Chapter 1

Artificial Intelligence Applications in PreK-12 Education: The Ethical Perspective

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Abstract

Arguably today, areas for which *Artificial Intelligence* (AI) applications are not used, are becoming almost extinct. AI applications have already been used in determining travel preferences, creating shopping lists, in supporting child raising, toward the creation and maintenance of autonomous vehicle systems. In fact, AI applications are frequently employed in educational trajectories as well. Here, the main objectives are to enable students to receive a more quality education and to better facilitate their learning processes. At the same time, these technologies provide teachers with a fair number of materials of novel sort along with other 'intelligent applications' to be utilized in instruction. That said, technology carries the potential to bear several disadvantages particularly when used outside of numerous determined purposes. In this direction, AI may negatively affect students via fostering cheating behavior, causing deprivation of creative thinking processes, and personal development. Today, with the help of an AI application entitled ChatGPT-4 developed by Open AI company, it is possible to write a paper, thesis, or summary on almost any subject. Writing codes, solving problems, and developing creative applications are amongst the operations this application can easily overcome. To this end, it would be fair to state that AI applications can cause harmful societal effects aside from the convenience they provide. This creates public concern, and national and international governmental institutions declared some restrictions and legal guidelines in this regard. Our country (Türkiye) currently has no law or a draft version of a law on how AI applications should be benefitted. Howbeit, some other

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countries have published AI ethical guidelines and policy documents. In light of all these, this study intends to discuss the ethical dimension(s) of using AI applications, and their reflections in particular at PreK-12 levels by scrutinizing the phenomenon through a literature review and through collecting data from student teachers taking a qualitative route. As a result of the research, it appears that establishing an ethical practice framework for AI applications is inescapable. Further, learners at PreK-12 levels need to be made knowledgeable about the ethical dimension(s) of the said applications with the emphasis that these applications act as more than being yet another time passing/recreation tools since they can assist in development to a greater extent but posing greater threats for those students.

1. Introduction

One can comfortably articulate that *Artificial Intelligence* (AI) applications have gained an important place in spheres of education in recent years. Education institutions also acknowledge and make us of AI technologies to improve student's learning processes, enhance efficiency of organizational operations and provide access to bulks of information (Akgun & Greenhow, 2022). However, the rapid progress of AI applications has brought a considerable number of ethical concerns (Cath et al., 2018; Sevgi, Ayyıldız & Yılmaz, 2023). These are enlisted as equality, privacy, data security, transparency, accountability, justice, privacy issues together with having an unlimited access to all types of information, problems threatening freedom of speech, dignity, sustainability causing 'information pollution' (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021).

In this context, it will be an essential step to examine the ethical dimensions of AI applications, especially toward the boundaries of PreK-12 levels where the information is produced and disseminated should always cater to the best interest of the child and hence present solutions drawing attention to adverse impacts. Also, human-artificial intelligence collaborative environments, which are on the increase as the 'power goes on', may cause young people to develop contraindications on educational, social, emotional, cognitive, cultural, and political areas. This requires a decolonized and *"humanized post-human ethic"* (Adams et al., 2023).

Without doubt, AI applications in education have gained the role of shaping how education content should be presented, and how to support the dynamic and shifting responsibilities of teachers (Hern´andez-Orallo & Vold, 2019; Sevgi & Yılmaz, 2023). Yet, the ethical side of the modus operandi should not be neglected whilst performing the relevant procedures.

When it comes to ethics, moral values come into play in terms of the results of the related activities carried out as part of the practicum. For this very reason, rather than the desired outcomes of resorting to AI applications in relation to practicality, in education, the 'how' of doing things what ethical situations may be violated should be examined.

AI applications can indeed create ethical problems in the fields of privacy and data breach, equality and fair use, personal development, prejudice and discrimination, human-machine relationship, freedom of thought and thought, and autonomy (Jobin et al., 2019). This necessitates designating and announcing a moral and legal framework for controlling AI applications, determining access limits, and producing legal content warranting freedom of use.

2. Literature (Research) Review

The ethical frameworks and guidelines established for artificial intelligence (AI) applications are also evident in the field of education. While the integration of AI into education offers numerous advantages—such as supporting students' learning processes, providing teachers with innovative instructional materials, and enabling personalized learning experiences—it also raises various ethical concerns. The incorporation of AI into the educational system encompasses a broad spectrum of issues, including student privacy, data security, transformations in teacher-student interactions, and the establishment of ethical usage standards (Yılmaz, Şahin-Atılgan & Güzel-Sekecek, 2024).

In this regard, Luckin et al. (2016) state that the ethical problems associated with AI applications in education do not become particularly prominent at early age levels. However, as AI continues to become more widespread, it is anticipated that issues such as the ethical boundaries of AI systems used in education, data privacy, and cognitive dependency will gain greater significance in the future.

Jobin et al. (2019) conducted a comprehensive study analyzing the ethical principles governing AI applications, their limitations, and how these principles should be framed in a cross-sectoral context. Their research emphasizes the necessity of not limiting the discussion on ethical principles to the education sector alone but rather integrating these considerations into a more comprehensive interdisciplinary model.

Similarly, Southgate et al. (2019) focused on the use of AI applications in schools, examining their impact on teachers, students, and school administrators. Their study analyzes how AI-powered educational tools are

transforming pedagogical processes and how they can be made more effective in instruction. However, the increasing prevalence of such applications also raises critical questions, such as how to protect students' digital footprints and how to delineate ethical boundaries.

Research conducted by Algora Lab (2021) highlights that more than 300 ethical guidelines and policy documents have been produced globally on AI. This indicates a growing awareness of the need to establish ethical standards for AI and a trend among various countries toward developing legal frameworks in this regard. Nevertheless, how these policies will be integrated into education remains a subject of ongoing debate.

Irwin et al. (2021) examined the ethical aspects of AI applications within the framework of children's privacy rights and data confidentiality. Key concerns include the protection of children's data on digital platforms, how AI-based educational applications utilize student information, and the extent to which such data is anonymized.

Holmes et al. (2021) investigated how AI applications in education could be modeled within a community-level ethical framework. Their research underscores the importance of fostering ethical awareness among individuals and increasing societal consciousness regarding the potential ethical dilemmas posed by AI. They emphasize the necessity of developing awareness programs for teachers and students, establishing ethical codes, and integrating these principles into educational environments.

A study conducted by UNESCO (2021) proposed recommendations on how AI should be integrated into the field of education and how these technologies should be positioned within educational settings. UNESCO has been actively involved in defining international principles that promote the ethical use of AI and encourages countries to develop policies based on these guidelines.

Schiff (2021) underscores the significance of ethical principles and national policies in education, highlighting the need to establish ethical boundaries for the use of AI applications. The fact that AI policies differ across countries necessitates the formulation of universally accepted ethical standards at a global level.

The studies conducted by the United Nations International Children's Emergency Fund (UNICEF, 2021a, 2021b) extensively analyze the ethical limitations of AI and their implications for children's rights. These studies stress the importance of safeguarding children's rights when engaging with AI, ensuring data security, and clearly defining ethical usage boundaries. It

is particularly emphasized that AI-powered educational tools used at the PreK-12 level, while offering significant developmental benefits, also pose ethical risks.

Similarly, Adams et al. (2023) identified the ethical principles governing AI applications in K-12 education and examined how these principles could be integrated into educational processes. Their study suggests that for AI tools to be used effectively and ethically in education, teachers and school administrators must develop a greater awareness of these issues.

In conclusion, addressing AI applications in education within an ethical framework is crucial for ensuring both student safety and the effective implementation of pedagogical processes. AI systems used in education should not merely be considered as technological innovations but also as elements requiring careful evaluation from an ethical and social responsibility perspective. In this context, it is evident that further research and policy development are needed at both national and international levels to ensure the ethical use of AI applications in education.

3. Method

The present study aims to examine the ethical considerations associated with the use of artificial intelligence (AI) applications in education through a two-stage research design. The first stage involves an extensive literature review, in which existing ethical principles and guidelines related to AI applications in educational settings were systematically analyzed and discussed. This phase of the study employs the document analysis method, which allows for an in-depth examination of academic publications, reports, policy documents, and ethical frameworks established by various national and international institutions. The comparative analysis of ethical principles in AI applications in education serves as the foundation for understanding the core concerns and debates in the field.

In the second stage, a qualitative research approach was adopted, focusing on the perceptions and experiences of university students regarding AI ethics in education. To achieve this, semi-structured interviews were conducted with 12 university students enrolled in the School of Education at a state university located in the Western Black Sea Region of Türkiye. The participants were selected through random sampling, ensuring a diverse and unbiased representation of perspectives. The interviews aimed to gather students' viewpoints on the ethical dimensions of AI, particularly concerning its impact on teaching, learning, assessment, and personal data privacy.

A structured interview form, developed by the researchers, was used as the primary data collection tool. This form contained a total of three open-ended questions, designed to elicit participants' reflections on the ethical implications of AI applications in education. The questions focused on:

1. Perceptions of AI Ethics: Students' awareness and understanding of ethical concerns related to AI in education.
2. Personal Experiences and Observations: Participants' direct or indirect experiences with AI tools in their academic journey and their ethical considerations.
3. Recommendations for Ethical AI Use in Education: Suggestions on ethical guidelines, potential risks, and measures that should be taken to ensure responsible AI implementation in learning environments.

The qualitative data obtained from the interviews were subjected to content analysis, a widely used method in qualitative research for identifying themes, patterns, and relationships within textual data. The responses provided by the students were coded and categorized into key themes, allowing for a systematic interpretation of the ethical challenges and concerns surrounding AI in education. The findings from this analysis were then compared with insights derived from the literature review, enabling a more comprehensive understanding of the ethical landscape of AI in educational contexts.

By integrating both document analysis and qualitative interviews, this study aims to present a holistic perspective on the ethical considerations of AI in education. The combination of theoretical insights and empirical data contributes to the ongoing discourse on AI ethics, highlighting the importance of developing well-defined ethical frameworks and guidelines to ensure the responsible and fair use of AI technologies in learning environments.

4. Findings

Pertaining to the first stage of the study, it seems that there exist plentiful studies on the ethical aspects of AI applications. These cover an extensive area such as decision systems of autonomous machines (Anderson & Anderson 2015), meta-applications within the scope of AI ethics (Vakkuri & Abrahamsson 2018; Yılmaz, 2021), and improved AI guidelines (The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems, 2019) contains. Nevertheless, it is worth noting that the current study aims to cast light on the ethical dimension of AI applications in education making it more specific.

The literature review points to four different ethical documents by competent institutions in the field of education. These were as follows, respectively (Adams et al., 2023):

1. World Economic Forum (2019): *Generation AI: Establishing Global Standards for Children and AI,*
2. The Institute for Ethical AI in Education (IEAIED, 2021): *The Ethical Framework for AI in Education,*
3. UNESCO (2021): *AI and Education: Guidance for Policymakers,*
4. (UNICEF, 2021b): *Policy Guidance on AI for Children.*

The issues that emphasized respecting education are equality, privacy, data security, transparency, accountability, justice, sustainability, and information pollution. Addedly, confidentiality and data breach, equality and fair use, personal development, prejudice and discrimination, human-machine relationship, freedom of thought and thought, and autonomy were considered topics that may cause ethical issues. Below are a number of subjects that are worthy of dealing with in education:

Equity: All students should have equal access to AI applications in an inclusive fashion.

Privacy: AI applications should be able to store user information within specific standards and security protocols and should not share them with third parties.

Data Security: AI applications should be able to securely store information on personal, corporate, and educational issues in databases.

Transparency: AI applications in education should transparently share data collection policies and data processing processes with users to improve themselves and provide better service.

Accountability: AI applications should have clearly defined standards and accountable user systems.

Fairness: AI applications should comply with the legal rules in data collection, processing, and sharing the obtained data with users and should be able to serve for all users.

Sustainability: AI applications should be for long-term and sustainable education rather than for daily solutions. In this sense, the needs of the age should be followed closely, and frequent updates are needed.

Information Pollution: AI applications should prevent information pollution by considering filtering and official certificates for the security of the source.

AI applications possess ethical dimensions and heavy duties to be fulfilled in education and some of these explain access policies and give chances of information sharing, albeit partially, on working principles. Even though these practices will be encountered more intensely in the coming years, the international acceptance of ethical guidelines and worlwide cooperation will help establish specific standards in an effective way. For children, so as to be able to care about their well being and development, it should be ensured that universal ethics sheds light to all the processes and procedures.

In the second stage of the study, semi-structured interviews were completed with 12 prospective teachers of PreK-12 levels. The questions posed revealed responses in themes, categories, and codes as presented in Table 1.

Table 1. Themes, categories and codings for interview questions

Theme	Category	Code	(f)
Ethical dimensions that AI applications should own	Legal	Open data processing	2
		Compliance with the law	2
		Transparency of data collection policies	1
		Emphasis on privacy and equality	1
	Moral	No sharing of personal data	3
		Underlining value judgments	1
		No producing of information pollution	1
		Presenting accurate information	1
Importance attached to the ethical dimension of AI applications	Significance level	I care a lot	1
		I care partially	2
		I don't care at all	9
Usage area of AI applications	Doing homework and assignments/ tasks	Project preparation	5
		Creating creative apps	1
		Solving complex problems	1
	Curiosity and discovery	Discovering topics one's curious about	3
		Doing research	1
		Accessing unlimited information	1

At this point it is clear that AI applications should have two different policies viz. legal and moral. These are similar to the ethical guidelines belonging to the influential organizations that have been stressed earlier in the paper. With regard to the importance attributed to AI applications and ethical issues apparently most did not give importance to these. This can be associated with the applications being new, and their harmful aspects have not yet been discovered. To wit, students as users are not fully aware of their ethical responsibility. It is observed that students use these applications intensively for doing homework, solving complex problems, and preparing novel tasks. Lastly, students' sense of curiosity plays an active role in the use of these applications. All in all, these findings are believed to unveil a snapshot of the future professionals of PreK-12 levels.

5. Implications

The superior results of this research may be presented in the following way:

1. AI applications in the field of education are being given more importance at the national and international levels nowadays. This points out the vitality of preparing ethical guidelines and legal notifications globally. Alongside the advantages of AI, it is deemed essential to indicate the usage limits and legal aspects.
2. AI applications are practical time-passing tools that attract people's attention besides being powerful tools to support scientia in the field of education and in other fields and sectors. Whatever the rationale behind turning to these applications, all types of information to be gained should be refined and filtered. In doing so, speaking of PreK-12 education, warranting equal, fair, transparent, and reliable media and forms of instruction as well as all other kinds of teaching and learning can be made possible.
3. Ethical frameworks and draft laws should be established in our country (Türkiye) addressing AI applications in education immediately to target all children. In this way, healthy usages can be realized and sustained.

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