

## HUMAN FACTOR AND ETHICAL RESPONSIBILITY IN ARTIFICIAL INTELLIGENCE-BASED EDUCATIONAL SYSTEMS

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**Abstract:** *The rapid development of artificial intelligence (AI) technologies has significantly transformed modern education systems. AI-based educational platforms, adaptive learning environments, and intelligent tutoring systems are increasingly used to enhance teaching effectiveness and personalize learning processes. However, the growing integration of AI into education raises critical philosophical and ethical concerns, particularly regarding the role of human agency and ethical responsibility. This study examines the human factor and ethical responsibility within AI-based educational systems from a philosophical and pedagogical perspective. Using theoretical analysis, comparative analysis, and philosophical inquiry, the research investigates how AI technologies influence teacher–student relationships, academic integrity, decision-making processes, and responsibility in educational environments. The results show that while AI systems improve efficiency and personalization in learning, they cannot replace the ethical judgment, emotional intelligence, and moral responsibility inherent in human educators. The study concludes that sustainable integration of AI in education requires a balanced model where technological innovation is guided by ethical principles and human-centered pedagogical values.*

**Keywords:** *artificial intelligence in education, human factor, ethical responsibility, digital education, philosophy of education, intelligent learning systems.*

### INTRODUCTION

The digital transformation of education has accelerated significantly in the twenty-first century. Advances in artificial intelligence (AI) technologies have introduced new possibilities for improving the effectiveness, accessibility, and personalization of educational processes. AI-based systems such as intelligent tutoring systems, adaptive learning platforms, automated assessment tools, and data-driven learning analytics are increasingly used in modern educational institutions.

These technologies allow educational systems to analyze large volumes of learner data, identify individual learning patterns, and provide personalized learning pathways. Consequently, AI has the potential to improve educational outcomes, optimize teaching strategies, and enhance student engagement. However, the growing reliance on AI in education also raises fundamental philosophical and ethical questions.

One of the central issues concerns the **human factor in education**. Education has traditionally been viewed as a deeply human-centered process involving

interpersonal communication, moral guidance, and the development of critical thinking. Teachers play a crucial role not only in transmitting knowledge but also in shaping students' ethical values, emotional development, and social competencies. When AI systems begin to assume some instructional functions, questions arise about the evolving role of teachers and the ethical implications of delegating educational responsibilities to machines.

Another critical concern relates to **ethical responsibility in AI-based educational environments**. AI algorithms often make decisions regarding assessment, learning recommendations, and performance predictions. However, these decisions may contain biases or inaccuracies that could negatively affect students. Determining who is responsible for such decisions—the developer, the institution, the teacher, or the AI system itself—poses a significant ethical dilemma.

From a philosophical perspective, the integration of AI into education challenges traditional concepts of knowledge, agency, responsibility, and the nature of learning. Therefore, understanding the ethical implications and human dimensions of AI-based educational systems is essential for ensuring responsible technological integration.

The purpose of this study is to analyze the role of the human factor and ethical responsibility in AI-based educational systems and to explore how these systems influence pedagogical practices, teacher–student relationships, and educational values.

**Methods.** This research employs a qualitative and theoretical methodological approach based on several complementary research methods.

First, **theoretical analysis** was conducted to examine academic literature related to artificial intelligence in education, digital pedagogy, and philosophy of education. Scholarly articles, international reports, and educational policy documents were analyzed to identify key concepts and theoretical frameworks relevant to the study.

Second, **comparative analysis** was used to examine different approaches to AI integration in educational systems across various countries and institutions. This method helped to identify similarities and differences in ethical guidelines, human–AI interaction models, and institutional strategies for responsible AI use in education.

Third, **philosophical analysis** was applied to explore the ontological, epistemological, and ethical dimensions of AI-based educational systems. The study analyzed how AI technologies influence concepts such as knowledge acquisition, human agency, responsibility, and the teacher–student relationship.

Fourth, a **systemic approach** was used to examine education as a complex system where technological, pedagogical, and ethical components interact. This approach enabled the identification of relationships between AI technologies, educational practices, and ethical responsibilities within the learning environment.

Through the integration of these methods, the study provides a comprehensive examination of the human and ethical dimensions of AI-based educational systems.

**Results.** The analysis revealed several significant findings regarding the role of the human factor and ethical responsibility in AI-driven education.

### **1. Enhancement of Personalized Learning**

AI-based educational systems significantly improve the ability to personalize learning processes. Adaptive learning algorithms analyze students' learning behaviors, performance data, and preferences to generate customized learning pathways. This enables students to progress at their own pace and receive targeted feedback based on their individual needs.

Such personalization increases student engagement and learning efficiency. However, the effectiveness of personalized learning still depends on the guidance and pedagogical expertise of teachers.

**Transformation of the Teacher's Role.** The integration of AI technologies does not eliminate the role of teachers but transforms it. Teachers increasingly act as facilitators, mentors, and ethical guides rather than solely as providers of information.

AI systems can automate certain routine tasks such as grading assignments, tracking student performance, and generating recommendations. This allows teachers to focus more on creative instruction, emotional support, and critical thinking development.

Nevertheless, excessive reliance on AI systems may lead to a reduction in direct human interaction within educational environments, potentially weakening the social and emotional dimensions of learning.

**Ethical Risks and Challenges.** The study identified several ethical challenges associated with AI-based educational systems:

- **Algorithmic bias** in AI decision-making processes
- **Data privacy concerns** related to the collection and analysis of student data
- **Academic integrity issues**, including AI-assisted plagiarism
- **Opacity of AI algorithms**, which may reduce transparency in educational decision-making

These challenges demonstrate the need for clear ethical guidelines and accountability frameworks.

**Responsibility in AI-Based Decision-Making.** One of the most complex issues involves determining responsibility for decisions made by AI systems. In AI-supported educational environments, decisions about assessment, learning recommendations, or academic performance predictions may significantly influence students' educational trajectories.

The results indicate that responsibility should remain primarily with human actors, including teachers, educational institutions, and technology developers. AI should function as a supportive tool rather than an autonomous decision-maker in educational contexts.

**Discussion.** The findings of this study highlight the importance of maintaining a **human-centered approach to education** despite the rapid expansion of artificial intelligence technologies.

From a philosophical perspective, education is not merely a process of information transfer but a complex interaction involving ethical development, social learning, and intellectual growth. While AI systems can support cognitive aspects of learning, they cannot replicate essential human qualities such as empathy, moral reasoning, and contextual understanding.

The integration of AI into educational systems therefore requires careful consideration of ethical principles. These principles should include transparency, accountability, fairness, and respect for human dignity. Educational institutions must ensure that AI technologies enhance rather than undermine the values that define meaningful education.

Another important implication concerns the professional responsibilities of educators. As AI technologies become more integrated into teaching processes, teachers must develop new competencies related to digital ethics, data literacy, and responsible technology use. Teacher training programs should incorporate these competencies to prepare educators for AI-enhanced learning environments.

Furthermore, policymakers and educational institutions must establish regulatory frameworks that address ethical risks associated with AI in education. Such frameworks should protect student data, prevent algorithmic discrimination, and ensure that human oversight remains central to educational decision-making.

Ultimately, the ethical integration of AI in education requires collaboration among educators, technologists, policymakers, and philosophers. Only through interdisciplinary dialogue can the benefits of AI be realized while safeguarding the human values that underpin education.

**Conclusion.** Artificial intelligence is rapidly reshaping educational systems by introducing innovative tools that enhance learning personalization, efficiency, and accessibility. However, the integration of AI into education raises important questions regarding the role of the human factor and ethical responsibility.

The findings of this study demonstrate that although AI technologies can significantly improve educational processes, they cannot replace the human elements that define effective teaching and learning. Teachers remain essential as mentors, ethical guides, and facilitators of intellectual development.

To ensure responsible AI integration in education, it is necessary to develop ethical frameworks that emphasize transparency, accountability, and human-centered values. Educational institutions must also provide appropriate training for educators and establish policies that protect students' rights and data privacy.

In conclusion, the future of education should not be viewed as a competition between humans and machines but rather as a collaborative partnership where AI

technologies support human educators in creating more effective and ethical learning environments.

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