Rethinking Education in the Age of AI: Challenges and Opportunities for Teaching and Learning

Cláudia Neli de Souza Zambon[1] [0000-0002-5298-1942]
Angélica María Guajardo-Cocke[2] [0000-0002-0682-2932]
Juan Pablo Catalán Cueto[3] [0000-0003-4702-8839]
[1]*Centro Univesitário Senai Santa Catarina*
[2]*Universidad SEK*
[3]*Universidad Andres Bello*
claudianzambon@gmail.com

Abstract

This study presents an overview of the use of Artificial Intelligence in higher education. It is a broad topic, but we focus on the perception of the challenges and opportunities that artificial intelligence presents within the educational context. To this end, an exploratory review of the literature on this topic was carried out, in addition to interviews with teachers and students. As a result of the bibliographic research, we highlighted challenges such as ethics, data protection, obtaining results without bias; and opportunities include personalized learning, support for teachers in creating lesson plans and materials, and control in school management. Regarding the interviews, we listed the main points that will be transformed into a questionnaire for the continuation of this study.

KEYWORDS: ARTIFICIAL INTELLIGENCE, EDUCATION, HIGHER EDUCATION.

Introduction

Higher education stands out as the educational level that appears most in research on the use of chatbots in education (Kuyven et al., 2018; do Nascimento, 2023) with most of them being used to answer questions related to academic processes (Sousa y Fecchio, 2021). For students, the use of these resources is more focused on solving activities and developing research papers.

With this, it is clear that students are failing to develop their critical thinking skills and using applications based on Artificial Intelligence (AI) to speed up their schoolwork (Vicari, 2021).

Curiosity in education is an important tool for learning, since it is a powerful motivator for students, as it drives the exploration and discovery of new information, activating areas of the brain that are crucial for learning. It not only motivates, but also calls upon imagination, creativity, and research and analysis skills, necessary to find answers or formulate new questions. This process feeds a continuous cycle of learning, essential for students to maintain interest and intrinsic motivation throughout their studies, developing their own motivation that continually engages them (Vicari, 2021).

The present article used AI (ChatGPT) for its translation and editing, with the authors being ultimately responsible for its content.

The big challenge is to find ways to use AI to contribute positively to student learning, instigating critical thinking and opening space for creativity and innovation. Thus, the objective of this research was to understand how AI is being applied in higher education, highlighting the challenges and opportunities to improve the teaching-learning process.

Theoretical Framework

Artificial Intelligence in Education

An educational environment needs to be motivating to keep students interested in class, so simply using gamification or educational games is no longer enough (Vicari, 2021). Several studies in the literature highlight the use of Artificial Intelligence (AI) as an innovation in this field.

However, one of the challenges presented in the use of AI in the classroom is related to the great complexity of AI in interacting with humans (Vicari, 2021). There is still a long way to go in the search for sentiment analysis. One caution that must be taken is related to the excessive dependence on AI, which can lead to a reduction in human abilities, also reducing the capacity for critical thinking and decision-making (Souza, et al., 2023).

Use of Artificial Intelligence

Several ways of applying AI in education have been identified, from helping with school management [6] to adapting content according to the student's profile (Souza, et al., 2023).

Traditional teaching is becoming increasingly obsolete, and students are tired of traditional classes. Considering that more and more students are arriving with some type of report identifying their capabilities and limitations, teaching must be adapted to each need so that inclusion can occur in the classroom (Souza, et al., 2023; Renz y Vladova, 2021).

Teachers do their best to teach a class using different methods and techniques to meet the needs of all students, but this task is very laborious and time-consuming for planning. Adaptive learning systems "use advanced algorithms to analyze each student's individual performance and progress, identifying strengths and areas that need improvement" (Souza, et al., 2023, p.19).

Method

This work was carried out as a starting point to encourage academic society to turn its attention to this new phase of education, the insertion of AI in educational processes. To this end, an exploratory bibliographic review (Gil, 2007) was carried out related to the use of AI in education, with a focus on higher education.

Initially, only the Google Scholar database was used for exploratory bibliographic research. It was complemented by informal interviews with teachers and students to identify their perceptions regarding the topic. These interviews generated input for the creation of questionnaires that will be used to deepen the investigation.

Results

The benefits of using AI in education that appear most frequently in the literature are related to: personalized learning, adapting to the needs of each student (Souza, et al., 2023; Narciso et al.,2024; Hwang, et al., 2020) creating lesson plans, correcting assessments and developing activities (Souza, et al., 2023); use in the area of school management and monitoring school dropout rates (Narciso et al.,2024); information on careers and necessary skills (Júnior et al., 2023).

Among the challenges, the ethical issues of use and high implementation costs stand out (Narciso et al., 2024), in addition to privacy and data protection (Fernandes et al., 2024); equitable access and teacher preparation (Vicari, 2021; Holmes et al., 2019); identifying whether a student used AI to perform the work (do Nascimento, 2023); "lack of quality data to train AI models" (Júnior et al., 2023, p. 259]; understanding how algorithms work to extract reliable data (Júnior et al., 2023).

Discussion

There is a great ethical concern related to personal data in the use of AI (Fernandes et al., 2024), bringing up the discussion of how to deal with these issues without causing harm to students. Another important point is the concern for equity and inclusion of all, thinking in terms of technology and the analysis of algorithms (Fernandes et al., 2024; Santos et al., 2024), since not everyone has computers or Internet access, and the analyses may be biased according to the interpretation of the algorithm. There is also a need to train teachers to use these technologies appropriately (Júnior et al., 2023), and AI can be used to create lesson plans, activities, assessments, and assist with corrections. Personalized learning systems are gaining ground in this scenario as they provide "interactive teaching materials, carrying out adaptive assessments and offering personalized feedback to students" [Souza et al., p. 23].

Conclusion

This study contributes to a better understanding of how education is doing in relation to the use of AI, given that there is still a lot of room for exploration. For managers, the use of data analysis systems, for teachers, a way to optimize their time and increasingly improve the quality of teaching, and for students, various forms of learning and research. Therefore, AI is here to help us, we just need to know how to use it wisely.

Limitations and Future Research

This work aimed to understand the scenario of the use of AI in higher education. Since this is initial research, the bibliographic review was limited to the Google Scholar database, expanding to the next stage of analysis in databases such as WOS and Scopus. We will continue with the investigation using a questionnaire to find out the perception of teachers and students regarding the use of AI in the classroom. We will also seek to learn about the tools and strategies used by teachers to assist in teaching and learning, in addition to forms of support for the creation of lesson plans, activities and assessments.

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