Artificial Intelligence in Education: Opportunities, Challenges, and the Changing Role of Teachers in the Context of NEP 2020

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Abstract

Artificial Intelligence (AI) is increasingly transforming teaching, learning, assessment, educational administration, and teacher professional development. The emergence of generative AI has created new opportunities for personalized learning, instructional planning, feedback, accessibility, and academic support, while simultaneously raising concerns regarding academic integrity, misinformation, privacy, algorithmic bias, digital inequality, and excessive dependence on technology. In India, the National Education Policy (NEP) 2020 emphasizes the meaningful integration of technology into education while promoting equity, quality, creativity, critical thinking, flexibility, and holistic development. The present conceptual paper examines the opportunities and challenges associated with AI in education and analyses the changing role of teachers in an AI-enabled educational environment. A qualitative conceptual review of recent scholarly literature, policy documents, and international educational frameworks was undertaken. The literature indicates that AI can strengthen educational processes when it is integrated with sound pedagogical practices and appropriate human oversight. However, technological access alone cannot ensure educational improvement. Teachers require technological, pedagogical, ethical, critical-evaluation, and socio-emotional competencies to use AI responsibly. The paper proposes a human-centred approach in which AI functions as a support mechanism rather than a replacement for teachers. The study concludes that effective AI integration requires continuous teacher development, ethical safeguards, appropriate institutional policies, equitable access, and assessment reform. The findings have implications for teacher education institutions, educational administrators, policymakers, and researchers working toward technology-enabled education under NEP 2020.

Keywords: *artificial intelligence, education, teachers, teacher education, NEP 2020, generative AI, digital learning, AI literacy*

Introduction

Technology has always influenced the development of educational systems. From printed textbooks and audio-visual materials to computers, online learning platforms, and mobile technologies, educational practices have continuously adapted to technological change. Artificial Intelligence (AI) represents a significant new stage in this transformation because AI systems can analyse information, recognize patterns, generate content, provide recommendations, and interact with users through natural language.

The emergence of generative AI has made these capabilities increasingly accessible to teachers and students. AI tools can generate lesson plans, explanations, questions, summaries, examples, feedback, and other educational materials within seconds. These developments have the potential to reduce routine workload and provide learners with additional opportunities for practice and support. At the same time, they have created important questions concerning academic integrity, reliability of information, privacy, authorship, assessment, and the future role of teachers.

Research indicates that AI applications in education include intelligent tutoring, adaptive learning, automated assessment, learning analytics, educational chatbots, recommendation systems, and generative content (Crompton & Burke, 2023; Wang et al., 2024). The rapid expansion of these applications requires educational institutions to consider not only technological possibilities but also pedagogical and ethical consequences.

The issue is particularly important in India because the National Education Policy (NEP) 2020 promotes the appropriate use of technology to improve educational access, teaching-learning processes, assessment, and teacher development. However, effective technological integration requires more than providing digital tools. Teachers need the knowledge and professional judgement to determine how, when, and why AI should be used.

The present paper therefore examines the opportunities and challenges associated with AI in education, focusing particularly on the changing role of teachers and the implications for teacher education in the context of NEP 2020.

Objectives of the Study

The study was undertaken with the following objectives:

1. To examine the emerging applications of AI in education.
2. To identify the major opportunities provided by AI-supported education.
3. To analyse the challenges and ethical concerns associated with AI.
4. To examine the changing role and competencies of teachers in an AI-enabled environment.
5. To discuss implications for teacher education in the context of NEP 2020.

Research Methodology

The study adopted a **conceptual and qualitative review design**. Relevant scholarly literature, systematic reviews, international educational frameworks, and policy documents concerning artificial intelligence and education were examined. Particular emphasis was placed on recent literature because of the rapid development of generative AI.

The reviewed literature was thematically organized into four major areas: (a) educational applications of AI, (b) opportunities and benefits, (c) challenges and ethical concerns, and (d) changing teacher roles and competencies. The findings were synthesized through qualitative thematic analysis. No primary survey data or statistical results were generated; therefore, the paper does not claim empirical relationships or causal effects.

Artificial Intelligence in Education

AI refers broadly to computer-based systems capable of performing tasks that traditionally require aspects of human intelligence, including learning, reasoning, prediction, language

processing, and decision support. In education, AI can be used at the classroom, institutional, and administrative levels.

At the classroom level, AI may support personalized instruction, content generation, tutoring, feedback, assessment, and learning analytics. At the institutional level, it can support student services, administrative processes, resource planning, and decision-making. According to Crompton and Burke (2023), AI research in higher education has expanded considerably across teaching, assessment, administration, and student support.

Generative AI has further expanded the educational possibilities because teachers and students can interact with AI systems using ordinary language. However, the usefulness of AI depends on the quality of its outputs and the ability of users to critically evaluate them. AI should therefore be understood as a tool that supports educational activity rather than as an independent educational authority.

Opportunities of AI in Education

Personalized Learning

AI can support personalized learning by analysing learner performance and recommending appropriate content, practice activities, or levels of difficulty. Such systems can potentially provide differentiated support in classrooms where teachers have limited time to address every learner individually.

Personalization may be particularly useful for learners who require additional practice or alternative explanations. Nevertheless, teacher involvement remains necessary because learner needs are influenced by social, emotional, cultural, and contextual factors that automated systems may not adequately understand.

Instructional Planning and Teacher Support

Generative AI can assist teachers in preparing lesson plans, discussion questions, examples, quizzes, rubrics, and differentiated learning materials. Such assistance can reduce time spent on routine preparation and allow teachers to concentrate on instructional design and learner interaction.

The teacher, however, must review and adapt AI-generated material. AI-generated content may contain factual errors, inappropriate examples, or insufficient sensitivity to the particular classroom context.

Assessment and Feedback

AI can support formative assessment by generating questions, analysing responses, identifying common errors, and providing preliminary feedback. These applications can assist teachers in identifying areas where learners require additional support.

However, automated assessment should not completely replace teacher judgement. Educational achievement involves creativity, reasoning, communication, application, and reflection, which may not always be adequately evaluated by automated systems.

Accessibility and Inclusion

AI-based speech recognition, text-to-speech, translation, summarization, and adaptive technologies may improve access to learning resources for diverse learners. These technologies may be particularly valuable in multilingual and inclusive educational settings.

At the same time, AI systems can reproduce linguistic and cultural biases. Therefore, educational institutions must evaluate whether AI tools adequately represent the needs of different learner groups.

Teacher Professional Development

AI can also support teachers' continuing professional development. Teachers can use AI to explore teaching strategies, develop instructional resources, reflect on classroom practices, and identify professional learning materials.

UNESCO's AI Competency Framework for Teachers emphasizes AI foundations, ethics, pedagogy, human-centred thinking, and professional learning as important areas of teacher competence (Miao & Cukurova, 2024).

Challenges and Ethical Concerns

Academic Integrity

Generative AI has created new challenges for traditional assignments. Students can use AI to produce essays, answers, and other academic work without demonstrating their own understanding. This challenges conventional approaches to homework and take-home assessment.

Educational institutions should therefore move toward authentic and process-oriented assessment. Classroom activities, oral presentations, reflective tasks, project-based learning, problem-solving, and supervised writing can provide stronger evidence of genuine learning.

Accuracy and Misinformation

AI systems may generate information that appears convincing but is factually incorrect. Students who lack adequate subject knowledge may have difficulty recognizing such errors.

AI literacy should therefore include source verification and critical evaluation. Students should learn that AI-generated information requires checking against reliable academic and authoritative sources.

Privacy and Data Security

Educational AI systems may process information concerning student performance, behaviour, interactions, and personal characteristics. Improper collection or use of such information may create privacy risks.

Educational institutions should establish clear rules regarding consent, data collection, storage, access, and third-party use. Privacy and data protection should be incorporated into institutional AI policies.

Algorithmic Bias

AI systems can reproduce biases present in their training data. Such bias may influence recommendations, generated content, or automated decisions. Teachers therefore need to understand that AI outputs are not necessarily neutral or objective.

Human oversight is particularly important when AI is used for high-stakes decisions involving students.

Digital Inequality

AI may increase educational inequality when advanced technologies are available primarily to students with better devices, connectivity, and digital skills. Consequently, AI integration must be accompanied by efforts to improve digital infrastructure and access.

NEP 2020's emphasis on equity and inclusion is particularly relevant in this regard. Technological innovation should not create additional barriers for disadvantaged learners.

Changing Role of Teachers

AI is changing the professional role of teachers rather than eliminating the need for teachers. Five major transformations can be identified.

First, teachers are increasingly becoming **learning facilitators** rather than only information providers. Students can access large amounts of information through digital and AI systems, making guidance and interpretation increasingly important.

Second, teachers are becoming **learning designers**. AI may assist in producing instructional content, but teachers remain responsible for selecting appropriate learning objectives, activities, resources, and assessment methods.

Third, teachers are becoming **critical evaluators**. They must evaluate both student work and AI-generated material for accuracy, relevance, bias, and quality.

Fourth, teachers increasingly serve as **ethical guides**. They must help students understand responsible AI use, academic integrity, privacy, authorship, and misinformation.

Finally, teachers remain **human mentors**. Empathy, encouragement, motivation, interpersonal relationships, moral development, and understanding of individual circumstances are fundamental aspects of education that cannot simply be delegated to AI.

Teacher Competencies for the AI Era

Effective AI integration requires a broader conception of teacher competence.

Technological Competence

Teachers should understand basic AI concepts, common educational applications, strengths, and limitations. They do not need to become programmers, but they should possess sufficient AI literacy to make informed decisions.

Pedagogical Competence

Teachers must know how to integrate AI with curriculum objectives and teaching strategies. Technology should be selected because it improves learning rather than simply because it is new.

Ethical Competence

Teachers should understand privacy, bias, transparency, intellectual property, academic integrity, and responsible AI use.

Critical-Evaluation Competence

Teachers should be able to verify AI-generated information, identify errors, compare sources, and encourage students to question AI outputs.

Assessment Competence

Teachers need to design assessments that demonstrate authentic learning. Assessment should increasingly emphasize reasoning, application, creativity, reflection, and communication.

Socio-Emotional Competence

As technology becomes more prominent, human relationships become increasingly important. Teachers require empathy, communication, mentoring, and classroom-management skills to support learners effectively.

Implications for Teacher Education Under NEP 2020

Teacher education institutions need to respond systematically to the growth of AI. Digital literacy alone is no longer sufficient. Teacher education programmes should incorporate AI literacy, ethical use, AI-supported pedagogy, assessment reform, data privacy, and critical evaluation.

Teacher education curricula may include modules on:

- Foundations and applications of AI in education;
- Generative AI and instructional planning;
- AI-supported assessment and feedback;
- Academic integrity in the age of generative AI;
- Data privacy and ethical AI;
- Algorithmic bias and fairness;
- AI literacy and critical evaluation;
- Inclusive and multilingual applications of AI; and
- AI-supported professional development.

Professional development should be continuous because AI technologies change rapidly. Teacher education institutions should create communities of practice where teachers can exchange experiences and critically examine new AI applications.

NEP 2020 emphasizes critical thinking, creativity, flexibility, technology integration, and holistic development. AI can contribute to these objectives when it is used within a pedagogically and ethically appropriate framework. Technology should therefore remain subordinate to educational goals.

Proposed Human-Centred Framework

Based on the literature reviewed, the present paper proposes a **Human-Centred AI Education Framework** consisting of five interconnected dimensions:

1. AI Literacy: Understanding AI capabilities, limitations, and educational applications.

2. Pedagogical Integration: Selecting AI tools according to learning objectives and learner needs.

3. Ethical Responsibility: Protecting privacy, ensuring fairness, maintaining academic integrity, and addressing bias.

4. Critical Evaluation: Verifying AI-generated information and developing critical thinking among learners.

5. Human Agency: Ensuring that teachers and learners retain responsibility for important educational decisions.

The framework emphasizes that successful AI integration requires balance. Technology without pedagogy may become inefficient; technology without ethics may create harm; and technology without human agency may weaken the educational relationship.

Educational Implications

The findings have several implications for educational stakeholders.

For **teacher education institutions**, AI literacy should become part of both pre-service and in-service teacher development. For **teachers**, AI should be treated as a support resource that requires professional judgement. For **students**, AI literacy should include responsible use, information verification, and academic integrity. For **educational administrators**, clear institutional policies should address acceptable use, assessment, privacy, and data protection. For **policymakers**, AI initiatives should address digital inequality, infrastructure, teacher preparedness, language diversity, and ethical safeguards.

Recommendations

The following recommendations are proposed:

- AI literacy should be incorporated into teacher education programmes.
- Educational institutions should formulate clear and regularly updated AI policies.
- Teachers should receive continuous professional development in AI-supported pedagogy.
- Assessment should increasingly emphasize authentic and process-oriented learning.
- Students should be taught responsible and critical AI use.
- Privacy and data security should be central to institutional AI implementation.
- AI tools should be evaluated for accuracy, accessibility, cultural relevance, and bias.
- Equitable access to AI-enabled educational resources should be promoted.

- Human judgement should remain central to important educational decisions.
- Empirical research should examine the effects of AI on learning, teacher workload, motivation, creativity, and educational equity.

Limitations

The study is conceptual and based on secondary literature and policy documents. It does not include primary data from teachers or students and therefore does not establish statistical relationships or causal effects. Furthermore, AI technologies are developing rapidly, meaning that specific applications and challenges may change over time. Future research should validate the proposed framework through empirical studies.

Conclusion

Artificial Intelligence has considerable potential to transform education by supporting personalized learning, instructional planning, assessment, accessibility, and teacher professional development. At the same time, it presents serious challenges related to academic integrity, misinformation, privacy, algorithmic bias, and educational inequality.

The most important implication is that AI should complement rather than replace teachers. The teacher's role is evolving from information provider toward facilitator, learning designer, critical evaluator, ethical guide, and human mentor. This transformation requires teachers to develop technological, pedagogical, ethical, critical, and socio-emotional competencies.

In the context of NEP 2020, responsible AI integration can contribute to educational quality, innovation, inclusion, and lifelong learning. However, the success of AI in education will not depend simply on the availability of advanced technology. It will depend on how effectively teachers are prepared, how responsibly institutions implement AI, and how strongly human values remain at the centre of education.

The future of education should therefore not be understood as **teachers versus technology**, but as **teachers using technology intelligently, critically, ethically, and humanely to improve learning**.

References

- Aljemely, Y. A. (2024). Challenges and best practices in training teachers to utilize artificial intelligence: A systematic review. *Frontiers in Education, 9*, Article 1470853. https://doi.org/10.3389/feduc.2024.1470853

- Almasri, F. (2024). Exploring the impact of artificial intelligence in teaching and learning of science: A systematic review of empirical research. *Research in Science Education, 54*, 977–997. https://doi.org/10.1007/s11165-024-10176-3

- Bond, M., Khosravi, H., De Laat, M., Bergdahl, N., Negrea, V., Oxley, E., Pham, P., Chong, S. W., & Siemens, G. (2024). A meta systematic review of artificial intelligence in higher education: A call for increased ethics, collaboration, and rigour. *International Journal of Educational Technology in Higher Education*, *21*, Article 4. https://doi.org/10.1186/s41239-023-00436-z

- Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education, 20*, Article 22. https://doi.org/10.1186/s41239-023-00392-8

- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
- Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeiffer, F., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., … Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences, 103*, Article 102274. https://doi.org/10.1016/j.lindif.2023.102274
- Miao, F., & Cukurova, M. (2024). *AI competency framework for teachers*. UNESCO. https://doi.org/10.54675/ZJTE2084
- Ministry of Education, Government of India. (2020). *National Education Policy 2020*. Government of India.
- OECD. (2023). *OECD digital education outlook 2023: Towards an effective digital education ecosystem*. OECD Publishing. https://doi.org/10.1787/c74f03de-en
- Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments, 10*, Article 15. https://doi.org/10.1186/s40561-023-00237-x
- UNESCO. (2021). *AI and education: Guidance for policy-makers*. UNESCO.
- UNESCO. (2023). *Guidance for generative AI in education and research*. UNESCO.
- UNESCO. (2024). *AI competency framework for students*. UNESCO.
- Wang, S., Wang, F., Zhu, Z., Wang, J., Tran, T., & Du, Z. (2024). Artificial intelligence in education: A systematic literature review. *Expert Systems with Applications, 252*, Article 124167. https://doi.org/10.1016/j.eswa.2024.124167
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—Where are the educators? *International Journal of Educational Technology in Higher Education, 16*, Article 39. https://doi.org/10.1186/s41239-019-0171-0