



PROSPECTS OF ARTIFICIAL INTELLIGENCE (AI) AND PERSONALIZED LEARNING IN INCLUSIVE EDUCATION INTEGRATED TO THE NATIONAL EDUCATION POLICY (NEP) - 2020

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Chief Editors

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AI ENABLED PERSONALIZED LEARNING FOR INCLUSIVE CLASSROOMS UNDER NEP 2020

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Abstract

The National Education Policy (NEP) 2020 represents a shift in the education system of India towards greater equity, access, quality, and inclusion. In this environment, Artificial Intelligence (AI)-enabling personalized learning is emerging as an important means of meeting the diverse needs of students in inclusive classrooms. This paper discusses the potential uses and challenges of using AI-based personalized learning strategies within the context of NEP 2020 and how such applications are likely to assist teachers in differentiating instruction for students with special needs, close achievement gaps among students, and create a learner-centered instructional environment in accordance with the goals outlined in NEP 2020.

The paper also examines how adaptive learning technologies, intelligent tutoring systems, and learning analytics will facilitate improved engagement and academic achievement for diverse learners. Furthermore, it examines the ethical considerations, hardware and software needs, and capacity building requirements that are necessary for successful implementation. Overall, the paper brings together policy issues and technical solutions to reinforce AI-enabled personalized learning as an essential strategy to strengthen inclusive, equitable, and future-oriented education systems in India.

Keywords: Artificial Intelligence, Personalized Learning, Inclusive Education, NEP 2020, Educational Technology

Introduction

The education systems around the globe are experiencing a dramatic shift due to technological advancements. Artificial Intelligence has emerged as a major innovation catalyst in the learning and teaching process. In India, the National Education Policy 2020 has identified the use of digital technologies and AI to enhance learning outcomes and promote inclusive and equitable education for all learners.

Inclusive classrooms include students with varying learning abilities, socio-economic statuses, languages, and disabilities. Conventional teaching methods, which are one-size-fits-all, are not able to address the varied needs of students. AI-powered personalized learning provides adaptive, flexible, and data-informed solutions to address the needs of individual students, thus furthering the cause of inclusive education as envisioned in NEP 2020. However, in recent years, the growing availability of educational data and technology has made it possible to apply AI in the classroom. Technologies such as adaptive learning systems, intelligent tutoring systems, and learning analytics are changing the way teachers and learners interact. These technologies facilitate continuous assessment, feedback, and

personalized learning experiences, which are critical for meeting individual differences in inclusive education settings. Furthermore, the COVID-19 pandemic has brought to the fore both the potential and limitations of digital education in the Indian context. Technology has made it possible to continue education, but it has also brought to the fore the inequities in access and learning outcomes. In this backdrop, AI-enabled personalized learning has the potential to not only improve digital education but also address equity concerns by providing targeted support to disadvantaged and marginalized learners.

In this context, the current study aims to explore the relevance of AI-based personalized learning in the context of inclusive classrooms within the framework of NEP 2020. The study aims to explore how AI can be effectively utilized within the Indian education framework to achieve inclusivity, quality, and holistic development of learners within the ethical boundaries of AI-based personalized learning. AI-based personalized learning helps to create inclusive classrooms in which learning is tailored to suit different learners, in line with the Indian National Education Policy (NEP) 2020, which aims for equitable access hypothetically extended towards 2029 and the goals of technology-driven equity.

NEP Foundations

The National Education Policy (NEP), also known as NEP 2020, recognizes the importance of technology in facilitating personalized learning across many disciplines to address existing gaps in traditional educational settings. Through the use of artificial intelligence (AI) and other technological tools, NEP 2020 aims at creating an inclusive educational system that promotes equity and individualised learning experiences regardless of where a child was raised or whether they were born with a disability or other challenges. In addition, NEP 2020 emphasises a student-centred approach that promotes learners' ability to achieve mastery of knowledge by using curriculum flexibility, developing digital infrastructures, and implementing the widespread use of AI across the country to enhance the quality of education received by all students.

AI Technologies

AI uses adaptive learning technologies that analyze student data in real-time to adjust levels of difficulty and style. Such technologies as intelligent tutoring apps offer immediate feedback, while predictive analytics help identify struggling students early on. Natural language processing allows for multilingual support, which is critical in India's diverse environment, ensuring that the content speaks to the culture.

Inclusive Classroom Benefits

Personalized learning paths using AI increase engagement for special or resource-poor students, reducing the likelihood of dropout. It provides equal opportunities for all students by offering voice-assisted learning for visually impaired students and gamified learning modules for motivation. Teachers also benefit from learning analytics dashboards to track student progress, enabling differentiated learning rather than one-size-fits-all teaching

Concept of AI-Enabled Personalized Learning

AI-enabled personalized learning is the application of artificial intelligence concepts and technologies to create, manage, and deliver learning experiences that are personalized to meet the individual needs of learners. Unlike traditional learning approaches that are standardized in terms of content and pace, personalized learning is centered on adapting content, instruction, and assessment to meet the needs of individual learners based on their abilities, interests, and learning styles.

Artificial Intelligence adds a personal touch to learning by continuously collecting and analyzing data about learners, including their performance, level of engagement, response rates, and learning preferences. Using this data, AI systems can automatically adjust learning experiences to meet the needs of individual learners by recommending learning resources and providing personalized feedback.

Literature Review

An increasing number of studies document the potential of artificial intelligence in transforming the way we teach and learn through personalisation, automation, and use of data to inform decision-making regarding education. Literature indicates that AI-enhanced learning environments can provide personalised instructional content based on the unique needs of each learner, thereby enhancing their engagement with course material, increasing their retention rates, and improving their overall academic performance.

Studies conducted on adaptive learning environments and intelligent tutoring systems demonstrate that the provision of personalised feedback and self-paced learning provide significant benefits for diverse learners.

Researchers have examined the requirement for differentiated instruction to address the diverse needs of learners in an inclusive education context (i.e., those with disabilities, those that experience difficulty learning, and those from lower socio-economic backgrounds). Literature demonstrates that when technology is used to enhance personalisation, inclusive education will be enhanced through a variety of different content formats, assistive tools, and flexible methods of assessment. Speech recognition via artificial intelligence, text-to-speech, and predictive analytics have been shown to improve learner access by reducing barriers to learning and increasing the availability of learning resources.

At the policy level, recent analyses have shown that NEP 2020 has identified technology (including artificial intelligence) as a major facilitator of equity and quality in education. Researchers have found that the component of learner-centric education, the need for technological infrastructure, and the necessity to build teacher capacity to support personalised education is congruent with the learner-centred focus of AI-based personalised learning models in NEP 2020. However, the literature has also identified barriers including the digital divide, ethical issues, and data privacy.

Key Challenges of Implementing AI Personalized Learning in Inclusive Classrooms under NEP

The implementation of AI personalized learning in inclusive classrooms under the NEP 2020 in India faces major challenges that are infrastructure-based and rooted in equity and human issues. These challenges undermine the policy's objective of providing equitable and technology-based education.

Digital Divide

The rural and disadvantaged regions lack stable internet connectivity, electricity, and devices, thus denying access to AI. The NEP emphasizes the need for improvement in infrastructure, but the pace of implementation is slow, thus widening the urban-rural divide.

Lack of Skills in Teachers

Few teachers have AI skills, causing resistance or misapplication of AI in inclusive education. Initiatives such as the NCERT AI series are available but have an unbalanced reach, making it difficult to adapt to differently abled or paced learning.

Data Privacy Concerns

The collection of student data is prone to violations and misuse without strict enforcement of the DPDP Act. Inclusive AI requires cautious treatment of sensitive data for the disadvantaged, but policies are lagging behind technological implementation.

Bias in Algorithms

Biased data used to train AI algorithms will disadvantage marginalized castes, languages, or genders, contrary to the principles of inclusivity. The NEP emphasizes equity but uses development priorities that favor English-language content.

Cost and Scalability

The initial cost of implementation is high and can be a burden on public exchequers, making pilots feasible only in elite schools. Upkeep and upgrades will further stress resource-deprived inclusive learning environments.

Teacher Training Programs Pay Attention to AI for Inclusive Education under NEP

The two main teacher training programs that focus primarily on using digital tools for diverse learners through government and NCERT's CIET platform are both primarily focused on providing educators with the necessary resources to implement inclusive education using artificial intelligence (AI) and comply with NEP 2020's equity goals, including assisting educators in providing personalized and accessible learning opportunities in their classrooms using AI.

NCERT CIET Programs

Within the teacher training experience, CIET provides an online program called "Digital Technology and Inclusive Education" where participants receive five hours of training on

the use of assistive technology, adaptive learning systems, and open educational resources (OERs); such as DIKSHA; for students with disabilities or students within marginalised communities. CIET also offers another program entitled "Artificial Intelligence (AI) in Education," where day four will include live training sessions on the use of AI to implement inclusive education through the use of both YouTube and PMeVidya.

DIKSHA and NISHTHA Modules

DIKSHA combines AI-enriched content in various languages, with the help of NISHTHA's ICT training in DIETs for a blended inclusive setup. The cluster centers also train teachers on AI tutors along with human tutors.

Focus Areas

The focus areas include multilingual content, immediate feedback, responsible use of AI, and approaches to teach neurodiverse children, with a focus on collaboration rather than rote learning.

Recommendations

To achieve a successful AI-enabled personalized learning experience in an inclusive education system with the support of NEP 2020, policymakers must focus on building out national infrastructure, something that will require providing low-cost devices and high-speed internet access to rural areas, coupled with a commitment to providing all teachers with the professional development they need to implement this vision (e.g., NCERT's CIET programmes, DIKSHA). In addition, schools should pilot AI-enabled adaptive learning platforms, similar to those being pilot tested in DPS Noida, which need to include the development of multilingual tools as well as equitable algorithms that do not favour one set of learning behaviours over another, in order to support neurodiverse, underprivileged, or otherwise diverse learners. They should also develop protocols for comprehensive data privacy consistent with the provisions of the DPDP Act. Finally, by promoting public-private partnerships (PPP) to develop large-scale, scalable edtech solutions based on the principles outlined in the NEP, providing regular impact assessments and case studies of successful practices (e.g., assessments of state public schools), and continuously providing training to combine AI with human compassion, all participants should be empowered to achieve equitable outcomes by 2029.

Educational leaders should encourage cross-state collaborations to help disseminate information on successful AI pilots developed within state public schools in order to rapidly streamline efficient practices for inclusive personalized education. Developers should focus on creating open-source, low-bandwidth AI models that work across the thousands and thousands of devices available in India today, while developing voice-based interfaces that are capable of operating in each of India's 22 languages to ensure access to individuals with no vision or literacy. Finally, conducting regular equity audits, providing opportunities for parents to learn how to best support their child's educational needs, and making flexible

funding available through NEP's Samagra Shiksha will ensure sustained advancement towards turning challenges into outstanding opportunities for all students by 2029.

In addition, educational administrators must encourage inter-state collaboration for successful AI pilots, such as in state public schools, to quicken the pace of best practices in inclusive personalization. Developers must focus on open-source, low-bandwidth AI models that are compatible with India's devices, including voice interfaces in 22+ official languages, to include non-literates and visually impaired children. Equity audits, with structured frameworks of classroom observations, focus groups, and achievement gap analysis, together with effective parental engagement workshops via PTAs/SMCs, and flexible funding for offline AI kits through NEP's Samagra Shiksha, will help maintain the pace. These, borrowed from successful rural experiences, turn challenges into opportunities for a truly inclusive AI ecosystem by 2029.

Expected Outcomes

The future of personalized learning through AI in inclusive classrooms as part of India's National Education Policy 2020 is expected to be very positive. By 2029, a seamless integration of these technologies will take place across India through a nationwide network of Augmented and Virtual Reality (AR/VR) labs, multilingual AI-based tutors and hybrid human/ AI models. The combination of public and private sector initiatives (for example the expansion of Atal Tinkering Labs) and IT-based tools such as Microsoft Shiksha CoPilot will be able to upskill teachers at a large scale between 2026 and 2029. This will enable the delivery of real-time adaptive content to both urban and rural areas, and across all ability levels, which will potentially lead to an increase in overall learning outcomes by between 10% and 20% for diverse groups of students. Through predictive analysis, at-risk students will receive early intervention to support their retention in school; and ethical frameworks will be developed to diminish bias in the education system, establishing India's leadership position in providing equitable, technology-enhanced education that will fully meet the National Education Policy's vision of providing a multidisciplinary, competency-based educational experience to all students.

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