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ETHICS AND CHALLENGES OF APPLYING ARTIFICIAL INTELLIGENCE IN EDUCATION: A LITERATURE REVIEW

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Abstract:

This research aims to analyze the ethics and challenges that arise in the application of Artificial Intelligence (AI) technology in the world of education. Using the literature review method, this study identifies various ethical issues, such as data privacy, equal access to technology, and the role of teachers that are threatened by AI, as well as the technical and social challenges faced by educational institutions in integrating these technologies. Ethical theories of utilitarianism, deontology, and social justice are used as a basis for evaluating the impact of the application of AI in education, both from the perspective of maximum benefits to society and moral and justice principles. The results of this study are expected to provide insight for policymakers and education practitioners in developing ethical and inclusive AI implementation strategies, taking into account the need to maintain the quality of education and protect the rights of students and teachers.

Keywords: *Artificial Intelligence, Educational Ethics, Implementation Challenges*

INTRODUCTION

Artificial Intelligence (AI) has become a transformative force that has penetrated various sectors, including education. AI offers great potential to improve learning efficiency, such as personalization of teaching materials and simplification of administrative tasks. However, behind this potential, there are significant challenges that include ethical issues, access gaps, and changing the role of educators in the education ecosystem (Zawacki-Richter et al., 2019);Knowles, 2021).

One of the main challenges is the digital divide exacerbated by unequal access to AI technology. Many educational institutions, especially in economically constrained regions, do not have adequate infrastructure to make the most of AI. As a result, students from different economic backgrounds face unequal learning opportunities. These inequities not only inhibit the creation of personalized learning but also reinforce systemic inequalities in educational outcomes (Chen et al., 2023).

In addition, the integration of AI in education raises serious concerns regarding the privacy and security of student data. AI systems often require the collection of large amounts of data in order to function optimally. However, this

practice increases the risk of privacy breaches, especially for younger students who are more vulnerable. Therefore, a policy framework is needed that protects students' privacy rights without hindering technological innovation ((Talan, 2021; ÇAYIR, 2023).

Another challenge that is no less important is the concern that AI can reduce the role of educators in the learning process. While AI can help in tasks such as assessment and preparation of teaching materials, human interaction remains a key element in meaningful learning experiences. AI should be seen as a supporting tool, not a substitute for the role of teachers, to maintain important interpersonal relationships in education (Hinojo-Lucena et al., 2019; Rui & Badarch, 2022).

In this context, ethical discourse is important to ensure that the application of AI not only focuses on the technical benefits but also considers its social and moral impacts. The integration of AI in education must adhere to the principles of social justice, transparency, and human rights protection. This approach aims to make AI technology an inclusive empowerment tool, not a source of injustice (Ferikoğlu & Akgün, 2022; (Balta, 2023).

Several studies have identified the benefits of AI in education, such as the ability to improve personalization of learning experiences and operational efficiency. AI allows educators to tailor instruction to students' individual needs, improving engagement and learning outcomes. Additionally, this technology can simplify administrative processes, such as assessment and scheduling, allowing educators to focus more on teaching (Zawacki-Richter et al., 2019).

However, the study also points to significant risks that should not be ignored. Biases in AI algorithms, for example, can exacerbate inequality in access to education if not carefully managed. A poorly supervised AI system can inadvertently favor certain demographic groups more, creating new inequities in educational opportunities (Hall & Ellis, 2023; Akgun & Greenhow, 2022). In addition, existing policies are often not strong enough to regulate the moral and ethical implications of AI technology in education (Lee et al., 2024).

This research aims to answer some important questions about the ethical application of AI in education. How can the application of AI align with ethical principles and student rights? What are the challenges faced by educational institutions in implementing AI in an inclusive manner? How can we ensure that the application of AI does not exacerbate existing inequality? By reviewing the related literature, this research aims to provide deeper insights into how AI can be applied ethically and inclusively in education. The theoretical approaches used, such as utilitarianism and deontology, will help explore how these technologies can provide maximum benefits to society without sacrificing the principles of social justice. Thus, this research is expected to contribute to the development of more responsible educational policies and practices.

RESEARCH METHODS

This study uses a literature review approach that focuses on the analysis of the application of Artificial Intelligence (AI) in education, with an emphasis on the ethical and technical challenges faced in its implementation. The research objects include various cases where AI is applied to support learning, such as personalization of teaching materials, data analysis, and management of education administration (Zawacki-Richter et al., 2019; (Talan, 2021b). In addition, the study also examines the challenges faced, such as student data privacy risks, gaps in access to technology, and reduced role of teachers in the

learning process (Göçen & Aydemir, 2020).

This research relies on primary data in the form of relevant literature that discusses the application of AI in education, including journal articles, books, and research reports. Secondary data used included additional documents such as international policy reports, conference publications, and academic papers reviewing the ethical, social, and technical issues of AI in education (Ferikoğlu & Akgün, 2022). These sources are selected based on the relevance of the theme, credibility, and potential contribution to a deeper analysis.

The theoretical foundations used include three main approaches in ethics, namely utilitarianism, deontology, and social justice. The theory of utilitarianism (Bentham, 1789) helps evaluate the extent to which the application of AI provides maximum benefits, especially in improving educational efficiency. Deontology theory (Kant, 1785) emphasizes the importance of adhering to universal moral principles in the use of AI, such as protecting student privacy and respecting teachers' rights as educators. Meanwhile, social justice theory (Rawls, 1971) focuses on the equitable distribution of educational resources, so that AI does not exacerbate inequality, but rather becomes an inclusive empowerment tool (Lee et al., 2024).

The research process begins by collecting data from relevant literature using a systematic search method. All sources were analyzed using content analysis techniques, which are approaches that aim to identify patterns, relationships, and key themes in the literature data (Hinojo-Lucena et al., 2019). The analysis process includes organizing data by theme, such as the benefits and risks of AI, as well as a critical evaluation of mutually supportive or conflicting arguments in the literature (ÇAYIR, 2023; Zhang et al., 2023).

Through this approach, the research is expected to provide comprehensive insights into the application of AI in education. The results of the analysis aim to assist stakeholders, including policymakers and education practitioners, in developing ethical, inclusive, and sustainable AI implementation strategies (Akgun & Greenhow, 2022; Hall & Ellis, 2023).

RESULTS AND DISCUSSION

Research Results

This study identifies several key benefits of applying Artificial Intelligence (AI) in education, including personalized learning, improved educational administrative efficiency, and the ability to analyze big data to support better decision-making (Zawacki-Richter et al., 2019; Lee, 2024). Personalization allows students to get teaching materials tailored to individual needs, thereby improving learning outcomes and student engagement. Additionally, AI technology can ease teachers' workload through the automation of administrative tasks, such as grading and schedule planning.

However, the study also found significant challenges that hinder the widespread and ethical application of AI in education. These challenges include:

1.Technology Access Gap

AI requires adequate digital infrastructure, such as fast internet connections and advanced hardware. Many educational institutions, especially in developing countries, do not have the resources to implement these technologies. This exacerbates inequalities in access to education and reinforces systemic inequities (Göçen & Aydemir, 2020).

2.Data Privacy and Security

AI systems often collect large amounts of student data to improve their

performance. This practice raises serious concerns regarding privacy violations, especially in more vulnerable students. Existing regulations, such as the GDPR in the European Union, are important guidelines, but their implementation is still limited in many regions (Çayir, 2023; Zhang et al., 2023).

3.Algorithm Bias

Research shows that AI algorithms can reinforce existing social biases, for example by favoring certain groups or excluding others based on historical data. This threatens the principle of social justice in education (Akgün & Greenhow, 2021; Hall & Ellis, 2023).

4.Reducing the Role of Teachers

Although AI is designed to support educators, its overuse can reduce the role of humans in the learning process. Interpersonal interaction, which is an important element in education, is difficult to replace by technology (Hinojo-Lucena et al., 2019).

DISCUSSION

The application of AI in education provides a great opportunity to improve the efficiency and effectiveness of learning systems. However, these benefits cannot be fully realized without overcoming the existing challenges. This research emphasizes the importance of an ethical principle-based approach to ensure that AI is used fairly and inclusively.

From a utilitarianism perspective, the application of AI should ensure the greatest benefit to the largest number of individuals. This can be achieved by expanding access to technology through digital infrastructure investment in underdeveloped areas (Rawls, 1971). This approach also emphasizes the importance of ensuring that AI technology is used to support all students, without exception.

In the context of deontology, it is important to establish universal moral rules, such as the protection of student privacy. This requires a strict regulatory framework to prevent data misuse. Research shows that frameworks like this have been successfully implemented in several developed countries, but require adaptation to the educational context in developing countries (Knowles, 2021).

Meanwhile, social justice theory underlines the need for a fair distribution of educational resources. AI technology must be designed to reduce inequality, not exacerbate it. A fairness-based approach can include inclusive algorithm design as well as training for teachers to make better use of these technologies (Ferikoğlu & Akgün, 2022).

The study also highlights the need for stronger regulation to address bias in AI algorithms. For example, some studies have shown that historical data-driven algorithms tend to reinforce discrimination if not closely monitored (Hall & Ellis, 2023). Therefore, periodic audits of algorithms are required to ensure that AI technology provides fair and objective results.

In addition, the use of AI should not replace the role of teachers, but must be seen as a supporting tool. Teachers remain a key element in creating a meaningful learning environment. Thus, a comprehensive training program for educators is an important step in ensuring the successful integration of AI in education (Hinojo-Lucena et al., 2019).

CONCLUSION

This research shows that the application of Artificial Intelligence (AI) in education has great potential to improve learning efficiency and personalization,

but it also presents significant ethical and technical challenges, such as technology access gaps, data privacy issues, algorithm bias, and reduced teacher roles. To ensure that AI can be used ethically and inclusively, it is important to address the digital divide and implement strict regulations regarding the protection of students' personal data. In addition, bias management in algorithms and the role of teachers that remain central in the learning process need to be the main focus so that AI not only strengthens the quality of education, but also ensures social justice and ethics in its application.

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