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REVIEW

Ethics and limits in the use of artificial intelligence in education: a critical look

Ética y límites en el uso de la inteligencia artificial en la educación: una mirada crítica

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ABSTRACT

Artificial Intelligence (AI) has become an essential component of contemporary education, transforming teaching, learning, and institutional management. However, this technological evolution also raises complex ethical, pedagogical, and regulatory challenges. The chapter analyzes international frameworks such as the UNESCO Recommendation on the Ethics of Artificial Intelligence (2020), the Beijing Consensus on AI and Education, and the OECD's AI Principles, which collectively advocate for transparency, fairness, accountability, inclusion, and human oversight in educational contexts. It further examines how Latin American countries, particularly Venezuela, are beginning to legislate and regulate the use of AI through national policies, ethical codes, and training initiatives for teachers. The study highlights that ethical AI in education must ensure respect for human dignity, protect data privacy, and prevent algorithmic bias or technological dependency. It argues that while AI can enhance learning personalization and institutional efficiency, it must never replace the human dimension of education. The text concludes that ethical governance, teacher training, and participatory frameworks are indispensable to achieving a responsible and equitable integration of AI in educational systems, transforming technology into a means of empowerment rather than control.

Keywords: Artificial Intelligence; Educational Ethics; Algorithmic Transparency; Digital Governance; Teacher Training; Human-Centered Education.

RESUMEN

La inteligencia artificial (IA) se ha convertido en un componente esencial de la educación contemporánea, transformando la enseñanza, el aprendizaje y la gestión institucional. Sin embargo, esta evolución tecnológica también plantea complejos retos éticos, pedagógicos y normativos. El capítulo analiza marcos internacionales como la Recomendación de la UNESCO sobre la ética de la inteligencia artificial (2020), el Consenso de Pekín sobre la IA y la educación y los Principios de la OCDE sobre la IA, que en conjunto abogan por la transparencia, la equidad, la rendición de cuentas, la inclusión y la supervisión humana en los contextos educativos. Además, examina cómo los países latinoamericanos, en particular Venezuela, están comenzando a legislar y regular el uso de la IA mediante políticas nacionales, códigos éticos e iniciativas de formación para docentes. El estudio destaca que la IA ética en la educación debe garantizar el respeto de la dignidad humana, proteger la privacidad de los datos y prevenir el sesgo algorítmico o la dependencia tecnológica. Sostiene que, si bien la IA puede mejorar la personalización del aprendizaje y la eficiencia institucional, nunca debe sustituir la dimensión humana de la educación. El texto concluye que la gobernanza ética, la formación de los docentes y los marcos

participativos son indispensables para lograr una integración responsable y equitativa de la IA en los sistemas educativos, transformando la tecnología en un medio de empoderamiento en lugar de control.

Palabras clave: Inteligencia Artificial; Ética Educativa; Transparencia Algorítmica; Gobernanza Digital; Formación Docente; Educación Centrada En El Ser Humano.

INTRODUCTION

The arrival of artificial intelligence (AI) in education has revolutionized the way knowledge is taught, learned, and managed. From automated tutoring to adaptive assessment systems, AI is unlocking entirely new ways to tailor education, improve efficiency, and expand access. But this technological progress is not without ethical tensions, pedagogical dilemmas, and regulatory challenges. And the question that remains is: how have ethics and the limits of AI been applied in education?

Ethics, as a code of conduct that guides human action with respect for dignity, justice, and equity, is an element for regulating the use of intelligent technologies in educational contexts. To discuss the ethical implementation of AI in education, it is necessary to understand the regulatory frameworks and guidelines that international organizations have developed to address the issue from a multidimensional perspective. According to Paguay et al.[1], "... AI has become a highly relevant tool in the field of education, and exploring its application in a responsible and ethical manner is becoming increasingly important".

Various institutions have developed guiding principles to ensure that the use of AI in education is ethical, fair, transparent, inclusive, and focused on human well-being. Among the most notable documents is UNESCO's Recommendation on the Ethics of Artificial Intelligence,[2] which defines principles such as equity, inclusion, algorithmic transparency, personal data protection, and human oversight. This ethical framework establishes that all applications of AI in education must respect human rights, avoid the reproduction of biases, and promote equitable access to technologies. In its companion document Education and AI: Guidance for Policy Makers,[3] UNESCO highlights the need to train teachers and students in critical digital skills, as well as to ensure that intelligent systems do not replace pedagogical judgment or human interaction.

The Beijing Consensus on Artificial Intelligence and Education, promoted by UNESCO, presents a vision focused on sustainable development, cognitive justice, and technological sovereignty. This consensus emphasizes that AI must be adapted to local contexts, respect cultural diversity, and strengthen human capabilities rather than replace them. In this sense, it aligns with the principles of epistemic justice. The Organization for Economic Cooperation and Development[4] argues that AI in education must be trustworthy, responsible, and human-centered. It proposes five ethical pillars: technical robustness, fairness, transparency, accountability, and respect for autonomy. These principles seek to prevent automated systems from perpetuating inequalities or limiting the agency of educational actors.

Likewise, the general ethical principles of artificial intelligence focus on ensuring that its development and application respect human dignity, promote equity, and avoid social harm. These principles have also been expressed by organizations such as the World Economic Forum,[5] which has presented ethical principles for the fourth industrial revolution, highlighting the need to design technologies centered on human values, with multisectoral participation and an inclusive approach. In the field of education, this means that decisions on the use of AI must involve teachers, students, families, and communities, ensuring democratic governance of the technology.

DEVELOPMENT

The expansion of artificial intelligence into multiple areas of social life has driven the need to establish ethical principles to guide its design, implementation, and use. In the field of education, these principles are essential to ensure that AI promotes learning without violating rights or reproducing inequalities. The most internationally recognized principles are presented below:

- Transparency: AI systems must be understandable and auditable. This means that automated decisions can be explained and justified, especially in educational processes such as student assessment or selection.
- Accountability: Developers, users, and institutions must take responsibility for the effects of AI. This includes human oversight mechanisms and protocols for correcting errors or biases.
- Fairness and non-discrimination: AI must avoid reproducing prejudices or exclusions. Algorithms must be designed to treat all users fairly, without favoring certain groups on the basis of gender, ethnicity, socioeconomic status, or disability.
- Privacy and data protection: It is essential to ensure that personal information collected by AI systems is protected, used with informed consent, and not shared without authorization. In education, this means safeguarding students' academic and behavioral data.
- Security and technical robustness: Systems must be secure, reliable, and resistant to failure. In educational contexts, this means that AI platforms must operate without compromising the integrity of pedagogical processes or the digital security of users.
- Inclusion and accessibility: AI must be designed to be accessible to all, including people with disabilities and vulnerable communities. In education, this translates into technologies that respect linguistic, cultural, and territorial diversity.
- Sustainability: AI development must consider its environmental and social impact. In education, this means promoting technologies that strengthen local development and do not depend exclusively on costly or external infrastructure.
- Human oversight: AI should not replace human judgment, especially in sensitive decisions. In education, the role of the teacher as a critical mediator must be maintained, ensuring that technology complements rather than replaces pedagogical interaction.

These principles form the ethical infrastructure necessary for the design of reliable Artificial Intelligence that prioritizes human well-being and is oriented toward the collective good. Its effective implementation in education systems requires the formulation of clear public policies, specialized training for teachers, the active participation of the student population, and the contextualized adaptation of technological solutions to specific realities.

Similarly, the European Commission[6] and the European Parliament[7] have addressed the ethics of AI from a regulatory perspective, proposing legal frameworks that guarantee human oversight, the protection of minors, the traceability of algorithmic decisions, and the prohibition of discriminatory uses. In the field of education, these guidelines translate into the need to audit AI systems used in assessment, selection, or academic monitoring processes.

UNICEF[8], for its part, has focused its analysis on protecting children from the use of intelligent technologies. Its ethical approach includes defending children's digital rights, protecting their privacy, and promoting safe learning environments. This framework is particularly relevant in vulnerable contexts, where the use of AI can exacerbate access gaps or create surveillance risks.

The convergence of these international frameworks reveals a shared concern for guiding the development of AI toward educational ends that are emancipatory, respectful of diversity, and committed to equity. Their integration into public policies and pedagogical practices allows

for the construction of more just, transparent, and contextualized learning environments. Calderón[9] indicates that "The National Autonomous University of Mexico published ...a series of considerations for the responsible use of AI, recognizing its important advancement and inclusion in educational processes ...".



Note: Taken from the United Nations.[3] Illustration by Melissa Guerra (2024)

Figure 1. General ethical principles of AI

On the other hand, in Latin America, countries such as Venezuela have begun the process of normalizing the use of AI. The Ministry of Popular Power for Science and Technology presented a draft law on artificial intelligence, which was approved in the first round of discussions in the National Assembly, along with a Code of Ethics. In addition, AI policy has a technological infrastructure, such as the Center for AI Technology and Research. There are also training opportunities through eight Software Nodes, Soberano y Seguro (S3).

In a study conducted by the Telefónica Movistar Foundation,[10] the first study in Venezuela on the use of Artificial Intelligence (AI) in education was presented. It included a sample of 1,726 primary school teachers nationwide and revealed that 4 out of 10 teachers use AI tools in their teaching practices. The results obtained provide a starting point for the various actors in the education sector to work on designing and implementing programs that provide the necessary tools to maximize the potential of AI. The study shows that, in the field of education, Venezuela is in an exploratory stage in the use of AI, which is why it is crucial to close the knowledge gap and strengthen the digital skills of teachers, who are the key players in education.

Ethics also involves recognizing the limits of AI in education. Although these technologies can facilitate certain processes, they should not replace the human dimension of the educational act. Learning is not only the accumulation of information, but also the construction of meaning, dialogue, affectivity, and critical thinking. In this sense, teachers remain an irreplaceable and h y figure, capable of interpreting contexts, accompanying trajectories, and promoting values. AI can be a powerful tool, but its use must be subordinate to pedagogical goals and not the other way around.

At the elementary and middle school levels, the ethical implementation of AI faces particular challenges. For example, the use of virtual assistants or adaptive learning platforms can improve

personalization, but it also runs the risk of creating technological dependence or reducing human interaction. Calderón[9] points out that "...the use of artificial intelligence tools can lead to excessive dependence on the part of teachers." For this reason, the design of hybrid experiences has been promoted, where technology complements, but does not replace, the pedagogical link. In addition, guidelines for teachers on the responsible use of AI have been developed, emphasizing the need to critically evaluate digital resources and adapt them to the local context.

Consequently, teacher training is a fundamental pillar for implementing ethics in the use of AI. Educators need to understand its implications, assess its risks, and design pedagogical strategies that critically integrate AI. In this regard, training programs have been developed that address topics such as ethical algorithm design, data protection, bias analysis, and pedagogical mediation. These initiatives seek to empower teachers as reflective agents rather than mere users of technology. Córdova et al.[11] emphasize that the development of these skills requires reflective and ethically oriented virtual environments. This critical training makes it possible to avoid the uncritical use of technologies, promote digital literacy, and strengthen pedagogical autonomy.

Likewise, student participation in the design and evaluation of AI tools is an ethical practice that strengthens educational democracy. Including the voice of students in decision-making allows for the identification of real needs, the prevention of adverse effects, and the promotion of a culture of shared responsibility. In some institutions, ethics committees have been created where students, teachers, and specialists analyze the impact of AI on academic life, proposing adjustments and recommendations.

Ethics is also linked to cognitive justice, that is, the recognition of diverse knowledge and the inclusion of non-hegemonic perspectives in the design of educational technologies. If not contextualized, AI can reproduce cultural models that are alien to local realities. For this reason, the development of intelligent systems that integrate indigenous languages, community content, and intercultural approaches has been promoted. This practice not only enriches the educational experience but also strengthens identity and epistemological sovereignty.

Precise limits for responsible educational AI

Ethics applied to artificial intelligence in education is not limited to establishing abstract principles; it is necessary to define operational limits to guide its implementation in specific situations. These limits make it possible to maintain pedagogical autonomy, ensure cognitive justice, and prevent dehumanizing uses.

Artificial intelligence should be seen as an additional tool, not a replacement for teachers. We need educational systems that examine AI in a responsible and curious manner, putting people at the center, not just technology. Selwyn[12] argues that the debate about replacing teachers with artificial intelligence reveals technocratic biases that do not take into account the affective, ethical, and contextual aspects of the educational process. Critical pedagogy, based on Freire's ideas, maintains that to educate is to create conditions for the construction of meaning, something that no algorithm can replicate.

The use of AI in education involves the collection of sensitive data. It is therefore essential to ensure informed, clear, and accessible consent. According to Solove[13], "information about how data is used, what consent is required, and how such data is regulated is not always clear." In educational settings, this requires transparent protocols that explain to students and families what information is collected, for what purposes, and who manages it. UNESCO[14] also emphasizes the need to protect the digital rights of children and adolescents.

Algorithmic opacity poses an ethical risk in education. Automated decisions must be reviewable, traceable, and correctable. O'Neil[15] proposes methodologies for assessing the impact of algorithms on fundamental rights, including equitable access to education. In school

contexts, this involves auditing assessment systems, performance prediction, or resource allocation, ensuring that they do not reproduce biases or exclude vulnerable groups.

Table 1. Ethics and limits of AI use in education

Dimension 1: Fundamental Ethical Principles	Dimension 2: Necessary Operational Limits	Dimension 3: Levels of Educational Application
Transparency: understandable and auditable decisions	No replacement of human teachers	Classroom: pedagogical interaction and formative assessment
Equity and non-discrimination: avoiding algorithmic biases	Informed consent and data protection	Institution: academic and administrative management
Responsibility: human supervision and accountability	Algorithm auditing and traceability	Community: digital inclusion and citizen participation
Privacy: respect for students' personal data	Regulation of the use of sensitive data	Public policy: regulatory frameworks and ethical standards
Inclusion: accessibility for all social groups	Adaptation to local and cultural contexts	Teacher training: critical digital skills
Sustainability: responsible environmental and social impact	Limitation of commercial use of educational data	Research: development of contextualized and ethical AI
Social benefit: focus on the common good	Prevention of technological dependency	Curriculum: critical integration of AI into content

Note: Prepared using researched material and with support from Microsoft Copilot[16]

FINAL CONSIDERATIONS

Artificial intelligence (AI) has established itself as a tool with enormous potential in the field of education, especially in terms of pedagogical mediation, personalized learning, institutional management, and, notably, academic writing and research processes. Its ability to process large volumes of information, generate coherent texts, synthesize sources, and provide immediate feedback has transformed the traditional dynamics of intellectual production for both teachers and students.

In this context, most educational institutions—from universities to technical training centers—have begun to recognize AI as a legitimate complement to various educational processes. Its incorporation responds not only to the need to adapt to the technological changes of the 21st century, but also to the urgency of rethinking educational practices in terms of equity, efficiency, and innovation. The importance of AI in education is that it has great potential to revolutionize the global educational landscape, transforming the way teaching is delivered and received.[17]

In my experience, scientific journals, academic committees, and conference organizers have also embraced this reality, establishing explicit criteria to regulate the use of AI in the preparation of articles, presentations, and learning activities. In many cases, they have chosen to standardize its use through acceptance percentages that allow for distinguishing between human input and that generated by intelligent systems. For example:

In the development of learning activities, some institutions allow up to 20 % of AI-generated content, provided it is properly cited and contextualized. At academic conferences, organizers typically accept up to 25 % AI participation in the construction of presentations, requiring that its use be declared in the methodological references. In scientific journals, editorial policies have been established that allow a certain percentage of AI assistance, provided that its role is explicitly stated in the methodology or acknowledgments section.

These measures seek to balance the use of AI's technical capabilities with the preservation of intellectual authorship, academic ethics, and transparency in the production of knowledge. It is not a question of prohibiting its use, but rather of regulating it with clear criteria that prevent automated plagiarism, the loss of critical thinking, or the decontextualization of content.

In addition, these regulations promote a culture of responsible AI use, where students and teachers learn to integrate this tool as a support, without completely delegating the construction of knowledge. In this sense, training in ethical digital skills becomes indispensable, as does the development of institutional frameworks that guide its application in accordance with educational values.

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