ARTIFICIAL INTELLIGENCE IN DISTANCE LEARNING: ANALYSIS OF ADVANTAGES, CHALLENGES AND EDUCATORS' VIEWS

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SUMMARY
This work aimed to investigate the use of Artificial Intelligence (AI) as an auxiliary tool in distance learning, highlighting its advantages, disadvantages and teachers' perception regarding its use. This study, of a theoretical nature, consists of a literature review. The Capes database was consulted using terms and keywords related to the topic, in addition to using the material available in the Master's course in Emerging Technologies in Education at Must University. After the research, it was found that the use of AI has grown in recent decades, especially in distance learning. After all, the use of technologies is imminent and a way to bring students closer to educational institutions. Furthermore, the advantages of AI, such as assistance in correcting activities, preparing tasks and quickly understanding the needs of each student, are relevant so that teachers can work more effectively. This also allows students to receive personalized feedback and activities according to their needs and difficulties.
Key words: Distance learning. Artificial intelligence. Digital Technologies. Technology and Education.

ABSTRACT
This work aimed to investigate the use of Artificial Intelligence (AI) as an auxiliary tool in distance learning, highlighting its advantages, disadvantages, and teachers' perception of its use. This study, of a theoretical nature, consists of a literature review. The Capes database was consulted using terms and keywords related to the theme, in addition to the use of material provided in the Master's course in Emerging Technologies in Education at Must University. After the research, it was found that the use of AI has grown in recent decades, mainly in distance learning. After all, the use of technologies is imminent and a way to bring students closer to educational institutions. In addition, the advantages of AI, such as assistance in correcting activities, preparing tasks, and quickly understanding the needs of each student, prove to be relevant so that teachers can work more effectively. This also allows students to receive feedback and personalized activities according to their needs and difficulties.
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1. INTRODUCTION

The advancement of technologies and globalization have caused several changes in society. Currently, Artificial Intelligence (AI) has stood out due to its countless application possibilities and alternatives it offers to users. In this context, education has been looking for ways to integrate AI into teaching and learning processes, aiming to improve the quality of teaching, facilitate user access and integrate it with distance learning.

Distance education (EaD) refers to teaching carried out remotely and/or online. According to Moran (2002), the concept of distance learning is associated with the "teaching-learning process, mediated by technologies, where teachers and students are separated spatially and/or temporally".

According to historical records, some examples of this mode of learning were documented by Plato and in the Epistles of Saint Paul. However, some historians argue that his

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The beginning occurred only from the 15th century. During this period, the press played a crucial role in disseminating this type of teaching, allowing ideas to be shared with a larger audience and providing new debates, interactions and work production (Maia; Mattar, 2007).

It is observed that, with the end of the First World War, the search for schooling had great growth in Western Europe, causing distance learning to gain more and more space. In this context, between 1728 and 1970, correspondence study was characterized, in which the material to be studied was sent via mail, thus limiting contact between students of the same modality and between the institution (Guarezi; Matos, 2012).

At the end of the 20th century, the world began to open up more space for this type of teaching, with teacher training, openings of universities and creation of distance learning centers. From the 1960s onwards, following a transition in the economic model, from Fordism to industrial production, the second generation of EaD emerged, which lasted until 1990. During this period, communication and audiovisual media were widely used to integrate the knowledge of students.

The third generation began in 1990, with the entry of the online modality, coupled with audiovisual content, computers, technologies and the internet. Thus, teaching moves from an individual to a collective space with the presence of digital technology and facilitated contact between students, the institution and teachers (Guarezi; Matos, 2012; Maia; Matar, 2007).

This new modality opened the doors to a new style of learning and studying, where students can study whenever and wherever they want, according to their availability and interest. Therefore, the use of information and communication technologies (ICT) becomes essential in this process, helping and improving the experience of each student.

With the advancement of technology, Artificial Intelligence (AI) has been used as a teaching methodology in distance learning courses, where its function can range from simple robotic interaction with students to even assistance with research, as in the case of chatbots (Guarezi ; Matos, 2012).

> These changes concern the access that the population now has to computers, *notebooks, smartphones, tablets*and other devices, along with access to*Internet,*and also the insertion of technologies such as videoconferences, video classes,*podcasts*and the
> Artificial Intelligence itself on teaching platforms (Santos et al., 2021, np).

Given this, this research seeks to carry out a bibliographical review on the use of AI in the practice of distance learning, its contributions, advantages and disadvantages of its use in today's world. To this end, a simple query was made in the Capes database with the aim of investigating the use of Artificial Intelligence (AI) as an auxiliary tool in distance learning, highlighting its advantages, disadvantages and the perception of teachers in relation to its use. in educational waiting.

2. METHOD APPLIED IN THIS STUDY

This study adopted the literature review methodology, a widely recognized approach used in academic research. Bibliographical research, as stated by Gil (2008), Marcone and Lakatos (2016) and Severino (2007), is an effective method for deepening knowledge in a given field of study, allowing the identification, analysis and interpretation of various sources relevant to the topic in question.

The research consulted the Capes database, focusing on the topic "Artificial Intelligence and Distance Education". This approach allowed the identification of previous studies, theories, methodologies and results that contributed to understanding the impact and implications of Artificial Intelligence in Distance Education.

The literature review is a valuable tool for building knowledge, as it allows the critical analysis of previous work and the identification of gaps that can be explored in future research. As such, this two study contributes to the existing literature by providing a comprehensive and updated view on the topic of "Artificial Intelligence and Distance Education". Finally, some specialized websites on the subject and the material made available by Must University were consulted.

3. ARTIFICIAL INTELLIGENCE AND EAD EDUCATION

The evolution of the world is also reflected in knowledge and the way it is taught. In the past, the

School played an exclusive role in this concept, requiring the student to travel to the teaching location and dedicate a considerable amount of time to be there. However, society's needs have updated and changes needed to be implemented so that everyone is interested in graduating and/or specializing in the desired area, taking into account the busy lives that many people lead.

The first insertion of Artificial Intelligence (AI) was carried out by Warren McCulloch and Walter Pitts in 1943, based on philosophical knowledge, human brain functions and computational theories. As early as 1950, Alan Turing managed to architect a complete vision of computational Artificial Intelligence, where the machine was capable of learning and reinforcing learning for other people (Semensato; Francelino & Malta, 2015). This explains why virtual technologies have become popular in recent years, with emphasis on distance learning and the use of Artificial Intelligence on university platforms and Virtual Learning Environments (VLE).

The use of university platforms, such as the Modular Object-Oriented Dynamic Learning Environment (Moodle) and the AVA, facilitated the insertion of AI. After all, when it comes to distance learning courses, the demands of students and teachers are different. Therefore, using these resources facilitates communication, corrections and explanations that would otherwise consume a lot of time on both sides. Given this fact, Artificial Intelligence has demonstrated a role in personalizing teaching and learning, according to the needs and preferences of each student, highlighting their difficulties and providing more accurate and quick feedback (Picão et al., 2023).

Furthermore, AI, when used on platforms such as AVA, can, in a few minutes, from open learning, identify the student's feelings through their writing and the way they carry out activities, providing better engagement and motivation to students. This tool is very useful in distance learning teaching, after all, it can take a teacher a few weeks to fully understand each student (Guarezi; Matos, 2012).

> Artificial Intelligence in education promotes deeper learning, helps educators by promoting more focused and agile knowledge management, making the entire classroom work process more dynamic, actively attracting attention and
> full interest and engagement of students (Ferreira et al., 2023, np).

It is important to emphasize that the application of Artificial Intelligence (AI) must be in line with educational theories, especially in the context of distance learning. Among the most used theories, the following stand out: behaviorism, which proposes the assimilation of knowledge from the external environment, disregarding the existence of the mind; cognitivism, which aims to demonstrate that mental processes can be evaluated based on individual behaviors; and humanism, which emphasizes student-centered teaching and meaningful learning (Guarezi; Matos, 2012).

Analyzing the profile of the target audience is crucial, since many students who choose online teaching are those with limited time, who live far from large educational centers or who prefer to study at their own pace. Therefore, it is necessary that the curriculum is designed taking these aspects into account, in order to guarantee an effective learning experience. In this sense, the use of AI as an auxiliary tool in the process can be considered beneficial to improve teaching.

Therefore, it is relevant to investigate the application of Artificial Intelligence and its purpose, with the main focus on improving teaching and the knowledge acquired by each individual. This also includes the work carried out by teachers at institutions that offer distance learning courses.

4. ADVANTAGES AND DISADVANTAGES OF USING AI IN DISTANCE LEARNING

With the advancement of technologies around the world, the application of Artificial Intelligence (AI) in teaching presents several advantages, especially in saving time, whether when carrying out activities or making corrections. Distance Education (EaD) already has inherent benefits, such as the use of technologies, virtual teaching material, tutors and online forums, reduced costs compared to in-person education and flexibility in study schedules (Associação Brasileira de Educação a Distância, 2022) . Furthermore, social inclusion, recognition by the job market, the existence of multiple communication channels and the student's protagonism are other advantages associated with distance learning (Guarezi; Matos, 2012).

According to Barros et al., (2023), AI offers benefits in the previously mentioned aspects and emphasizes the understanding of problems related to difficulty in reading and understanding text, automatically

tization of activities on the institutions' portals and allows greater support from teachers to students. It is also noted that, with the use of this tool in conjunction with EaD, the dropout rate at universities fell from 15% to 8%, demonstrating the effectiveness of the support offered (Barros et al., 2023).

Flipped classrooms are another advantage of this application, where virtual tutors can be used to generate personalized activities for each student and their specificities, making teaching more attractive for each student. However, despite all these advantages, there are divergences in the use of AI in teaching, such as the authenticity of this resource in relation to educational concerns. Therefore, transparency is necessary in this process, in addition to careful planning of each activity and its use (Picão et al., 2023).

Adaptation problems, whether on the part of teachers or the institution, can also be considered a disadvantage, as it is clear that not everyone fully trusts Artificial Intelligence or is easy to use. In view of this, there is a certain resistance to the full use of AI and for certain evaluative activities, for example.

5. TEACHER'S VIEW OF AI AND ITS USE IN EDUCATION

In this paradigm, the teacher can be either for or against the use of Artificial Intelligence (AI), depending on its acceptance and ease of use. According to Picão et al. (2023), some teachers highlight the ease provided by AI in monitoring students on distance learning courses, with faster responses and more effective feedback on students' activities and performance.

However, other teachers express distrust regarding the use of this technology, expressing concerns that AI could generate controversial problems in learning and even "replace" the role of the teacher. However, this is not corroborated by university centers, which have presented teachers with work alternatives and new teaching-learning strategies for their students (Guimarães et al., 2023).

AI can be applied to virtual learning environments in several ways, optimizing these environments, such as Google Classroom, for example, through techniques and algorithms that allow understanding the behavior and performance of students during the learning process (Nunes et al., 2020).

This is especially important considering that each student has their own learning pace, gaps and abilities. Furthermore, AI can make it possible to provide a teacher for each student, through Intelligent Tutor Systems (ITS), which observe students' behavior and engage them in learning activities.

Other applications of AI in virtual learning environments include interactivity between the environment and users, personalized teaching, facilitating synchronous and asynchronous communication, providing personalized feedback and assessments, identifying points of difficulty and advancing where the student has problems. ease, among other benefits. Virtual learning environments have significant importance in the educational context, contributing to the expansion of school spaces and complementing basic education in face-to-face teaching.

According to Nunes (2020), these environments allow interactivity between the environment and users, offering personalized teaching at the learning pace of each student. They also facilitate synchronous and asynchronous means of communication, provide individual feedback and assessments, and propose improvements in areas of difficulty and advances in those where the student finds it easy. The use of AI techniques in virtual learning environments provides even more benefits, such as motivating students and increasing their own intelligence.

The challenges of implementing AI in education include the need to constantly update systems, as technology evolves quickly and it is necessary to keep up with these changes so that AI can be effectively applied in education. There is also concern about ensuring privacy and security of student data, as well as the possibility of algorithmic discrimination.

Teachers need to adapt to new technologies and learn to use AI tools efficiently, in addition to always being up to date with changes in technology. Students, in turn, need to be trained to use AI tools and must be prepared to deal with changes in the way of teaching.

AI can personalize teaching taking into account each student's preferences and difficulties. It uses a set of algorithms and techniques that allow machines to learn from data and previous experiences, enabling them to make decisions autonomously. With this, it is possible to adapt

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teaching to the individual characteristics of each student, making the learning process more efficient and meaningful. It can also provide more accurate and immediate feedback, helping students identify their knowledge gaps and improve their skills.

The application of Artificial Intelligence (AI) from the teacher's perspective offers numerous benefits. AI allows teachers to monitor student performance more effectively, identify learning problems and provide personalized feedback. AI enables greater virtual interaction between teachers and students, providing a more personalized learning experience adapted to each student's pace and learning style.

However, it is important to emphasize that AI does not replace the teacher, but rather complements the teaching and learning process. The role of the teacher continues to be fundamental in guiding and supporting students. It is essential that teachers are trained and qualified to work with AI, aware of its limits and potential, in order to improve the quality of education.

6. FINAL CONSIDERATIONS

The considerations of this study highlight the promising coupling of distance learning (EaD) with Artificial Intelligence (AI). It is observed that AI has played a significant role in teaching students who opt for distance learning, whether due to the diversity of platforms that can be incorporated and improved, such as the Virtual Learning Environment (VLE) and Moodle, or due to the practicality they provide to everyone involved.

The advantages of AI, such as personalization of learning and efficient task management, are offset by challenges that include the need for adequate technological infrastructure and data privacy concerns. The perspective of teachers regarding AI in teaching is predominantly positive, recognizing its potential to enrich the educational experience and strengthen the connection between students and institutions.

However, considering that the adoption of AI is still a relatively recent phenomenon, there is reflection among educators about their own preparation to integrate this technology and the advantages it really offers. It is important to highlight that the continued training of teachers is essential so that they can adapt to new technologies and maximize the benefits of AI in teaching.

Research has demonstrated that despite the disadvantages, the benefits of AI in distance learning significantly outweigh them, offering opportunities for more adaptive and inclusive teaching. As technology advances, AI is expected to become even more integrated into distance learning, transforming education to meet the needs of an increasingly digital society.

Given this, AI strongly assists teaching-learning, making it clear that its growth tends to be increasingly greater and broader, facilitating the dissemination of content on distance learning platforms. AI can help identify gaps in students' knowledge, enabling more effective and timely pedagogical interventions. It can also provide teachers with valuable insights into student progress, helping them - them to further personalize their teaching approaches.

However, it is crucial to ensure that the implementation of AI in teaching is done ethically and responsibly. This includes ensuring the privacy and security of student data, as well as avoiding any form of algorithmic discrimination. Furthermore, it is important to remember that AI is a tool to assist teachers, not to replace them. The role of the teacher in the teaching-learning process remains irreplaceable, especially when it comes to providing guidance, support and personalized feedback to students.

REFERENCES

BRAZILIAN DISTANCE EDUCATION ASSOCIATION.**Advantages of distance learning: what skills Can students win?**(website) 2022. Available at: <https://www.abed.org.br/site/pt/midiateca/textos_ead/2155/2022/08/vantagens_do_ead_que_competencias_os_vamos_podem_ganhar>. Accessed on: 27 Feb. 2024.

FERREIRA, JM et al. Artificial intelligence in education: technology as an ally of distance education.**Amor Mundi Magazine**, v. 4, no. 6, p. 143-157, 2023.

GIL, Antônio Carlos.**How to design research projects**. 5. ed. São Paulo: Atlas, 2008.

GUAREZI, RCM; MATOS, MM**Distance learning without secrets**. InterSaberes, 2012.

GUIMARÃES, UA et al. The use of artificial intelligence in distance learning education and its contribution. **RECIMA21-Multidisciplinary Scientific Journal**-ISSN 2675-6218, v. 4, no. 8, e473573-e473573, 2023.

MAIA, C.; MATTAR, J.**ABC of EaD**. Pearson Prentice Hall, 2007.

MARCONE, MR; LAKATOS, IN**Fundamentals of scientific methodology**. 8. ed. São Paulo: Atlas, 2016.

MORAN, J.M.**What is distance education?**2002. Available at: <https://moran.eca.usp.br/wp-content/uploads/2013/12/dist.pdf>. Accessed on: 27 Feb. 2024.

NUNES, AAG et al. Application of AI in education proposed use of an AV with AI.**InovaEduc Magazine**, n. 7, p. 1-18, 2020.

PICÃO, FF et al. Artificial intelligence and education: how AI is changing the way we learn and teach. **Amor Mundi Magazine**, v. 4, no. 5, p. 197-201, 2023.

SANTOS, SE et al. Artificial intelligence in virtual teaching and learning environments: A model proposal.**Research, Society and Development**, v. 10, no. 4, e9210413855-e9210413855, 2021. SEMENSATO, MR; FRANCELINO, LDA; MALTA, LS The use of artificial intelligence in distance education. **Cesuca Virtual Magazine: Knowledge without Borders**-ISSN, 2318(4221), p. 29-40, 2015. SEVERINO, AJ**Scientific work methodology**. 23. ed. São Paulo: Cortez, 2007.