

ARTIFICIAL INTELLIGENCE IN EDUCATION: HOLISTIC PERSPECTIVE ON ETHICAL ISSUES**Shuchita Singh**

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Over the past few years, numerous countries have formulated national artificial intelligence (AI) strategies, focusing on various policy sectors, including education. These strategies outline plans and expectations regarding the impact of AI on education and address the social and ethical implications associated with AI. Integrating Artificial Intelligence in Education (AIED) can significantly change the educational landscape and affect stakeholders' roles. AIED applications have been progressively used in recent years to increase student learning performance and experiences and to further our understanding of how students learn. Adopting AIED, however, also raises ethical questions and hazards, particularly about learner autonomy and the use of personal data. Although ethical and reliable AIED standards have just been released, there is still continuous discussion over the guiding ideals of ethical AIED. By examining international organizations' rules and standards through a systematic literature review, this research seeks to determine if there is an international agreement on ethical AIED. Further, the paper discusses the All India Council for Technical Education (AICTE) and National Education Policy (NEP) 2020's policy framework for Artificial Intelligence in Education (AIED). Thematic analysis is done by reviewing and compiling pertinent AIED rules and guidelines to conceptualize and formulate ethical standards. The recommended code of ethics serves as a framework to train and guide educational stakeholders in developing and implementing effective AIED.

Keywords: Artificial Intelligence, Higher Education, Ethics, Policies, Privacy

1 Introduction

One of the significant technological advancements in the 20th century was the integration of artificial intelligence (AI) in education [1], [2]. Despite the rapid development of AI for education (AIED) and the increased demand resulting from COVID-19, there needs to be more published information regarding the ethical aspects that should guide the development, progress, and application of ethical and reliable AI in education. As the popularity and use of AI grow, ethical concerns have also arisen, directly affecting its effectiveness and efficiency. Therefore, stakeholders must take ownership of the ethical aspects to ensure the sustainable implementation of AI in education. While Western countries extensively explore this aspect, the Indian perspective lacks clarity. In response to this requirement, UNESCO created international AI ethical guidelines, and all 193 member nations endorsed and signed them on November 25, 2021. The guiding text recognizes AI's significant and dynamic benefits while acknowledging the growing challenges to cultural, social, and ecological variety (UNESCO, 2021).

The ethics of AI in education have lately attracted the attention of researchers and international organizations [3]. However, from an Indian viewpoint, additional clarification is still required. The National Education Policy (NEP) and the All India Council for Technical Education (AICTE) have worked hard recently to accept and regulate the use of AI in higher education. This study aims to evaluate the Beijing Consensus (UNESCO, 2019), the European Commission (2019), the European Parliament Report Artificial Intelligence Education (OECD, 2021), the UNESCO Education & AI [4], the OECD (Organisation for Economic Co-operation and Development [OECD], 2021), as well as the Indian Policy Framework and initiatives. The goal is to evaluate how well the Indian Education System can resolve ethical concerns linked to using artificial intelligence in the classroom. The research is organized as follows:

Section 1: The introduction provides a comprehensive overview of AI in education worldwide.

Section 2: Emphasizes the opportunities ahead, focusing on the Indian landscape. It also reviews relevant literature and methodology to study previous studies on the ethical concerns of AI in education.

Section 3: Presents a detailed discussion on AIED principles and initiatives undertaken by Indian policymakers, including the AICTE and NEP. The section highlights the significance of ethics in the current education system, particularly from an Indian perspective.

Section 4: Concluding remarks summarize the Indian perspective by discussing the challenges and opportunities.

Section 5: Explores the future implication of the study.

A limitation of this study is that while AI in higher education is thoroughly examined, the role of artificial intelligence in primary education remains an area for future investigation.

2 Review Literature and Methodology

Artificial Intelligence

Artificial intelligence (AI) has been around for quite some time and was initially coined by McCarthy in 1956 [5]. McCarthy built upon Turing's earlier work [6], [7], who discussed the idea of intelligent reasoning and thinking that could be implemented in machines. Over the years, the definition of AI has evolved and expanded alongside remarkable advancements in its capabilities. In its present form, AI refers to computational systems with human-like abilities such as learning, adapting, synthesizing, self-correction, and utilizing data for complex processing tasks [8]. However, due to the interdisciplinary nature of AI, experts from fields like linguistics, psychology, education, and neuroscience may face challenges when attempting to define AI within the context of their own disciplines. Within the realm of higher education (HE), the utilization of AI has experienced a rapid surge in the past five years [9]. Consequently, there has been a proliferation of new AI tools tailored for HE, necessitating the creation of specific categories of AI for different disciplinary areas. Given the rapid growth and dynamic nature of AI in education (AIED), there is a pressing need to enhance the academic understanding of AIED and keep up with its advancements.

Artificial Intelligence in Education

The widespread adoption of AI in education offers numerous opportunities for teachers' and students' professional and personal growth. [10], [11]. AI's use in education encompasses various aspects, such as scheduling, resource allocation, student monitoring, and communication with parents. Along with customized tests, curriculum, learning applications powered by AI, and identification of shifts in student involvement throughout language learning, personalized teaching, and learning also includes these elements. Machine learning, artificial neural networks, and computer-assisted language acquisition are examples of how AI might support new educational paradigms. [12], [13], [14], [15]. Technological advancement and innovative educational research were previously unfeasible in traditional classrooms [16]. However, implementing AI in education has witnessed challenges concerning reasoning and ethics. Despite recent efforts to establish ethical criteria, a comprehensive consensus and uniform guidelines for AI in education still need to be improved.

This study aims to provide an integrated and holistic review of ethical principles for AI in education, as these technologies require regulation and ethical consensus. Before implementing the New Education Policy (NEP-2020) at the national level in India, the country's educational system had yet to focus on accommodating and adapting AI. The COVID-19 pandemic highlighted the need for a well-designed policy framework encompassing all aspects of AI application in education. According to the Ministry of Education's report (2019-20), only a small percentage of management schools in India had internet and computer facilities, indicating the necessity for proactive measures by policymakers.

Ethical Issues of AI in Education

Regardless of the potential to transform education, researchers and practitioners face numerous challenges when working with AI in education systems and activities [17]. These obstacles range from societal flaws like xenophobia, systematic racism, and discrimination against underrepresented student groups to complex moral dilemmas concerning data bias, privacy, and ethics [18], [19]. The widespread impact of AI in education has led to concerns about negative consequences, such as widening achievement gaps, the commercialization of education, and disparities between public and private schools. These challenges underscore the importance of educating instructors and students about the ethical issues associated with AI in education and how to address them.

Privacy concerns and ethical implications of AIED require careful consideration to distinguish between moral and ethical actions. Several studies have identified conflicting ethical themes related to general AI and AIED, particularly regarding data liability in various educational settings, including higher education, K-12 schools, and subjects. [20], [21], [22], [23]. These themes encompass fairness, accountability, biased data assumptions, informed consent, privacy breaches, statistical errors, surveillance, identity configuration, user confidentiality, learner privacy, integrity, inclusivity, and the ethics of data used for educational purposes and learning output. [24], [25] [26]. Understanding these values and principles is crucial for driving ethical, responsible, and accountable decisions and preparing for potential educational outcomes.

Though attempts to create ethical frameworks for all AI have been made, it is crucial to contextualize ethical and privacy concerns in education. [27]. Prior standards developed for other fields might not be appropriate in a learning environment. Addressing ethical and privacy problems with the design and usage of AIED requires a contextual approach. The importance of the sociotechnical milieu that educational technologies and practices produce in ethical issues has been highlighted in prior studies. [28], [29]. Designing ethical and reliable AIED systems and promoting their acceptance can be facilitated by understanding ethics and privacy from multiple angles. [30]. To provide thorough guidelines for stakeholders adopting AIED, it is crucial to consider policies and suggestions from international organizations like UNESCO, OECD, and the European Union in addition to published research. A robust basis for future AIED development and use may be established through a consensus-based examination of rules and regulations.

Methodology

The paper is developed by the comparative study of ethical structure and policy for other organizations like, OECD (2021), European Commission (2019), UNESCO Education & AI (2021), Beijing Consensus (2019), European Parliament Report AI Education (2021), AICTE as Per AICTE Act (1987) and National Education Policy (2020).

3Discussion

Ethical Principles for AI in Higher Education

It is necessary to ensure open communication and set specific ethical standards for using artificial intelligence in education. A stronger focus on establishing ethical rules for AI systems to match them with societal norms has been emphasized [31], [32], [33]. Additionally, introducing self-awareness and empathy into the development process may encourage AI engineers to produce AI systems that are more reliable and responsible based on behavioral science understanding [34]. Reputable scholars have undertaken theme analysis of studies on AI in education and pertinent ethical norms.

OECD (Organisation for Economic Co-operation and Development, 2021), Beijing Consensus (UNESCO, 2019). European Commission (2019), European Parliament Report AI Education (2021), National Education Policy (NEP) 2020, and All India Council for Technical Education (NEAT 2.0) are a few of the notable organizations mentioned in the study. This chapter applies inductive analysis to discover essential concepts about the use of AI in education, building on the theme analysis procedure [35].

3.1 Principle of Governance and Stewardship

The governance and stewardship of AI in education is a recurrent subject in all AI policies. Establishing an organizational structure for policy governance and coordination is emphasized in the UNESCO Education and AI 2021 study. Governance and stewardship of AI in education should ensure alignment between the use of AI and the intended purpose of the technology, optimizing the needs and interests of educational stakeholders. AI Governance Principles are formally defined as establishing policies, procedures, and standards for developing, using, and managing the information sphere [36]. The New Education Policy (2020) suggests conducting carefully designed pilot studies to determine the benefits of online/digital education before full implementation. AI governance, on the other hand, involves the ethical and responsible management of AI design and use. In other words, actions such as capacity building and transparency should be ensured through strict governance. The All India Council for Technical Education (AICTE) has reconstituted the All India Board of Information Technology Education to provide guidance and proper oversight under the AICTE Act 1987, effective January 3, 2020.

3.2 Principle of Transparency and Accountability

The importance of transparency in data usage within AI in education is highlighted by data ethics [37]. AI tools are increasingly utilized in educational settings to enhance teaching and learning practices [38]. This ethical principle is crucial for teachers and students as data visualization allows for understanding learner behavior and identifies areas where educators can provide additional support. The National Education Policy (2020) emphasizes the principle of faceless and transparent regulatory interventions using technology across various educational boards. Strict compliance measures are implemented to ensure that higher education institutions adhere to minimum norms and standards, with penalties for false disclosure of regulated information. The Higher Education Commission of India (HECI) oversees accountability and compliance.

It is essential to recognize that technology in education is an ongoing journey rather than a final destination, requiring coordination among various stakeholders to achieve policy objectives. Following the National Education Policy (2020), a specialized department will be established within the ministry to coordinate the development of digital infrastructure, digital content, and capacity building to meet the e-education needs of both schools and higher education. Given the rapid evolution of technology, India needs experts who can provide high-quality e-learning solutions within a vibrant ecosystem. These solutions must address the challenges of scale, diversity, and equity while also adapting to the quick pace of technological change, which has a decreasing lifespan. As a result, the centre will comprise specialists in e-governance, educational technology, digital pedagogy, and public administration.

3.3 Principle of Sustainability and Proportionality

The development and utilization of AI should consider environmental considerations, as is the case with any technological advancement (AHEG, 2020; OECD, 2021). Specifically, to achieve sustainability, the design, development, and use of AI in education should prioritize energy efficiency and minimize environmental impact (European Commission, 2019). Therefore, regulations governing AI in education should establish guidelines to address these ecological considerations throughout AI development and implementation. These laws should also consider other sustainability-related issues, such as economic and social ones, including politics, culture, and employability (European Parliament, 2021).

To uphold the principle of sustainability, the All India Council for Technical Education (AICTE) has implemented various initiatives. These include the introduction of schemes such as SWAYAM, which allows students to earn credits through free online learning anytime and anywhere. Another initiative, NEAT (National Education Alliance for Technology), focuses on personalized learning using the best educational technology from the industry to provide students with a more sustainable career. Furthermore, establishing "SAKSHAT," a One-Stop Education Portal in collaboration with the Ministry of Human Resource Development, was a significant step in 2006. SAKSHAT utilizes the potential of ICT by providing connectivity to higher education institutions, enabling access to a wealth of knowledge in cyberspace. It also offers high-quality educational modules with appropriate electronic content tailored to the individual needs of learners.

According to the National Education Policy (2020), establishing the National Educational Technology Forum (NETF), an independent organization, intends to promote communication and offer a forum for discussion. NETF will also offer diverse educational software to benefit students in remote areas and those with disabilities. This will help expand the reach of education across all segments of Indian society. One of NETF's ongoing responsibilities will be to categorize emerging technologies based on their potential and estimated timeframe for disruption. Periodic analyses will be presented to the Ministry of Human Resource Development (MHRD) to ensure the development of a more sustainable education system in India.

3.4 Principle of Privacy

Ensuring privacy is a significant ethical concern in implementing AI in education. Privacy can be understood as the fundamental right to safeguard personal data and be free from intrusion [39]. The digital revolution in education, mainly using AI and learning analytics, involves collecting and analysing extensive personal data to enhance the learning experience [40], [41]. However, this also poses risks to the privacy of teachers and students, as their personal information can be vulnerable to data breaches. For instance, in agent-based individualized education, past learning performance data can be used to predict future outcomes, which may go against the wishes of some students [42].

To protect learners' privacy rights, developers of AIED systems need to consider the perspectives of teachers and students to determine how AI should be utilized in the classroom. The National Education Policy (2020) emphasizes raising awareness among higher education institutions (HEIs) regarding privacy issues, data handling, and data protection. The policy document, specifically paragraph 23.13, highlights the ethical considerations surrounding developing and deploying AI-based technologies. AICTE has taken steps to ensure privacy compliance by introducing a credit course on cybersecurity in its curriculum. This aims to educate students on privacy and safeguarding personal information.

3.5 Principle of Security and Safety

Education learning systems play a crucial role in gathering user data and using it to predict learning behavior and performance. However, acknowledging the potential risks associated with data manipulation or corruption by external parties, including cybercriminals, is essential.

To ensure the privacy and security of sensitive information, AIEDs must implement robust solutions that effectively safeguard data from threats such as cybercrime, data breaches, and corruption. AICTE has taken proactive measures to promote cyber awareness and safety through initiatives like "Cyber Jaagrookta Diwas", which includes cybercrime awareness sessions on topics like cyber hygiene, social networks, electronic payments, and safeguards.

Protecting privacy and data security has become increasingly crucial, especially with the widespread adoption of virtual learning. It requires collaborative efforts and trust from all stakeholders involved. While learning analytics is guided by data ethics, AI systems, on the other hand, are intelligence manifested through technological artifacts. Therefore, AIED developers should prioritize the careful design, training, testing, and security validation of AI systems [43]. By emphasizing these aspects, they can ensure the integrity and reliability of the systems while maintaining the privacy and security of user data.

3.6 Principle of Inclusiveness

Ensuring accessibility is of utmost importance for maximizing the societal benefits of AIED. Exclusion of individuals goes against the principles of human rights, emphasizing the need for affordable and user-friendly designs that cater to diverse populations and cultures, particularly those with disabilities [44]. The European Commission Report (2021) emphasizes the significance of inclusiveness and equitable access to AI-enabled education, highlighting the availability of necessities, internet coverage, and next-generation digital infrastructure. The National Education Policy (2020) has taken steps to empower teachers with comprehensive training in learner-centred pedagogy and equip them to create high-quality online content using various teaching platforms and tools.

To make sure that they can accommodate a wide range of people and encourage fair access and utilisation, it is essential to consider the existing infrastructure, tools, capabilities, and social acceptance while designing, creating, and deploying AIEDs. Since equitable treatment of all students, regardless of gender, race, creed, sexual orientation, or any other condition, is essential for delivering high-quality education, inclusivity also applies to the fairness of AI algorithms. In order to guarantee that all students have equitable access to high-quality hands-on and practical learning opportunities, the National Education Policy (2020) established virtual laboratories and made use of already-existing e-learning platforms including DIKSHA, SWAYAM, and SWAYAMPRAKASH. Special attention will be given to catering to the needs of students and teachers from marginalized groups (SEDG) by providing them with suitable digital devices. Additionally, emphasis will be placed on developing content in various Indian languages to enable teachers and students to access digital resources in their preferred medium of instruction.

3.7 Principle of Human-Centred AIED

While ensuring people have meaningful choices and retain human control over artificial intelligence (AI) processes, AIED should attempt to improve and complement human cognitive, social, and cultural abilities. AI assistants have become increasingly prevalent and serve various functions, primarily providing recommendations and support to individuals. Therefore, designing and operating AI systems must avoid misleading information, respect user autonomy, foster independent thinking, and safeguard users' emotional and social well-being. This principle holds particular significance in the educational context, where users, especially children and young people, require special attention and protection (European Parliament, 2021).

To effectively implement AIED, training programs should be developed to equip educators with the necessary skills. A human-centred approach to AIED, which emphasizes learner agency, should be pursued through interdisciplinary collaboration among researchers, developers, and practitioners. This approach should focus on developing negotiation-based adaptive learning systems that prioritize cross-cutting competencies. By placing students and teachers at the core of AI implementations and maintaining human control, AIED can facilitate collaboration between humans and machines to achieve improved educational outcomes rather than replacing humans with AI.

AICTE recognizes the importance of upholding the principles of human-centred AIED. It aims to develop suitable pedagogical methods that cater to diverse classes and intellectual capacities and conduct research in e-learning. The National Information and Communication Technology (ICT) Education Mission aims to take advantage of ICT's potential to offer all students in higher education institutions top-notch, personalized, and interactive knowledge modules accessible from any location at any time via the Internet or Intranet. Table 3.1 below shows the comparative analysis:

Table 3.1 Artificial Intelligence in Education: Holistic Perspective on Ethical Issues

Ethical Principles for AIED	Codes/ Key Points	Governing Bodies (Sources)						
		OECD (2021)	European Commission (2019)	UNESCO Education & AI (2021)	Beijing Consensus (2019)	European Parliament Report AI Education (2021)	AICTE as Per AICTE Act (1987)	National Education Policy (2020)
Governance & Stewardship	Governance & Coordination	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Compatibility							
	Educational Stakeholders	Yes	Yes	Yes			Yes	Yes
		Yes	Yes	Yes			Yes	Yes
Transparency & Accountability	Transparency	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Visualization	Yes	Yes	Yes		Yes	Yes	Yes
	Accountability					Yes	Yes	Yes
Sustainability & Proportionality	Sustainability	Yes	Yes	Yes		Yes	Yes	
	Life-long Learning			Yes	Yes		Yes	Yes
Privacy	Personal Data						Yes	Yes
	Privacy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Security & Safety	Robust	Yes	Yes		Yes	Yes	Yes	
	Cyber Hygiene		Yes		Yes		Yes	
Inclusiveness	Social Inclusion	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Empowerment	Yes	Yes	Yes				Yes
Human-Centered	Human Centric	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Adaptive			Yes		Yes	Yes	Yes

4Conclusion

The challenges surrounding artificial intelligence in education are undeniable. Human rights organizations expressed serious concerns regarding AIED and collecting and analyzing personal data on learners, even though it is deemed crucial for generating high-quality educational outcomes through AI. While acknowledging the potential negative impacts on fundamental human rights, this research also contributes to discussions on the benefits of AI in education. Due to the intricate nature of AI, there is a need for a comprehensive and practical set of ethical guidelines tailored explicitly for AI in educational settings. We provide a set of ethical guidelines for AIED to spark more discussion and promote the creation of strong ethical standards.

These tenets can provide as a springboard for involving stakeholders and igniting dialogues by methodically analysing well-established general AI concepts in educational environments. Although some attention has been given to developing practical ethical criteria in the field of education, there still needs to be a consensus on the optimal ethical theory, particularly in the broader context of AI ethics. Additionally, the involvement of diverse stakeholders in educational discourse hinders the widespread application of formal or deductive ethical standards. India's diverse social, biological, and cultural landscape further challenges assimilating ethical principles. However, with the increasing adoption of technology and the growing interest of influential policymakers such as AICTE and NEP, it can be expected that the full implementation of NEP and continuous assessment by AICTE will lead to more careful consideration of ethical issues in AI adoption in education.

Building upon our findings, future research should focus on the implementation stage, with a particular focus on ensuring accessibility, addressing bias, and promoting equity in the adoption of AIED, especially for vulnerable groups such as children and individuals with disabilities. Developing a shared understanding and establishing ethical norms in AIED will require significant additional work. A logical next step in the right direction would be the publication of a webpage by NEP and AICTE outlining the ethical guidelines for AIED, facilitating transparency, and guiding stakeholders in their ethical considerations.

5 Implications & Future Research

Future studies could use automated text analysis methods to complement the research findings to generate additional insights. Incorporating AI ethics into educational research, focusing on fairness, responsibility, security, inclusion, and explainability, will help prevent algorithmic injustices and shape governance and long-term policies in essential industries. Establishing ethical guidelines and practice standards for artificial intelligence in education is crucial, as this will aid future educators and students in adopting responsible AI practices.

This study initiates discussions on the applicability of ethical standards in AIED, aiming to promote greater accountability and responsibility in integrating AI and educational technologies. While highlighting the potential negative impacts on fundamental human rights, it also contributes to the ongoing conversations about the benefits of AI in education. Given the complexity of AI, there is a need for a comprehensive and practical set of ethical guidelines explicitly tailored for AI in educational settings. The proposed ethical tenets serve as a starting point for further discussions on the robustness of these guidelines, and they should be followed by actionable policies to ensure that AIED systems are designed with ethical considerations in mind. Furthermore, exploring the assimilation of AIED in primary education would be a valuable area for future research, expanding the scope of the study and examining the specific implications and ethical considerations in this educational context.

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