The Role of Artificial Intelligence in Transforming Higher Education and Academic Research

Ms. Yogita, Research Scholar Department of Political Science, Chaudhary Devi Lal University Sirsa

Abstract

Artificial Intelligence (AI) is transforming higher education and academic research by reshaping teaching practices, learning processes, and knowledge production In higher education, Al-driven tools such as adaptive learning systems, intelligent tutoring, and automated assessment enhance instructional efficiency and promote personalized, student-centered learning environments. Al also improves administrative decision-making through data analytics and process automation. In academic research, Al accelerates literature synthesis, large-scale data analysis, and predictive modeling, thereby increasing the speed, scope, and accuracy of scholarly inquiry and supporting interdisciplinary innovation. Despite these benefits, Al integration raises significant concerns, including algorithmic bias, data privacy, academic integrity, and digital inequality. This paper critically examines both the transformative potential and ethical challenges of Al adoption in academia. It argues that effective implementation requires transparent governance, robust regulatory frameworks, and sustained human oversight to ensure that technological advancement aligns with academic values and equity.

Keywords: artificial intelligence, higher education India, NEP 2020, IndiaAI Mission, SWAYAM, DIKSHA, personalized learning, AI ethics, digital divide, generative AI, learning analytics, academic integrity

Introduction

Artificial Intelligence (AI) refers to the simulation of human cognitive processes learning, reasoning, problem-solving, perception, and language understanding by computational systems. The term was formally coined at the 1956 Dartmouth Conference, and AI development over subsequent decades progressed from narrow, rule-based expert systems to the contemporary era of machine learning, deep learning, and large language models (LLMs). In India, formal AI research dates to the Knowledge Based Computer Systems (KBCS) project of 1986, the country's first major nationally coordinated AI program, followed by the establishment of C-DAC in 1988 to advance supercomputing capacity (Ministry of Skill Development and Entrepreneurship, 2024). By 2024, India had emerged as a global leader in AI skill penetration, ranking first globally in the Stanford AI Index with a score of 2.8, surpassing the United States and Germany (About Bajaj Finserv, 2025). Modern tools — including generative AI platforms such as ChatGPT, Google Gemini, and BharatGPT — have moved AI from specialized research into everyday educational and professional use, placing Indian higher education institutions at a pivotal moment of technological transformation.

Importance of AI in the Modern Indian Education System

The modern Indian education system faces formidable challenges: approximately 1.5 million schools, 250 million students, a teacher shortage of roughly one million, and persistent disparities between urban and rural educational quality (Education for All in India, 2025). AI offers tools uniquely suited to these challenges — personalizing learning at scale, automating administrative burden, enabling multilingual content delivery, and supporting data-driven educational planning. India's NEP 2020 recognized AI's potential at the outset, envisioning the integration of AI, machine learning, and adaptive platforms across all stages of education, and proposing Centres of Excellence in AI for Education to drive context-specific implementation (Ministry of Education, 2020). UNESCO (2023) similarly underscored generative AI's transformative potential globally, while noting that fewer than 10 percent of schools and universities had developed institutional policies on its use at the time of their global survey — a governance gap as critical in India as in any country. The OECD's Digital Education Outlook

(2023) further documented the growing role of AI in student information systems, digital assessment platforms, and study guidance tools across member and partner countries.

Scope of AI in Indian Universities and Research Institutions

The scope of AI adoption in Indian higher education encompasses teaching and learning, academic research, curriculum design, student support, and administration. India's premier institutions — the IITs, IIMs, IISc, and IGNOU — have integrated AI into research programs and incubated AI-based startups through dedicated innovation ecosystems. IIT Madras Research Park, for instance, has attracted AI research funding from TCS, Ericsson, Intel, and GE Research, and collaborates with DRDO, Indian Railways, and ISRO on applied AI projects. The IndiaAI Mission, approved by the Cabinet in March 2024 with a budget of ₹10,371.92 crore over five years, is structured around seven pillars: AI compute infrastructure, foundational model development, the IndiaAI Datasets Platform, application development, Future Skills, startup financing, and Safe and Trusted AI (Press Information Bureau, 2024). The Future Skills pillar specifically targets higher education, supporting 500 PhD fellows, 5,000 postgraduate students, and 8,000 undergraduate students in AI-related programs, with 73 institutions onboarded and 31 labs launched in partnership with NIELIT and industry by July 2025 (PIB, 2024).

AI-Driven Teaching and Learning Methods

India has built one of the world's most extensive national digital learning ecosystems through platforms DIKSHA (Digital Infrastructure for Knowledge Sharing) and SWAYAM (Study Webs of Active Learning for Young Aspiring Minds). DIKSHA provides multilingual digital resources in over 35 Indian languages to 27.5 crore users — including 1.5 crore teachers across 36 states — with 70 percent rural penetration and QR-coded textbooks enabling instant offline content access (Banerjee &Biswas,2025). SWAYAM, developed with support from Microsoft, offers free MOOCs from Class 9 through postgraduate level; as of 2024, it recorded over four crore enrolments across 11,772 courses from 203 partnering institutions, with the UGC enabling formal credit transfer into degree programs. The OECD's Digital Education Outlook (2023) documented how national digital platforms of this kind can serve as critical infrastructure for AI-enhanced education, enabling real-time learning analytics to identify gaps and personalize delivery. India's PM eVidya program further extends digital education to students without internet access, broadcasting educational content across 12 SWAYAM Prabha DTH channels and through community radio in regional languages (Roombr, 2025).

Personalized Learning Through AI Algorithms

Personalized learning through AI is a central aspiration of NEP 2020, which explicitly envisions AI developing tailored learning systems — analyzing students' progress, identifying areas of strength and weakness, and offering individualized educational content through adaptive platforms (Daily Pioneer, 2024). Indian EdTech platforms have been at the forefront: BYJU'S leveraged AI to deliver adaptive assessments and tailored content to millions of students, while the government's BHASHINI platform incorporates AI-based multilingual processing across 22 Indian languages, enabling voice-enabled learning tools for vernacular-medium students (Education for All in India, 2025). Kasneci et al. (2023), emphasized that advanced AI chatbots and tutoring systems trained on large datasets produce contextually relevant responses enabling more natural, engaging, and personalized educational interactions. The OECD (2024) further noted that AI techniques used in intelligent tutoring systems address individual learner requirements through multiple approaches, making them particularly powerful for inclusive education in diverse, large-scale systems such as India's. AI can also bridge India's educational gaps through real-time language translation and voice recognition, supporting students whose primary language differs from the medium of instruction (Daily Pioneer, 2024).

Virtual Tutors and Intelligent Learning Systems

Virtual tutors powered by AI are especially relevant to India's severe teacher shortage. With approximately one million teachers needed to serve 250 million students, AI tutoring systems and chat-bots can provide vital supplementary instruction (Education for All in India, 2025). India's NISHTHA Online platform uses AI to deliver structured, grade-specific professional development to educators, and the government announced teacher training on a new AI curriculum planned for all schools from the 2026–27 academic year (CoinGeek, 2025). A systematic review by Labadze et al. (2023) found that AI chatbots serve students as learning assistants — providing learning materials, addressing queries promptly, facilitating micro-learning, and guiding learners step by step through adaptive processes. However, the same review cautioned that chatbots may struggle with complex or ambiguous questions and can provide inaccurate answers if not designed carefully for specific educational objectives — a concern magnified in India where students interact in diverse Englishes and regional language variants. Tondeur et al. (2024) similarly found in a scoping review that students perceive AI chatbots as highly useful for immediate feedback on writing, coding, and academic tasks, while also identifying the need for clear institutional guidelines governing their academic use.

Artificial Intelligence in Academic Research:

AI Tools for Data Collection and Analysis: AI is transforming academic research across Indian institutions, enabling researchers at IITs, IIMs, IISc, and central universities to gather and analyze data at previously unattainable scales. Machine learning algorithms identify patterns in large, complex datasets impossible for traditional statistical methods to process, while natural language processing tools assist with thematic coding of qualitative data in both English and Indian languages. The IndiaAI Datasets Platform, established under the IndiaAI Mission (PIB, 2024), provides AI researchers, startups, and academic institutions with structured access to high-quality, non-personal datasets across sectors including education, healthcare, and agriculture. This initiative has significant potential to reduce the data access barrier that has historically constrained researchers outside the premier IITs, particularly in Tier 2 and Tier 3 cities (IMPRI, 2025). The NITI Aayog's National Data and Analytics Platform (NDAP) further democratizes public data by making it accessible, interoperable, and user-friendly for AI-driven research, enabling universities across India to draw insights from comprehensive national datasets (IMPRI, 2025).

Automation in Literature Review and Research Design: The automation of literature review through AI tools is one of the most impactful developments for researchers at Indian institutions, where library access to international journals is often limited. As worldwide scientific output reached 3.3 million articles in 2022 — growing at 4–5 percent annually — comprehensively surveying any field has become formidable for individual researchers (Cypris, 2025). AI-powered tools such as Elicit, Semantic Scholar, Consensus, and Rayyan streamline systematic reviews by searching millions of academic sources, summarizing papers, extracting data, and identifying research gaps. Research in 2024 found that AI-assisted screening achieved 85 percent accuracy in identifying relevant papers while reducing review time by approximately 40 percent compared to manual processes (Cypris, 2025). Kousha (2024), writing in Learned Publishing, documented AI applications supporting peer review and publishing — including tools that recommend appropriate journals for submitted manuscripts, assist with initial quality control, and identify suitable reviewers — capabilities directly relevant to Indian researchers seeking publication in high-impact international outlets. MoE'sAnuvadini Foundation, established through AICTE in August 2023, uses AI to translate academic content into Indian languages, enabling broader dissemination of research across India's linguistically diverse scholarly community (National Science and Technology Council [NSSTC], 2024).

Enhancing Research Accuracy and Efficiency: AI contributes to research quality through

ISSN: 2393-8048

International Advance Journal of Engineering, Science and Management (IAJESM)

Multidisciplinary, Multilingual, Indexed, Double Blind, Open Access, Peer-Reviewed, Refereed-International Journal.

SJIF Impact Factor = 8.35, January–June 2026, Published on 28th February 2026

automated methodological checking. Tools such as Stat Check detect errors in reported statistical results, Sci Score assesses methodological rigor, and Robot Reviewer uses machine learning to identify bias in randomized controlled trials — all raising the quality floor of published research (Kousha, 2024). These capabilities are of particular significance for Indian institutions seeking to improve their global research rankings and citation impact. However, Kousha (2024) cautioned that papers under peer review should not be uploaded to commercial LLMs, as they may be incorporated into future responses — a concern with direct implications for research confidentiality. Suri(2025) noted that despite India's ambitious AI goals, the country has not paid sufficient attention to talent development and fundamental R&D, and risks falling short of its stated ambitions without targeted investment in these areas. The India AI Mission's Future Skills pillar directly addresses this gap, with 500 PhD fellowships and Data and AI Labs established in Tier 2 and Tier 3 cities to build distributed AI research capacity (PIB, 2024).

Role of AI in Curriculum Development and Assessment

AI-Based Curriculum Design: India's NEP 2020 has initiated a comprehensive reimagining of curriculum, with AI playing an increasingly prominent role. The policy proposes integrating topics such as AI, machine learning, big data, and 3D machining into undergraduate education, and mandates that universities offer doctoral and master's programs in machine learning and allied areas. CBSE introduced AI as an elective in Class IX from 2019–20 and Class XI from 2020–21, collaborating with IBM to integrate AI curriculum in 200 affiliated schools; CISCE added robotics and AI from the 2025–26 academic year; and the government announced a phased AI curriculum rollout across all schools from Grade 3, beginning in 2026–27, aligned with the National Curriculum Framework for School Education 2023 (CoinGeek, 2025). At the higher education level, IIMs and the Indian School of Business have integrated generative AI into their core offerings. The Union Budget 2025–26 allocated ₹500 crore for a Centre of Excellence in AI for Education to develop specialized modules in machine learning, robotics, data science, and AI ethics (AkhilBharatiyaShikshaSamagam, 2025). UNESCO (2023) and the OECD (2023) both recommended comprehensive AI literacy as a core curricular priority alongside sustained investment in teachers' digital competencies — recommendations India is operationalizing through NISHTHA and the IndiaAI Future Skills pillar.

Automated Grading and Evaluation Systems: Automated grading systems offer substantial efficiency gains in India's large-scale assessment context, where tens of millions of students sit board exams and university assessments annually. Natural language processing algorithms assess written assignments on criteria including argument structure, coherence, grammar, and originality, providing rapid, consistent feedback at scale — particularly valuable in high-enrollment courses where individual instructor feedback is logistically challenging. However, significant equity risks accompany these systems in the Indian context. EDUCAUSE Review (2023) found that AI evaluation tools may incorrectly flag work by non-native English speakers as AI-generated or assess it as lower quality — a concern with direct implications for the large proportion of Indian students who write in English as a second or third language. Additionally, algorithms trained primarily on standard American or British English may disadvantage students from regional-language medium backgrounds, threatening the validity of AI-assisted grading across India's diverse examination system. Zawacki-Richter et al. (2019) emphasized in their systematic review that AI applications in higher education must be designed with attention to equity and inclusion, not merely technical performance — a principle that must guide any deployment of automated grading in India.

Adaptive Testing and Learning Analytics: Adaptive testing systems use AI to adjust assessment item difficulty in real time based on demonstrated student performance, enabling more efficient and accurate measurement across a wide proficiency range. Learning analytics — the measurement and analysis of learner data to optimize learning — is being operationalized in

India through UDISE+ (Unified District Information System for Education Plus), the national school data management system covering all 1.47 million schools, which uses AI-driven analytics to help policymakers identify learning gaps, track enrollment and dropout trends, and optimize resource allocation (Education for All in India, 2025). The OECD (2024) noted that learner-centered AI tools, including adaptive learning systems, are particularly valuable for students with diverse learning needs — directly relevant to NEP 2020's commitment to inclusive education for students with disabilities, Scheduled Caste and Scheduled Tribe learners, and first-generation students. DIKSHA's inclusive reach — with 50 percent of teacher users being women and 30 percent from SC/ST communities (IJCRT, 2025) — illustrates how AI-enhanced platforms can begin to serve traditionally underserved populations when designed and governed with inclusion as a priority.

Enhancing Student Support and Administrative Efficiency

AI Chatbots for Student Services: AI-powered chatbots are a significant tool for student support in Indian universities, where student-to-advisor ratios are high and timely administrative support is a persistent challenge. These systems respond to student inquiries around the clock in English and increasingly in regional languages through AI translation, covering course registration, examination schedules, scholarship applications, hostel facilities, and academic advising. NASPA (2024) found that generative AI educational chatbots enhance student support and administrative efficiency, with students perceiving them as useful for immediate feedback on writing, coding, and academic tasks. India's BHASHINI KumbhSah'AI'yakChatbot — deployed at Mahakumbh 2025 to provide multilingual real-time services for millions of pilgrims — demonstrated mature technical capacity for multilingual AI service delivery at scale (National e-Governance Division [NeGD], 2025), a model increasingly being adapted for educational contexts. UNICEF India (2025) highlighted AI-powered adaptive tools and gamified learning platforms as significant resources for tailoring higher education to individual learner needs, noting that India's EdTech sector can serve as a force multiplier when deployed through appropriate institutional frameworks.

Admission, Enrollment, and Academic Advising Through AI: AI is being applied to student recruitment, admission, and enrollment management across Indian institutions. Predictive analytics can identify students at risk of dropping out — critical given India's secondary-level dropout rate of 14.1 percent in 2023–24 (Education for All in India, 2025) — enabling institutions to target retention interventions. AI platforms can also automate routine admission components such as document verification and initial application screening, reducing administrative burden in institutions processing tens of thousands of applications annually. SWAYAM's AI recommendation systems match students with appropriate MOOCs based on academic history and career objectives, while UGC's credit transfer framework integrates these recommendations into formal degree planning (Wikipedia, 2024). ScienceDirect (2025) noted that service-oriented chatbots in universities are used for enrollment assistance, admissions queries, and library services, while teacher-oriented chatbots act as classroom assistants facilitating student engagement. Ohio State University Academic Services & Career Development (2025) documented how universities deploying AI advisors — such as Georgia State University's Pouncechatbot — have achieved measurable improvements in enrollment and retention, providing a model Indian institutions can adapt.

Institutional Decision-Making Using AI Analytics: At the institutional level, AI analytics are informing strategic decision-making across Indian higher education. UDISE+ has been enhanced with AI-driven management tools that support educational planning at scale, while NITI Aayog's NDAP enables state governments, universities, and research institutions to draw insights from comprehensive national education datasets (IMPRI, 2025). NITI Aayog's AI for Inclusive Societal Development report (2025) emphasized how AI can ensure benefits reach India's 490 million informal workers and rural communities — including through improved

educational resource allocation (PIB, 2025). The OECD (2024) cautioned, however, that algorithmic decisions affecting resource allocation must be subject to human review and institutional accountability to safeguard equity and transparency. This principle is especially important in India's higher education governance context, where decisions affecting state universities, minority institutions, and tribal-area colleges carry constitutional significance. The IndiaAI Mission's Safe and Trusted AI pillar supports IITs and leading universities in developing solutions for deepfakes, privacy risks, and AI security challenges, building domestic expertise in responsible AI governance (NeGD, 2025).

Ethical Issues and Challenges of AI in Higher Education

Data Privacy and Security Concerns: AI integration in Indian higher education generates and depends upon sensitive student data, raising fundamental concerns about privacy, consent, and security. India's Digital Personal Data Protection Act (DPDPA, 2023) provides a comprehensive framework for personal data processing — a crucial regulatory development for AI applications in education (Education for All in India, 2025). However, implementation of the DPDPA across India's thousands of universities, colleges, and schools remains uneven, and teacher resistance to AI adoption partly stems from inadequate training and data privacy concerns (Education for All in India, 2025). UNESCO (2024a) emphasized data privacy, intellectual property rights, and responsible AI assessment integration as key governance priorities for higher education institutions globally. A December 2024 UNICEF India consultation in New Delhi specifically emphasized safeguarding children's privacy as generative AI, AR, and VR are integrated into education (UNICEF India, 2025). The IndiaAI Mission's Safe and Trusted AI pillar directly addresses these concerns by supporting the development of privacy-preserving AI solutions and cybersecurity frameworks at premier research institutions (NeGD, 2025).

Academic Integrity and Plagiarism Issues: Generative AI tools capable of producing sophisticated written content have created unprecedented academic integrity challenges in Indian universities. A systematic review published in Information (MDPI, 2025) found that while generative AI enhances educational engagement, it also poses significant risks of academic dishonesty. In India, where competitive examinations and grade-based merit systems disproportionately shape career outcomes, the temptation to misuse AI for academic work is especially acute. Tan and Maravilla (2024) reported that the International Center for Academic Integrity found 58 percent of students admitting to using AI tools dishonestly to complete assignments. Globally, 63 percent of teachers reported students for AI use on schoolwork in the 2023–24 academic year, up from 48 percent the previous year (Packback, 2025). EDUCAUSE Review (2023) noted that AI detection tools may incorrectly flag writing by non-native English speakers — a problem with direct implications for India, where the majority of students write in English as a second or third language, risking false accusations and compounding existing equity concerns. The UGC and AICTE have begun issuing guidance on academic integrity in the AI era, and Indian universities are exploring AI-resilient assessment design, though comprehensive mandatory institutional policies remain in early stages across most higher education institutions.

Bias, Transparency, and Accountability in AI Systems: AI systems deployed in Indian higher education carry significant risks of perpetuating and amplifying existing social biases. Most commercial AI tools have been trained predominantly on English-language, Western data, meaning they may perform poorly for Indian languages, regional dialects, and cultural contexts — potentially disadvantaging students from linguistic minorities or rural backgrounds. Additionally, historical patterns of educational inequality related to caste, gender, and geography in India's educational data could be reproduced by predictive algorithms if not carefully audited and mitigated. The OECD (2024) emphasized the importance of UNESCO's Recommendation on the Ethics of Artificial Intelligence across 193 member states as a

foundation for addressing bias and ensuring transparency in algorithmic systems. India, as a founding member of the Global Partnership on Artificial Intelligence (GPAI) and its 2024 president, has committed to advancing responsible, inclusive AI development (Atlantic Council, 2025). NITI Aayog's Responsible AI framework (2021) recommended establishing Ethics Councils in government research centres and developing sector-specific guidelines on privacy, security, and ethics — recommendations that must be translated into concrete institutional mandates within Indian universities (IndBiz, 2024). Transparent, explainable AI systems — whose decisions can be understood, contested, and corrected by human stakeholders — are an essential condition for equitable AI deployment in Indian higher education.

Opportunities and Future Prospects of AI in Higher Education

AI-Driven Innovation in Indian Universities: India's higher education institutions stand at the threshold of an AI-driven innovation era. The IndiaAI Mission's Foundational Models pillar supports development of India's own Large Multimodal Models in Indian languages — including BharatGPT (developed through the Reliance Jio–IIT Bombay collaboration) and Sarvam AI's models, which offer voice and text capabilities across 14 to 22 Indian languages (NSSTC, 2024). In October 2024, Prime Minister NarendraModi announced three AI Centres of Excellence focusing on healthcare, agriculture, and sustainable cities, partnered with IIT Delhi, IIT Ropar, IIT Kanpur, and AIIMS — placing academia at the center of AI innovation for national development (NSSTC, 2024). The Union Budget 2025–26's ₹500 croreallocation for a CoE in AI for Education specifically embeds AI research within the educational sector (AkhilBharatiyaShikshaSamagam, MoE, 2025). The NITI Aayog's AI for Inclusive Societal Development report (PIB, 2025) further provides a roadmap for using AI to expand access to education, skilling, healthcare, and financial inclusion for underserved populations — with higher education institutions positioned as both research hubs and implementation partners.

Collaboration Between Academia and Industry: Academic-industry collaboration in AI is a defining feature of India's emerging innovation ecosystem. The IndiaAI Mission's Startup Financing pillar has catalyzed investment: Indian generative AI startups received USD 760 million in funding in the first half of 2024, a 4.6-fold surge in GenAI services (IMPRI, 2025). Key innovation ecosystems bridging academia and industry include T-Hub in Telangana — the world's largest innovation hub, collaborating with IIT Hyderabad and ISB — and IIM Ahmedabad's IIMA Ventures supporting early-stage startups. IIT Madras Research Park exemplifies sustained academic-industry partnership in AI, with research funded by TCS, Ericsson, Intel, GE Research, DRDO, and ISRO (IndBiz, 2024). India's GPAI presidency (2024) and the Global IndiaAI Summit (July 2024) — which brought together over 12,000 global AI experts and delegates from 50 countries — advanced international cooperation in responsible AI development (PIB, 2024). Carnegie Endowment for International Peace (2025) cautioned, however, that India must pay greater attention to talent, data, and R&D — the missing pieces in its AI puzzle — or risk infrastructure investment outpacing the research and human capital needed to realize its ambitions.

Preparing Students for an AI-Based Workforce: Preparing India's students for an AI-driven labor market is an urgent national priority. India's Economic Survey 2024–2025 acknowledged that while AI will automate economically valuable tasks, it could also displace workers in middle and lower wage brackets, requiring enabling institutions that retrain workers and redesign academic curricula for the AI economy (CoinGeek, 2025). The World Economic Forum (2023) similarly identified AI as a transformative force requiring new competencies in data analysis, human-AI collaboration, and critical algorithmic evaluation. NEP 2020 mandates technology education from school level, with digital literacy, coding, and computational thinking introduced from early grades, while the #AIforAll program under Digital India focuses on society-wide AI literacy (MoE, 2020). UNESCO (2024b) launched its AI Competency

Frameworks for Students and Teachers during Digital Learning Week 2024, providing structured guidance for educational systems developing AI literacy at all levels. A UNESCO (2025) global survey found that nearly two-thirds of higher education institutions either have guidance on AI use or are developing it — a trend India must lead and accelerate, given the scale of its student population and the transformative potential of equipping that population for an AI-integrated economy.

Conclusion and Policy Recommendations

Summary of AI's Impact on Education and Research in India :This paper has examined the multifaceted role of AI in transforming higher education and academic research, with special reference to India. AI is reshaping teaching and learning through adaptive systems, multilingual platforms like SWAYAM and DIKSHA, and AI-enhanced virtual tutoring. It is accelerating academic research through literature automation, multilingual data analysis, and the IndiaAI Datasets Platform. AI is improving student services through chatbots and predictive analytics, transforming curriculum design through NEP 2020-mandated AI education, and supporting institutional decision-making through UDISE+ and NDAP analytics. India's distinctive national strategy — combining NEP 2020, the IndiaAI Mission (PIB, 2024), indigenous AI model development, and targeted investments in AI literacy — reflects an ambition to harness AI for inclusive national development rather than mere economic competitiveness. Yet significant challenges remain: only 34 percent of rural households have internet connectivity (TRAI, 2023, as cited in Education for All in India, 2025), teacher shortages persist, institutional capacity is uneven across university tiers, data privacy enforcement under the DPDPA is incomplete, and AI tools trained predominantly on non-Indian data risk perpetuating existing inequalities.

Need for Regulatory Frameworks and Digital Infrastructure: A central finding of this review is that governance of AI in Indian higher education has lagged behind its technical development. The UGC and AICTE must develop comprehensive, mandatory AI governance guidelines for all higher education institutions, covering data privacy, algorithmic transparency, academic integrity, and equitable access — aligned with the DPDPA (2023) and UNESCO's Recommendation on the Ethics of Artificial Intelligence. The OECD (2024) noted that allowing institutions to self-regulate AI use while merely requiring compliance with national data protection law has left many students inadequately protected — a governance gap requiring more prescriptive frameworks specifically for higher education in India. Investment in digital infrastructure is an equally essential prerequisite: the IndiaAI Mission's establishment of Data and AI Labs in Tier 2 and Tier 3 cities, with 31 labs launched by mid-2025 (PIB, 2024), must be significantly accelerated. National broadband connectivity, device access, and electricity for rural schools and colleges must be treated as conditions for any AI-enhanced educational initiative to achieve its stated goals of inclusion — not as secondary considerations to be addressed later.

Strategies for Responsible and Effective Use of AI in India: Several strategic principles emerge for responsible and effective AI use in Indian higher education. First, institutions should adopt a human-centered, pedagogically driven approach — ensuring AI tools augment rather than replace educators, and that educational goals, not technical capabilities, drive implementation. In India, where the teacher-student relationship carries deep cultural significance, this principle is especially important. Second, multilingual AI tools capable of operating effectively across Hindi and other major Indian languages must be prioritized, ensuring AI-enhanced education reaches students beyond English-medium institutions — a non-negotiable condition of equity in India's linguistic context. Third, sustained professional development for faculty must be expanded from premier IITs to all tiers of higher education through scaled NISHTHA programs and the IndiaAI Future Skills pillar. Fourth, robust equity monitoring mechanisms must be established to prevent AI adoption from exacerbating disparities between elite and state

universities, urban and rural institutions, and students from different caste, gender, and linguistic communities. Fifth, India should leverage its leadership in GPAI (Atlantic Council, 2025) and engagement with UNESCO and the OECD to shape global AI governance frameworks that reflect the perspectives of large, diverse, developing nations — ensuring international AI standards serve populations like India's, not only high-income English-speaking contexts. Finally, India's development of indigenous AI models — BharatGPT, BharatGen, and the Sarvam AI ecosystem — provides a historic opportunity to build educational AI tools grounded in Indian languages, knowledge systems, and social contexts (NSSTC, 2024), creating a foundation for AI-enhanced education that is genuinely equitable, contextually appropriate, and nationally sovereign.

References

About Bajaj Finserv. (2025). India's AI revolution: Driving inclusive growth and global leadership. https://www.aboutbajajfinserv.com/ticc/indian-ai-story

AkhilBharatiyaShikshaSamagam, Ministry of Education, Government of India.(2025). Centre of Excellence in AI for education. https://www.education.gov.in/en/nep/coe-ai-education

Atlantic Council. (2025, March 13). India's path to AI autonomy. https://www.atlanticcouncil.org/in-depth-research-reports/issue-brief/indias-path-to-ai-autonomy/

Suri.A (2025, February). The missing pieces in India's AI puzzle: Talent, data, and R&D. Carnegie Endowment for International Peace https://carnegieendowment.org/research/2025/02/the-missing-pieces-in-indias-ai-puzzle-talent-data-and-randd

CoinGeek. (2025, September 10). India to introduce AI curriculum in all schools by 2026. https://coingeek.com/india-to-introduce-ai-curriculum-in-all-schools-by-2026/

Cypris. (2025). 11 best AI tools for scientific literature review in 2026. https://www.cypris.ai/insights/11-best-ai-tools-for-scientific-literature-review-in-2026

Daily Pioneer. (2024, February 7). Integration of AI in national education policy 2020. https://www.dailypioneer.com/2024/state-editions/integration-of-ai-in-nat-l-edu-policy-2020.html

EDUCAUSE Review.(2023). Academic integrity in the age of AI. https://er.educause.edu/articles/sponsored/2023/11/academic-integrity-in-the-age-of-ai

Education for All in India.(2025). AI in education. https://educationforallinindia.com/ai-in-education/

Education for All in India. (2025). Transforming Indian school education by 2030: The role of AI and data-driven insights. https://educationforallinindia.com/transforming-indian-school-education-by-2030/

IMPRI Impact and Policy Research Institute. (2025, March 6). IndiaAI Mission (2024): Empowering innovation, infrastructure, and inclusive growth through AI. https://www.impriindia.com/insights/indiaai-mission-2024/

IndBiz, Economic Diplomacy Division, Government of India. (2024). India's artificial intelligence strategy: AI for All. https://indbiz.gov.in/indias-artificial-intelligence-strategy-ai-for-all/

IndiaAI, Government of India. (2020). How India is integrating AI in the new education policy. https://indiaai.gov.in/article/how-india-is-integrating-ai-in-the-new-education-policy

Banerjee &Biswas(2025).Empowering Educators, Bridging Divides: Evaluating DikshaAndSwayam For Digital Teacher Training And Economic Inclusion In India. International Journal of Creative Research Thoughts (IJCRT) https://www.ijcrt.org/papers/IJCRT2507545.pdf

Kousha, K. (2024). Artificial intelligence to support publishing and peer review: A summary and review. Learned Publishing. https://doi.org/10.1002/leap.1570

Labadze, L., Grigolia, M., &Machaidze, L. (2023). Role of AI chatbots in education: Systematic literature review. International Journal of Educational Technology in Higher Education, 20(1), 56. https://doi.org/10.1186/s41239-023-00426-1

Ministry of Education, Government of India.(2020). National Education Policy 2020. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

Ministry of Skill Development and Entrepreneurship, Government of India. (2024). AI for all: India's blueprint for a smarter future – History of AI in India. https://www.pib.gov.in

NASPA – Student Affairs Administrators in Higher Education. (2024). The impact of generative AI educational chatbots on the academic support experiences of students in U.S. research universities. https://www.naspa.org/blog/the-impact-of-generative-ai-educational-chatbots

National e-Governance Division. (2025). AI for all: India's blueprint for a smarter future. https://negd.gov.in/blog/ai-for-all-indias-blueprint-for-a-smarter-future/

National Science and Technology Council.(2024). India – Artificial intelligence. https://nsstc.niar.org.tw/en/highlights/analysis/2024-11-01-in-ai

NITI Aayog, Government of India. (2018). National strategy for artificial intelligence: #AIForAll. https://niti.gov.in/national-strategy-artificial-intelligence

NITI Aayog, Government of India. (2021). Responsible AI: #AIForAll – Approach document for India, Part 1: Principles for responsible AI. https://www.niti.gov.in/sites/default/files/2021-02/Responsible-AI-22022021.pdf

Ohio State University Academic Services & Career Development. (2025). The rise of chatbots in higher education: Transforming teaching, learning, and student support. https://ascode.osu.edu/news/rise-chatbots-higher-education

Organisation for Economic Co-operation and Development.(2023). OECD Digital Education Outlook 2023. https://www.oecd.org/en/publications/oecd-digital-education-outlook-2023_c74f03de-en

Organisation for Economic Co-operation and Development. (2024). The potential impact of artificial intelligence on equity and inclusion in education. https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/08/the-potential-impact-of-artificial-intelligence-on-equity-and-inclusion-in-education_0d7e9e00/15df715b-en.pdf

Packback. (2025). Moving beyond plagiarism and AI detection: Academic integrity in 2025–2026. https://packback.co/resources/blog/moving-beyond-plagiarism-and-ai-detection-academic-integrity-in-2025/

Press Information Bureau, Government of India. (2024, March 7). Cabinet approves over Rs. 10,300 crore for IndiaAI Mission. https://pib.gov.in/PressReleasePage.aspx?PRID=2012375

Press Information Bureau, Government of India. (2025). Transforming India with AI. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2209737

Roombr.(2025). 5 government schemes for digital classrooms in India. https://www.roombr.com/blog/digital-classroom-govt-initiatives-india

ScienceDirect.(2025). Integrating AI chatbots for enhancing academic support in business education. https://www.sciencedirect.com/science/article/abs/pii/S1472811725001223

Tan, K., &Maravilla, J. C. (2024).Shaping integrity: Why generative artificial intelligence does not have to undermine education.Frontiers in Education, 9. https://pmc.ncbi.nlm.nih.gov/articles/PMC11540794/

Tondeur, J., Scherer, R., Baran, E., Siddiq, F., Valtonen, T., &Sointu, E. (2024). Perceptions and use of AI chatbots among students in higher education: A scoping review of empirical studies. Education Sciences, 14(8), 922. https://doi.org/10.3390/educsci14080922

United Nations Educational, Scientific and Cultural Organization.(2023). Guidance for generative AI in education and research. https://www.unesco.org/en/digital-education/ai-

future-learning

United Nations Educational, Scientific and Cultural Organization. (2024a). AI and education: Protecting the rights of learners. https://unesdoc.unesco.org/ark:/48223/pf0000395373.locale=en

United Nations Educational, Scientific and Cultural Organization.(2024b). AI competency framework for students. https://www.unesco.org/en/digital-education/ai-future-learning

United Nations Educational, Scientific and Cultural Organization. (2025). UNESCO survey: Two-thirds of higher education institutions have or are developing guidance on AI use. https://www.unesco.org/en/articles/unesco-survey-two-thirds-higher-education-institutions

UNICEF India.(2025). AI and human agency — India's role in shaping the future of learning. https://www.unicef.org/india/blog/ai-and-human-agency-indias-role-shaping-future-learning

Wikipedia.(2024). SWAYAM. https://en.wikipedia.org/wiki/SWAYAM

World Economic Forum. (2023). The future of jobs report 2023. https://www.weforum.org/publications/the-future-of-jobs-report-2023/

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(1), 39. https://doi.org/10.1186/s41239-019-0171-0