Artificial Intelligence in Education

The importance of technology and AI in modern education have the potential to revolutionize the teaching and learning process, providing students with personalized experiences, assisting teachers with administrative tasks and exposing learners to tech-driven career paths. Artificial intelligence in education requires careful planning, infrastructure development, and continuous monitoring to ensure that it aligns with the goals and principles outlined in the NEP 2020.
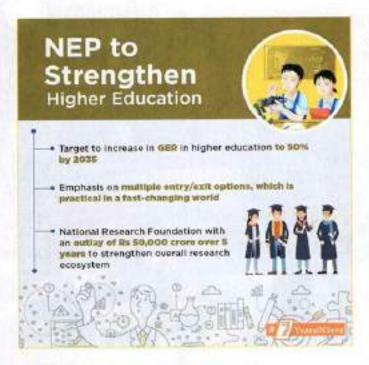
*J.P. Pandey
**Raja Pandit

India's National Education Policy (NEP) 2020

NEP 2020 has brought a revolutionary change in the Indian education system. It has created a transformative turn in educational policy and provided the framework for futuristic education in India to revamp the existing education system. NEP 2020 aims to provide high-quality education to all, emphasizes the importance of access, equity, and quality, and create a knowledge society. NEP 2020 also aspires to improve rural education by providing access to quality education and reducing the gap between rural and urban education. The policy focuses on early childhood education, vocational education and technology integration. It sketches an inclusive vision for transforming the educational landscape with a holistic approach.

* The author is an IRPS officer. Email: jppandey.irps@gov.in
** The author is Consultant in Ministry of Education, GoI.

NEP to Strengthen Higher Education

- Target to increase in **GER** in higher education to **50%** by **2035**

- Emphasis on **multiple entry/exit options, which is practical in a fast-changing world**

- National Research Foundation with an outlay of Rs 50,000 crore over 5 years to strengthen overall research ecosystem

Technology Integration in NEP 2020

Ensuring extensive and equitable use of technology in teaching and learning, removing language barriers, online and digital education, increasing access for divyang students and educational planning and management are major initiatives of NEP 2020. Mentioning of 'Artificial Intelligence' at 8 places in NEP 2020 clearly recognises the importance of AI in education.

Integrating AI tools into education is one of the new educational reforms. Education has two fold responsibilities, one of preparing our students to learn about AI as a subject, providing a conducive ecosystem for research & development activities in the field of AI and on other hand to use AI for achieving its own objectives. This tool prepares students for their skill development and modern employment market. The concept of AI is a transformative force in education. Its sole aim is the overall improvement of the education system which is the cornerstone of the NEP and has taken very serious note of the role of technology in the field of education and its applications such as e-learning, online resources and the use of digital tools.

Artificial Intelligence

The term 'artificial intelligence' was first coined in 1956 by John McCarthy, a Dartmouth College professor who aimed to create machines capable of reasoning and using human language. Research in AI was slow for about 3 decades but soon after the developments of computer technology, advances in machine learning and neural networks, a resurgence was observed in the 1990s. The invention of Chat GPT in 2022 marked a significant milestone which showcased an unprecedented capability in large language understanding and generation. Recent release of DeepSeek has further fuelled the advancements in AI.

Today, AI plays an important role in sectors such as healthcare, finance etc and it has the potential to revolutionize education with innovation in teaching and learning practices and speed up the progress towards SDG 4. India has been geared up in big way to attain the benefits of this new age technology. Celebration of Artificial Intelligence Appreciation Day on July 16, 2024 marked the pivotal moment to reflect on AI's transformative impact across the nation.

In today's rapidly evolving educational landscape, artificial intelligence is playing an increasingly crucial role in shaping the future of learning. From personalized instruction to automated administrative tasks, AI-powered tools are transforming academics across the nation. The importance of technology and AI in modern education have the potential to revolutionize the teaching and learning process, providing students with personalized experiences, assisting teachers with administrative tasks and exposing learners to tech-driven career paths. Artificial intelligence in education requires careful planning, infrastructure development, and continuous monitoring to ensure that it aligns with the goals and principles outlined in the NEP 2020.
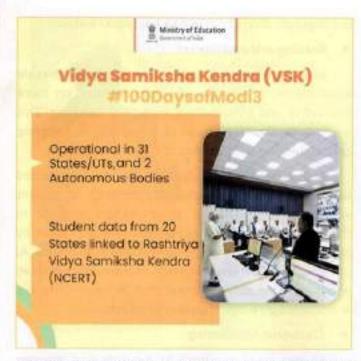
Artificial Intelligence in India

"The future of AI is not predetermined – it's a future we all have a hand in creating"

The Niti Aayog in its discussion Paper on National Strategy for Artificial Intelligence, has identified the focus as 'AI for All' to leverage the transformative technologies to ensure social and inclusive growth.

AI can be the backbone of India's Governance through Tech

Vidya Samiksha Kendra (VSK)
#100DaysofModi3

Operational in 31 States/UTs, and 2 Autonomous Bodies

Student data from 20 States linked to Rashtriya Vidya Samiksha Kendra (NCERT)

The paper has highlighted Education as one of the core areas of AIs focus in India.

Government initiatives such as "AI for All" and the National AI Strategy underscore India's commitment to harnessing AI for societal benefit and its potential to address uniquely Indian challenges keeping ethical implications and ensure inclusive development that preserves our cultural values and benefits all citizens.

On July 15, 2023, the Ministry of Skill Development & Entrepreneurship launched the 'AI for India 2.0' initiative which represented a significant step in the government's efforts to promote AI in the field of education and skill development. It offers free online training on Artificial Intelligence and aims at equipping youth with essential AI skills to prepare them for future job markets. It assists students in breaking language barriers in technology education by offering courses in multiple Indian languages.

Other leading initiatives in India are Skill India AI Portal which is an online platform that offers AI courses, tutorials, and certifications in collaboration with tech firms and educational institutions, National AI Skilling Program helps to enhance AI skills through customized training modules with industry leaders, covering machine learning, data science, and AI ethics.

AI in the Curriculum

NEP 2020 focuses on the integration of essential subjects, Skills and Capacities in curriculum. Concerted curricular and pedagogical initiatives are being adopted both in school and Higher education system for the introduction of contemporary subjects such as Artificial Intelligence, Design Thinking, Holistic Health, Organic Living, Environmental Education, Global Citizenship Education (GCED), etc. at relevant stages to develop various important skills in students.

Apart from this, a focus on STEM education envisions creating a 'STEM-infused' curriculum and concepts across all disciplines. This approach aims to break down the barriers between science, technology, engineering, and mathematics and encourage a comprehensive understanding of the world. Similarly, A focus on Robotics provides a dynamic and engaging platform for students to apply their STEM knowledge in a practical way. Students gain valuable hands-on experience in problem-solving, teamwork, and critical thinking by designing, building and STEM programming robots. This hands-on approach to learning is essential for preparing students for the future workforce, where adaptability, innovation and technological literacy are highly valued skills. These initiatives will boost the student's interest in AI by enhancing the scientific temperament. DoSE&L, Ministry of Education through its flagship scheme of Samagra Shiksha Scheme and PM SHRI Yojana support these initiatives all across the country.
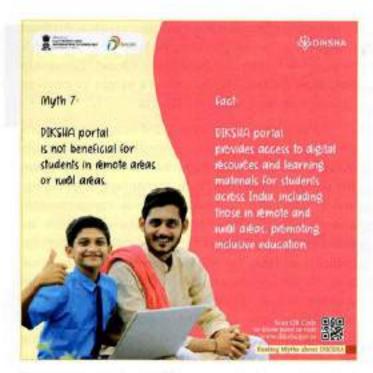
Use of AI in Education

The Indian school education system is one of the largest in the world consisting of around 25 lakh students in 14.5 lakh schools with around 96 lakh teachers. Inadequate infrastructure, poorly qualified and motivated teacher force and quality education are constant challenges of our education system. AI can assist in various ways.

✦ Teaching and Learning Process

AI-powered professional development tools help to locate resources and tailor them according to the teachers' needs and interests, fostering continuous

Myth 7

DIKSHA portal is not beneficial for students in remote areas or rural areas.

Fact

DIKSHA portal provides access to digital resources and learning materials for students across India, including those in remote and rural areas, promoting inclusive education.

professional growth. There are many classroom management tools which can help teachers monitor student engagement, providing valuable insights. In addition to enhancing student learning, AI can also streamline administrative tasks for educators. AI can personalize learning by adapting content and pace to individual student needs. This personalized approach helps address diverse learning styles and paces, ensuring that each student receives the attention and resources they need to succeed. AI-powered tools can analyse vast amounts of data to provide personalized learning experience.

AI-powered chatbots can provide 24/7 assistance to students and parents, answering common questions and directing them to relevant resources. By automating these time-consuming tasks, AI can better be used at platforms like DIKSHA to provide all relatable materials as per students' individual needs and preferences. Chatbot TARA at DIKSHA portal can boost the assimilation of teachers, learners and academics by providing a rich repository of varied resources in the form of audio, visual contents to aid in the teaching and learning processes. This allows educators to dedicate more energy to high-impact activities like lesson planning and one-on-one coachings. Such others AI-powered Chatbots, and Virtual Assistants are providing continuous support to students in the learning process. AI-administered language learning and translation tools are helping a lot in breaking down barriers to language learning. This is a boon for the application of regional languages in technical education along with addressing the linguistic diversity in India's education system

Grading and assessment

AI powered grading systems can handle large-scale assessments, freeing up educators to focus on more interactive and personalized aspects of teaching. This aligns with the NEP's goal of emphasis on fostering critical thinking skills instead of rote memorization.

Automatic formative assessment with AI-assisted techniques can provide actionable feedback on student writing, understanding or other student outputs. In the long run, AI could save teachers time and effort by automating the students' homework and assessments. AI can assist in evaluation and analysis of answer sheets. It can also analyse the students orientation, likings, preferences and accordingly prove resources to excel in life.
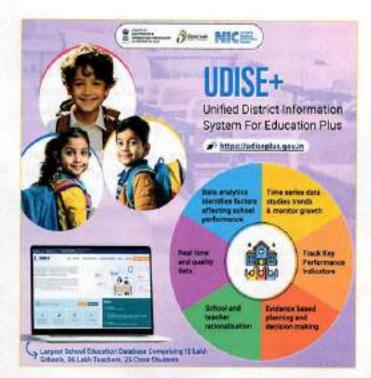
Classroom Monitoring

AI can assist teachers to monitor and manage classroom activities for effective teaching practices. It will save precious time and energy. AI-assisted systems can be used for classroom-based student monitoring. AI-assisted video applications have the potential to monitor each student individually. Best part of AI is that it's free from biases and can provide guided charted solutions for every student. With the advent of generative AI, it can create new contents like text, images and audio/vedios and evolve in immersive ways.

Measures such as face recognition, usage analysis and theft detection are absolutely necessary to maintain a safe environment in educational institutions. This will help in increasing the examination integrity. There is a need for secrecy and fairness in the exam. Maintaining its balance in sanctity can be done by AI.

Support Learners with Disabilities

AI powered assistive technologies, such as speech-to-text applications for hearing-impaired students and

UDISE+
Unified District Information System For Education Plus

https://udiseplus.gov.in

Largest School Education Database Comprising 15 Lakh Schools, 96 Lakh Teachers, 25 Crore Students

text-to-speech for visually impaired students, along with real-time language translation services can make education more accessible to diverse students. Apps like PRASHAST facilitate early screening of students for possible disabilities. AI can further make this process efficient and effective. It is a step towards realising the vision of Equitable and Inclusive Education, of NEP 2020, and SDG 4.

✦ Improvement in Educational Administration

The recent initiatives of the ministry of education, GoI in the form of Vidya Sameeksha Kendra has provided a new dimension to the educational administration. The ability to effectively collect, monitor, correlate, and analyse data will lead to timely actions to implement schemes. Various initiatives of the Ministry of Education like UDISE, Student Database, NAS, NIPUN BHARAT, Teacher Database, DIKSHA etc. are efficient systems working in silos. Integrating various data sets and breaking through the barrier of operating in silos will help us effectively leverage different entities towards a common goal. AI can further correlate various data sets, analyse them meaningfully using big data analysis, and machine learning and provide insights for effective decision making to enhance the overall monitoring of the education system and thereby improving learning outcomes.

AI powered Vidya Samiksha Kendra will assist in tracking student enrolment and drop-outs, students and teachers attendance, progress in their learning levels, Out of School Children mainstreaming, textbook delivery, monitor the real-time status of various projects/ activities under the ambit of Samagra Shiksha, monitor and track field level academic and non-academic activities at state level, improve the academic performance of students, enhance the accountability of teachers in schools, effective utilisation of the available resources and also empower administrators and teachers in the field to take data driven decisions effectively.

AI Ambition in Union Budget 2025-26

Union Budget 2025-26 presented its AI ambitions and allocated Rs. 500 crore to set up an AI centre of excellence on education. The AI center of excellence for education can prove to be a strong signal for integrating AI for both the educators and learners. This will unlock learning and help in enhancement of the quality of education which shall increase the employability.

Data analysis is very much needed to improve education. AI also facilitates the creation of immersive learning experiences through virtual reality (VR) and augmented reality (AR). These technologies can bring abstract concepts to life, making learning more engaging and practical. Such immersive experiences align with the NEP's vision of promoting experiential learning and a holistic approach to education.

AI for Education in Rural India

The state of education in rural areas is often challenging due to numerous obstacles including limited resources, teacher shortages, and inadequate infrastructure for individualised learning, all of which contribute to a significant educational gap between rural and urban areas. AI can prepare rural students for success from supporting teachers to enhancing access.

AI can support and empower teachers in rural areas to access vast educational materials in order to create customized lesson plans and teaching-learning materials. It can allow teachers to focus on inspiring and guiding their students, creating a more dynamic and responsive educational environment suited to rural needs. The integration of AI can assist in creating a more inclusive and equitable education system by leveraging technology to overcome geographical barriers and resource constraints.

According to the National Education Policy (NEP) 2020, regional languages (or mother tongue, local language) should be used as the medium of instruction wherever possible, at least until Grade 5, and preferably

E-LEARNING

up to Grade 8 and beyond, promoting the use of regional languages in education to preserve cultural heritage and enhance learning outcomes. AI has provided multiple solutions to language learning. AI can also translate educational materials into local languages, promoting inclusivity and ensuring all students can access quality resources. AI can also bridge gaps by enhancing virtual classrooms and online courses. These platforms connect rural students with qualified educators worldwide, offering specialised courses and subjects not available locally.

AI-powered offline learning platforms can deliver educational content even in areas with unreliable electricity and limited internet connectivity. These platforms synchronise data and updates whenever an internet connection is available, ensuring uninterrupted learning. This adaptability is crucial for consistent education delivery in rural areas.

Rural areas often lack extensive educational facilities like libraries and laboratories. AI can help overcome this by providing digital resources accessible through smartphones and other devices. AI-powered educational apps offer interactive materials, including videos, simulations, and quizzes, enhancing the learning process's effectiveness. This equitable distribution of resources can significantly reduce the educational disparity between rural and urban students, ensuring rural students have access to similar opportunities and personalised learning experiences as their urban peers thereby democratise the learning experiences.

Challenges

Privacy risks are a major concern. One is wary about what personal data is collected and how it is used. Data collection, data processing, data dissemination and invasion may lead to encroach into an individual's personal space, choices or activities.

Teacher-student relations are most sacrosanct in India. Relying more on AI has potential to hamper the teacher-student relationships and may impact on social-emotional aspects of learning. If teacher-student interactions vanish, students' social skills and interpersonal development will suffer. While artificial intelligence can be a great teaching tool, the role of real-life educators in fostering critical thinking, emotional intelligence and social skills remains important in education. Though AI can enhance the teaching process, the unique qualities that teachers bring in their students and to the classroom make them irreplaceable.

Cheating and plagiarism are also major challenges. AI may be used to complete assignments or exams or write papers unethically. It is said that AI is only as good as the algorithms it is based on. If the data it draws is inaccurate or biased, then the information it creates will be inaccurate or biased. Responsible, accountable and ethical development of AI is essential to ensure that AI benefits all stakeholders in the educational ecosystem.

Even when rural schools have access to technology, a lack of digital literacy and training can hinder its effective use. Many teachers and students in rural areas lack the skills and knowledge needed to integrate AI into their learning process.

Way Forward

Mention of AI in NEP-2020 reflects a paradigm move towards adapting technology to create a more inclusive, skill-oriented and efficient education system in India. As the use of AI in education continues to evolve, it has all the potential to significantly contribute to prepare all the stakeholders in the education system for a better future.

AI in education can assist every child to reach their full potential regardless of their socio-economic background. In order to bridge the digital divide, urban-rural gap and reap the benefits of Artificial Intelligence, broadband access, high-speed internet, investment in affordable tech Solutions, open-source software, cloud-based platforms and effective teacher-training programmes should be provided at all levels in a big way. With all the advantages AI can ensure quality education to all to realise the objectives of Viksit Bharat by 2047. □