

Role Of AI in Reshaping Education and Research

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Abstract: *The rapid evolution of Artificial Intelligence (AI) has brought transformative changes to education and research, reshaping traditional paradigms and unlocking new possibilities for innovation and growth. This article explores the multifaceted role of AI in modern academia, highlighting its applications in personalized learning, virtual classrooms, administrative efficiency, and research methodologies. AI-driven tools such as intelligent tutoring systems, chatbots, and automated grading have improved educational outcomes by enabling adaptive learning experiences and reducing the burden on educators. In research, AI enhances data analysis, literature reviews, and peer review processes, accelerating scientific discovery while raising important concerns around ethics, reproducibility, and data integrity. Despite its advantages, the overreliance on AI poses risks to critical thinking, originality, and the humanistic essence of education. This article emphasizes the need for a balanced approach to AI adoption—one that respects human values, ensures inclusivity, and fosters responsible innovation. By embracing AI as a supportive tool rather than a replacement for human intellect, education and research can evolve in ways that are both technologically advanced and ethically grounded*

Keywords: *AI, education, research*

Introduction

The artificial intelligence (AI) has undergone a gradual evolution, but its recent advancements have culminated in paradigm-shifting phenomenon that has profoundly impacted humanity. Its emergence has precipitated a revolution that has transformed nearly every facet of life, assuming multifaceted roles that range from serving as a personal instructor for health, guide for life counseling, teacher, to a sophisticated researcher.

Artificial intelligence has undergone remarkable transformation over the years, from basic machines and robots to advanced software systems. Its widespread availability and accessibility has significantly enhanced the domains of education, research, governance and many more. Ai is structured with major facilities from data illustration, machine learning, natural language processing, planning, reasoning, explanation, and cognitive features (Kandual, 2020). These attributes gives a personal touch to AI, rendering it more dependable and user centric. Consequently, AI's is fundamentally reshaping the educational system and its applicability extends beyond physics, Computer Science, data science.

The proliferation of artificial intelligence has led to its integration into educational curricula worldwide, reflecting its significance in modern society. Educational institutions are now incorporating AI-related topics for the programs to equip students with the knowledge and skills necessary to navigate an increasingly AI- driven world. In education, Ai has pushed back the traditional pedagogical methods, yielding numerous benefits to both teacher and students. For example AI powered personalized learning, intelligent tutoring system, automated grading system, has boosted the whole process of teaching and learning to another level. This has led to improved outcomes increased efficiency, smarter studying with open access to vast array of topics. As a result, new opportunities for growth and innovation are emerging, paving the way for brighter tomorrow (Harry, 2023).

AI's precision and velocity in data analysis, combined with its capacity to deliver nuanced insights and perform human-like tasks is revolutionizing the landscape of research work and study. As AI transforms research methodologies across disciplines, it impacts data analysis, research gap identification, literature reviews and personalization of learning and research experiences. However, it raises concerns about human elements in the research process, ethical data practices and research reproducibility (Ampong, 2024).

The Role of AI in Revolutionizing Education

The very nature of AI tools like ChatGPT (Generative Pre-trained Transformer), Gemini, DeepSeek, and Grammarly—being personalized and adaptive due to their sophisticated features—has led to their growing integration into the educational system. These technologies adjust to each student's mental capabilities, offering personalized learning experiences with a tailored pace and instant feedback through Intelligent Tutoring Systems (ITS). In contrast to traditional classrooms, where it is often challenging to accommodate individual learning speeds and needs, AI bridges this gap by delivering adaptive education that directly addresses students' questions and helps them understand concepts more deeply. It also enhances engagement through virtual classrooms, offering a more immersive learning experience (The Role of Artificial Intelligence in Education, 2025).

AI-driven classrooms grant students greater autonomy in their learning, making the process smoother and more self-directed. They also foster confidence by providing constructive, judgment-free feedback. Furthermore, AI has simplified many aspects of education—reducing teachers' workloads, closing knowledge gaps, and assisting with writing tasks. However, it is ultimately the teacher who plays a vital role in instilling values, ethics, and emotional intelligence in students. While AI can be a powerful educational tool, a careful balance must be maintained to ensure it complements rather than replaces what humans do best (Johnson, 2024). Education should remain a holistic experience that nurtures the mind, heart, and soul – 'educare' in its truest sense. Thus AI should only be taken as a means to support and augment this broader vision of education.

Enhancing Virtual Classrooms with AI and NLP

The integration of artificial intelligence (AI) and natural language processing (NLP) into virtual classrooms bridges the gap in interaction that typically occurs in physical classrooms by enabling seamless communication between students and educators. These technologies simplify the teaching and learning process in multiple ways—such as through real-time translation and captioning, voice commands, and chatbot-assisted discussions. By enabling effective and accessible interaction, AI ensures that both students and teachers can engage meaningfully, regardless of physical distance. NLP further strengthens this connection by allowing the system to understand, interpret, and respond to human language, thereby fostering a more personalized and connected virtual learning environment (Sreenivasu S.V.N, 2023).

Leveraging AI for Educational Excellence

Today, AI handles a multitude of tasks in education including: recording student attendance through biometrics, data management, grading and assessment, lesson planning and curriculum design, managing routine tasks and workflows also ensuring timely completion of tasks with efficiency and quality. Thus leveraging of AI in education has streamlined administrative task reducing errors and saving time. This allows educators to focus on delivering high-quality education and fostering excellent student performance (Patil Sanjay, 2022).

Several universities have successfully implemented AI featured chatbots to make the administration easy for example, Georgia State University's "Pounce" which provides students timely enrollment information, responds to students enquiries, similarly University of North Georgia's "AskNigel" chatbots helps students in finding lot of information related to academic

courses, campus events, university information, admission etc. (Harry, Roel of AI in Education, 2023).

Future AI school

As AI continues to evolve and expand its capabilities, it is essential to encourage both students and teachers to integrate this technology into their academic activities to further empower learning and teaching. By harnessing the power of AI, more dynamic, engaging, and personalized learning environments can be created—benefiting both educators and learners alike (Steele, 2023). However, it is equally important to address the digital divide and educational inequalities that may hinder the equitable adoption of AI in schools. Comprehensive training, along with access to adequate AI resources and education about AI's capabilities, applications, ethics, and limitations, is critical. Such efforts help foster an inclusive and healthy learning environment while actively working to bridge the digital divide (Walter, 2024). Moreover, this approach promotes the responsible use of AI and mitigates concerns about misuse.

The evolving dynamic between plagiarism detectors and AI technology underscores the importance of fostering a cultural academic honesty and valuing original work in educational settings (Grassini, 2023). Thus the integration of Artificial Intelligence (AI) in education necessitates a balanced approach to ensure that human skills development is not compromised. As AI continues to improve, it's essential to design assignments and projects that require creativity and critical thinking, and problem solving making it difficult for AI technologies to replicate them (Kelly, 2024). While AI can be a valuable tool, excessive reliance on it may lead to erosion of student's skills to think independently and innovatively. As Mahatma Gandhi wisely noted "Earth provides enough to satisfy every man's needs, but not every man's greed". This perspective highlights the judicious use of AI only where it is needed because overindulgence could lead to cognitive decline and loss of essential human faculties.

Research and Artificial Intelligence (AI)

Today's fast-paced world demands rapid innovation and efficiency and thus AI emerged as a game changer. Its significance in human society is clearly evident that areas like research, the backbone of societal progress has begun to leverage on AI in various aspects of research work. A part from technical help, AI also serves as a catalyst by solving problems creatively and generating new ideas and effective ways of execution across different disciplines of research (Bajorath, 2022). Some of the role of AI in research:-

Optimizing the peer review process

Publishing a paper before used to be complicated task as the work demanded originality, structural coherence, and sequential flow of the ideas under tight deadlines followed by revisions rendering it a challenging endeavor (Khalifa, 2024). However, the peer review process, once a labor intensive and time consuming task, has been significantly streamlined with the integration of AI which automates initial checks and corrections efficiently thereby reducing the workload for human reviewers and accelerating the process of publication (Aranguena, 2024).

Data Analysis

Data analysis is a crucial yet complex aspect of research, requiring specialized tools and software. While new researchers may face challenges, thus AI has reduced such problems by efficiently managing large datasets also improving the accuracy of their findings. The AI's capability to interpret data and transform it into valuable insights has made AI role invaluable in the area of research (Christou, 2023). It also can analyze and integrate vast amounts of data from multiple fields, enabling researchers to leverage insights from diverse disciplines and drive innovative breakthroughs (Ali, 2023).

Literature Review

The process of conducting a literature review can be a daunting task, given the vast and diverse array of published works. The sheer volume of filtering necessitates efficient searching, filtering, and analysis to identify pertinent studies and findings. Thus, Artificial Intelligence has emerged as a valuable tool in facilitating this process, enabling researchers to carry out the task effortlessly. AI facilitates research by extracting and analyzing, and synthesizing information from selected literature providing comprehensive overviews (Dergaa, 2023).

Problems of using AI in Scientific research:-

The advent of Artificial Intelligence (AI) has revolutionized the research process, leveraging its capacity to process vast amounts of data and identify complex patterns thereby yielding novel insights. Nevertheless, it is crucial for researchers to acknowledge AI's limitations recognizing both its potential and boundaries. As Francis Bacon's philosophical framework also suggests, objectivity in research requires rigorous testing and falsification. To achieve this, researchers must be aware of potential pitfalls, and cautioning against the influence of 'idols of mind' that can lead to flawed assumptions and understanding.

The growing role of AI in decision making is promising, but its unpredictable nature can cause errors and inconsistencies (Bathae, 2017). Earlier AI systems were predominantly reactive, responding to predetermined instructions with significant human oversight. In contrast, contemporary AI enables independent decision-making, adaptation, and continuous learning. Unlike earlier AI, which was static and rule-based, modern AI, which can set self-determined goals and reduce human interaction, transforming organizational learning and decision making capabilities (Bertossi, 2020)

However, the reliance on foreign-based intelligence for strategic decision making raises concerns about trust and autonomy, particularly for developing nations. In today's world, nations prioritize protecting their power and status, which can compromise the objectivity of foreign intelligence tools. Furthermore, third-world countries already grappling with orientalism and eurocentrism may find their narratives shaped by external forces, perpetuating imperialistic dynamics. While it's unrealistic to expect researchers to abandon AI tools entirely, cautious and expert handling can mitigate these risks, preserving the originality of research and local narratives.

AI also has raised many concerns like ethical, social and legal, as already in the world AI we have also seen the advancement of legal problems like deep fakes where people are becoming a victim. In research, inadequate data privacy in AI systems poses risks, including compromised confidentiality and potential loss of intellectual property (Mazurek, 2019).

Given these challenges, the rapid growth of AI in scientific research necessitates the establishments of clear guidelines to address emerging issues around objectivity, reproducibility, transparency, accountability to promote the integration of scientific research (Resnik, 2025).

Conclusion

In conclusion, AI has revolutionized society, bringing numerous benefits and challenges. While it's a valuable tool for learning, teaching, and research, it's essential to strike a balance in its usage. Over-reliance on AI could erode our mental capabilities undermining the very foundation and backbone of society – education and research.

To enhance both education and scientific research a nuanced understanding of AI ethics is crucial to ensure balanced usage. This will help to garner quality education and holistic development of student and later important aspects of research like originality, trust, innovation would be protected and reliable.

Ultimately, AI was designed to fill gaps and augment human capabilities, rather than limiting human power and letting it dictate our path. By embracing AI responsibly, we can unlock new opportunities and can shape a better world for all.

Bibliography

- 1) *The Role of Artificial Intelligence in Education*. (2025, May 1). Retrieved 30 June 2025, from medium.com: <https://medium.com/the-role-of-artificial-intelligence-in-education>
- 2) Ali, S. T.-S.-M.-R. (2023). Explainable Artificial Intelligence (XAI): What we know and What is left to attain Trustworthy Artificial Intelligence. *Information Fusion*, 99.
- 3) Ampong, K. O. (2024, June). Artificial intelligence research: A review on dominant themes, methods, frameworks and future research directions. *Telematics and Informatics Reports*, 14.
- 4) Aranguena, I. (2024, April). *AI in Research: Its Uses and Limitations*. Retrieved June 28, 2025, from researchtoaction.org: <https://www.researchtoaction.org/2024/04/ai-in-research-its-uses-and-limitations>
- 5) Bajorath, J. (2022). Artificial Intelligence in interdisciplinary life science and drug discovery research. *Future Science OA*, 8(4).
- 6) Bathaee, Y. (2017). The artificial intelligence black box and the failure of intent and causation. *Harv.J.L. & Tech*, 31, 889.
- 7) Bertossi, L. F. (2020, 03 May). Data Quality and Explainable AI. *Journal of Data and Information Quality (JDIQ)*, 12(2), 1-9.
- 8) Christou, P. (2023). How to use Artificial Intelligence (AI) as a Resource, OW Methodological and Analysis Tool in Qualitative research? *The Qualitative Report*, 28(7), 1968-1980.
- 9) Dergaa, I. K. (2023). From human writing to artificial intelligence generated text: examining the prospects and potential threats of ChatGPT in academic writing. *Biology of Sport*, 40(2), 615-622.
- 10) Grassini, S. (2023). Shaping the Future of Education: Exploring the Potential and Consequences of AI and ChatGPT in Educational Settings. *Education Sciences*, 13(7), 692.
- 11) Harry, A. (2023, March). Role of AI in Education. *Interdisciplinary Journal and Humanity*, 2(3), 260-268.
- 12) Harry, A. (2023, March). Role of AI in Education. *Interdisciplinary Journal and Humanity*, 2(3), 260-268.
- 13) Johnson, K. (2024, 3 June). *California teachers are using AI to grade papers. Who's grading the AI?* Retrieved 30 June Monday, 2025, from calmatters.org: calmatters.org/economy/technology/204/06/teachers-ai-grading
- 14) Kandual, N. (2020, September). Role of Artificial Intelligence in Education. *Alochana Chakra Journal*, IX(IX), 305-309.
- 15) Kelly, S. M. (2024, April 6). *CNN Business*. Retrieved 03 2025, from Teachers are using AI to grade essays. But some experts are raising ethical concerns: <https://www.cnn.com/2024/04/06/tech/teachers-grading-ai/index.html>
- 16) Khalifa, M. M. (2024). Using artificial intelligence in academic writing and research: An essential productivity tool. *Computer Methods and Programs in Biomedicine Updates*, 5.
- 17) Mazurek, G. (2019, 30 June). Perception of privacy and data protection in the context of the development of artificial intelligence. *Journal of Management of Analytics*, 6(4), 344-364.
- 18) Patil Sanjay, M. R. (2022). An Efficient Approach for Object Detection using Deep Learning. *Journal of Pharmaceutical Negative Results*, 563-5772.

- 19) Resnik, D. H. (2025). The ethics of using artificial intelligence in scientific research: new guidance needs for new tool. *AI and Ethics*, 5, 1499-1521.
- 20) Sreenivasu S.V.N, S. K. (2023). Cloud Based Electric Vehicle's Temperature Monitoring System Using IOT. *Cybernetics and Systems*, 1-16.
- 21) Steele, J. L. (2023). To GPT or not GPT? Empowering our students to learn with AI. *Computers and Education: Artificial Intelligence*, 5.
- 22) Walter, Y. (2024, 26 February). Embracing the future of Artificial Intelligence in the classroom: the relevance of AI literacy, prompt engineering, and critical thinking in modern education. *International Journal of Educational Technology in Higher Education*, 15.