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Original Article

Artificial Intelligence and the Reconfiguration of Knowledge: Philosophical Implications for Contemporary Education

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Abstract

The emergence of artificial intelligence (AI), particularly generative AI and large language models, has profoundly transformed the epistemological foundations of knowledge production, dissemination, and validation within contemporary educational systems. Rather than functioning merely as technological tools, AI systems increasingly operate as epistemic infrastructures that mediate how knowledge is generated, interpreted, and legitimized in academic environments. This article examines the philosophical implications of AI for contemporary education by synthesizing literature across philosophy of education, epistemology, cognitive science, and educational technology. The analysis explores how AI reshapes the nature of knowledge, the authority of expertise, the roles of teachers and learners, and the institutional structures of universities and schools. It further evaluates the ethical, epistemological, and pedagogical tensions that arise when algorithmic systems participate in knowledge production. While AI offers unprecedented opportunities for personalized learning, expanded access to information, and new forms of human–machine collaboration, it simultaneously challenges traditional assumptions about intellectual autonomy, critical thinking, and the meaning of education itself. The article concludes that contemporary education must reorient toward epistemic resilience, philosophical literacy, and human-centered AI integration in order to preserve the fundamental purposes of education in an AI-mediated knowledge society.

Keywords: *Artificial Intelligence in Education, Philosophy of Education, Knowledge Transformation, Educational Technology, AI Ethics in Education, Digital Learning Environments*

Introduction

The rapid development of artificial intelligence (AI) technologies has initiated a profound transformation across multiple sectors of society, including healthcare, governance, business, and education. Among these transformations, the impact of AI on knowledge systems has emerged as one of the most significant intellectual challenges of the twenty-first century. In educational contexts, AI is no longer simply a supplementary technological resource but increasingly functions as a central actor in the processes through which knowledge is produced, organized, evaluated, and transmitted. Historically, educational institutions have served as the primary custodians of knowledge. Universities, schools, and scholarly communities traditionally mediated the processes through which knowledge was generated and validated. The rise of digital technologies initially expanded access to information through online repositories, open educational resources, and collaborative platforms. However, the introduction of advanced AI systems—particularly generative models capable of producing human-like text, images, and analyses—has transformed this landscape more fundamentally. AI systems now participate actively in intellectual workflows, including writing, summarization, research assistance, assessment, and knowledge synthesis.

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This transformation raises profound philosophical questions concerning the nature of knowledge, the authority of expertise, and the role of human cognition in learning [1].

Classical educational philosophy has long conceptualized knowledge as a process emerging from inquiry, dialogue, and critical engagement. Educational theorists such as John Dewey emphasized that knowledge is not merely a collection of facts but a dynamic process of experiential inquiry and reflection. In contrast, contemporary AI systems operate through statistical pattern recognition across vast datasets, generating plausible responses without genuine understanding or intentionality. The coexistence of these two epistemic paradigms—human experiential inquiry and algorithmic prediction—creates tensions within contemporary education. On one hand, AI technologies offer unprecedented possibilities for enhancing learning environments, enabling personalized instruction, and expanding access to knowledge. On the other hand, the widespread reliance on AI raises concerns regarding intellectual dependency, erosion of critical thinking skills, and the shifting locus of epistemic authority from human experts to algorithmic systems [2]. Recent scholarship suggests that AI should not be understood merely as an educational tool but as a transformative epistemic infrastructure that reshapes the conditions under which knowledge is produced and validated. Scholars argue that AI systems influence not only the content of knowledge but also the habits of thinking, reasoning, and inquiry that define educational practice. The philosophical implications of these developments extend far beyond technological considerations. They challenge fundamental assumptions about the meaning of education, the nature of human intelligence, and the future role of educational institutions in a knowledge society increasingly mediated by machines. This research article seeks to examine these transformations through a comprehensive philosophical analysis of AI and its impact on knowledge structures within contemporary education. By synthesizing interdisciplinary literature across philosophy, education, technology studies, and cognitive science, the article explores how AI is reconfiguring the epistemic foundations of education and what this means for the future of learning [3] (Figure 1).

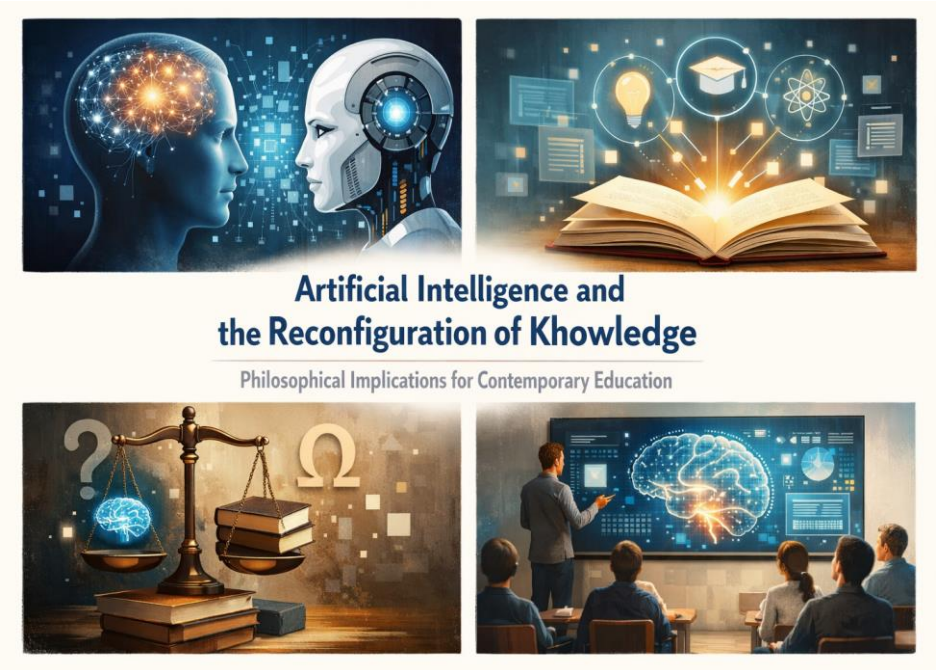

Figure 1: Applications of artificial intelligence in contemporary education

The Changing Nature of Knowledge in the AI Era

The concept of knowledge has historically been central to philosophical inquiry. Classical epistemology traditionally defined knowledge as justified true belief, emphasizing the role of evidence, rational justification, and intellectual responsibility. Educational systems were designed around this epistemological framework, focusing on the acquisition, interpretation, and application of verified knowledge. However, the emergence of AI-mediated knowledge systems has begun to challenge these traditional assumptions. In the age of generative AI, knowledge increasingly appears as an output generated by computational processes rather than solely as the product of human reasoning and experience.

1 Knowledge as Process vs. Knowledge as Output

In traditional educational philosophy, knowledge was conceptualized primarily as a process. Learning involved active engagement, questioning, experimentation, and reflection. Students developed understanding through intellectual struggle and interaction with teachers, texts, and peers. Generative AI systems introduce a different paradigm. Instead

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of engaging in processes of inquiry, these systems generate responses based on statistical correlations within training data. As a result, knowledge appears in the form of polished outputs rather than experiential learning processes.

Scholars describe this transformation as an "epistemological drift," in which the value of knowledge shifts from truth and understanding toward plausibility and efficiency. AI-generated answers may appear authoritative even when they lack deep reasoning or contextual awareness. This shift has significant implications for education because it alters the relationship between effort, understanding, and intellectual achievement. When AI systems can generate sophisticated essays or analyses instantly, the traditional link between cognitive effort and learning becomes blurred.

2 Knowledge Abundance and the Crisis of Intellectual Authority

Another significant consequence of AI technologies is the radical expansion of knowledge availability. Historically, access to knowledge was limited by institutional, economic, and technological constraints. Libraries, universities, and expert communities served as gatekeepers responsible for preserving and validating knowledge. AI systems disrupt this model by making vast quantities of information instantly accessible and interpretable. Students can now obtain explanations, summaries, and analyses within seconds through AI-powered tools. While this democratization of knowledge has many benefits, it also creates new challenges. When knowledge becomes abundant and easily generated, the authority of expertise may become diluted. Students may struggle to distinguish between reliable information and algorithmically generated content that merely appears convincing. Recent educational research suggests that heavy reliance on AI tools can create a phenomenon known as "false mastery," where students produce high-quality outputs without fully understanding the underlying concepts. In such cases, AI becomes not a facilitator of learning but a substitute for cognitive engagement [4].

Artificial Intelligence as Epistemic Infrastructure

A growing body of scholarship argues that AI technologies should be understood not merely as educational tools but as epistemic infrastructures that reshape the production and validation of knowledge.

1 From Tools to Infrastructure

Traditional educational technologies—such as calculators, projectors, or digital learning platforms—function primarily as tools that assist existing pedagogical practices. AI systems, however, operate at a deeper level of educational infrastructure.

They influence:

- how information is organized
- how knowledge is generated
- how learning is assessed
- how academic work is produced

As AI becomes integrated into research workflows, writing processes, and educational platforms, it effectively becomes part of the epistemic environment within which knowledge emerges. Research suggests that AI systems increasingly shape the habits and practices of intellectual work, including reading, writing, coding, and problem solving. This infrastructural role distinguishes AI from earlier educational technologies [5].

2 Human–AI Co-Production of Knowledge

Another emerging phenomenon is the collaborative production of knowledge between humans and AI systems. Rather than replacing human intelligence entirely, AI often functions as a partner in intellectual workflows.

Examples include:

- AI-assisted academic writing
- automated literature review
- research hypothesis generation
- data analysis
- collaborative problem solving

In these contexts, knowledge emerges from hybrid interactions between human cognition and algorithmic systems. While such collaboration can increase productivity and creativity, it also raises questions about authorship, originality, and intellectual responsibility [6].

Philosophical Foundations of AI in Education

Understanding the impact of AI on education requires engagement with several philosophical traditions, including epistemology, philosophy of technology, and philosophy of education.

1 Classical Educational Philosophy

Classical educational philosophy emphasizes the importance of human intellectual development through dialogue, reflection, and critical reasoning.

Philosophers such as:

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- Socrates
- Plato
- Aristotle
- John Dewey

viewed education as a process of cultivating intellectual virtues and moral judgment.

From this perspective, knowledge cannot be reduced to information retrieval. Instead, it emerges through human inquiry and reflective engagement with ideas.

4.2 Technological Mediation of Knowledge

Modern philosophy of technology examines how technologies shape human cognition and social structures. Technological mediation theory argues that technologies influence not only what humans can do but also how they perceive and interpret the world. AI technologies represent a particularly powerful form of cognitive mediation because they participate directly in reasoning processes (Table 1) [7].

Table 1. Philosophical Perspectives on Knowledge and AI

Philosophical Perspective	Key Thinkers	View of Knowledge	Implication for AI in Education
Classical Epistemology	Plato, Aristotle	Knowledge as justified true belief	AI cannot possess genuine knowledge
Pragmatism	John Dewey	Knowledge as inquiry and experience	AI may support inquiry but cannot replace it
Constructivism	Piaget, Vygotsky	Knowledge constructed through interaction	AI can mediate learning environments
Posthumanism	Donna Haraway, N. Katherine Hayles	Knowledge distributed across human–machine networks	AI becomes part of epistemic systems

The Transformation of Educational Roles

AI integration also transforms the roles of teachers and students.

1 Teachers as Epistemic Orchestrators

Rather than functioning solely as transmitters of knowledge, teachers increasingly act as orchestrators of human-AI learning environments.

They must guide students in:

- evaluating AI outputs
- identifying bias and misinformation
- integrating AI tools responsibly

Educational researchers argue that teachers must balance algorithmic assistance with human judgment in order to maintain meaningful learning experiences.

2 Students as Algorithmic Learners

Students in AI-mediated environments develop new cognitive habits.

Instead of memorizing information, they increasingly focus on:

- prompt engineering
- information verification
- synthesis of AI-generated knowledge

While these skills may become essential in the digital age, they also raise concerns about cognitive dependency on automated systems.

Artificial intelligence represents one of the most transformative developments in the history of education. By altering the ways knowledge is produced, validated, and transmitted, AI challenges many of the philosophical assumptions that have historically guided educational institutions. Rather than merely enhancing existing pedagogical practices, AI technologies are reshaping the epistemic foundations of education itself. Knowledge is increasingly generated through hybrid human-machine processes, intellectual authority is becoming decentralized, and the roles of teachers and learners are undergoing significant transformation. These developments create both opportunities and risks. AI can expand access to knowledge, support personalized learning, and enable new forms of intellectual collaboration. At the same time, it may undermine critical thinking, intellectual autonomy, and the humanistic values traditionally associated with education. Understanding these transformations requires sustained philosophical reflection. Education systems must not simply adopt AI technologies but critically examine how they reshape the meaning and purpose of knowledge [8].

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Historical Evolution of Knowledge Systems and Educational Structures

Understanding the philosophical implications of artificial intelligence for contemporary education requires situating AI within the broader historical evolution of knowledge systems. Educational institutions have always been deeply connected to the technologies and epistemic structures through which societies produce and distribute knowledge. From oral traditions to manuscript culture, from print capitalism to digital networks, each technological transformation has reconfigured the ways knowledge is organized, transmitted, and validated. Artificial intelligence represents the latest stage in this historical process, yet its impact appears more radical than previous transformations because it involves the automation of cognitive processes themselves. In premodern societies, knowledge transmission was largely oral and communal. Philosophical traditions in ancient Greece, India, and China relied on dialogue, memory, and apprenticeship as primary modes of intellectual development. The Socratic method, for instance, emphasized dialectical engagement through questioning and reflection. Knowledge in such contexts was inseparable from interpersonal relationships and communal participation in intellectual life. Teachers functioned not merely as information transmitters but as mentors guiding students through processes of reasoning and ethical development. The invention of writing and manuscript culture gradually altered this dynamic. Written texts enabled the preservation of knowledge across generations and geographic distances, thereby transforming educational institutions into repositories of intellectual traditions. Medieval universities in Europe and scholarly institutions in other parts of the world organized knowledge through canonical texts, commentaries, and scholastic debates. The authority of knowledge became increasingly associated with textual traditions and scholarly interpretation. The emergence of print technology during the fifteenth century marked another major epistemological transformation. The printing press dramatically expanded the circulation of knowledge, enabling the standardization of texts and the dissemination of scientific ideas. Historians of knowledge have argued that print culture played a crucial role in the development of modern science, as it allowed researchers to share experimental findings and engage in collective intellectual inquiry. Modern educational institutions evolved alongside these technological transformations. Universities became centers of research, knowledge production, and intellectual specialization. Disciplines such as physics, philosophy, sociology, and economics developed distinct methodologies and epistemic standards. Educational systems emphasized the mastery of disciplinary knowledge and the cultivation of analytical reasoning. The digital revolution of the late twentieth century introduced a new phase in the evolution of knowledge systems. The internet dramatically expanded access to information, enabling learners to retrieve knowledge from global databases and online resources. Digital technologies also facilitated collaborative knowledge production through platforms such as open-source communities and online academic networks. Artificial intelligence represents a further step in this trajectory, yet it differs from earlier technologies in a crucial way. Whereas previous technologies primarily enhanced the storage and transmission of information, AI technologies participate directly in the generation and interpretation of knowledge. This shift introduces unprecedented philosophical challenges because it blurs the boundary between human cognition and machine computation [9].

Artificial Intelligence and the Automation of Cognitive Labor

One of the most profound implications of AI for education lies in the automation of cognitive labor. Historically, automation has primarily affected physical tasks in industrial contexts. Machines replaced manual labor in manufacturing, transportation, and agriculture. In contrast, AI systems automate tasks traditionally associated with intellectual work, including writing, reasoning, data analysis, and decision-making. The automation of cognitive labor has significant consequences for educational institutions because many academic activities involve precisely these forms of intellectual work. Students are trained to analyze texts, formulate arguments, conduct research, and synthesize information. When AI systems can perform these tasks with increasing sophistication, the nature of academic learning must inevitably evolve. AI-powered systems can now generate essays, summarize research articles, translate languages, analyze datasets, and even propose scientific hypotheses. Such capabilities challenge traditional assumptions about intellectual effort and academic achievement. If machines can produce high-quality analytical texts, the value of student writing assignments may need to be reconsidered. From a philosophical perspective, this development raises questions about the relationship between cognition and technology. Philosophers of mind and technology have long debated whether cognitive processes can be extended beyond the human brain into external tools and environments. The theory of the extended mind, for example, suggests that tools such as notebooks, calculators, and computers can function as components of cognitive systems. AI technologies appear to push this idea even further. Rather than merely storing information or facilitating calculations, AI systems actively participate in reasoning processes. In doing so, they create hybrid cognitive environments in which human and machine intelligence interact continuously. Educational systems must therefore confront a fundamental question: should AI be treated as a cognitive partner that enhances human learning, or as a substitute that risks undermining intellectual development [10].

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Epistemological Questions Raised by Artificial Intelligence

Artificial intelligence raises several foundational epistemological questions concerning the nature and limits of machine knowledge. Classical epistemology traditionally defined knowledge as justified true belief, emphasizing the importance of rational justification and evidence. However, AI systems do not possess beliefs or intentions in the human sense. Instead, they generate outputs based on statistical relationships within training data. This distinction raises the question of whether AI systems can truly be said to "know" anything. Some philosophers argue that AI systems merely simulate knowledge without possessing genuine understanding. According to this view, AI outputs should be interpreted as probabilistic predictions rather than epistemically grounded claims. Other scholars adopt a more pragmatic perspective, suggesting that knowledge should be evaluated in terms of functional performance rather than internal mental states. If AI systems consistently produce reliable and useful information, they may be considered epistemically valuable even if they lack human-like understanding. These debates reflect deeper philosophical tensions between representational and pragmatic theories of knowledge. Representational theories emphasize the correspondence between beliefs and objective reality, whereas pragmatic theories evaluate knowledge based on its practical consequences. Educational institutions must navigate these philosophical tensions when integrating AI technologies into learning environments. If AI systems are treated as authoritative sources of knowledge, students may become less motivated to engage in critical reasoning. Conversely, if AI outputs are treated merely as provisional suggestions, they may serve as valuable tools for stimulating inquiry and discussion [11] (Table 2).

Table 2. Human Knowledge vs. AI-Generated Knowledge

Dimension	Human Knowledge	AI-Generated Knowledge
Source	Experience, reasoning, reflection	Statistical patterns in training data
Understanding	Contextual and interpretive	Pattern-based prediction
Intentionality	Guided by goals and values	Algorithmic optimization
Accountability	Human responsibility	Diffuse responsibility across developers and users
Creativity	Emerges from imagination and experience	Recombinational synthesis of existing data

Artificial Intelligence and the Authority of Expertise

Another major philosophical implication of AI concerns the transformation of expertise. In traditional educational systems, expertise is developed through years of study, research, and professional practice. Experts possess deep domain knowledge and are recognized as authorities within their fields. AI technologies challenge this model by providing non-experts with access to sophisticated analytical capabilities. Students can now generate complex explanations and analyses with minimal prior knowledge. As a result, the visible distinction between novice and expert may become less apparent. This phenomenon has been described as the democratization of expertise. AI tools enable individuals without specialized training to perform tasks that previously required professional knowledge. While this development can empower learners and expand access to intellectual resources, it also raises concerns about the erosion of epistemic authority. If AI-generated content becomes widespread, determining the reliability of information may become increasingly difficult. Students may rely on AI systems without understanding the limitations or biases embedded in algorithmic outputs. Educational institutions must therefore emphasize epistemic literacy—the ability to evaluate sources, assess evidence, and recognize uncertainty. Rather than discouraging the use of AI, educators may need to teach students how to critically engage with algorithmic knowledge systems [12].

Cognitive Implications of AI-Assisted Learning

The integration of AI into educational environments also has important implications for cognitive development. Learning is not merely the acquisition of information but a process through which individuals develop intellectual skills, conceptual understanding, and critical thinking abilities. Psychological research suggests that cognitive effort plays a crucial role in learning. When students struggle with complex problems, they develop deeper understanding and stronger memory retention. If AI systems provide instant solutions to academic tasks, this productive struggle may be reduced. At the same time, AI technologies can support cognitive development when used appropriately. Intelligent tutoring systems, for example, can adapt to individual learning needs and provide personalized feedback. Such systems may help students overcome learning barriers and develop conceptual understanding more effectively. The challenge for educators lies in balancing assistance and autonomy. AI should support learning without replacing the intellectual effort necessary for genuine understanding [13].

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Ethical Dimensions of Artificial Intelligence in Education

The integration of artificial intelligence into educational systems introduces a wide range of ethical considerations that extend beyond technical functionality. Ethical questions emerge because AI technologies influence not only how students learn but also how knowledge is evaluated, how academic success is measured, and how intellectual authority is distributed within society. When algorithmic systems participate in educational processes, they inevitably shape the moral and institutional values that guide learning environments. One of the central ethical concerns relates to the transparency of AI systems. Many contemporary AI models operate as complex computational architectures whose internal mechanisms are not easily interpretable by human users. In educational contexts, this lack of transparency can create difficulties for teachers and students who must rely on algorithmic outputs without fully understanding how those outputs are generated. Educational philosophy traditionally emphasizes the importance of rational justification and evidence in knowledge production. If AI systems produce conclusions without transparent reasoning processes, the epistemic foundations of education may become obscured. Another ethical issue involves fairness and equality in access to AI technologies. Educational institutions around the world vary significantly in terms of technological infrastructure, financial resources, and digital literacy. Schools and universities with advanced AI resources may offer students enhanced learning opportunities, while institutions lacking such technologies may struggle to compete academically. This technological disparity risks widening existing educational inequalities between regions, institutions, and social groups. Ethical discussions also focus on the responsibility associated with AI-generated knowledge. When students rely on AI tools to produce academic work, questions arise regarding authorship, intellectual ownership, and academic integrity. Traditional academic norms emphasize the originality of student work and the importance of demonstrating individual understanding. The ability of AI systems to generate sophisticated written content challenges these norms and requires educational institutions to reconsider the criteria by which intellectual contributions are evaluated. At a deeper philosophical level, AI technologies raise questions about the moral purpose of education itself. Education has historically been understood not only as a process of knowledge acquisition but also as a means of cultivating intellectual virtues such as honesty, curiosity, responsibility, and critical thinking. If students become increasingly dependent on algorithmic systems for intellectual tasks, educators must consider whether such reliance supports or undermines the development of these virtues. Ethical reflection therefore becomes an essential component of AI integration in education. Rather than focusing solely on technical efficiency, educational institutions must evaluate AI technologies in relation to broader ethical principles that define the goals of learning and intellectual development [14].

Algorithmic Bias and Epistemic Justice

Another major concern associated with artificial intelligence in education involves the problem of algorithmic bias. AI systems are trained on large datasets that reflect the historical patterns, social assumptions, and cultural perspectives embedded within the data. As a result, AI models may reproduce or amplify existing biases present in their training environments. In educational contexts, algorithmic bias can affect several dimensions of knowledge production. AI systems used for content generation, recommendation systems, or automated grading may unintentionally favor particular perspectives or interpretations. For example, historical or cultural narratives generated by AI systems may reflect dominant global viewpoints while marginalizing alternative voices or local knowledge traditions. This issue relates closely to the philosophical concept of epistemic justice. Epistemic justice refers to the fair recognition of individuals and communities as legitimate contributors to knowledge. When certain voices or perspectives are systematically excluded or undervalued within knowledge systems, epistemic injustice occurs. AI technologies may contribute to epistemic injustice if the datasets used to train them fail to represent diverse intellectual traditions. Educational systems that rely heavily on AI-generated knowledge may therefore risk reinforcing dominant epistemic frameworks while overlooking marginalized perspectives. The challenge for educators and policymakers lies in developing strategies to ensure that AI systems promote inclusive knowledge environments. This may involve diversifying training datasets, implementing mechanisms for bias detection, and encouraging critical engagement with AI-generated content. Educational philosophy plays an important role in this process because it provides conceptual tools for examining the values embedded within technological systems. By analyzing the ethical and epistemological assumptions underlying AI technologies, scholars can help ensure that educational innovation aligns with principles of fairness and intellectual diversity [15].

Academic Integrity in the Age of Generative Artificial Intelligence

Academic integrity has long served as a foundational principle within educational institutions. Universities and schools emphasize honesty, originality, and intellectual responsibility as essential components of scholarly practice. However, the emergence of generative AI technologies has created new challenges for maintaining these principles. Generative AI systems can produce essays, research summaries, programming code, and other academic materials that closely

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resemble human-authored work. Students may use these tools to complete assignments with minimal personal engagement in the learning process. As a result, traditional definitions of plagiarism and academic misconduct may no longer adequately address the complexities introduced by AI technologies. The difficulty lies in distinguishing between legitimate AI-assisted learning and inappropriate reliance on algorithmic content generation. For example, AI tools may serve as useful research assistants that help students organize ideas, refine writing, or explore alternative perspectives. At the same time, excessive dependence on AI-generated outputs may undermine the educational goal of developing independent analytical abilities. Educational institutions are therefore experimenting with new approaches to academic integrity. Some universities encourage transparent disclosure when AI tools are used in academic work. Others redesign assessment methods to emphasize in-class activities, oral examinations, and project-based learning that require direct demonstration of understanding. These changes reflect a broader shift in educational philosophy. Rather than focusing exclusively on preventing AI usage, educators increasingly aim to cultivate responsible and reflective engagement with AI technologies. Students must learn not only how to use AI tools effectively but also how to evaluate their outputs critically and integrate them ethically into scholarly practice [16] (Table 3).

Table 3. Traditional Academic Integrity vs AI-Age Academic Integrity

Dimension	Traditional Academic Integrity	AI-Age Academic Integrity
Authorship	Individual student authorship	Human–AI collaborative authorship
Plagiarism	Copying human-authored work	Undisclosed AI-generated content
Assessment	Written assignments and exams	Process-based and interactive evaluation
Intellectual Effort	Demonstrated through writing	Demonstrated through reasoning and analysis
Educational Goal	Knowledge reproduction and argumentation	Critical engagement with AI-supported knowledge

Human–AI Collaboration in Knowledge Production

While many discussions of AI in education focus on risks and challenges, it is equally important to recognize the potential benefits of human–AI collaboration. Rather than replacing human intelligence, AI systems can augment human cognitive capacities and facilitate new forms of intellectual creativity. Human–AI collaboration occurs when individuals use AI tools to explore ideas, generate hypotheses, analyze complex data, or synthesize information from diverse sources. In these contexts, AI functions as an intellectual partner that expands the scope of human inquiry. In research environments, AI technologies are already assisting scientists in analyzing large datasets, identifying patterns, and generating predictions. Similar applications are emerging in educational settings, where AI tools help students explore complex topics and develop interdisciplinary perspectives. The philosophical significance of this development lies in the possibility of distributed cognition. Knowledge production may increasingly occur within networks that include both human thinkers and algorithmic systems. Rather than being confined to individual minds, cognition becomes distributed across technological environments. However, effective human–AI collaboration requires critical awareness of the limitations of AI systems. AI outputs are influenced by training data, algorithmic design, and probabilistic reasoning processes. Without careful evaluation, AI-generated information may appear authoritative even when it contains inaccuracies or biases. Educational institutions therefore face the task of teaching students how to participate responsibly in human–AI knowledge networks. This involves cultivating skills such as critical analysis, epistemic humility, and reflective judgment [17].

Reimagining the Purpose of Education in an AI-Mediated World

The philosophical implications of AI extend beyond specific pedagogical practices to the broader purpose of education itself. For centuries, educational systems have emphasized the transmission of knowledge and the development of intellectual skills necessary for professional and civic life. In an era where AI systems can generate information instantly and perform many analytical tasks traditionally associated with human expertise, the educational mission may require redefinition. If access to information becomes universal and automated, the value of education may shift from knowledge acquisition toward deeper forms of intellectual development. Many scholars argue that education in the AI age should prioritize uniquely human capacities such as creativity, ethical reasoning, emotional intelligence, and interdisciplinary thinking. These capacities involve complex forms of judgment and contextual awareness that AI systems currently struggle to replicate. Philosophically, this shift reflects a transition from an information-centered model of education to a wisdom-centered model. Instead of focusing primarily on what students know, educational institutions may increasingly emphasize how students think, interpret, and apply knowledge in complex real-world situations. This transformation aligns with broader traditions in educational philosophy that view education as a process

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of cultivating intellectual character rather than merely transmitting information. In this sense, the rise of AI may actually reinforce the importance of humanistic education, including philosophy, ethics, and the humanities [18].

Artificial Intelligence and the Transformation of Pedagogical Theory

The integration of artificial intelligence into educational environments does not merely introduce new tools; it fundamentally reshapes the theoretical foundations of pedagogy. Pedagogy traditionally refers to the principles and methods through which knowledge is taught and learned. Over centuries, educational theorists have developed a wide range of pedagogical models, each reflecting broader philosophical assumptions about knowledge, cognition, and human development. The emergence of AI challenges many of these assumptions and encourages the reexamination of teaching and learning in technologically mediated contexts. Classical pedagogical models often emphasize direct interaction between teachers and learners. In traditional classrooms, teachers guide students through lectures, discussions, and collaborative activities that promote conceptual understanding. Pedagogical approaches such as constructivism and experiential learning highlight the importance of active participation and reflective engagement in the learning process. These theories assume that knowledge emerges through meaningful interaction with ideas, experiences, and social environments. Artificial intelligence introduces a new dimension to these interactions by creating environments in which learners can engage with intelligent systems capable of responding dynamically to questions, learning patterns, and cognitive needs. AI-driven educational platforms can analyze student performance data, identify knowledge gaps, and generate personalized learning pathways. In doing so, they reshape the relationship between instruction and learning outcomes. The philosophical implications of this transformation are significant. When AI systems participate in pedagogical processes, the locus of educational authority shifts from exclusively human instructors to hybrid human-machine environments. Teachers may increasingly function as facilitators who guide students in navigating AI-mediated knowledge systems rather than serving as primary sources of information. Such transformations require a redefinition of pedagogical expertise. Educators must develop not only subject knowledge but also the ability to design learning experiences that integrate AI technologies in ways that support intellectual growth and critical reflection. Pedagogical theory must therefore expand to include the analysis of algorithmic mediation within learning environments [19].

Intelligent Tutoring Systems and Personalized Learning

One of the most prominent applications of artificial intelligence in education is the development of intelligent tutoring systems. These systems use machine learning algorithms to analyze student interactions, assess performance, and adapt instructional materials to individual learning needs. Personalized learning environments have long been considered an ideal goal in educational theory because students vary significantly in cognitive styles, prior knowledge, and learning pace. Traditional classroom settings often struggle to accommodate these differences because teachers must address large groups of students simultaneously. AI-powered tutoring systems attempt to overcome this limitation by providing individualized feedback and adaptive learning pathways. The philosophical appeal of personalized learning lies in its alignment with learner-centered educational theories. Educational psychologists have long argued that meaningful learning occurs when instruction is tailored to the cognitive development and interests of individual students. AI systems can facilitate such adaptation by continuously analyzing patterns in student responses and adjusting instructional strategies accordingly. However, personalized learning also raises important philosophical questions about the nature of education. When learning becomes highly individualized, the communal dimension of education may weaken. Schools and universities have historically functioned as social environments in which students engage in collective inquiry, debate, and intellectual collaboration. Excessive reliance on personalized AI systems could potentially isolate learners from these shared experiences. Another concern involves the reduction of learning to measurable data points. AI systems rely on quantifiable indicators such as response accuracy, completion rates, and engagement metrics. While these indicators provide valuable insights into learning processes, they may not capture deeper forms of intellectual growth such as creativity, ethical reasoning, or conceptual transformation. Educational institutions must therefore balance the advantages of personalized AI-supported learning with the broader humanistic goals of education [20].

Artificial Intelligence and Curriculum Transformation

The presence of AI technologies in educational environments inevitably influences the structure and content of curricula. Curriculum design traditionally reflects societal expectations regarding the knowledge and skills that students should acquire through formal education. As technological landscapes evolve, curricular frameworks must adapt accordingly. In the AI era, several shifts in curricular priorities are becoming apparent. Digital literacy and computational thinking are increasingly recognized as essential competencies for navigating technologically mediated societies. Students must develop the ability to understand algorithmic systems, evaluate digital information sources, and engage critically with technological infrastructures. Beyond technical competencies, AI also prompts renewed attention

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to interdisciplinary learning. The complex challenges associated with artificial intelligence—such as ethical governance, social impact, and economic transformation—cannot be addressed solely within technical disciplines. They require insights from philosophy, sociology, law, psychology, and other fields within the humanities and social sciences. Consequently, many educational institutions are exploring interdisciplinary curricula that integrate technological knowledge with ethical and philosophical reflection. Such programs aim to prepare students not only to use AI technologies but also to understand their broader implications for society. This transformation reflects a deeper philosophical shift in the conception of knowledge. Instead of treating disciplines as isolated domains, AI-mediated knowledge systems encourage cross-disciplinary integration and collaborative inquiry [21] (Table 4).

Table 4. Curriculum Priorities in the AI Era

Educational Dimension	Traditional Curriculum Focus	AI-Era Curriculum Focus
Knowledge Acquisition	Memorization and disciplinary mastery	Conceptual understanding and knowledge integration
Skill Development	Analytical reasoning and writing	AI literacy, data interpretation, and critical evaluation
Technological Engagement	Basic digital skills	Algorithmic awareness and computational thinking
Interdisciplinary Learning	Limited cross-disciplinary interaction	Integration of humanities, technology, and ethics
Educational Outcome	Knowledge reproduction	Creative problem solving and adaptive learning

Institutional Transformation in Higher Education

Artificial intelligence is also reshaping the institutional structures of higher education. Universities historically function as centers of research, teaching, and intellectual community. However, the rapid development of AI technologies introduces new challenges to traditional academic models. One transformation concerns the production and dissemination of knowledge. AI systems can assist researchers in literature review, data analysis, and even hypothesis generation. These capabilities may accelerate the pace of scientific discovery but also raise questions about the role of human creativity in research. Universities must also adapt to changing labor markets influenced by AI automation. As many professions evolve in response to technological advancements, higher education institutions face pressure to redesign academic programs that prepare students for emerging careers. Furthermore, the availability of AI-driven learning platforms challenges the exclusivity of traditional universities as providers of knowledge. Online AI tutors and open educational resources allow individuals to access educational content outside formal institutional structures. While universities continue to play a crucial role in research and credentialing, their pedagogical authority may become increasingly decentralized. These developments suggest that higher education institutions must redefine their value proposition in an AI-mediated knowledge economy. Rather than serving solely as information providers, universities may emphasize mentorship, research collaboration, ethical guidance, and interdisciplinary intellectual communities [22].

Global Policy Approaches to Artificial Intelligence in Education

The rapid integration of AI into educational systems has prompted governments and international organizations to develop policy frameworks addressing its opportunities and risks. Policymakers recognize that AI technologies will significantly influence the future of education, workforce development, and social equity. Many national education strategies emphasize the importance of integrating AI literacy into school curricula. Governments seek to ensure that students understand not only how to use AI technologies but also how these systems influence economic and social structures. International organizations have also highlighted ethical considerations related to AI in education. Policy discussions frequently address issues such as data privacy, algorithmic transparency, and equitable access to technological resources. These concerns reflect broader debates regarding the governance of AI technologies in society. Educational policy frameworks increasingly encourage collaboration between educators, technologists, and philosophers. Such interdisciplinary cooperation is essential because the challenges associated with AI integration extend beyond technical design to include ethical, social, and cultural considerations. The development of global guidelines for AI in education represents an important step toward ensuring that technological innovation aligns with fundamental human values [23].

Philosophy of Mind and Artificial Intelligence in Educational Contexts

The philosophical implications of artificial intelligence in education cannot be fully understood without examining debates within the philosophy of mind. Questions about the nature of intelligence, cognition, and understanding lie at

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the center of contemporary discussions about AI. These debates are particularly relevant to educational philosophy because education fundamentally concerns the cultivation of human cognitive capacities. The philosophy of mind has long investigated the relationship between mental processes and physical systems. Classical thinkers considered whether human cognition could be reduced to mechanical processes or whether it involved unique forms of consciousness and intentionality. With the development of computational models of cognition in the twentieth century, many scholars began to conceptualize the mind as an information-processing system similar in certain respects to a computer. Artificial intelligence research emerged from this intellectual context. Early AI researchers proposed that human reasoning might be replicated through symbolic computation and algorithmic problem-solving. While initial expectations about machine intelligence proved overly optimistic, contemporary AI systems demonstrate remarkable capabilities in areas such as language processing, pattern recognition, and predictive analysis. These developments raise important philosophical questions regarding the distinction between human cognition and machine computation. Human thinking involves not only logical reasoning but also emotional awareness, contextual interpretation, and embodied experience. AI systems, by contrast, operate primarily through statistical pattern recognition within large datasets. In educational environments, this distinction becomes particularly significant. Learning involves processes such as conceptual understanding, reflective judgment, and the integration of knowledge with personal experience. AI systems may assist with information retrieval and analytical tasks, but they do not possess lived experiences or subjective awareness. Consequently, AI technologies should be viewed not as replacements for human cognition but as complementary tools that extend certain cognitive functions. Educational philosophy must therefore articulate frameworks that integrate AI support while preserving the uniquely human dimensions of learning [24].

Human Cognition and Machine Cognition: A Comparative Perspective

To understand the implications of AI in education, it is useful to compare the characteristics of human cognition and machine cognition. Although AI systems demonstrate impressive computational capabilities, their underlying processes differ significantly from those of human minds. Human cognition is shaped by biological evolution, social interaction, and embodied experience. Cognitive processes such as perception, memory, reasoning, and creativity develop through complex interactions between neural systems and environmental contexts. Human learning is deeply influenced by emotional motivation, cultural narratives, and ethical considerations. Machine cognition, on the other hand, relies on mathematical optimization and statistical modeling. Machine learning algorithms analyze patterns in large datasets and generate predictions based on probability distributions. These systems do not possess awareness or intentions; their outputs reflect the structures embedded within their training data. The differences between these forms of cognition highlight the complementary potential of human–AI collaboration. AI systems excel at processing large volumes of data and identifying patterns that may not be immediately visible to human observers. Humans, meanwhile, contribute interpretive insight, ethical judgment, and contextual understanding. Educational environments that integrate AI effectively should therefore emphasize the synergy between these two cognitive modes rather than framing them as competing forms of intelligence [25] (Table 5).

Table 5. Characteristics of Human and Machine Cognition

Dimension	Human Cognition	Machine Cognition
Nature of Intelligence	Biological and experiential	Computational and algorithmic
Learning Process	Experience, reflection, and social interaction	Data training and statistical optimization
Understanding	Contextual and interpretive	Pattern recognition without subjective awareness
Creativity	Imaginative and context-sensitive	Recombination of existing data patterns
Ethical Judgment	Guided by moral reasoning and values	Not intrinsically present

Creativity and Artificial Intelligence in Educational Practice

Creativity has traditionally been considered one of the most distinctive features of human intelligence. Educational institutions often aim to cultivate creativity through activities such as writing, artistic expression, scientific experimentation, and interdisciplinary exploration. The emergence of generative AI systems capable of producing text, images, music, and other creative outputs has therefore prompted renewed philosophical reflection on the nature of creativity. Generative AI models produce creative outputs by recombining patterns found within large datasets. When generating an essay, for example, an AI system predicts sequences of words that statistically correspond to patterns observed in training data. Although these outputs may appear novel or imaginative, they ultimately derive from the recombination of previously existing information. Human creativity, in contrast, involves complex processes of imagination, intuition, and personal experience. Creative insights often emerge through unexpected connections

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between ideas, emotional engagement with problems, and reflection on lived experiences. Such processes cannot easily be reduced to statistical correlations. Nevertheless, AI systems can play a valuable role in supporting human creativity. By generating alternative perspectives, summarizing complex materials, or visualizing conceptual relationships, AI tools may stimulate new ideas and encourage exploratory thinking. In educational settings, students may use AI systems as creative partners that help expand the range of possibilities within intellectual inquiry. The key philosophical challenge lies in maintaining a clear distinction between genuine creative understanding and algorithmically generated novelty. Educators must ensure that students engage actively in creative processes rather than relying passively on automated outputs [26].

Cognitive Offloading and Epistemic Dependency

Another important philosophical issue related to AI in education concerns the concept of cognitive offloading. Cognitive offloading occurs when individuals rely on external tools or technologies to perform mental tasks that would otherwise require internal cognitive effort. Examples include using calculators for arithmetic calculations or digital calendars for memory management. AI technologies significantly expand the scope of cognitive offloading because they can perform complex tasks such as writing, analysis, and problem-solving. While such assistance can enhance efficiency and productivity, it also raises concerns about epistemic dependency—the condition in which individuals rely excessively on external systems for knowledge and reasoning. Educational psychologists have long emphasized the importance of active cognitive engagement in learning. When students grapple with difficult concepts, they develop deeper understanding and stronger cognitive skills. If AI systems provide immediate solutions to intellectual challenges, students may miss opportunities to develop these abilities. However, cognitive offloading is not inherently negative. Human cognition has always been supported by cultural tools such as language, writing, and technology. The challenge lies in determining how AI technologies can be integrated in ways that support rather than replace meaningful learning processes. Educational strategies may involve designing assignments that require students to evaluate, critique, and reinterpret AI-generated outputs rather than simply reproducing them. Such approaches encourage students to engage actively with knowledge while benefiting from technological assistance [27].

Future Knowledge Ecosystems in AI-Driven Education

The integration of artificial intelligence into educational systems suggests that future knowledge ecosystems will differ significantly from traditional academic structures. Knowledge will increasingly emerge from networks of interaction involving human learners, educators, digital platforms, and algorithmic systems. These ecosystems may be characterized by continuous flows of information, collaborative problem-solving, and interdisciplinary integration. Students may engage with AI tutors, virtual laboratories, and global research networks that extend beyond the physical boundaries of classrooms and universities. In such environments, the role of educational institutions may shift toward facilitating intellectual communities rather than serving as exclusive repositories of knowledge. Universities and schools may function as hubs for collaborative inquiry where students develop critical thinking skills, ethical awareness, and interdisciplinary understanding. The philosophical challenge lies in ensuring that these technological transformations support the deeper purposes of education. Knowledge ecosystems should promote intellectual curiosity, social responsibility, and the pursuit of truth rather than merely optimizing efficiency or productivity [28].

Challenges

Despite providing a comprehensive philosophical analysis of the relationship between artificial intelligence and contemporary educational systems, this article has several limitations that should be acknowledged. These limitations arise from the conceptual scope of the study, methodological constraints inherent in review-based research, and the rapidly evolving nature of artificial intelligence technologies. First, the study primarily adopts a conceptual and philosophical approach rather than an empirical methodology. While philosophical analysis allows for deep reflection on the epistemological and ethical implications of artificial intelligence in education, it does not provide direct empirical evidence regarding the effectiveness of AI technologies in real classroom settings. The arguments presented are therefore largely interpretative and theoretical, drawing on existing literature rather than original experimental or field-based data. Second, the review relies on secondary sources and previously published literature, which may reflect particular academic perspectives or disciplinary biases. Much of the current research on artificial intelligence in education originates from technologically advanced regions with strong digital infrastructures. As a result, the perspectives included in this study may not fully represent the experiences and educational realities of institutions in developing or resource-limited contexts. This limitation highlights the need for broader geographical representation in future research on AI-driven education. Another limitation concerns the rapid pace of technological change in artificial intelligence. AI systems, tools, and educational platforms evolve quickly, and new developments frequently emerge that may significantly alter existing educational practices. Consequently, some discussions presented in this article may become outdated as new AI technologies and pedagogical applications are introduced. Continuous scholarly

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engagement will therefore be necessary to update and refine philosophical analyses of AI in education. Additionally, the study focuses primarily on higher education and formal learning environments, with relatively limited discussion of AI applications in primary education, vocational training, and informal learning contexts. Since artificial intelligence technologies are increasingly being used across diverse educational settings, future research should examine how these systems influence learning across different age groups and institutional structures. The article also concentrates largely on philosophical and ethical implications, while technical aspects of artificial intelligence systems—such as algorithm design, computational architecture, and data engineering—are addressed only in a general manner. A deeper interdisciplinary analysis involving collaboration between philosophers, educators, and computer scientists would provide a more comprehensive understanding of how AI systems function within educational ecosystems. Finally, the normative recommendations offered in this study regarding ethical governance, equitable access, and responsible implementation of AI technologies are theoretical in nature. Their practical application may face institutional, political, and economic constraints that vary across educational systems and national contexts. In light of these limitations, the findings and arguments presented in this review should be understood as a conceptual framework for ongoing discussion rather than definitive conclusions. Future research combining philosophical inquiry with empirical investigation will be essential for developing a more complete understanding of how artificial intelligence is reshaping knowledge and education in the twenty-first century [29].

Future Directions and Philosophical Prospects of Artificial Intelligence in Education

1 The Emergence of Hybrid Intelligence in Learning

One of the most significant future developments in AI-driven education is the concept of hybrid intelligence, which refers to collaborative systems in which human cognition and artificial intelligence operate in partnership. Rather than replacing human educators or learners, AI systems are increasingly envisioned as cognitive collaborators that augment human intellectual capacities. Hybrid intelligence models emphasize the complementary strengths of humans and machines. Artificial intelligence systems excel at processing large datasets, identifying patterns, and performing complex computational tasks. Human learners, on the other hand, possess creativity, moral reasoning, contextual understanding, and emotional intelligence. The integration of these capacities can produce learning environments that combine analytical precision with human interpretive insight. In such environments, AI systems may function as adaptive mentors that provide real-time feedback, identify conceptual misunderstandings, and suggest personalized learning pathways. Teachers may assume new roles as facilitators of critical inquiry, guiding students in interpreting information, evaluating algorithmic outputs, and integrating technological tools into meaningful intellectual practices. From a philosophical perspective, hybrid intelligence challenges traditional distinctions between human knowledge and technological mediation. Knowledge production becomes a distributed process involving both human and machine contributions. Understanding this collaborative dynamic will be essential for shaping future educational practices.

2 Reimagining the Role of the Teacher

The integration of AI into education inevitably prompts questions about the future role of teachers. Some early discussions of AI technologies suggested that automated tutoring systems might eventually replace human educators. However, contemporary research increasingly indicates that AI is more likely to transform rather than eliminate the teaching profession. Teachers remain indispensable because education involves far more than the transmission of information. It includes mentorship, ethical guidance, emotional support, and the cultivation of intellectual curiosity. AI systems may assist with routine tasks such as grading, administrative management, and personalized feedback, thereby allowing educators to devote more attention to higher-level pedagogical activities. In the future, teachers may serve as interpreters of algorithmic knowledge, helping students understand the limitations and assumptions underlying AI systems. They may also play a crucial role in fostering digital literacy and critical engagement with technology. As AI becomes integrated into educational environments, teachers will need to guide students in questioning algorithmic outputs, recognizing biases, and developing responsible technological practices. The philosophical significance of this transformation lies in the reaffirmation of education as a fundamentally human endeavor. While AI can support cognitive processes, the formation of intellectual character and ethical awareness remains deeply rooted in human relationships.

3 Curriculum Transformation in the Age of AI

Artificial intelligence is also likely to reshape educational curricula across disciplines. As AI systems increasingly perform tasks involving data analysis, pattern recognition, and information retrieval, educational priorities may shift toward skills that complement rather than compete with machine capabilities. Future curricula may emphasize interdisciplinary thinking, creativity, ethical reasoning, and complex problem solving. Students will need to develop the ability to collaborate with AI systems while maintaining critical awareness of their limitations. Digital literacy will expand beyond basic technical skills to include understanding algorithmic processes, data ethics, and the social implications of technological systems. Philosophically, this curricular transformation reflects a broader shift in the

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concept of knowledge itself. In traditional educational models, knowledge was often associated with the accumulation of factual information. In an AI-mediated world where information is instantly accessible, the emphasis moves toward interpretation, synthesis, and critical evaluation. Educational institutions may therefore prioritize learning experiences that encourage inquiry, experimentation, and collaborative knowledge construction. Project-based learning, interdisciplinary research, and experiential education may become increasingly central to academic programs.

4 Global Knowledge Networks and Educational Transformation

Artificial intelligence has the potential to reshape education at a global scale by facilitating the creation of interconnected knowledge networks. Digital learning platforms powered by AI can connect students and educators across geographical boundaries, enabling collaborative learning communities that transcend traditional institutional structures. These global networks may support new forms of knowledge exchange, allowing learners from diverse cultural contexts to contribute to shared intellectual projects. AI systems can translate languages, recommend relevant resources, and facilitate cross-cultural communication, thereby expanding the reach of educational opportunities. From a philosophical standpoint, the emergence of global knowledge networks challenges conventional notions of authority and expertise in education. Knowledge may increasingly be produced through distributed collaboration rather than centralized institutions. This transformation aligns with broader trends in the digital knowledge economy, where innovation often arises from interdisciplinary and international cooperation. However, the development of global educational networks also raises questions about cultural diversity and epistemic pluralism. Educational systems must ensure that the expansion of global knowledge infrastructures does not lead to the homogenization of intellectual traditions. Respect for diverse epistemologies and cultural perspectives remains essential for a truly inclusive educational future.

5 The Philosophical Future of Knowledge

Perhaps the most profound implication of AI for education concerns the philosophical understanding of knowledge itself. Artificial intelligence challenges long-standing assumptions about human cognition by demonstrating that machines can perform tasks previously associated with intelligence, such as language processing, pattern recognition, and complex problem solving. These developments invite renewed philosophical reflection on the nature of knowledge, understanding, and intelligence. If AI systems can generate scientific hypotheses, produce creative texts, and analyze philosophical arguments, the boundaries between human and machine cognition become increasingly complex. However, many philosophers argue that genuine understanding involves more than computational ability. Human knowledge is embedded within lived experience, cultural context, and moral reflection. AI systems may process information effectively, but they lack consciousness, intentionality, and subjective awareness. Education therefore plays a crucial role in preserving the human dimensions of knowledge. By encouraging reflection on meaning, values, and ethical responsibility, educational institutions ensure that technological advancements remain aligned with broader human aspirations [30].

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