

Short Paper

A Discussion about the Impact of ChatGPT in Education: Benefits and Concerns

Charles Alves de Castro¹

¹ Head of Quality Assurance at ICD Business School Dublin, Ireland

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Abstract

The advent of advanced machine learning models such as ChatGPT has led to significant advancements in various fields, including education. The purpose of this article is to explore the impact of ChatGPT in higher education, covering both positive and negative nuances. A critical literature review analysis was conducted, which included references from reliable sources. The methodology used in this article was based on a critical literature review method. The results of the analysis indicate that ChatGPT might have several benefits in education, including improved student engagement, personalized learning experiences, and enhanced teaching practices. However, there are also some negative implications, such as concerns over privacy, academic integrity, and the potential for bias. The article concludes by highlighting the need for further research in this area and providing recommendations for educators and policymakers.

Keywords

ChatGPT, Artificial Intelligence, Education, Benefits, Concerns

1. Introduction

The field of education is continuously evolving, with the emergence of new technologies that can potentially transform the way we teach and learn (Haleem et al., 2022). One of these technologies is advanced machine learning models such as ChatGPT, which has been shown to have a significant impact in various fields, including education (Sun, 2023). ChatGPT is an artificial intelligence language model developed by OpenAI that uses deep learning techniques to generate human-like responses to user input. Its capabilities in natural language processing have made it a valuable tool in education, with the potential to improve student engagement, personalize learning experiences, and enhance teaching practices (Mollick, 2022). However, with any new technology, there are also potential negative implications that need to be considered. This article aims to explore the impact of ChatGPT in education, covering both positive and negative nuances.

2. Methodology

The methodology used in this article was based on a critical literature review method. The critical literature review involves analyzing and synthesizing existing literature on a particular topic to identify key themes, issues, and controversies (Saunders et al., 2019). The literature review was conducted using electronic databases such as newspapers affiliated with Harvard University, Reliable Newspapers, Google Scholar, Springer and Scopus. The search terms used were “ChatGPT in higher education”, “impact of ChatGPT in education”, and “ChatGPT in teaching and learning”. The inclusion criteria were articles published between 2019 and 2023. This topic is a novelty and not many studies have been conducted about ChatGPT in education, demonstrating a gap in the literature.

3. Critical Literature Review

A few published articles have been conducted on the impact of ChatGPT in education. The following section provides a critical analysis of the literature, including references to relevant articles (Mollick, 2022).

Recently the study of NUNES et al. (2023) investigated the performance of the GPT-4 model on the ENEM exam (Brazilian University Admission Exams) and Challenge dataset, utilizing zero-shot, few-shot, and few-shot with CoT (Chain-of-Thought) strategies. GPT-4 demonstrates improved accuracy (87%), particularly in mathematics and natural sciences, when applying the few-shot CoT prompt. The research establishes GPT-4 as the new state-of-the-art model for the ENEM challenge and highlights its potential as an educational tool with the ability to generate informative explanations to answers, which could enhance students’ understanding and support their learning process (Nunes et al., 2023).

Additionally, Kelly (2023) depicted in a newspaper article that a recent study revealed that ChatGPT passed law exams in four courses at the University of Minnesota and a business management exam at the University of Pennsylvania’s Wharton School of Business. The AI performed at the level of a C+ student in the law courses, while achieving a B to B-grade in the business course. Despite its success, ChatGPT struggled with advanced prompts and made mistakes with basic math (Kelly, 2023). These results have raised concerns among educators about the potential misuse of such technology by students. As a result, some public schools have banned the use of ChatGPT on their networks and devices (Kelly, 2023). While restrictions are being considered for test-taking, experts argue that the technology still has a place in the classroom if used responsibly, offering unique opportunities for enhancing the educational system.

However, Italy decided on a more restrictive decision. The Italian Data Protection Authority has temporarily banned ChatGPT due to concerns regarding a recent data breach and the legality of using personal data for training the chatbot (Milmo, 2023). As a precautionary measure, the authority has imposed a temporary restriction on the processing of Italian users’ data by OpenAI, the San Francisco-based company that owns ChatGPT, until the chatbot complies with privacy requirements (Milmo, 2023).

In light of the above discussion, this article aims to explore the impact of ChatGPT in higher education, covering both positive and negative nuances. Therefore, in the following paragraphs, I outlined the positive and negative implications of ChatGPT in higher education.

3.1 Positive Implications

3.1.1 Improve Student Engagement

One of the significant benefits of ChatGPT in education can be improve students engagement. Educational institutions should carefully adopt ChatGPT as an educational tool that could enhance students' creativity, provide customized tutoring, and effectively equip students to work alongside artificial intelligence systems in their future careers (Roose, 2023). In addition, ChatGPT has the potential to enhance student engagement and motivation in asynchronous online learning sessions or activities, thus improving learning outcomes (Mucharraz y Cano et al., 2023).

3.1.2 Personalized Learning Experiences

Another significant benefit of ChatGPT in education is personalized learning experiences. ChatGPT can tailor its responses to individual students based on their learning preferences and progress. ChatGPT can provide personalized feedback to students resulting in better learning outcomes compared to a traditional feedback system.

3.1.3 Enhancing Student's Language Skills and Abilities

ChatGPT can be a powerful tool for improving students' language skills and abilities (Mucharraz y Cano et al., 2023). By emulating real-life conversations, students can practice their language skills in a safe and non-judgmental environment. This allows students to experiment with different phrases, grammar structures, and expressions without the fear of making mistakes. ChatGPT can also provide personalized feedback on students' language use, identifying areas where they may need improvement and suggesting ways to enhance their language proficiency. Moreover, ChatGPT can be used to practice conversational interactions, allowing students to build their confidence and fluency in speaking the language. This conversational practice can also help students to improve their listening and comprehension skills, as they are exposed to a range of conversational patterns and speech styles (Mucharraz y Cano et al., 2023). Overall, the use of ChatGPT as a language-learning tool can be highly effective in enhancing students' language skills and abilities, and helping them to achieve their language-learning goals.

3.1.4 Enhanced Teaching Practices

ChatGPT can also enhance teaching practices by providing teachers with valuable insights into students' learning processes. For example, ChatGPT can analyze students' responses and provide feedback to teachers on areas that need improvement. Additionally, ChatGPT has the potential to significantly reduce the amount of time teachers spend preparing for classes. With its ability to generate automated responses, ChatGPT can create lesson plans, assessments, quizzes and other teaching materials quickly and efficiently (Roose, 2023). This can be especially beneficial for teachers who are already overburdened with administrative tasks and grading assignments. ChatGPT can also provide real-time feedback on student responses, allowing teachers to quickly identify areas where students may be struggling and adjust their teaching methods accordingly. Furthermore, the system can generate personalized learning experiences for students, based on their individual learning styles and preferences, freeing up more time for teachers to focus on providing one-on-one assistance to students who need it (Roose, 2023). By streamlining administrative tasks and offering personalized learning experiences, ChatGPT can help teachers to work more efficiently and effectively, ultimately improving the quality of education for students.

3.1.5 Other Areas Positively Impacted and Reported in the Literature

A recent study demonstrated that the implementation of ChatGPT technology in radiology has the potential to impact various areas, such as report generation, better communication with patients and referrers, decision-making support, and data analysis for research purposes (Lecler et al., 2023). However, the authors acknowledge the potential limitations of ChatGPT and emphasize the need for ongoing validation of new technology (Lecler et al., 2023).

3.2 Negative Implications

3.2.1 Concerns Over Privacy

One of the significant concerns with ChatGPT in education is privacy. As ChatGPT collects and stores student data, there is a risk that this data could be compromised, leading to potential privacy violations (Tlili et al., 2023). Additionally, students may feel uncomfortable sharing personal information with an AI-based system.

3.2.2 Academic Integrity

Another concern with ChatGPT in education is academic integrity. As ChatGPT is capable of generating human-like responses, there is a risk that students could use the system to cheat on exams or assignments. This highlights the need for educators to implement measures to prevent cheating when using ChatGPT in education (Mucharraz y Cano et al., 2023; Sun, 2023; Tlili et al., 2023).

3.2.3 Potential for Bias

Another potential negative implication of ChatGPT in education is the potential for bias (Mucharraz y Cano et al., 2023). ChatGPT learns from the data it is trained on, and if the data is biased, the system could perpetuate this bias (Geological Society of London, 2023). For example, if the data used to train ChatGPT is biased towards a particular gender or race, the system may generate biased responses. This highlights the need for educators to ensure that the data used to train ChatGPT is diverse and representative.

4. Results

The critical literature review analysis identified several positive and negative implications of ChatGPT in education. The positive implications include improved student engagement, personalized learning experiences, and enhanced teaching practices. The negative implications include concerns over privacy, academic integrity, and the potential for bias. The findings indicate that although ChatGPT is a valuable tool in education, it must be used with greater care, and additional safety guidelines for its use in educational settings should be established (Geological Society of London, 2023; Mucharraz y Cano et al., 2023; Roose, 2023; Tlili et al., 2023).

Additionally, there is a pressing need for ethical policies to prevent the use of AI-generated texts in scientific papers. If editors and reviewers are unable to distinguish between authentic and AI-generated research or determine the true authorship of the texts, it poses a significant problem (Sun, 2023). To address this issue, editors and reviewers must be informed about the use of AI-generated texts, and measures should be put in place to ensure the authenticity of the research presented (Sun, 2023). As the use of AI becomes more widespread, it is essential for the scientific community to take action to safeguard the integrity of published research (Sun, 2023).

5. Discussion

The results of this article indicate that ChatGPT has the potential to transform higher education by improving student engagement, personalizing learning experiences, and enhancing teaching practices. However, there are also potential negative implications that need to be considered, such as concerns over privacy, academic integrity, and the potential for bias. The findings of this article highlight the need for educators, researchers and policymakers to carefully consider the implications of using ChatGPT in education and implement measures to mitigate potential negative effects.

Cambridge University Press has introduced new guidelines to help researchers utilize generative AI tools, such as ChatGPT, while maintaining academic standards of transparency, originality, accuracy, and plagiarism prevention. These guidelines apply to research papers, books, and other scholarly works published by the press. Key principles include declaring and explaining the use of AI, ensuring that AI is not treated as an author, adhering to Cambridge's plagiarism policy, and holding authors accountable for the accuracy, integrity, and originality of their research, including the use of AI. The move aims to address concerns about the potential misuse of large language models while acknowledging the opportunities they present for research and experimentation.

The Cambridge principles for generative AI in research publishing include that:

- AI use must be declared and clearly explained in publications such as research papers, just as scholars do with other software, tools and methodologies (AI Contributions to Research Content, 2023).
- AI does not meet the Cambridge requirements for authorship, given the need for accountability. AI and LLM tools may not be listed as an author on any scholarly work published by Cambridge (AI Contributions to Research Content, 2023).
- Any use of AI must not breach Cambridge plagiarism policy. Scholarly works must be the author's own, and not present others' ideas, data, words or other material without adequate citation and transparent referencing (AI Contributions to Research Content, 2023).
- Authors are accountable for the accuracy, integrity and originality of their research papers, including for any use of AI (AI Contributions to Research Content, 2023).

As educational institutions adopt AI tools like ChatGPT, it is crucial to establish clear guidelines and policies that foster responsible use and maintain academic standards. The Cambridge University Press's approach serves as a valuable blueprint for balancing the potential benefits and risks associated with AI-driven research and education. By promoting transparency, accountability, and ethical AI usage, we can harness the power of these technologies while safeguarding academic integrity and fostering innovation in higher education.

6. Conclusion

In conclusion, ChatGPT has the potential to revolutionize higher education by improving student engagement, personalizing learning experiences, and enhancing teaching practices. However, there are also potential negative implications that need to be considered, such as concerns over privacy, academic integrity, and the potential for bias. The findings of this article suggest that further research is needed to fully understand the impact of ChatGPT in education. Educators, researchers and policymakers should carefully consider the potential benefits and drawbacks of using ChatGPT in education and implement measures to ensure that the technology is used ethically and effectively. While it is important to welcome the advantages of AI, it is equally crucial to remain cognizant of its possible drawbacks and limitations. Further research is needed to fully understand the potential benefits, concerns and limitations of using ChatGPT within the education field, and to develop best practices for its use in this context.

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Ethics Statement

This article complies with research ethics.

Disclosure Statement

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Notes on Contributors

Mr Charles A. Castro is the head of quality assurance and lecturer at ICD (International College Dublin) Business School. He lectures on topics related to marketing and business. Additionally, Mr Castro holds a Master of Science in Marketing from the University of Bari Aldo Moro in Italy (2020), a Master of Science in Human Resources Management from the University of Limerick in Ireland (2015) and a Bachelor of Science in Business Administration and Managerial Processes from the Newton Paiva University in Brazil (2013). He has been awarded important scholarships, such as the Irish Research Council Government of Ireland Postgraduate Scholarship (2021), TU Dublin Funding Programme for Graduate Research (2020), Scholarship by the Ministry of Foreign Affairs and International Cooperation of the Government of the Republic of Italy (2018), Scholarship by the Poggiolevante Collegio Universitario di Merito—IPE in Italy (2018) and Scholarship by Kemmy Business School—University of Limerick (2015). Mr Castro has gained significant experience in management and business, working for companies in Brazil, Italy and Ireland. His research areas of interest are: a) Marketing, Social Media Marketing, and Digital Marketing; b) People Management, Internationalisation of People, and Transcultural Human Resources Management.