

Artificial Intelligence in Education: Realising NEP 2020's Vision Through Personalised Learning Approaches

Anshu Chandra¹, Dr. Anju Verma²

ABSTRACT

The Indian National Education Policy (NEP) 2020 promotes technological integration for inclusive, equitable and learner-centered education. This paper explores how AI-powered personalized learning can support NEP 2020's goals by addressing diverse learning needs across India's socio-economic and linguistic landscape. Employing a qualitative six steps AI-assisted reflexive thematic analysis framework (suggested by Naeem et al., 2023; Braun and Clarke, 2006), guided by the TPACK model (Koehler and Mishra, 2006), the study draws on policy documents, EdTech case studies and international reports. Findings highlight AI's potential in customizing content, supporting differentiated instruction and enhancing educational quality. Despite infrastructural disparities, algorithmic prejudice, data privacy problems and educator readiness, these issues are rigorously examined. The study concludes with policy and pedagogical recommendations to implement AI in an inclusive, ethical and context-sensitive manner aligned with NEP 2020's transformative vision.

Keywords: *Artificial Intelligence, NEP 2020, Personalised Learning, Educational Equity.*

Author(s):

¹J.R.F. Research Scholar,
Teacher Education Department,
Nagaland University, Kohima Campus.
Email ID: anshuchandra19@gmail.com

²Professor, Teacher Education Department,
Nagaland University, Kohima Campus.
Email ID: anjuverma@nagalanduniversity.ac.in

1. INTRODUCTION

The '*doctrine of Anitya*' (Sanskrit) by Buddhism and the '*doctrine of Flux*' by the Greek philosopher Heraclitus both said that 'Change is the sole constant in our universe' (Harvey, 2013; Graham, 2019, p. 112). This era is also witnessing significant changes due to the swift progress in Artificial Intelligence (AI). AI is redesigning almost every facet of life so, the sphere of education is also no exception. AI technologies are transforming educational practices through ITS (intelligence tutoring systems) and adaptive learning platforms, facilitating enhanced customisation, immediate feedback and data-informed decision-making. (Luckin et al., 2016). In India where is rich diversity in multiple aspects; above technological shifts are predominantly pertinent in light of NEP 2020, which aims to create a revolutionary and inclusive educational framework that leverages AI to tackle systemic obstacles and learning disparities (NEP, 2020, p. 58).

Undoubtedly, limited availability of faculty and administrative staff, delayed responses and inconsistency in guidance, office hours and tutor-led sessions like traditional student support systems often fail to accommodate different needs, personalised and urgent requirements of the students, specially within extensive online educational settings (Zawacki- Richter et al., 2019). But the NEP strongly emphasizes the integration pertaining to novel technologies encompassing AI, Machine learning and many types of educational software and hardware to enhance teaching methods, access, equity and quality in education (NEP, 2020, p. 23, 58). Moreover, the growing digitalization of education expedited by the COVID-19 pandemic has created an urgent demand for 24/7 student support, personalized learning pathways and scalable educational solutions (Daniel, 2020).

Thus, these existing challenges can be address by AI chatbots and virtual assistants through providing instant responses to queries, personalized suggestions as well as continuous engagement irrespective of time and location (Méndez & González, 2022). Indeed, the creation of the NEFT (National Educational Technology Forum) and projects like DIKSHA and PM eVIDYA shows the policy's dedication to leveraging the technology to cater the different educational requirements of pupils nationwide for inclusive education (MoE, 2020).

Hence, from the heart of this policy document arises a significant question in front of a research scholar, Can AI-powered personalized learning serve as a viable solution to India's educational disparities, particularly in multilingual, rural and underserved contexts? This paper explores, how AI can personalize learning pathways, support differentiated instruction and foster learner autonomy while also identifying challenges such as ethical concerns, teacher preparedness and infrastructural limitations through thematic analysis, in light of the function of AI in facilitating the strategic objectives of NEP 2020.

1.2. RESEARCH QUESTIONS

1. How does NEP 2020's vision for education regarding the usages of AI in the classroom?
2. How can diverse Indian classroom benefit from AI-driven personalized learning in terms of equity, inclusivity and learner-centered instruction?

3. What policies and professional development initiatives are required to enable educators to integrate AI-based personalized learning technologies in line with NEP 2020?

1.3. STUDY OBJECTIVES

1. To assess the potential of AI in enabling individualized education.
2. To analyse the alignment between AI-driven learning and the objectives of NEP 2020 on technology-enhanced education.
3. To examine the prospects and challenges associated with adoption of AI in diverse Indian educational settings.
4. To explore instructional practices for the sustainable integration of AI in education.

2. METHODOLOGY

The researcher adopted a thematic analysis design under the qualitative research method to explore the function of AI-driven individualized education in realizing NEP 2020's vision. Secondary data were sourced from the NEP 2020 policy document, UNESCO's AI in Education guidelines, relevant academic journals from various databases like Google Scholar and ERIC, and government reports. The TPACK framework (Koehler and Mishra, 2006) and the six-step reflexive thematic data analysis process (Braun and Clarke, 2006) with the AI-assisted framework (Naeem et al., 2023) guided the analysis procedure to identify the recurring patterns and critical themes related to inclusivity, equity, teacher readiness, and ethical considerations. The study attempts to explore how AI integration intersects with pedagogy, content, and technology in Indian educational contexts.



Figure. 1: The flow diagram presentation for AI-assisted reflexive thematic data analysis procedure suggested by Naeem et al., 2023

3. THEMATIC DISCUSSION

A thematic discussion helps to make sense of large amounts of qualitative information by organizing it around key themes, making the findings clearer and more meaningful for readers or stakeholders. Themes are defined as “an idea or concept that encapsulates and summarises the essential point of a coherent and meaningful pattern in the data” and “a common, recurring pattern across a data-set, centered around a principal organizing concept” (Braun and Clarke, 2009).

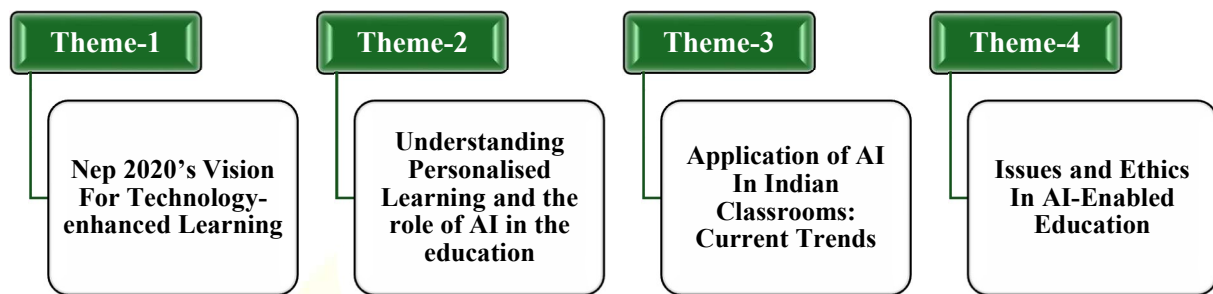


Figure. 2: The hierarchy list diagram for discussion themes after the 5th step of adopted TA framework.

3.1. NEP 2020'S VISION FOR TECHNOLOGY-ENHANCED LEARNING

NEP 2020 changes India's education paradigm. The use of technology to improve educational access, equity and quality is one of its most revolutionary ideas. So that, India's vast diversity (such as linguistic, geographic, socio-economic) would be recognised through holistic, flexible and learner-centered pedagogy. Recognizing the policy calls for leveraging technology is significant not merely as a tool but as an enabler of personalized, adaptive and inclusive learning (NEP, 2020, p. 48).

A. Technology as a Driver of Inclusion and Quality: NEP 2020 emphasizes technology's role in long-standing gaps in educational access and outcomes. It envisions the use of digital platforms and AI-based tools to provide tailored learning experiences for students with different learning needs and backgrounds. The policy asserts that such innovations are crucial to achieving universal foundational literacy and numeracy by 2025, and to promoting competency-based and experiential learning across all levels of education (MoE, 2020). DIKSHA, PM eVIDYA and SWAYAM are NEP 2020 programs that demonstrate this goal. Such platforms offer OERs, digital textbooks, teacher training content and multilingual content delivery with AI integration. NEP also proposes developing adaptive assessment systems that provide tailored feedback and learning methodologies, which AI can help with (MoE, 2020).

B. Establishment of the National Educational Technology Forum (NETF): Under NEP 2020, the NETF was established as an autonomous entity to lead educational technology research, policy and capacity building (MoE, 2020). NETF finds and integrate emerging technologies like AI, machine learning and big data analytics pedagogically. NEP 2020 fosters collaboration between academics, government and EdTech entrepreneurs through the NETF to connect technological interventions with pedagogical aims and local needs. It emphasizes the significance of teacher empowerment through digital literacy training and ongoing professional development (UNESCO, 2022).

C. Personalised and Adaptive Learning: The NEP's technical vision emphasizes personalized and adaptive learning. The policy requires instructional tools that can: (i) Adapt content delivery to specific learners. (ii) remediate or enhance as needed. (iii) Respond to real-time data on student performance. (iv) Provide immediate, actionable feedback. Indeed, AI-powered learning systems align well with these goals by utilizing data analytics to tailor learning pathways and improve learning efficiency (Holmes et al., 2022). Such approaches may

assist Indian classrooms to accommodate different cognitive talents, learning paces and linguistic settings. However, the policy recognizes the digital gap as a major equity issue. Stakeholders should enable universal device, internet and culturally relevant content access (Moe, 2020). Hence, this emphasizes the need for inclusive, accessible and affordable AI systems in rural and underserved areas.

3.2. UNDERSTANDING PERSONALISED LEARNING AND THE ROLE OF AI

Moving away from the traditional model of “one-size-fit-for-all” by offering flexibility in how, what and when students learn (Walkington, 2013). Personalized learning as an approach that customizes the educational experience based on each learner’s unique strengths, needs and interests (NEP, 2020, p.13-15). The policy promotes using Ed-Tech and digital platforms to accommodate varied learning styles and skills and let students learn at their own rapidity. In India’s heterogeneous classrooms, personalized learning can enhance inclusivity and effectiveness in education. AI functions as a crucial facilitator of this goal, providing tools and methodologies that automate personalization and enable individualized instruction on a large scale.

A. What is AI-powered personalised learning? AI-driven personalised learning denotes the application of artificial intelligence technology to customize educational experiences according to the distinct needs, preferences, capabilities and learning styles of individual students (Yang and Wen, 2023; Katiyar et al., 2024; Sumathy and Navamani, 2024). This analysis indicates that the systems may customize educational content, suggest learning pathways and deliver prompt feedback to both learners and educators (Luckin et al., 2016). These systems leverage AI technologies like machine learning for pattern detection and learning result prediction; NLP for multilingual instructions and voice questions; Augmented and virtual reality computer vision for immersive learning; learner-needs-based recommender systems; and lastly these tools enable learner-centric education in big classrooms when individual attention is challenging (Luckin et al., 2016).

B. Benefits of AI in Supporting Personalised Learning: (i) AI platforms offer dynamic content delivery or customize learning material complexity based on student achievement (Holmes et al., 2022). (ii) Intelligent tutoring systems use dialogue-based interactions and feedback loops to imitate one-on-one human tutoring (VanLehn, 2011). (iii) AI enable automated assessments and feedback actually generates and grades formative assessments quickly, helping students identify their strengths and weaknesses. (iv) Predictive analytics can identify at risk students and advise treatments, improving retention and achievement (Zawacki-Richter et al., 2019). For instance, ConveGenius and Byju’s platforms in India leverage AI to provide curated content to students based on performance data or metrics, encouraging continuous self-paced learning (NITI Aayog, 2021).

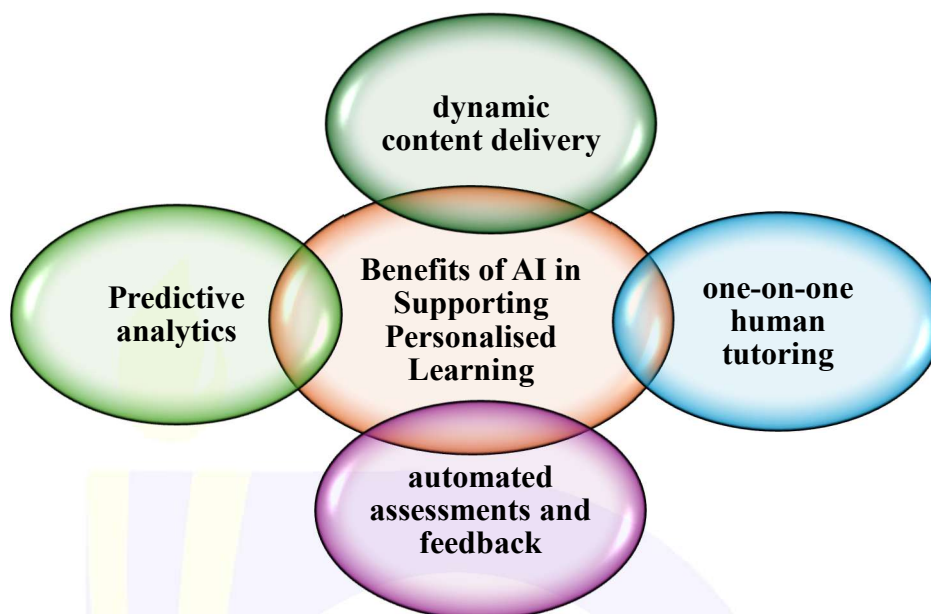


Figure. 3. The info-diagram presentation of benefits of AI in supporting personalised learning.

C. Addressing diverse needs through AI: With 265 million children in 1.5 million schools, India has one of the world's largest school-age populations and this demographic has significant digital access, learning results and language diversity gaps (UDISE+, 2023). Well-designed AI can bridge these gaps. Multilingual AI systems can engage rural and tribal learners with localized language material (UNESCO, 2022). AI-powered speech to text, screen readers and gesture recognition systems can also improve classroom inclusion for disabled students. In fact, these tools facilitate access to educational content and support diverse learning needs, thereby promoting equitable participation (Al-Azawei, Serenelli, & Lundqvist, 2016). However, the success of AI integration in personalised learning depends on how well it aligns with local educational needs, teacher capacities, and policy priorities such as those outlined in NEP 2020.

3.3. APPLICATION OF AI IN INDIAN CLASSROOMS: CURRENT TRENDS

India's education system is experiencing notable changes as AI is increasingly integrated into teaching and learning. While still emerging, AI adoption in India is advancing through initiatives that promote personalised learning, digital assessment, and inclusive education (Kumar et al., 2022).

Table 1: Application of Artificial Intelligence technology (AI) in Indian Classrooms

Areas	Examples	Key Benefits	Adoption/Impact	Challenges
Personalized Learning	Byju's, Vedantu, Embibe	Customizes content to student needs	Over 60% of educators use AI (people matters, 2024, may 14).	Requires quality data, teacher training
Smart Tutoring & Feedback	Embibe, AI chatbots	Real-time feedback, identifies knowledge gaps	Adaptive learning in edtech	Language, curriculum adaptation
Administrative Automation	AI grading, attendance tools	Saves time, improves efficiency	Streamlines teacher workload	Data privacy, system integration
Predictive Analytics	Early intervention systems	Identifies at-risk students, targeted support	Used for performance monitoring	Need for robust analytics
Multilingual & Inclusive Tools	AI translation, accessibility	Supports diverse languages, disabilities	Aligns with NEP 2020	Tech access in rural areas
Collaborative Digital Platforms	Screen-integrated tables	Interactive, participative learning	Patent innovations emerging (Tamang & Bora, 2024).	Cost, infrastructure requirements
Parental Engagement	AI-based updates, dashboards	Real-time student progress for parents	Growing in urban schools	Digital literacy gap

A. Developing Edtech Ecosystem and AI Startups: India's EdTech ecosystem has helped mainstream education adopt AI-enabled technologies. Byju's, ConveGenius, Embibe and LEAD School's intelligent learning system leverage machine learning algorithms to tailor curriculum, personalize content delivery, track student progress and provide actionable and relevant feedback (NITI Aayog, 2021). For instance, tailors learning to individual strengths and weaknesses using data-driven insights and adaptive learning algorithms, while ConveGenius uses conversational AI bots to engage regional language learners. The Atal Innovation Mission (AIM) under NITI Aayog and Intel India's AI for Youth project have also helped students and educators embrace AI (NITI Aayog, 2021). These programs teach 21st-century skills including computational thinking, problem-solving and data literacy which are key to NEP 2020.

B. Government-Led Digital Education Initiatives with AI: Government platforms like DIKSHA, SWAYAM and NISHTHA are adding AI features to improve user experience and accessibility. DIKSHA tracks instructor engagement and performance throughout training modules using learning analytics. The platform is also investigating AI content curation and customized learning recommendation (MoE, 2021). The policy-level National Digital Education Architecture (NDEAR) launched in 2021 aims to build a federated education environment. The application of AI and big data to provide real-time insights into student learning patterns would enable targeted interventions and continual development (MoE, 2021).

C. Personalized Learning and Adaptive Assessments: AI-powered personalised learning is rising in Indian classrooms, especially private and tech-supported public schools. Adapting content to student answers provides just-in-time feedback and scaffolding. For instance, Karnataka, India, studies found that AI-driven platforms like Byju's and Vedantu improved student engagement and academic performance and these platforms dynamically adapt teaching materials to student performance and engagement data using machine learning algorithms (Madhu et al., 2024). Educational initiatives' Mindspark AI-enabled assessment tool has been shown to improve math and language learning; Mindspark's randomized controlled trial showed statistically significant gains in student performance, showing that AI-based adaptive learning could improve foundational learning in India (Banerjee et al., 2016). This line up with NEP 2020's goal of attaining universal foundational literacy and numeracy by 2025.

D. AI Scaling Issues in Indian Classroom: Technological Infrastructure Gaps, Teacher Training and Digital Literacy, Socioeconomic inequalities, Financial Constraints, Data Privacy and Security, Regulatory and Compliance Issues (Goel, 2025; ET 2025). To enable AI's equitable and effective integration in Indian classrooms, strategic infrastructure investments, thorough teacher training, rigorous data protection policies and inclusive approaches are needed (Goel, 2025). AI-powered education, especially in rural and tribal areas where internet connectivity, device availability and digital literacy remain inadequate (UNESCO, 2022). Equally important is the need for multilingual and culturally relevant AI systems that reflect India's linguistic and regional diversity. Without inclusive design, AI may reinforce existing inequalities instead of mitigating them (Holmes et al., 2022). Therefore, the implementation of AI in Indian classrooms must be guided by ethical principles, robust infrastructure, and continuous teacher training.

3.4. ISSUES AND ETHICS IN AI-ENABLED EDUCATION

The NEP 2020 envisions transformative use of technology and offers AI-enabled education also (NEP, 2020, p. 58) to advance equitable and quality education for all level, across India (NEP 2020, p. 3, 11, 24 and 41) and emphasizes the importance of technology as a facilitator of inclusion and quality learning (NEP, 2020, p. 41). Additionally, it focuses integrating technology not only for enhanced learning but also as a tool for inclusive, personalized and adaptive instruction (NEP, 2020, p. 48). While the integration of AI in education, it is vital to ensure that its deployment supports equity, transparency and ethical use of data. it also implies the need for systemic preparedness to navigate emerging several ethical and implementation related risks associated with AI in education that must be critically addressed:



Figure. 4: pictorial presentation for issues and ethics in AI-enabled education in India.

A. Digital Disparity and Structural Inequity: A significant obstacle to egalitarian AI implementation is the enduring digital divide. It is said in 'Guidance for Policymaker' that despite rapid digitalization, large segments of the Indian population lack access to reliable internet, smart devices and basic digital literacy (UNESCO, 2022). Students in rural and tribal areas, particularly girls and learners with disabilities, are disproportionately affected by infrastructural and socio-economic barriers (KPMG & Google, 2017; WEF, 2022; Centre for Civil Society, 2024). Thus, inclusive strategies for risk exacerbating existing inequalities, assurance of consistent available continuous data input and cloud-based connectivity, even in low-resource environments and without adequate infrastructure and support, the benefits of AI-based personalised learning may remain concentrated among privileged groups.

B. Data Privacy and Consent: AI systems in education rely heavily on data collection such as tracking learner behaviour, engagement, assessment outcomes and more. In many Indian schools, especially in public systems, mechanisms for obtaining informed consent from parents or guardians are either underdeveloped or non-existent (Zawacki-Richter et al., 2019). Moreover, there is currently no comprehensive legal framework in India to regulate data privacy in education, although the Digital Personal Data Protection Act, 2023 is a step in the right direction. Until robust data governance mechanisms are institutionalized, the risk of data breaches, misuse of sensitive information and surveillance of children remains high (NITI Aayog, 2021).

C. Algorithmic Bias and Transparency: Biassed training data or incorrect models cause AI systems to provide discriminatory or distorted result. In education, this could lead to unfair recommendations, erroneous assessments, or exclusion of particular learner groups from helpful treatments (Holmes et al., 2022). AI bias can be problematic in high-stakes decisions like admissions, grading and student profiling. To avoid this, AI model design and deployment must be transparent. Explainable AI could help educators and policymakers understand how AI technologies work and how decisions are made (Luckin et al., 2016). This is crucial for stakeholder trust and accountability.

D. Educator Readiness and Role Evolution: AI cannot replace the socio-emotional, ethical and contextual judgment that teachers bring to the learning process. However, many Indian teachers lack training in using AI tools effectively, leading to underutilization or misuse of such technologies (UNESCO, 2022). NEP 2020 calls for robust teacher professional development programs, but there is a need for focused initiatives and sufficient capacity building that build educators' digital and AI literacy.

4. CONCLUSION

NEP 2020 aims to reform current approach of education in India. It emphasizes diversity, inclusivity, equity and the integration of technology to enhance learning outcomes. Through personalised learning, AI can help to achieve these goals. In fact, it can create a more inclusive and efficient education system by offering self-paced, relevant and contextualized learning as per students' needs. As outlined in this study, AI-powered solutions can offer adaptive learning, real-time assessments and personalized feedback. India's diverse classrooms and educational

fairness issues make these advances relevant. AI can also support students with disabilities and offering multilingual solutions (UNESCO, 2022). However, the government, schools and technology companies must solve the digital disparities, data privacy concerns, algorithmic biases and teacher readiness for AI to reach its NEP 2020 potential (KPMG & Google, 2017; Zawacki-Richter et al., 2019). Additionally, A strong regulatory framework that assures ethical AI deployment and professional development programs for digital literacy and AI competencies are also necessary (Luckin et al., 2016). If these concerns are solved, AI can help NEP 2020 to achieve a learner-centric, inclusive and future-ready educational system.

4.1. Prospective Avenues and Pragmatic Suggestions: Numerous critical initiatives must be undertaken to enhance AI in education and align it with NEP 2020: (i) The government must emphasize digital infrastructure in rural and underprivileged areas to ensure fair access to AI-powered educational tools and technology (UNESCO, 2022). (ii) Regulation through a strong legislative framework will be required to protect data privacy, eliminates AI model biases and open decision-making (NITI Aayog, 2021). (iii) DIKSHA can provide professional development program to train educators in AI-based classroom technologies (iv) AI-driven personalized learning needs more qualitative and quantitative research across diverse educational settings. AI can truly help India's education system become more personalized, inclusive and global with these efforts.

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