs has the ability to establish links between various entities using the large volume of connected data and AI models as their foundation. There have been several studies geared toward education that use knowledge graphs; this will be an exciting research sub-area for the development of intelligent learning tools or partners.

Intelligent tutoring tools and agents play a significant role in helping to bridge the widening gap that exists between the rising number of students throughout the world and the decreasing number of competent specialist teachers (Castro, 2019). Thousands of schools across the United States and abroad are currently making use of many different information and communication technology systems to supplement and improve their conventional educational programs. The knowledge-based domain served as inspiration for the construction of intelligent tutoring assistants and systems. As the field of education evolves to incorporate increasingly personalized, interactive methods of instruction, such as learning by instructing, acquiring information by example, or even learning by video games, the knowledge-based limits of intelligent tutoring agents are evident (Zawacki-Richter et al., 2019). Technologies based on artificial intelligence and data science are especially suited for dynamic challenges that call for ongoing learning. One reason for this is the efficiency with which these tools can glean previously undiscovered insights and information from high-dimensional, non-structured data, as compared to the efficiency with which humans can do the same (Sandu & Gide, 2019). AI in education and conversational agents are also particularly good at forecasting the cognitive demands, outcomes, mental states, and talents of students and then advising the appropriate course of action to take as a result of automated responses (Hew et al., 2023). For instance, intelligent tutoring agents that have been enhanced with AI may be used to represent students' feelings and abilities, such as their capacity to carry out scientific research inside a virtual environment and their ability to automatically create

suggestions. Even though AI in education research has not quite figured out how to explain what and how intelligent tutoring agent decisions and actions are to students or teachers, the role of AI techniques and models that are easy to understand has become even more important in modern learning. This is because it gives an intelligent educational agent the ability to defend its acts and draw logical conclusions from those activities. In addition, this helps users trust and have faith in the validity and integrity of the learning system, which is a huge benefit.

Demszky et al. (2023) noted that academic institutions have been thrown into disarray as a result of the proliferation of generative artificial intelligence technologies such as ChatGPT, particularly in middle and high schools. The fear that students may use the technology to cheat has prompted several institutions of higher learning to prohibit its usage on school Wi-Fi networks and devices. However, colleges and universities have been more cautious about adopting this policy. However, due to the availability of AI writing bots, educational institutions at the higher level have been obliged to modify the ways in which they educate and evaluate students. Some instructors are restructuring their courses to include more oral examinations, group work, and handwritten evaluations, while others are planning to add ChatGPT. The introduction of GPT-4, an improved version of ChatGPT, as well as the production of competing chatbots, has elevated the importance of generative AI tools in teaching and learning process.

The table below provides the summary of reviewed studies and the key areas on the role applications and uses of artificial intelligence-powered conversational agents in education.

Table 1. Areas relevant studies focused on

Areas of coverage	Relevant studies
Personalized learning	(Huang et al., 2023; Conati et al., 2021; Ahmed & Ganapathy, 2021; Huang et al., 2023)
Personalized student engagement	(Ahmed & Ganapathy, 2021; Barrett et al., 2019; Chhibber & Law, 2019; Luan et al., 2020)
Virtual teacher-student interactions	(Huang et al., 2023; Chhibber & Law, 2019; Barrett et al., 2019)
Intelligent tutoring agents	(Conati et al., 2021; Ahmed & Ganapathy, 2021; Zawacki-Richter et al., 2019; Barrett et al., 2019)
Educational conversational agents	(Tlili et al. 2023; Conati et al., 2021; Kong et al., 2022; . Barrett et al., 2019)
Chatbots and generative AI	(Tlili et al. 2023; Demszky et al., 2023; Hew et al., 2023)
Challenges	(Ahmed & Ganapathy, 2021; Demszky et al., 2023; Sandu & Gide, 2019; Kong et al., 2022;
Personalized student engagement	(Ahmed & Ganapathy, 2021; Barrett et al., 2019; Chhibber & Law, 2019; Luan et al., 2020)

3. RESEARCH METHODOLOGY

This study adopted a qualitative research design. The study made use of Conati et al.'s (2021) literature review on the application of conversational agents in education. Peer-reviewed articles were analyzed to develop a framework for the role of conversational agents in higher education learning. The aim of a qualitative case study can be to demonstrate the current literature and research findings on the status of AI and conversational agents in education. The analysis of the case study focused on themes about the current state of conversational agent use in higher education with regard to improving teaching and learning experiences.

4. FINDINGS AND DISCUSSIONS

The review summary was structured according to thematic areas in the use of AI in education, as discussed in the following subsequent sections.

4.1. AI-Enabled Blended Learning

The findings outline the role that artificial intelligence can play in delivering equitable and effective learning on a large scale. The application of AI in education is portrayed in the form of an all-encompassing learning framework that is enabled by conversational agents and chatbots (Conati et al., 2021). In a recent study, Srinivasan (2022) noted that the AI-enabled learning process is viewed in its entirety through the lens of the framework, which seeks to blend fundamental learning, learning science, and customization. The structure is made up of a few different components, each of which may scale particular facets of learning independently of the topic being studied. It consists of fundamental components for education coupled with learning science-optimized, useful material that may be applied to any topic, field, or course of study. The framework utilizes a learning orchestrator that is tailored to the specific needs of each individual student in order to bring together all of the separate components (Srinivasan, 2022). When taken together, they lay a solid foundation that may serve as a blueprint for any application involving AI-enabled learning. The AI-powered learning framework is also applicable to other stakeholders involved in the learning process, such as educators, parents, peers, mentors, educational institutions, and other learning contexts, such as organizations that are interested in re-skilling or up-skilling staff (Srinivasan, 2022).

Through the use of AI, each student is provided with a personalized learning experience that includes personalized timetables, personalized activities, engagement with digital technologies, and personal suggestions (Villegas-Ch et al., 2020). Additionally, a personalized approach makes students feel that they are the only ones being taught, which boosts their level of involvement and enthusiasm in their academic work. Students are able to cease comparing themselves to one another when they participate in activities that are suited to the requirements of various learning groups. A student should have approached a teacher earlier and sought assistance in front of the other students. It is now sufficient to put a question into a personal virtual assistant in order to receive an immediate response with an explanation. Because of the opportunities provided by AI technologies, individual success is brought to the forefront, which in turn reduces the amount of stress experienced in the classroom (Villegas-Ch et al., 2020). If there was less pressure, there would be less stress and greater motivation to learn.

4.2. Personalized Learning Assistant

There is a growing body of research that demonstrates the ways in which AI may improve personalized education. Any online framework must have an adaptive personalization component as core functionality to tailor each student's experience of education and maximize their capacity for learning while also determining the preferences of each learner and tracking those preferences over time (Demszky et al., 2023). The personalized learning assistant consists of a personalizer and an orchestrator. The former constantly personalizes the learning content, while the latter collaborates with the learner to accomplish the orchestration. In addition to this, the component will have an optimizer for cognitive load as well as multisensory engagement. To accomplish this, instructors must be able to engage students through a variety of sensory channels, including context-rich, interactive conversation, and develop an initial set of fragmented learning pathways for the program or learning unit. The personalizer needs to be able to accommodate personalization at highly granular levels in the learning unit, such as at the level of an individual idea, for example. AI-assisted learning envisions the construction of a meta-taxonomy of learning types over time, in which each atomic learning item may be grouped into a more abstract learning type. This will allow for a more comprehensive classification of learning.

Kerry et al. (2009) argued that it is possible that this will help us comprehend learning preferences on a more general, abstract level of learning type. The personalizer will keep an eye on learners' areas of difficulty while doing this and will then suggest the best course of action. For the intervention to be effective, the framework will need to determine if the issue is caused by a lack of knowledge of the prerequisites or by difficulty understanding the

information. When it comes to personalized learning, the framework must make it possible for the learner to obtain the necessary resources and advance their level of expertise wherever it is feasible (Tlili et al., 2023). In regard to AI-enabled personalized learning, the framework needs to supply further examples and problems for the learner to practice in order to give them the possibility of repetition. These discoveries might also be included in the technique for interleaving and spacing that will be used for the remainder of the course. When timely remedial interventions are implemented, the learner's pathway through the course becomes more personalized.

4.3. Use of Chatbots as Learning Agents

ChatGPT is an artificial intelligence program that has the ability to aid in the process of producing a scientific article. It can assist with the literature review, identify research topics, offer an overview of the current status of the subject, and help with duties such as formatting and language review. Additionally, it has the potential to have time-saving uses in clinical practice. Hobert and Meyer von Wolff (2019) affirmed that it is essential to have international academic standards in place to control the use of chatbot tools in scientific writing and build systems for recognizing and punishing unethical usage. This is because the use of chatbot tools is expected to become widespread in the near future. While chatbots can be helpful for researchers, they should not be utilized in place of real people's knowledge, sensibilities, and personalities.

4.4. Smart Knowledge Discovery

Considering the large data sets on which AI is trained, there is an ever-expanding body of information available on any possible subject on the internet. Although it is possible that the fundamental ideas and facts will not shift in the majority of instances, it will be extremely necessary to have constant access to new information. During the course of going through a learning program, a student could find it helpful to refer to supplemental information in order to improve their grasp of the subject matter or the idea being taught (Villegas-Ch et al., 2020). In addition, a teacher demands a straightforward method to keep up with the most recent advancements in their sector. A continuous knowledge acquirer would identify new knowledge that is dynamically relevant to the learner and deliver it to them. It will auto-curate and auto-synthesize continually, accessing relevant material from online sources on any topic, and it will do it on its own. The property of knowledge discovery can be utilized in relation to any subject or area of study that is of interest. The newly found material may be staged for the instructor to evaluate before being presented to the student; however, this depends on the context.

4.5. Integration with Learning Management Systems

Durall Gazulla et al. (2023) argued that it takes careful thought and planning to create chatbots and conversational agents for online education that are both successful and interesting for students. Firstly, teachers have to decide what the chatbot or conversational agent will be used for and how broad its reach will be. Take into consideration the problem being addressed, the value being delivered to the students, as well as the responsibilities or roles that the teacher is delegating. Also, teachers should familiarize themselves with the learners and their requirements, including their traits, preferences, objectives, and difficulties. In addition to this, it is essential to make use of data and analytics concerning how students learn and communicate. Furthermore, teachers should adapt their chatbot or conversational agent to the particular circumstances and demands of their classrooms. Shaikh et al. (2022) reiterated that teachers should make sure to select the appropriate platform and tool for the conversational agent or chatbot. Make sure that it is interoperable, that it can be accessed, and that it has features and functionalities that are simple to use and that can be customized. Besides, teachers need to design the discussion and the engagement. Determine the attitude, manner, and personality of the chatbot or conversational agent, as well as the sort of language it will employ. Also, plan for how it will provide learners with feedback, advice, or assistance in the face of mistakes, misconceptions, or criticism.

Hobert and Meyer von Wolff (2019) suggested that teachers may utilize the results of effectiveness evaluations to learn more about the areas in which their chatbots or conversational tools should be improved in order to better support online learning. Teachers need to test their lessons frequently and iterate in order to eliminate errors, improve functionality, enhance performance, and add new content. In addition, it is important to include learners as

well as stakeholders in the design process in order to guarantee alignment, relevance, and quality. Lastly, it is important to stay abreast of the most recent developments and trends in chatbot technology. Teachers can do this by utilizing newly developed tools and platforms or incorporating newly developed features such as speech recognition or emotion detection.

4.6. Personalized Instructor-Learner Interactions

Schiff (2021) found that using conversational agents can help educators unlock several levels of learning assistance based on the manner and styles in which they connect with their students. In essence, one can wonder if using ChatGPT involves the development of new skills and ways of thinking in order to make full use of its potential in an educational setting. In addition, this example suggests that it is not enough to just ask a question or require anything; rather, it is necessary to ask the appropriate question or require the appropriate amount of information in order to obtain accurate ChatGPT outputs. Demszky et al. (2023) noted that ChatGPT use provided more evidence not just that students are able to cheat but also that they are able to manipulate the system and still succeed in their endeavors. Despite the fact that this decision is understandable, ChatGPT has the potential to completely transform the educational system by introducing a plethora of benefits that might, for example, assist lecturers and students in their respective learning and teaching practices, such as the preparation of teaching materials and the creation of quizzes. Therefore, just like any other technological advancement, ChatGPT comes with both positive and negative aspects. As a result, more research and debate are required regarding how to use it in educational institutions rather than just outlawing its use. Therefore, more conversations with specialists from a variety of fields, such as education, security, and psychology, should be developed in order to promote the understanding and good use of chatbots as technology in general and ChatGPT in particular. As a consequence of this, further rules and regulations need to be developed in order to support the use of ChatGPT in educational institutions like schools and universities. In this regard, viable future study areas should further explore the potential repercussions of depending too heavily on chatbots for educational purposes.

5. LIMITATIONS

5.1. Ethical Issues

Conventionally, Sandu and Gide (2019) noted that humans must include both what they have learned from other people as well as their own thoughts in order to successfully complete the process of obtaining information from other people and creating fresh articles or reviews. It is normal for people to repeat the discoveries, remarks, and written works of others. As a result, it is easy for humans to get dangerously close to committing plagiarism when they convey an idea without properly attributing it to the original writers. According to this description, AI or ChatGPT systems are capable of committing plagiarism, but they may also be taught to avoid plagiarizing the work of others by paraphrasing it in a manner that is analogous to how human writers do it. In contrast, the use of computer systems to rewrite phrases and paragraphs in order to lower the overall rate of plagiarism is not something that can be tolerated in the realm of academic writing. Since plagiarism could mean the act of merely copying the work of another person, paraphrasing what they wrote without altering the meaning in any way, and omitting any personal touches, engaging in such conduct violates the principle of academic honesty. For this reason, journal editors should make use of tools that recognize written material using AI to improve their ability to identify instances of plagiarism.

5.2. Education Quality and Academic Integrity

The absence of an experienced and critical human mind behind scientific activity might lead to the risk of reproducing or magnifying existing biases and mistakes in the data, which would result in unjust conclusions and impede the development of scientific knowledge (Hobert & Meyer von Wolff, 2019). Regardless of the use of AI, we are of the opinion that the participation of a knowledgeable individual in the area, both in the performance of scientific activity and in the writing of it, is an essential component to ensuring that the work is of high quality. Ouyang et al. (2022) noted that the phenomenal advancement of AI tools might result in a substantial rise in the number of publications produced by some scholars, but this is not always followed by a commensurate growth in

those researchers' actual levels of expertise in the relevant domain. In so doing, academic institutions that base recruiting decisions on the quantity of publications rather than the quality of those articles may face ethical challenges when trying to find qualified individuals to fill open positions. In addition, it has not been effectively determined whether or not the ChatGPT ought to be specified by the authors of the work that was authored utilizing this method. In conclusion, despite the fact that ChatGPT and other chatbot services are now offered at no cost, there is no assurance that this will continue to be the case in the foreseeable future. Since most of the breakthrough AI startups are rolling out beta versions of their technology, it is expected for them to phase out free services once the product has developed and tested enough for largescale commercialization.

6. PROPOSAL FOR FURTHER RESEARCH

This literature review has highlighted the role of conversational agents and chatbots in improving student engagement in learning. Educational chatbots are effective in answering frequently asked questions, enhancing personalized learning, and improving student engagement. Based on the current literature on educational technology, it is also clear that educational chatbots will certainly spur change in teaching. In order to fully understand the effect of chatbots in the classroom, further research is necessary to experiment with how students and teachers respond to the deployment of conversational agents in the classroom environment. The research will conduct experimental research using Blackboard Chatbot, an educational chatbot, to investigate the impact of an artificial intelligence-powered chatbot in promoting teaching and learning experiences as well as student engagement.

CONCLUSIONS

The rise of AI promises to change all facets of life, with educational realms such as teaching and learning being prime candidates for drastic changes. The need to improve learning and teaching experience necessitates the adoption of AI technologies, tools, and services to enhance the academic outcomes and streamline content delivery. The review of literature on the role of AI in education affirmed the potential benefits of using conversational agents to enhance learning. Fundamentally, conversational agents and chatbots operate on algorithms that have been trained to read inputs in natural language and respond with appropriate replies, which may have been pre-written or may have been newly created by AI. Reinforcement learning, natural language processing, and machine learning are some of the methods that are routinely used to enhance ChatGPT's capacity to comprehend its users' needs and provide a comprehensive response to those needs. In the most practical sense, both instructors and students are able to ask anything in a conversational manner and obtain a rapid and acceptable textual response that is modeled after a human being. In fact, ChatGPT has the potential to develop into a promising and powerful tool for activities such as the automatic production of drafts, the summary of articles, and the translation of languages. Teachers and educational institutions need to invest in educational chatbots to improve learning experience and mitigate some of the challenges associated with limited workforce and diverse student population. Nevertheless, the use of this instrument in academic writing presents certain ethical considerations and, as a result, ought to be regulated.

DECLARATION OF COMPETING INTEREST

The author declares to have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this research.

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