

Reconfiguring Higher Education in the Age of AI

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Extended Abstract

Artificial intelligence (AI) is widely recognized as a transformative force reshaping higher education worldwide, driving a fundamental shift from traditional teaching-centered universities toward dynamic ecosystems of knowledge creation, dissemination, and co-production. This study examines how AI is redefining core university functions, including teaching, research, governance, and institutional decision-making, while also exploring the emerging paradigm of human-machine collaboration and its implications for the future of higher education. The main objective is to provide a conceptual and analytical synthesis of AI's influence on the epistemological, pedagogical, and organizational foundations of universities across developed and developing contexts. The study adopts a qualitative, conceptual, and analytical review based on a systematic synthesis of recent academic literature, international policy reports, and strategic frameworks on AI in education. Rather than using empirical data, the analysis integrates theoretical and policy insights into a unified framework organized around three dimensions: functional transformation of universities under AI, emergence of human-in-the-loop systems in education and research, and development of essential competencies for human-AI collaboration. Findings indicate that AI systems significantly enhance efficiency in higher education by automating and augmenting tasks such as data analysis, content generation, personalized learning, academic writing support, and preliminary decision-making. These capabilities improve scalability, accessibility, and responsiveness in educational systems. However, despite these advantages, AI still lack ethical reasoning, contextual understanding, value-based judgment, and accountability, making human oversight essential in all critical academic processes. In this context, the human-in-the-loop paradigm emerges as a central framework, emphasizing that humans must remain responsible for problem formulation, methodological design, interpretation of results, and final decision-making, while AI functions as an augmentative tool that enhances analytical capacity and cognitive efficiency. This paradigm reflects a shift from automation-centered approaches toward augmentation-centered systems in which human and artificial intelligence operate in a complementary relationship. The study further shows that the competitive advantage of future universities will not depend on replacing

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human with machines but on strengthening human-machine collaboration. Accordingly, competencies such as prompt engineering, critical thinking, data literacy, and adaptive learning are becoming essential for students and academic staff. These skills enable individuals to critically evaluate AI outputs, refine machine-generated content, and convert outcomes into meaningful academic contributions. In addition, the study highlights that disparities in digital infrastructure, institutional capacity, and governance maturity across countries significantly affect AI adoption in higher education. While advanced economies rapidly integrate AI into academia, many developing countries face limitations in infrastructure, skills, and governance, which may widen global inequalities in knowledge production if not addressed. Beyond technical aspects, the study emphasizes governance, ethics, and institutional responsibility in AI integration. Effective adoption requires transparent, accountable frameworks that ensure fairness, reduce bias, protect data privacy, and maintain academic integrity. Without such frameworks, AI may lead to over-reliance on automation and reduced transparency. Ultimately, the study concludes that the transformation of higher education in the era of AI should not be viewed as technological substitution, but as a human-centered reconfiguration of roles between humans and machines. Universities are evolving into hybrid environments where AI handles repetitive and data-intensive tasks, while humans retain responsibility for ethical judgment, creativity, leadership, and strategic decision-making. The future competitiveness of universities will depend not on the extent of AI adoption, but on the quality of human-machine interaction and the ability of institutions to balance technological capability with human agency. Accordingly, successful universities will invest in infrastructure, human capital, and governance systems to ensure that AI strengthens rather than replaces human intelligence.

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