



The Transformative Role of Artificial Intelligence in Education—Pathways to Viksit Bharat 2047

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Abstract

Integrating AI into India's education system has the potential to change everything by making learning more individualized, effective, and accessible for everyone. India can use AI to make the goal of Viksit Bharat 2047 come true by carefully meeting its needs for infrastructure, teaching, and ethics. The road requires teamwork, new ideas, and a strong commitment to fairness so that every student can succeed in the AI-driven future. This chapter examines the impact of AI on the transformation of educational paradigms. The influence of AI utilization in the current global educational framework and within the Indian context has been examined. The chapter also discusses the challenges and obstacles that AI in education faces, along with various measures needed to overcome them and ensure impartial and efficient implementation. This chapter also explores how the use of AI tools for academic tasks and other purposes affects students, including their perceptions of the cognitive and academic impacts and their views on using AI tools in high-stakes situations. The chapter also provides statistical information and a summary of the actions and needs for Indian educational institutes to use AI in a way that is equitable and has room to expand.

Keywords: Artificial Intelligence, Viksit Bharat, Educational Paradigms, Indian Educational Platforms, Future-ready India.

Introduction

A new era of Artificial Intelligence (AI) has been embarked in the 21st century. This has revolutionized the way people live, work, and engage with one another in all

aspects of life. AI has not only steered technological innovation but is also playing a crucial role in modern society by driving productivity, economic development, and data-informed decision-making. AI boosts competence and allows individuals to concentrate on creative and premeditated roles (Li et al., 2024). It reduces the labor and wastage of resources for doing routine and repetitive tasks across sectors like healthcare, finance, logistics, shipping and manufacturing by automating the processes thereby providing a competitive edge to businesses. AI nurtures innovation, creation of new job opportunities, and aiding the upsurge of completely new industries thereby contributing to economic development of the countries (Trabelsi, 2024). However, AI assisted automation has led to workforce displacements in many sectors and thus to fill this void, upskilling and reskilling of the workforce adapting to new and evolving job requirements is obligatory (Onifade et al., 2022). Furthermore, data-driven insights given by AI tools empowers organizations and governments in decision and policy-making in areas such as public health, transport, education, and urban planning (Marwaha et al., 2024). However, with the permeation of AI into deeper roots of daily life, a critical apprehension around privacy, bias, accountability, and moral application emerges (Radanliev, 2025). It is essential to resolve these issues for ensuring inclusive and equitable services by AI. It is anticipated that by 2030 AI will impressively redesign and transform the global education systems with its ability to provide tailored learning, increased accessibility and administrative efficiency. The adoption of AI will completely transform the traditional teaching methodologies and pedagogies paving way to more student centric, engaging, and rewarding educational outcomes worldwide (Wang et al., 2024).

As India is becoming future ready to achieve the vision of *Viksit Bharat 2047* in its centennial year of independence, into a completely modernized and fully developed nation, the role of AI in education becomes critical (Mehta et al., 2025). It is foreseeable as the keystone with the goal of providing every citizen with the knowledge, skills, and values needed for comprehensive growth and global competitiveness as envisioned by *Viksit Bharat 2047* endeavor. The education roadmap purposes to achieve 100% literacy and engagement through accessible learning across formal education, digital platforms, and sustenance for ignored, backward and unprivileged masses of population. It also addresses the need of differently-abled learners concentrating on building an inclusive, future-equipped, and empowered nation. The redesigning of curriculum reinforced by competency-based assessments and skilled teachers is envisaged. This will promote rational thinking, ingenuity, and ultimate learning experiences. To address the societal and provincial inequalities, scholarships, hostels, and bridge courses are to be introduced as per the Viksit Bharat vision. Vocational education will be made available to encourage continual upskilling and prepare individuals to meet the demands of the industry (Department of Administrative Reforms and Public Grievances, 2022). The vision is

to lay the foundation for a knowledge-driven *Viksit Bharat* by 2047 where students and youth will be equipped with digital literacy, coding, and emerging tech skills thereby building a future-ready workforce (NITI Aayog, 2025).

In this chapter, the influence of AI in reshaping educational paradigms is explored. The impact of use of AI in the present educational setup globally and in Indian context has been discussed. The chapter also provides statistical insights, and summarizes the roadmap and requirements for scalable, unbiased AI adoption in Indian education.

The Growth of AI in Education - Global and Indian Perspective

AI in education is the use of machine learning, natural language processing, computer vision, and data analytics to enhance administration, provide customized teaching, and improve learning results. These technologies make computers intelligent enough to mimic human behavior, acclimatize to distinct needs of individual, and automate complex and difficult educational tasks. Its primary applications in revolutionizing education includes:

- **Personalized Learning and Smart Tutoring Systems:** The use of AI tools helps in analyzing student data to modify content, speediness, and evaluations according to individual student needs. It is possible to identify the strengths and weaknesses of a learner and individualized attention can be assured. AI adapted learning provide real-time feedback, helps in identifying learning gaps, and offers focused interventions to increase student engagement and retention (Hasan et al., 2024).
- **Teacher Empowerment and Active Engagement:** Using AI tools can liberate educators and academicians from administrative responsibilities such as grading, attendance, scheduling, and other routine tasks by automating the system. They can thus have greater freedom to engage in higher-value activities that include focus on instruction and mentoring. AI can help with lesson planning and curriculum design, offering real-time insights about the needs and progress of the students (Wang et al., 2024).
- **Inclusive and Accessible Education Tools:** The delivery of educational content in regional languages using multilingual AI platforms aids in mitigating language barriers and bridging gaps for students in rural and underserved communities. Learning can be made more equitable due to the simplicity and ease with which AI-powered platforms can translate content, provide text-to-speech, speech to text, text to sign language and vice versa. These can adapt and modify resources for students with disabilities or special needs.
- **Skill Development and Well-equipped Workforce:** Students are honed with essential skills in coding, robotics, and data science, aligning their learning with the demands of future job markets. The learning experiences can be

enriched with real-time adaptive curricula and smart course content made available through AI. This can prepare students for evolving industrial demands while ensuring their sustenance (Hardaker & Glenn, 2025).

- **Data-Driven Education Planning and Management Policy:** The operational efficiency of data systems that provide real-time, accurate decision-making for resource allocation and policy planning in education can be enhanced using AI. It ensures more effective data-driven educational planning and management strategies for improving learning outcomes and overall system performance (Umoke et al., 2025).

World-wide, AI in education is expanding substantially undergoing a transformative shift in pedagogical and administrative paradigms. AI in the education market is valued between \$4.8 billion and \$5.88 billion in 2024. It is projected to reach between \$6.9 billion and \$ 7.05 billion in 2025 and by 2030, it is expected to grow to \$32.27 billion with a Compound Annual Growth Rate (CAGR) of 31.2 %. This is attributed to enhanced adoption of AI-driven solutions among students, educators and administrators, designed to improve learning outcomes, simplifying and automating institutional processes, and address prevalent educational challenges. Administrators and educators are significantly felicitated by AI by automating routine tasks, such as grading and data management, personalized learning experiences and the improved operational efficiency within educational institutions. It is sited as an essential infrastructure in streamlining admission, human resources, financial aid processing, analyzing student performance and for taking informed data-driven decisions for university administrators (Palmer, 2024). Among students, adoption of AI is predominantly extensive. As per the data given by a survey in 2024 (Kelly, 2024), 66% of students were already utilizing AI tools in their studies. By 2025, the number increased to 92% with 88% specifically used AI for academic assignments (Freeman, 2025). Nearly 95% of student users claimed grade improvements with the use of AI tools like ChatGPT (Freeman, 2025). Increased use of AI in the higher education sector among students from 66% in 2024 to 92% in 2025 has successfully showcased the fundamental shift in academic workflows and study habits.

Use of immersive technologies such as Augmented Reality (AR) and Virtual Reality (VR) further reformed the educational landscape and demonstrated significant pedagogical efficacy. These technologies increase deeper cognitive engagement and superior knowledge retention compared to traditional instructional methods by creating interactive and context-rich learning environments. The student enrollment in courses thus increased to 97% and achieved a knowledge rate of 75% compared to just 10% for reading and 5% for lectures (National Training Laboratories). The encouragement of digital literacy and the use of cutting-edge technology into national educational frameworks by various government initiatives, further reinforce this inclination. The adoption rates among important stakeholder groups reflects the

widespread integration of AI. The AI market in education is poised to be dominated by North America owing to its advanced infrastructure, significant investments in educational technology, and readiness of the population to adopt new AI-driven tools. This leadership is projected to contribute 43% of the global market's growth between 2025 and 2029 (Technavio, 2025). Asia-Pacific area is also expected to be the fastest-growing AI industry in education, driven by the developing economies like India and China through government support for greater digitalization (Knowledge Sourcing Intelligence LLP, 2025).

AI plays a pivotal role in the realization of the Viksit Bharat 2047 goals of India. The use of AI will address the longstanding challenges of improving the quality of education in India while expanding its reach and accessibility. The integration of AI in India's extensive and multifaceted education system emerged as an evolving force, addressing the challenges of scale while encouraging personalized and egalitarian learning. The educational landscape in India is enormous, with a network of approximately 1.5 million schools catering to 24.8 crore (248 million) students, managed by around 98 lakh (9.8 million) teachers (Press Information Bureau, 2025). This vast scale presents significant challenges in providing consistent and high-quality education across diverse geographic and socioeconomic sections of the population. The higher education sector is equally vast with student enrollment increasing significantly to 4.33 crore (43.3 million) in the 2021–2022 academic year from 3.42 crore (34.2 million) in 2014–2015 (Times of India, 2025). This progression is supported by an increasing number of institutions, including over 1,200 universities and thousands of colleges (Education for All in India). Innovative solutions involving the use of AI technologies are thus needed to manage this enormous volume of students while maintaining equitable access and high-quality results.

A vibrant network of AI-powered educational technology platforms has emerged to cater these challenges. Companies such as BYJU'S, Embibe, Vedantu, and Toppr have gained extensive acceptance by offering adaptive personalized learning experiences that cater to individual student needs- pace and style. The use of AI by these private players tends to bridge educational barriers, ensuring that students in both urban and rural settings have access to high-quality content (Thathoo, 2023). For instance, BYJU'S uses a suite of in-house AI models, including the prediction model BADRI, to study a student's learning patterns, detect probable knowledge gaps, and deliver personalized information to improve understanding and retention.

Significant initiatives are also taken by the Indian government to integrate AI into the public education framework. Its flagship program, 'Digital Infrastructure for Knowledge Sharing (DIKSHA)' for school education uses AI to offer a wide range of multilingual syllabus-based e-content like textbooks, lesson plans, teacher training modules, and assessments (Department of School Education & Literacy, 2024). This makes it easier for students, particularly those from underrepresented communities, to

access the content (Thathoo, 2023). This bridges the urban-rural divide and through easily available AI-powered adaptive learning content and training programs empowers the teachers to improve learning outcome on national level (Department of School Education & Literacy, 2024).

AI is being used by various government-run educational data management platforms in India. For example, Unified District Information System for Education Plus (UDISE+) and Student Database Management System (SDMS), are optimized using AI. UDISE + collects data on schools, teachers, enrollments, infrastructure and academic performance from all government and private schools in India. It supports data-driven real-time planning and monitoring to help policy formulation, resource allocation, and school-level interventions. It is also used to generate the School Report Card for transparency and accountability (Ministry of Education, 2023).

SDMS maintains individual student-level records like student enrolment, attendance, progression, and benefits received (e.g., scholarships, uniforms, mid-day meals). It is started to provide direct benefit transfers to intended students. It helps to reduce duplication and dropout rates. SDMS is recognized within Samagra Shiksha Abhiyan Scheme (National Council of Educational Research and Training, 2022). Table 1 lists other educational platforms in India that have the potential to completely transform the country's educational planning, delivery, and improvement processes and help in realization of the Viksit Bharat 2047 goal of universal access to high-quality, inclusive, and egalitarian education using AI.

Table 1: AI integration in Indian Educational Platforms -Future Possibilities

Initiative	Purpose
National Achievement Survey (NAS)	Published by the National Council of Educational Research and Training (NCERT) under the Ministry of Education (MoE) every three years, for an assessment of the school education system by periodic monitoring of student learning outcomes across classes III, V, VIII, and X. Can use AI to identify trends, shortcomings and regional divides based on learning outcome data (Press Information Bureau, 2019).
Shala Gunvatta (ShaGun) Portal	Monitor implementation of the <i>Samagra Shiksha Abhiyan</i> to track the progress of education programs and schemes. Hoists videos, documents, and best practices from states and UTs. AI can automate quality assessments and generate performance dashboards (Press Information Bureau, 2021).

National Digital Education Architecture (NDEAR)	Framework for creating networks of interoperable education platforms allowing cross-platform sharing of learning materials, assessments, and student/teacher information. AI can be used to automate administrative tasks, predict dropout rates, and customize learning pathways (Press Information Bureau, 2023).
Aadhaar-Enabled Student Tracking Systems	Uses Aadhar unique identification id for monitoring academic progress, tracking enrolment, attendance, direct benefit transfer, and avoid duplication of beneficiaries. AI models can identify irregular attendance trends and suggest focused interventions.
NIPUN Bharat Progress Monitoring Tools	Under the NIPUN Bharat Mission, monitor basic literacy and numeracy skills. Gathers information on literacy levels per child. AI can identify problems in foundational skills and modify teaching materials accordingly (National Council of Educational Research and Training, 2025)
PARAKH (Rashtriya Sarvekshan)-Performance Assessment, Review, and Analysis of Knowledge for Holistic Development)	National assessment regulator for standardizing student evaluation across all boards under NCERT and MoE. AI can develop adaptive assessments, analyse cognitive skills, and ensure fairness across exams (Wang et al., 2024).

Navigating Opportunities and Challenges

The integration of AI in the education sector has resulted in a complete transformation in the learning and teaching methodologies. One of the most significant areas where AI in education shows great potential is development of personalized learning paths. AI algorithms can be used to analyze individual student strengths, weaknesses, and learning styles which can further the educators to deliver highly customized learning. This AI powered tailored approach not only enhances comprehension but also leads to reduced dropout rates and improved academic outcomes, another feature is 24/7 support facilitated by AI-powered chatbots and virtual assistants. These intelligent agents offer round-the-clock assistance, answering student queries, providing clarifications, and guiding learners through complex modules, ensuring continuous access to educational resources regardless of time or location.

Beyond this, AI significantly boosts the overall efficiency of educators and institutions by automating mundane yet time-consuming administrative tasks such as grading, attendance tracking, and scheduling with the help of AI powered tools. This liberates teachers from clerical burdens, allowing them to dedicate more time and energy to actual pedagogy, lesson planning, and direct student interaction. With the help of AI, vast amounts of educational data can be processed in a more time efficient

manner. Teachers get useful insights on student performance, curriculum effectiveness, and institutional trends. These insights further help in a more effective resource allocation and making informed policy adjustments, thereby, leading to systemic improvements in education quality.

Furthermore, AI plays a crucial role in promoting equity and accessibility within the educational system. It enables Enhanced Accessibility by delivering quality educational resources to students in remote or underserved areas through AI-powered online platforms, effectively bridging the geographical and socioeconomic divide. This ensures that students who historically faced barriers to education can now access high-quality learning opportunities. AI also contributes to Multilingual and Inclusive Education. By leveraging natural language processing and generation capabilities, AI tools can translate content into multiple languages, provide real-time captions, and adapt learning materials into various formats to cater to diverse learning needs and disabilities. This fosters a more inclusive learning environment where linguistic and ability differences are no longer impediments but rather are accommodated and celebrated, ensuring that education is truly accessible to all.

Integration of Artificial Intelligence (AI) in education is also accompanied by significant challenges and risks that require careful consideration. One of the primary concerns is Reduced Human Interaction, resulting due to over-reliance on automated systems. This may diminish the invaluable engagement between teachers and students, which is crucial for social and emotional learning. Another critical issue is Privacy and Security. AI platforms collect vast amounts of sensitive student data, necessitating robust protection measures to prevent breaches that could lead to severe consequences.

Furthermore, overdependence on AI poses a threat to the development of fundamental cognitive abilities, it could hinder students' critical thinking, creativity, and problem-solving skills. There is also a significant implementation costs associated with acquiring and maintaining sophisticated AI systems. This is a substantial barrier, particularly for institutions in low-resource settings where budgets are already constrained.

Table 1: Pros and Cons of AI in Education

Pros	Cons
Personalized learning for all	Less human interaction
24/7 support via virtual assistants	Privacy and data security risks
Automated grading and administration	Potential for algorithmic bias
Data-driven decision-making	Overdependence on technology
Enhanced accessibility and inclusion	High implementation and maintenance costs
Multilingual and remote learning support	Resistance from educators and learners

Quantitative Insights and Impact of AI

Evidence shows that Artificial Intelligence (AI) has high adoption rates among both educators and students, resulting in substantial improvements in academic outcomes (Schiel et al., 2023).

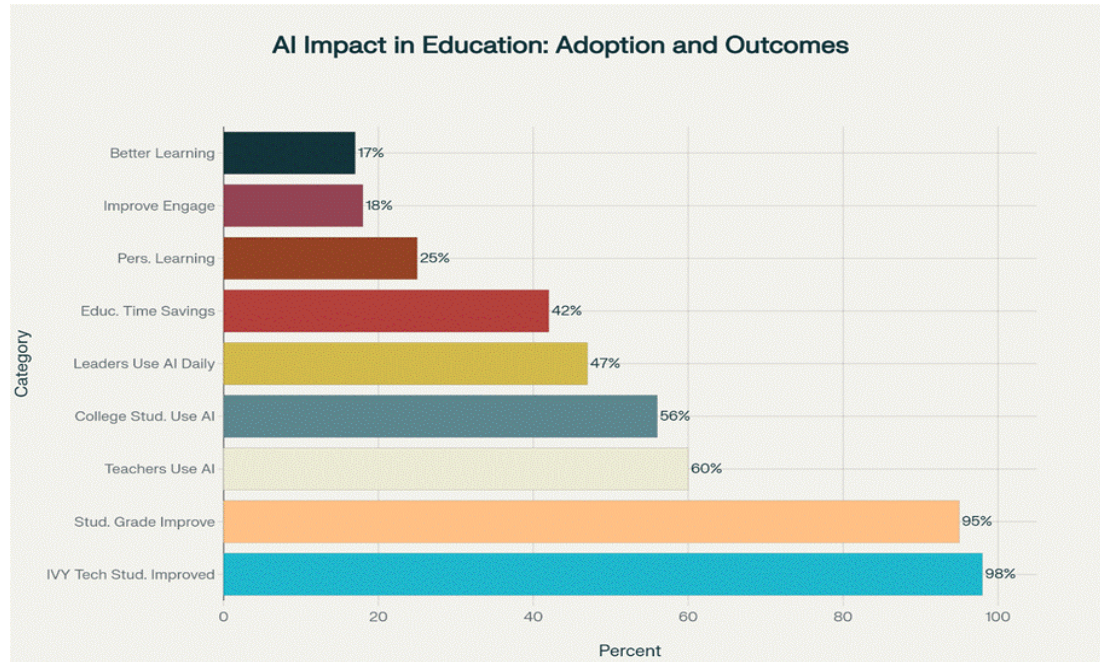


Figure 1: Adoption Rates and Positive Outcomes from AI use in Education Worldwide

Source: Schiel et al. (2023)

Figure 1 visualizes the significant impact and widespread adoption of Artificial Intelligence in education. It shows that nearly 60% of teachers and 56% of college students globally are using AI for academic work. 47% of education leaders daily use AI. Among educators, the most frequently reported benefit of AI integration is the reduction in administrative workload (42%), followed by its role in supporting personalized learning (25%). The graph highlights that 95% of learners reported improvements in their grades, and at one institution, 98% of at-risk students were able to achieve passing grades through AI-driven interventions.

Building a Future-Ready India with Scalable AI

The vision for Viksit Bharat 2047 imagines a technologically advanced India where Artificial Intelligence (AI) serves as a cornerstone for economic growth. In order to obtain sustained economic growth, it is imperative for India to develop Scalable AI. Scalable AI refers to AI systems and infrastructures that can be easily scaled up. That is, AI systems that can handle more volume and user demands, while maintaining, or even improving, its performance, reliability and efficiency (Marpu et al., 2025).

In the context of education, if an AI system that helps in education can be scaled up from a few students to millions of students all across the nation or the world without experiencing quality deterioration, slowing down, hanging or getting too costly, then it is said to be scalable AI.

For the Indian education system, it firstly means developing AI systems that can deal with diversity by accommodating for different languages, different socio-economic characteristics as well as differences in the learning styles of the population in rural and urban areas (Kharche et al., 2024). Secondly, it requires overcoming infrastructural constraints like inconsistent electricity supply, limited access to digital devices like computers, laptops and smartphones, and unreliable internet connectivity, amongst others (Joy, 2025). Good quality teacher training and capacity building is needed as well, so that they can further disseminate their knowledge of AI, thus helping in achieving AI literacy and digital literacy amongst the citizens. Thirdly, it should be able to meet each student's individual needs, instead of teaching each student in the same way in a one-size-fits all approach, even when more and more students start using the system (Marpu et al., 2025). Finally, it is important to ensure that the digital divide is bridged, and AI is used to close the educational gap between the haves and the have-nots, rather than increasing inequality (Zhu, 2023).

Conclusion and Future Directions: From Vision to Actions

In order to truly harness the potential of AI in achieving a developed nation status by 2047, and making Viksit Bharat@2047 successful, one must envision a strategy focused on fronts like innovation, equity and ethics. This section discusses actionable steps that need to be taken to realize this vision.

Innovation is essential for India to reach new heights in the education sector. This can be done by creating an environment and infrastructure that encourages ethical use of AI in education, rather than being afraid of adopting it. India is a diverse country having diverse educational needs, and it is imperative to use the latest technology to empower both academic institutions and startups to meet these needs. This can be seen through the EdTech sector that is developing in our nation, and is growing exponentially, establishing itself as a global leader. Companies like Embibe and BYJU's are at the forefront of this, and show that AI can provide a personalized learning experience (Jayaselvi et al., 2023). It is necessary for India to build on this momentum to reach a developed nation status by 2047.

Further, with regards to equity, extra effort needs to be made to ensure that AI does not deepen the existing inequalities in the country. For this, it is necessary not only to focus on digital literacy but also on 'AI literacy', especially for the vulnerable groups like girls, differently abled, economically weaker sections, as well as people living in rural areas (Agarwal et al., 2024). AI can help these groups immensely by providing translation tools that overcome language barriers, adaptive accessibility

features (like voice control, amongst others) for the differently abled, and easy knowledge dissemination from the comforts of one's homes for those unable to go to traditional educational institutions due to various socio-economic factors. However, these useful features of AI, which can act as an equalizer and can decrease inequality, won't be realized if AI-literacy and AI education is not made accessible to these groups (Zhu, 2023).

Finally, India also needs a strong regulatory and policy framework for AI use to make sure that AI is used ethically and responsibly in all sectors, including education. This requires ensuring that the privacy of the citizens is maintained, along with ensuring that there is transparency, fairness and accountability is upheld. Further, given that technology is advancing at an unprecedented rate in today's age, it is essential that this framework remain dynamic and the authorities remain proactive in ensuring that the framework is up to date with the current issues and is able to address the constantly emerging, new risks (Joy, 2025).

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