

2. India AI Mission – Science & Technology

India AI's mission envisages the opening of the AI Centres for Excellence (CoE) in education.

IndiaAI Mission – A key focus of this mission is the development of a high-end common computing facility equipped with 18,693 Graphics Processing Units (GPUs), making it one of the most extensive AI compute infrastructures globally. This capacity is nearly nine times that of the open-source AI model DeepSeek and about two-thirds of what ChatGPT operates on.

India's AI Integration in Education – Overview

Artificial Intelligence (AI) is emerging as a transformative enabler in India's education sector, offering solutions for personalized learning, administrative efficiency, and inclusion. India's focus on digital transformation in education is supported by the National Strategy for AI (2018), National Education Policy (NEP) 2020, and several digital infrastructure initiatives like DIKSHA, PM e-VIDYA, and NDEAR. However, effective integration demands attention to infrastructure gaps, teacher capacity, ethical concerns, and digital equity.

Current Digital Readiness in Schools

a) Computer Access – The percentage of schools with computer access rose from 57.2% in 2023–24 to 64.7% in 2024–25. This expansion reflects targeted funding through Samagra Shiksha, and the prioritization of ICT-enabled learning under government digital education missions.

b) Internet Connectivity – Schools with internet access increased from 53.9% to 63.5% in the same period. Yet, connectivity disparities persist across rural and government schools, affecting the uniform rollout of AI-based learning tools.

c) Teacher Training and Digital Literacy – Less than 50% of secondary and higher secondary teachers are trained in computer usage or digital pedagogy. This skills gap limits effective classroom integration of AI-based tools and calls for continuous professional development (CPD) programs.

d) Student Access and Digital Divide –

Gender gap – Male students exhibit higher digital literacy levels than female students.

Rural–urban divide – Students in rural, remote, or socio-economically disadvantaged areas face infrastructural and affordability constraints. Bridging this divide is vital to ensure equitable AI adoption and prevent new forms of educational exclusion.

AI in Policy and Curriculum

a) National Strategy for Artificial Intelligence (2018) – Identified education as a core sector for AI application under the theme “AI for All.” Suggested reforms include –

1. Integration of AI and digital literacy in school curricula.
2. Use of adaptive learning platforms, intelligent tutoring systems, and predictive analytics to identify at-risk students.
3. Digitization of student and teacher data to improve performance monitoring.

Encouraged partnerships between public, private, and academic institutions to build scalable AI solutions for education.

b) National Education Policy (NEP) 2020 – Envisions AI as a transformative driver of holistic, inclusive, and flexible learning. Key provisions include –

1. Deployment of AI-based assessment tools and feedback systems for personalized learning.
2. Creation of an AI-enabled holistic progress card integrating academic, cognitive, and socio-emotional growth indicators.
3. Strengthening digital and computational thinking from foundational stages.

NEP also promotes research collaboration and AI literacy as essential 21st-century competencies.

c) CBSE's AI Curriculum Integration

The Central Board of Secondary Education (CBSE) introduced AI as an optional subject from Class VIII and as a skill subject in Classes IX–XII.

Developed –

1. AI Curriculum Handbook and Integration Manual to guide teachers.
2. Age-appropriate modules across three domains – Data, Computer Vision, and Natural Language Processing (NLP).

Promotes project-based learning, encouraging students to solve real-life community problems using AI.

d) Digital Infrastructure and Schemes

DIKSHA – National platform for digital teaching-learning resources in multiple languages.

PM e-VIDYA – Integrates TV, radio, and online platforms for multimodal digital access.

NDEAR (National Digital Education Architecture) – A blueprint for federated digital systems ensuring interoperability, scalability, and data security.

Samagra Shiksha – Provides funding for ICT labs, teacher training, and digital resource development. Collectively, these frameworks form India's "AI readiness backbone" for school education.

Significance of AI Adoption in Schools

a) Personalized and Adaptive Learning – AI tools dynamically tailor content, pace, and difficulty to student performance, ensuring individualized learning pathways. Facilitates remedial support for slower learners and extension tasks for advanced students.

b) Multilingual and Linguistic Inclusivity – AI-driven translation and speech technologies enable multilingual content delivery, addressing India's linguistic diversity. Supports NEP's emphasis on mother-tongue-based education.

c) Support for Learners with Disabilities – AI-based assistive technologies (e.g., text-to-speech, speech recognition, and predictive text systems) enhance accessibility for students with visual, hearing, or mobility impairments. Promotes inclusive education aligned with the Rights of Persons with Disabilities Act (RPwD), 2016.

d) Administrative Efficiency – Automates routine tasks like grading, attendance tracking, and progress reporting. Allows teachers to focus on pedagogical innovation, mentorship, and socio-emotional support.

e) Advanced Assessments and Feedback – AI enables competency-based assessments and real-time feedback, shifting focus from rote memorization to critical thinking and conceptual understanding.

f) Predictive Analytics for Student Retention – AI systems analyze data such as attendance and performance to identify students at risk of dropping out. Facilitates timely interventions and counseling, improving retention rates.

Challenges and Concerns

a) Algorithmic Bias and Fairness – AI systems trained on limited or skewed datasets may reinforce existing gender, linguistic, or socio-economic biases. Unchecked, this could deepen educational inequities rather than reduce them.

b) Data Privacy and Security – Student and teacher data are sensitive and must be safeguarded.

Risks include unauthorized access, profiling, and data misuse, particularly in the absence of robust compliance mechanisms.

c) AI Misinformation and Quality Control – Generative AI tools can produce inaccurate or misleading content ("hallucinations"), compromising educational integrity. Teachers need training to curate and fact-check AI-generated materials.

d) Lack of Localized Datasets and Language Support – Many AI platforms are English-centric, lacking regional language datasets or culturally contextual models. This limits regional adoption and student engagement in vernacular-medium schools.

e) Digital Divide and Infrastructure Gaps – Students in rural and low-income regions face barriers like lack of electricity, devices, and connectivity. This perpetuates a digital exclusion cycle, especially affecting girls and marginalized communities.

f) Cognitive and Pedagogical Concerns – Excessive reliance on AI may erode foundational cognitive skills, creativity, and problem-solving abilities. It may also reduce teacher-student interaction, essential for socio-emotional development.

Policy Recommendations and the Way Forward

a) Transparency and Explainability – AI systems in education must disclose how and why they make recommendations, in ways understandable to teachers, parents, and students. Enhances trust, accountability, and interpretability.

b) Privacy and Consent Safeguards – Data use must align with the Digital Personal Data Protection (DPDP) Act, 2023, ensuring –

1. Parental consent for minors' data collection.
2. Purpose limitation, data minimization, and restricted retention periods.
3. Regular data audits and third-party security assessments.

c) Bridging Infrastructure Gaps – Expand broadband connectivity in rural areas under BharatNet and similar initiatives. Invest in school-level computing infrastructure, maintenance units, and IT support through public-private partnerships.

d) Teacher Empowerment – Scale up AI literacy and pedagogical training through DIKSHA and SCERTs. Focus not just on technical know-how but also AI ethics, bias recognition, and responsible use.

e) Localization and Inclusivity – Develop AI tools in Indian languages using datasets from initiatives like Bhashini (National Language Translation Mission). Encourage open-source AI models customized for local curriculum and contexts.

f) Institutional and Regulatory Framework – Establish national AI ethics and audit guidelines for education technology platforms. Clarify liability, redress mechanisms, and content verification standards to safeguard learners.

Conclusion

Integrating AI in education represents a paradigm shift toward a data-driven, learner-centric system. However, technological sophistication must be matched with ethical responsibility, teacher readiness, and equitable access. India's approach—combining digital infrastructure, policy innovation, and social inclusion—positions it to become a global model for AI-enabled, human-centric education. In essence, the goal is not to replace teachers with algorithms but to empower educators and students alike through intelligent, inclusive, and ethical technology.

Source – <https://www.thehindu.com/sci-tech/technology/how-is-ai-transforming-teaching-and-learning-practices-in-indian-classrooms/article70128321.ece#~:text=Such%20a%20training%20shall%20enable,of%20both%20teachers%20and%20students>