The use of artificial intelligence (AI) in the school environment: Implications for the teaching and learning process

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ABSTRACT

The objective of this study was to analyze teachers' perceptions about the use of artificial intelligence in the school environment, highlighting its implications for the teaching and learning process. The research adopted a qualitative exploratory approach, involving 13 teachers from a Brazilian public school selected by convenience. Semi-structured one-on-one interviews were used to collect data, allowing for a detailed exploration of teachers' perceptions of the integration of artificial intelligence in education. Discourse analysis was used to examine the transcripts of the interviews, identifying recurring patterns and themes that reflected the opinions and perspectives of the participants. The results of this research show that teachers recognize the transformative potential of artificial intelligence (AI) in education, especially highlighting its ability to personalize teaching and provide adaptive feedback to students, which promotes individualized academic progress and inclusion in the educational environment. However, these benefits are mitigated by significant challenges, such as a lack of technical capacity and resistance to change on the part of educators. The need for investment in continuing education is crucial to empower teachers to effectively integrate AI into their pedagogical practices, maximizing its positive impact on education. In addition, overcoming resistance to change requires collective efforts to foster a culture of innovation and support for the integration of emerging

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technologies into education. Thus, to fully harness the benefits of AI in education, it is critical to address these challenges through comprehensive capacity-building initiatives and effective strategies to promote the uptake and adoption of new technologies in the educational environment, aiming for a more adaptable, inclusive, and effective education for all learners.

Keywords: Artificial intelligence, Teaching and learning process, Education.

INTRODUCTION

Artificial intelligence (AI) has been an area of constant technological advancement in recent decades. With the development of more complex algorithms, increased computational power, and access to large data sets, AI has revolutionized various industries, from medicine to transportation. These advances have allowed AI systems to perform complex tasks with previously unimaginable precision and efficiency, opening doors to new possibilities and applications in various fields (COSTA JÚNIOR, 2023; SOUZA et al., 2023).

In the realm of education, the advancement of technology has been instrumental in transforming the way people learn. The integration of AI into educational platforms has allowed for a personalization of teaching, adapting to the individual needs of each student. Additionally, AI has been used to analyze vast amounts of educational data, providing valuable insights into learning patterns, weaknesses, and areas for improvement for both students and educators (BUZATO, 2023; BARBOSA, 2023).

However, the potential of AI in education goes beyond personalization and data analysis. Implementing intelligent virtual assistants in virtual or in-person classrooms can improve student-teacher interaction by offering instant support and answers to student queries. Additionally, AI can be used to develop intelligent tutoring systems, which can offer personalized and adaptive feedback, helping students hone their skills in specific areas of study (COSTA; BROOK; MOSSIN, 2023).

As technology continues to evolve, it is essential that AI is used ethically and responsibly in the educational environment. Issues such as student data privacy, algorithmic bias, and equity in access to education must be carefully considered and addressed. However, with careful and planned implementation, artificial intelligence has the potential to revolutionize the teaching-learning process, making education more accessible, personalized, and effective for all students (FERNANDES, 2023).

In this context, the objective of the present study was to analyze teachers' perceptions about the use of artificial intelligence in the school environment, highlighting its implications for the teaching and learning process. The study was limited to teachers from a Brazilian public school, thus having a qualitative approach.

METHODOLOGY

The research carried out was an exploratory investigation with a qualitative approach, aiming to understand more deeply the perception of teachers in relation to the integration of artificial intelligence in education. The sample consisted of 13 teachers from a Brazilian public school, who were selected for convenience due to accessibility and availability to participate in the study.

For data collection, individual interviews were conducted with each teacher, allowing a detailed exploration of their opinions, experiences, and perspectives on the use of artificial intelligence in the educational environment. These interviews were semi-structured, meaning that there was a set of pre-defined topics and questions, but also space for participants to express their opinions freely and spontaneously.

The application of the semi-structured interview allowed for adequate flexibility to tailor the questions as per the need and context of each interview, ensuring that all relevant areas were covered in a comprehensive manner. By allowing teachers to share their experiences in a more natural way, the semi-structured interviews enabled a deeper and richer understanding of participants' perceptions of the use of artificial intelligence in education.

Data analysis was conducted using the discourse analysis technique, a qualitative method that involves a thorough review of the transcripts of interviews with teachers. In this process, each transcript was carefully examined for patterns, recurring themes, and nuances in participants' narratives about the use of artificial intelligence in education.

In the analysis, excerpts from the interviews that reflected the opinions, experiences, and perspectives of teachers in relation to AI were highlighted. These excerpts were then categorized and grouped based on emerging common themes. During this analysis, the different discourses present in the interviews were identified and interpreted, allowing a deeper understanding of the complexities and varieties of the participants' points of view.

RESULTS AND DATA ANALYSIS

Through data collection, it was possible to verify the perceptions of teachers about the use of artificial intelligence in education. Initially, we sought to inquire about the main opportunities that the use of AI provides to the teaching of process and learning. As a result, it was found that the main opportunity was linked to artificial intelligence's ability to personalize teaching and adapt it to students' individual needs. Teachers highlighted that AI can offer adaptive learning resources, which adjust to each student's pace and learning style, providing a more inclusive and effective teaching environment.

> Artificial intelligence opens doors to incredible personalization in teaching. I imagined how this could help each student progress at their own pace and learning style. The possibility of offering adaptive resources seemed like a revolutionary change that could make my teaching more effective and inclusive (E02).

> I realize that AI can offer instant personalized feedback, which could really help my students improve and grow academically. It seems that we are entering a new era of more adaptable and accessible teaching (E05).

> In my opinion, the customizability is truly extraordinary. I envisioned how we could use this technology to create learning experiences tailored to each student, taking into account their

> individual abilities and preferences. It seems that AI has the potential to completely transform our approach to education (E10).

The results reveal a consensus among the teachers interviewed about the opportunities offered by artificial intelligence (AI) in the educational context. Participants highlighted AI's ability to personalize teaching and tailor it to individual student needs as the top perceived opportunity. This personalization is considered a revolutionary change that can make teaching more effective and inclusive.

Personalization of teaching is seen as a significant advantage of AI, as it allows each student to progress at their own pace and learning style. The adaptive capabilities offered by AI are perceived as a powerful tool for meeting the specific needs of each student, creating a more dynamic and effective learning environment.

Thus, teachers recognize the potential of AI to provide instant personalized feedback, which can assist students in their academic development. This individualized feedback is seen as a way to help students improve and grow in their abilities, contributing to a more adaptable and accessible education.

In addition to these opportunities, participants emphasized AI's ability to provide instant and personalized feedback, allowing students to identify areas for improvement and receive individualized support for their academic progress.

> AI offers instant personalized feedback. This can really help students identify where they need to improve and receive individualized support (E03).

> Providing personalized feedback is a revolution in teaching. With AI, the process becomes more adaptable and efficient for all students (E07).

The interpretive analysis of the data reveals a unanimous perception among the participants about the importance of personalized feedback provided by artificial intelligence (AI) in the educational environment. The emphasis on AI's ability to offer instant, personalized feedback stands out as a significant opportunity perceived by teachers. This individualized feedback is recognized as a powerful tool to help students identify areas for improvement and receive support tailored to their specific needs, thereby effectively promoting academic progress.

Teachers' perception of AI as a tool for providing personalized feedback reflects an understanding of the technology as a means of improving the efficiency of the educational process. By acknowledging AI's ability to make feedback more adaptable and efficient, participants evince an optimistic view on the role of technology in promoting more inclusive and effective education. This view is reinforced by the recognition that the personalized feedback offered by AI not only helps students identify areas for improvement but also makes the teaching process more adaptable to each student's individual needs.

However, despite this opportunity, teachers also pointed out challenges in the use of AI in education. The main challenge cited was around the need for capacity building and training of teachers to effectively use artificial intelligence in the educational environment. Participants highlighted the lack of technical knowledge needed to integrate and use AI tools effectively into their pedagogical practices.

> While AI promises to revolutionize education, we face the crucial challenge of a lack of skills. Effectively integrating these tools requires technical knowledge that many of us do not yet have (E12).
>
> The potential of AI in education is immense, but without proper training, we are missing out on opportunities. It is essential to invest in teacher training so that we can use these tools effectively and transform the educational environment (E08).

Analysis of the results indicates that while teachers recognize the potential of artificial intelligence (AI) in education, they face significant challenges related to a lack of adequate capacity building and training. These challenges are pointed out as the main obstacle to using AI effectively in their pedagogical practices. The lack of technical knowledge required to integrate and utilize AI tools is highlighted as a common concern among participants.

The teachers' reports reflect an awareness of the importance of continuous training to keep up with the rapid technological changes in the field of education. They recognize that despite the revolutionary potential of AI, it is essential to invest in teacher training to ensure they can make the most of these tools and transform the educational environment in a positive way.

It is also noteworthy that another challenge was related to the resistance to change on the part of some teachers, who feel intimidated or insecure when adopting new technologies in their teaching methodologies.

> We face the added challenge of resistance to change. Some colleagues, like me, are intimidated by the adoption of new technologies, which limits our ability to make the most of the tools available (E04).
>
> We need to deal with resistance to change among teachers. There is an insecurity in adopting new technologies, which hinders the effective implementation of AI in our pedagogical practices (E01).

The reports reveal the presence of two interconnected challenges in the context of the implementation of artificial intelligence (AI) in education: resistance to change on the part of some teachers and insecurity in adopting new technologies in their teaching methodologies.

First, the resistance to change is highlighted, evidenced by the fear and intimidation reported by teachers when considering the adoption of new technologies, such as AI, in their pedagogical practices. This resistance can be attributed to several factors, such as familiarity with traditional

teaching methods, lack of knowledge about how new technologies work, and fear of failure when trying to incorporate them into their routines.

In addition, teachers' insecurity regarding the adoption of new technologies is highlighted as an additional challenge. A lack of confidence in one's own ability to effectively use technological tools can result in an ineffective implementation of AI in pedagogical practices, limiting the potential for positive transformation of the educational environment.

CONCLUSION

The results of this survey reveal that teachers recognize the transformative potential of artificial intelligence (AI) in education, especially with regard to personalizing teaching and providing adaptive feedback to students. AI offers significant opportunities to improve effectiveness and inclusivity in the educational environment, making it a valuable tool for promoting individualized academic progress.

However, these benefits face important obstacles, especially related to a lack of technical training and resistance to change on the part of teachers. The need for investment in continuing education is evident to enable educators to effectively integrate AI into their pedagogical practices, thereby maximizing its potential for positive impact on education.

In addition, resistance to change poses an additional challenge, as some teachers feel intimidated or insecure when adopting new technologies in their teaching methodologies. Overcoming this resistance requires a collective effort to foster a culture of innovation and support for the integration of emerging technologies into education.

Therefore, to fully harness the benefits of AI in education, it is crucial to address these challenges through comprehensive capacity-building initiatives and effective strategies to promote the uptake and adoption of new technologies in the education environment. Only in this way can we ensure that artificial intelligence is harnessed to the fullest to promote a more adaptable, inclusive, and effective education for all students.

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