

Artificial Intelligence in Online Learning Platforms: Transforming Education in the Indian Context

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Abstract

The infusion of artificial intelligence into digital learning environments is dramatically transforming educational practices worldwide. In India, this evolution resonates with the core principles of the National Education Policy 2020, which champions tailored instruction, broadened inclusion, and fair access to digital resources. This paper examines the present scenario of AI deployment within India's online education sector, focusing on its uses in adaptive learning, smart tutoring systems, administrative streamlining, and improving access for learners with specific learning disabilities. Through an analysis of government-led projects like DIKSHA and the India AI Mission, along with the growing presence of AI-enabled EdTech solutions, the study weighs both the prospects and the obstacles accompanying this technological shift. Although AI offers remarkable opportunities to scale education and make it more democratic, persistent issues—such as the digital gap, linguistic plurality, and privacy risks—remain significant. The paper ends with actionable suggestions for policymakers and teachers to adopt AI in a responsible manner, so that every learner across the subcontinent can benefit equitably.

Keywords: Artificial Intelligence, Online Learning, National Education Policy 2020, India, Educational Technology, Personalized Learning, Digital Divide.

Introduction

The rapid advancement of educational technology has triggered a fundamental change in how teaching and learning occur, shifting away from conventional, teacher-dominated classrooms toward more dynamic, student-centered experiences. At the heart of this change lies artificial intelligence. AI technologies—ranging from machine learning and natural language processing to predictive analytics—are redefining the creation, delivery, and evaluation of educational content. For a country like India, with its vast young population and extreme socioeconomic contrasts, deploying AI in education is both a strategic necessity and a formidable challenge. The ambitious goals of the National Education Policy 2020 have spurred both government agencies and private EdTech firms to increasingly rely on AI to provide quality education at scale, address learning gaps, and equip students for a technology-driven global economy (Ministry of Education, 2023; Press Information Bureau, 2026a).

The Indian Educational Landscape and NEP 2020:

The National Education Policy 2020 represents a landmark shift in India's educational framework. Acknowledging that AI, big data, and machine learning will reshape traditional job markets, the NEP strongly advocates multidisciplinary learning and digital proficiency (Government of India, 2020). It urges a move away from rote memorization and champions customized, experiential learning pathways that match individual student strengths. The policy explicitly calls for introducing contemporary subjects such as artificial intelligence, design thinking, and computational thinking at suitable stages of school education (Ministry of Education, 2025). In line with this, the Central Board of Secondary Education has already introduced AI as a skill module from Class VI and as an optional subject from Classes IX to XII (Press Information Bureau, 2025).

AI serves as a key facilitator for the NEP's vision of a flexible and inclusive education system. Initiatives like the India AI Mission, launched in March 2024 with a ₹10,371 crore budget over five years, aim to make technology accessible to underserved, rural, and tribal populations (Press Information Bureau, 2026b). The Union Budget 2025-26 further set aside ₹500 crore for a Centre of Excellence in AI for Education, underlining the national commitment to AI-driven educational change (Press Information Bureau, 2025). Moreover, bodies such as CBSE and NCERT have woven AI literacy into school curricula from early secondary grades, and the SOAR (Skilling for AI Readiness) program now offers structured AI

modules to both students and teachers nationwide (Press Information Bureau, 2025; Ministry of Skill Development and Entrepreneurship, 2025). This top-down policy approach ensures that AI is not merely employed as a teaching aid but is also studied as a foundational discipline.

Theoretical Foundations for AI in Education:

The use of AI in educational contexts rests on several established theories that shape how intelligent learning systems are designed and implemented. Siemens' (2013) connectivism argues that learning in the digital era occurs through distributed networks of people and information—a concept that AI-powered platforms operationalize via adaptive content delivery and personalized suggestions. Learning analytics, also articulated by Siemens (2013), offers a methodological basis for collecting and examining student interaction data to guide instructional choices—a practice increasingly adopted by Indian platforms such as DIKSHA to pinpoint learning gaps and suggest relevant resources (NITI Aayog, 2025). Woolf et al. (2013) laid out grand challenges for AI in education, including the creation of intelligent tutors capable of offering the kind of personalized, adaptive guidance that human instructors provide. These theoretical underpinnings are crucial for appreciating how AI tools are engineered to operate within India's complex educational environment.

Major Applications of AI in Indian eLearning Platforms:

AI's role in India's digital education ecosystem spans several domains, greatly enriching both teaching and learning.

Personalized Learning and Adaptive Assessments:

The traditional “one-size-fits-all” approach proves highly ineffective in a nation as diverse as India. AI-driven adaptive platforms use machine learning algorithms to continuously evaluate a student's performance, behaviour, and engagement in real time. Based on this analysis, the system modifies the pace, difficulty, and sequence of content. For instance, advanced learning management systems can detect when a learner struggles with a specific maths concept and automatically offer remedial exercises, while simultaneously challenging more advanced students with complex problems (Ranjan, 2020). Sakri et al. (2025) further showed that personalized recommendation systems significantly boost engagement, retention, and academic achievement in online settings.

A notable evaluation study in Andhra Pradesh, coled by Nobel laureate Michael Kremer, examined the ConveGenius. AI Personalized Adaptive Learning platform

and found that students using the software more than doubled their learning rates—gains were roughly 2.3 times higher than those of peers not using the platform (Kremer et al., 2025). Deployed in over 1,200 government schools, the PAL software tailors instruction to each student's level, effectively addressing the wide variation in learning abilities within heterogeneous classrooms. Notably, girls gained the equivalent of 2.31 additional years of schooling through the program, underscoring AI's potential to foster gender equity in educational outcomes (Kremer et al., 2025).

Intelligent Tutoring Systems and Virtual Assistants:

Intelligent tutoring systems replicate the experience of one-on-one human coaching. In India, where student-to-teacher ratios are often unfavorable—especially in higher education and competitive exam preparation—ITS offer a scalable remedy. These platforms deliver instant feedback, step-by-step guidance, and round-the-clock academic support. The SATHEE platform, developed by IIT Kanpur with backing from the Ministry of Education, is a prime example at the national level. SATHEE integrates an AI conversational tutor, an AI doubt solver, personalized study plans, adaptive learning paths, and AI-powered mock tests with detailed performance analytics, offering free resources for students preparing for major exams like JEE, NEET, and CUET (IIT Kanpur, 2026). Its multilingual resources and completely free access model show how AI can be responsibly deployed on a large scale to improve learning outcomes while maintaining inclusivity (IIT Kanpur, 2026).

Similarly, Infinity Learn by Sri Chaitanya launched AINA, India's first voice-first AI mentor powered by Google Cloud, which resolves over 200,000 student doubts monthly across nine Indian languages and English (Infinity Learn, 2025). Datta's (2025) research on incorporating robotics and AI algorithms to support hands-on learning and adaptive tutoring further confirms the effectiveness of technology-enhanced instruction in Indian settings. Sarkar and Sarkar's (2026) work on cognitive AI learning environments for ethical, context-aware tutoring in higher education highlights the sophisticated capabilities emerging in Indian ITS research.

Accessibility and Inclusivity:

AI holds immense promise for making education accessible to students with special needs. Recent innovations in the Indian EdTech space have focused heavily on specific learning disabilities. Web based tools like Readable assist children with dyslexia by improving phonetic awareness through interactive exercises, while prototype systems such as Voice Fusion AI provide multilingual assistive support for Indian languages (Press Information Bureau, 2026a). Khan and Sujatha (2025) demonstrated that AI can enhance teaching in special education and has the potential to revolutionize learning outcomes for Indian children with disabilities by creating a more accessible and inclusive educational landscape.

Cognitii, India's first AI and human infrastructure platform for inclusive education, helps institutions screen early, plan support faster, and deliver personalized learning for children with autism, ADHD, dyslexia, and intellectual disabilities (Cognitii, 2026). The Drishti Library initiative at IIIT-Hyderabad, developed under the Bhashini mission, uses AI and language technologies to convert higher education textbooks into Braille and audiobook formats across 12 major Indian languages, significantly expanding access for visually impaired learners (India Today, 2025b). Furthermore, the government's DIKSHA platform has integrated AI-based keyword search in videos and read aloud features specifically designed for visually impaired students (Ministry of Education, 2025).

Administrative Automation and AI-Powered Assessment:

Beyond instruction, AI drastically reduces the administrative burden on educators. Indian schools and universities are integrating AI tools to automate attendance tracking, schedule timetables, and grade standardized assessments. A groundbreaking AI-driven assessment pilot in Jodhpur, Rajasthan, graded over 70,000 students across 1,000 schools in seconds, generating detailed, bias-free report cards that help teachers identify learning gaps and plan targeted interventions (The Indian Express, 2026). The Deep-Grade platform by Chennai based startup Smartail enables automated grading of handwritten and descriptive answers, providing real time performance analytics and faster feedback (Shaastra, 2026).

Pratham, one of India's largest education nonprofits, partnered with Anthropic to develop the "Anytime Testing Machine," an end to end assessment system powered by Claude that generates curriculum aligned tests, digitizes handwritten answers, automatically grades them, and delivers personalized feedback (Pratham International, 2026). Designed to strengthen learning pathways within India's

systemic realities—under resourced schools, high pupil teacher ratios, and uneven connectivity—this system allows educators to reallocate time toward high impact activities such as curriculum design, mentorship, and personalized interventions (Pratham International, 2026).

The EdTech Ecosystem and Public-Private Synergy

The collaboration between public and private sectors is accelerating AI adoption in India. National platforms have incorporated AI to manage large user bases. DIKSHA, serving over 200 million students and teachers, leverages AI to recommend contextual content based on geographic and linguistic backgrounds and has integrated features such as personalized learning paths, adaptive assessments, and automated translation into 12 Indian languages (NITI Aayog, 2025; ANI News, 2025). India-AI Youth initiatives, including the Gen AI Resource Hub and LLM for Young Developers Course, are equipping young Indians with applied AI skills, fostering a shift from digital consumers to digital creators (Press Information Bureau, 2026b).

Private EdTech platforms are similarly advancing AI integration. NITI Aayog's (2026) recent report on the school education system explicitly calls for embedding AI in pedagogy to modernize teaching and learning through adaptive tools, real time feedback, and student progress tracking. The report also acknowledges that the rapid expansion of AI-based tools has outpaced the capacity of curricula and teacher preparation systems, and that teacher training remains short, generic, and detached from classroom realities (NITI Aayog, 2026). This candid assessment from the government's premier think tank signals both the recognized potential and the acknowledged implementation challenges of AI in Indian education.

Challenges and Ethical Considerations

Despite promising advances, the integration of AI in Indian online learning platforms faces significant systemic hurdles.

The Digital Divide and Infrastructure Constraints

The most pressing challenge is India's digital divide. While urban areas enjoy highspeed internet and widespread device access, rural areas often lack basic digital infrastructure. Data from the National Statistics Office shows that only 26.4% of rural males aged 15–24 are digitally literate, compared to 44.2% in urban areas; among rural females, the figure drops to just 14.3% (ET Edge Insights, 2026). According to UDISE, only 18.47% of rural schools have internet connectivity versus 47.29% in urban regions (India Today, 2025a). A study by the

Azim Premji Foundation found that about 60% of rural schoolchildren lack access to online learning due to unavailability of devices or poor broadband (ET Edge Insights, 2026). AI-powered platforms require substantial bandwidth and computing power; without targeted investments in rural broadband and affordable hardware, AI deployment risks widening existing educational inequalities.

Linguistic Diversity

India has 22 official languages and hundreds of dialects. Most global AI models are trained predominantly on English datasets, creating a fundamental mismatch with the linguistic realities of Indian learners. For AI tutoring and NLP chatbots to be truly effective and inclusive, they must be localized. The Bhashini mission, India's national language translation initiative, has made significant progress—over 350 AI models supporting all 22 scheduled languages have been built, and the free Bhashini app has crossed one million downloads (Indian Express, 2025). About 200 higher education courses have been translated from English into eight Indian languages with subtitles (Indian Express, 2025). The Bhashini Samudaye platform has on-boarded over 10,000 contributors to support the development of a multilingual AI ecosystem through crowdsourced linguistic data (Press Information Bureau, 2026c). Nevertheless, building robust, context-aware multilingual AI models for India's diverse linguistic landscape remains an ongoing challenge.

Data Privacy and Security

AI algorithms require vast amounts of personal data to function effectively, raising significant privacy concerns. In educational settings, this includes sensitive information about a student's cognitive abilities, behavioral patterns, and academic history. The Digital Personal Data Protection Act, enacted in 2023 and operationalized through rules notified in late 2025, establishes a comprehensive legal framework for safeguarding student data (Lexology, 2026). Under the DPDPA, educational institutions qualify as Data Fiduciaries, while AI vendors typically function as Data Processors (Lexology, 2026). The National Human Rights Commission has taken cognizance of alleged DPDPA violations by AI and EdTech platforms, issuing notices to key government bodies and directing compliance reports (Economic Times Telecom, 2026). Ensuring that EdTech platforms adhere to strict data protection regulations, anonymize student data, and prevent algorithmic bias is crucial. Furthermore, institutions must actively educate students on digital responsibility and data privacy.

Teacher Capacity and Systemic Readiness

NITI Aayog's (2026) report highlights a critical gap: educators are rarely trained to teach foundational AI concepts or digital reasoning skills, leaving students without adequate understanding of AI systems that will likely shape their future work and civic participation. The report further notes the absence of clear frameworks for data governance, privacy, authorship, and responsible AI use in schools (NITI Aayog, 2026). Recognizing this, India launched the AI Literacy for Teachers program in 2026, aiming to train over one million teachers by 2027 through the Bodhan AI Centre of Excellence incubated at IIT Madras (India Today, 2026). The program positions AI as a daily classroom assistant in lesson planning, content creation, assessments, and student feedback, addressing one of the most pressing challenges—teacher workload and classroom diversity (The Tribune, 2026). This signals a growing awareness that successful AI integration requires not only technological infrastructure but also substantial investment in human capacity building.

Future Directions and Policy Recommendations

The integration of AI into Indian education is at a pivotal moment. Several emerging trends merit attention. First, the development of India-specific large language models trained on multilingual datasets will be critical for overcoming the English-centric bias of current AI tools. The Bharat Gen initiative and ongoing work under Bhashini represent important steps in this direction. Second, the convergence of AI with other emerging technologies—blockchain for credentialing, augmented and virtual reality for immersive learning, and the Internet of Things for smart classrooms—will open new avenues for educational innovation.

Policymakers should prioritize several actions: accelerating rural broadband infrastructure under the National Broadband Mission to ensure AI-enabled education reaches the last mile; mandating and enforcing robust data protection frameworks specific to educational contexts under the DPDPA; scaling teacher AI literacy programs beyond the initial one-million-teacher target to cover the entire educator workforce; investing in open-source, publicly-funded AI models trained on Indian languages to reduce dependence on proprietary global platforms; and establishing clear ethical guidelines for algorithmic fairness, transparency, and accountability in educational AI applications.

Conclusion

The integration of artificial intelligence into online learning platforms represents a monumental shift for India's education sector. By aligning with the progressive mandates of NEP 2020, AI-driven technologies offer the potential to deliver personalized, inclusive, and high-quality education to millions of learners. Applications ranging from adaptive learning algorithms in Andhra Pradesh's government schools to AI-assisted platforms like Drishti Library for students with disabilities demonstrate the technology's capacity to democratize learning at an unprecedented scale.

However, realizing this potential requires addressing foundational challenges. Policymakers and educators must work collaboratively to bridge the digital divide, develop robust multilingual AI models, establish stringent data privacy frameworks, and invest substantially in teacher capacity building. The NITI Aayog's call for AI-driven learning and district-level task forces, combined with initiatives like the AI Literacy for Teachers program, signal a growing institutional recognition that technology alone cannot transform education—it must be accompanied by systemic reforms, infrastructure development, and human capability enhancement. Ultimately, AI should not be seen as a replacement for human educators, but rather as a powerful pedagogical tool that augments the teaching process, ensuring that the Indian youth are equipped to navigate and lead in the future global economy.

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