

Impact of Artificial Intelligence on Teacher Training and Professional Development under NEP 2020: A Review

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Abstract

Artificial Intelligence is now a potent instrument for transforming the educational system in our digital world. It has significantly influenced teaching methods, learning processes, and professional development practices. The National Education Policy (NEP) 2020 has substantially promoted the integration of technologies like artificial intelligence in order to ameliorate the norms of school teacher

According to NEP 2020, this review article examines the effects of artificial intelligence on teacher training and professional growth. It examines how advancements in virtual classrooms, learning analytics, intelligent tutoring systems, adaptive learning platforms, and AI-based technologies have transformed teaching strategies and educational methodologies. The study also shows how AI facilitates personalized knowledge, nonstop evaluation, and the ongoing professional development of preceptors.

The research also examines the major advantages, challenges, and constraints of using artificial intelligence in teacher training schools. Topics covered include data security, digital literacy, ethical concerns, resistance to technological progress, and a lack of sufficient technological infrastructure. The review concludes that there's a large eventuality for artificial intelligence to ameliorate school teacher education and professional development programs. Still, careful drug, respectable training, and ethical execution are still necessary for long- continuing and successful issues.

Keywords: Artificial Intelligence, teacher training, professional development, NEP 2020, educational technology, personalized learning, digital education.

Introduction: -

The 21st century is depicted by a digital revolution that is redefining the contours of worldwide education system. The education system now incorporates artificial intelligence as a fundamental component, increasing the efficacy and efficiency of programs for teacher training and professional growth. Teachers, who form the foundation of education, are increasingly benefiting from AI-powered tools that support their development, instructional methods, and student interaction. The forefront of this change is Artificial Intelligence (AI), which includes technologies that replicate human cognitive functions like reasoning, learning, and decision-making. Traditional pedagogy is being transformed into more learner-centered and data-informed models by AI applications, such as intelligent tutoring systems, adaptive learning platforms, chatbots, and predictive analytics. The National Education Policy (NEP) 2020 in the Indian context aims to facilitate the country's shift towards a global knowledge economy via the integration of technology and skill-based learning. The essential function of digital literacy and AI in improving the quality and accessibility of education is highlighted by the policy. In order to meet potential educational challenges and opportunities, it promotes giving teachers and students AI skills. The effort to build computer systems that can replicate human thought and behavior is known as "artificial intelligence" (AI). Technology has overturned the world of learning as education materials, especially during the pandemic of Covid 19 (Rangaiah, 6 Applications of AI in Education Sector, 2024) [10].

“Firstly, AI enabled hyper personalization helps in developing customized learning in an environment based on ability performed mode of learning and experience.” (Dwivedi, Mishra, & Hughes, 2020, p. 17). “Secondly the use of smart assistants (Amazon Alexa, Google home, Microsoft Cortana) and associated technologies offer significant potential to help students” (Dwivedi, Mishra, & Hughes, 2020, p. 17) [1] The rapid advancement of technology has propelled Artificial Intelligence (AI) to the forefront of education, transforming the learning

sphere of students. AI helped in the progress of the education system immensely and both academic professionals and students are benefited by AI.

NEP 2020 and AI IN TEACHER TRAINING

The national Education Policy (NEP) 2020 is transforming the education system, and artificial intelligence is playing a crucial role in the transformation of teaching methods, evaluation and enhancement of the teaching – learning systems. NEP2020 emphasizes the holistic development of children through hands-on learning. The National Education Policy 2020 envisions a transformative shift by integrating Artificial Intelligence in teacher training and professional development programs. AI-driven solutions can support personalized learning, automated assessments, and adaptive teaching methodologies. This review explores existing literature on AI's role in teacher education within the framework of NEP 2020. Artificial Intelligence, with its vast potential for individual learning and efficient management, is playing an important role in teacher training and professional development.

Methodology

The paper is exploratory in nature and Artificial Intelligence information is derived from articles in journals, magazines and other online sources. The data relies on secondary sources of information.

Objectives of the research

- Examine the role of AI in teacher training and professional development
- Explore various AI tools used in teacher training and ongoing professional development
- Identify the key challenges AI poses in education and suggest strategies to address them

Literature Review

In 2020, Morocco hosted the 21st International Conference on Artificial Intelligence in Education (AIED), where it was recognized that AIED is a groundbreaking area of educational technology (Kaur, 2024) [3]. In her article, Sapna Saklani (2024) [12] lists numerous Artificial Intelligence tools and platforms that may be utilized in education.

Bidisha Borchetia and Mridula Hazarika (2024) elaborated utilization of AI technology in new educational policies and strategies. They primarily focus on NEP 2020 and the role of AI in education. Luckin et al. (2018) specify some of the features of AI that can enhance self-paced learning, improve retention power and pedagogical skills of learners.

Afiya Jamal (2023) in her research paper she focused on AI's influence on teacher education, their challenges, advantages and disadvantages. The use of artificial intelligence (AI), which is described as the capacity of computers to replicate human cognitive functions such learning, reasoning, and self-correction (Russell & Norvig, 2020), has started to change education globally.

Professional development methods have traditionally, and largely, taken the form of decontextualized, episodic, and inflexible learning opportunities, such as professional development workshops, seminars, or certification courses; these methods have long been criticized (Desimone & Garet, 2015).

Addressing the difficulties of integrating AI into Indian classrooms, the article investigates how to utilize current worldwide AI support systems to improve education in India. It identifies significant challenges, such as infrastructure shortages, teacher training, data privacy issues, and the demand for localized content, and addresses how to modify tried-and-true AI frameworks, technologies, and best practices from across the globe to fit India's specific educational environment.

The paper explores leveraging existing global AI support systems to enhance education in India, addressing the challenges of implementing AI in Indian classrooms. It discusses adapting proven AI frameworks, tools, and best practices from around the world to suit India's unique educational landscape, and identifies key obstacles such as infrastructure gaps, teacher training, data privacy concerns, and localized content needs.

AI in teacher training and professional development

In contrast, traditional teacher training courses frequently employ classroom practice, workshops, and in-person seminars, which may not be as individualized. These restrictions can be overcome with the help of artificial intelligence. The following are a few of the most important functions of AI in teacher training and professional growth:

Personalized Professional Development

By analyzing teacher data (course completion, quiz scores, classroom feedback), AI systems make the following recommendations:

- Certain skill modules
- Courses that expand knowledge of the topic
- Approaches to enhancing teaching

Utilizing AI-driven analytics, platforms like DIKSHA may customize teacher learning routes.

AI-Based Lesson Planning and Assessment

Teachers may benefit from using AI tools:

- Create lesson plans
- Make worksheets that are varied.
- Create competency-based assessments

The emphasis on experiential and competency-based learning in NEP 2020 is consistent with this.

Virtual Reality for Educational Simulations

In this scenario, with the aid of AI-powered simulations, teachers can try their hand at: • Keeping control in the classroom • Multilingual teaching methods • Inclusive education strategies This is particularly useful when dealing with India's diverse classrooms.

Data-Driven Monitoring

AI dashboards include:

- Examination of student achievement
 - Monitoring learning outcomes
 - Attendance and participation trends
- Based on real-time data insights, teachers may change their methods.

AI and Pedagogical Improvement

AI offers insights into student performance based on data analysis, their actions and learning styles. Through this information data-driven analysis enables teachers to modify their instructional approaches to improve educational results, which is a primary goal of NEP2020. Moreover, AI assists educators in incorporating sophisticated teaching methods such as personalized learning platforms that help students in their advancement and additionally educators can address various demands of learners within their classrooms.

AI and Inclusion and Diversity

One of the major focus areas of NEP 2020 is inclusivity and equity. AI helps to make an environment that accommodates all students irrespective of their background, making it possible that no child is left behind. AI related tools empower teachers in creating a more inclusive learning environment as it helps teachers in recognizing the specific learning needs of students as well as children with special needs or learning disabilities. AI provides differential teaching methods, strategies to cater the needs of the students

AI and Bridging the gap in remote and underserved areas

Lack of resources and infrastructure, especially in rural and remote areas is a noteworthy challenge in teacher training programs in India. AI platforms provide solutions to this challenge by offering remote access to high quality teacher training programs. Now there is no need to travel long distances to attend training sessions but they can access from anywhere and anytime as per their own convenience.

▪ Improving Emotional Intelligence

Teachers have a great opportunity to use AI to boost their emotional skills, which are important for creating a positive classroom atmosphere. With AI tools, they can look at how they interact with students and receive suggestions on improving classroom management. For instance, AI can evaluate how the teacher speaks, observes body language, and senses the overall mood in the classroom. This feedback can help teachers build better connections with their students and encourage more involvement in class.

AI and cooperative schoolteacher network

Through Virtual network, preceptors across countries unite with each other, bandy their strategies with one another, partake their ideas and coffers. And therefore, engage in a collaborative problem- working approach, working each other's matters and help in their professional development

Integrating AI Tools into Teacher Training Programmes

Updating Curriculum Content Teacher training institutions need to revise their curricula to include AI literacy.

Providing Practical Experience with AI Tools

Teachers must have opportunities to use tools in real or simulated classroom settings. Teacher training programmes can provide:

- Access to AI-enhanced learning platforms
- Simulated teaching environments powered by AI
- Assignments requiring teachers to create AI-supported lesson plans

This practical exposure ensures that teachers build confidence in using Artificial Intelligence.

Establishing Partnerships with EdTech Companies

Collaboration with technology companies can provide teacher training institutions with access to updated tools, training materials, and expert guidance. These partnerships may also help institutions stay informed about emerging technologies.

Initiatives by National Council of Educational Research and Training:

NCERT also takes an initiative to provide educators hands-on experience regarding AI tools. CIET under NCERT conducts training programs in order to enhance skills of teachers to utilize AI tools effectively in the teaching learning process.

India ai Portal: This National AI portal was launched by the Government of India, which offers a repository of AI-related resources, including articles, news, research papers and educational resources. This portal helps educators to access AI tools and remain updated on the latest developments of the Indian education system by integrating AI.

Canva: Canva is an online Graphic design platform which provides templates, fonts, photos and design elements for creation of professional design. It is a user-friendly drag and drop interface which assists in creation of presentation, posters, for resume, brochures, social media graphics and many more. All these AI tools and platforms contribute to the teacher education and training course and also on professional development in India on a large scale.

Problems and Recommendations for Using Artificial Intelligence in Teacher Education and Professional Development

To make teacher training and professional growth more personalized, efficient, and scalable, Artificial Intelligence (AI) is being gradually introduced. Issues related to technology, teaching methods, ethics, and educational institutions need to be addressed. Without careful planning and thoughtful policies, AI won't fully support teachers in their development.

Challenges of Using AI**1. Limitations in Technology and Access to Digital Resources :**

The National Education Policy 2020 provides some support, but there are still significant gaps in digital access. Key Issues: - Limited internet access in rural areas - Not enough devices for

everyone - Frequent power shortages - Lack of tech support These challenges make it hard for everyone to benefit from AI-based training resources.

2. Ethical Issues and Data Privacy

AI Systems create large quantities of data and include:

- Classroom recordings.
- Student achievement data.
- Metrics to evaluate staff performance.

With this, educators may have concerns about:

- Data privacy.
- Consent.
- Professionals surveilling their activities.

As a result, educators may see artificial intelligence primarily as a surveillance tool instead of an opportunity for improvement.

4. Issues Related to Equity and Algorithmic Biases

- AI algorithms trained on biased datasets may be used as a tool to further support:
- Existing instructional practices.
- Blurring cultural differences.
- Ongoing disadvantage of minority populations and teachers in rural settings.

5. Financial Barriers

Implementing AI entails an expense which includes:

- Upgrading infrastructure.
- Cost of software subscriptions.
- Cost of maintenance.
- The expense of training.

6. Policy and Governance Gaps

Although the National Education Policy 2020 promotes technology integration, clear national guidelines for AI governance in teacher education are still evolving. There is a need for structured regulatory frameworks.

Suggestions and Recommendations

#Infrastructure Improvements Digitally

- Expansion of Connectivity in Rural Areas
- Device Grant Programs from GOI
- Reliable Source of Electricity
- Technical Assistance Teams

#Improving Skills and Knowledge of AI

- AI Awareness Module in Existing B.Ed., M. Ed.
- More Opportunities to Train Teachers on AI in CPD
- Hands-On Training on AI Tools for All Teachers
- Ability to Critically Assess AI
- Use AI as complementary to teaching, not a replacement for...

#Keeping Your Data Safe Through Data Governance & Ethical Standards

- Clear Policies on Data Governance
- Consent Required for Data Collection
- Transparency on Algorithms

#Human/A.I. Coaction

- Use A.I. to support, not replace, these areas: *Mentoring* *Peer Collaboration* *Teaching Skills Development*
- Most Robust Hybrid Models Have a Combination of Professional Support and A.I. Analytics as Their Base7. Establishing unambiguous policy guidelines

Establish national AI standards for teacher preparation

Create frameworks for monitoring and evaluation

Make sure that AI projects are in line with the goals of NEP 2020.

Conclusion

AI has changed the landscape of teacher preparation and professional development by offering tailored, data-driven solutions that help educators enhance and refine their teaching practices over time. AI provides a variety of ways to help teachers improve their development, including real-time feedback and virtual simulations, resulting in increased efficiency and effectiveness for educators seeking to develop their skills. However, in order for AI to be successfully integrated into the education system, there are many issues that need to be resolved, such as providing equitable access, prioritizing the protection of student privacy and data security, and finding the right balance between technology's capabilities and the human element of classroom instruction. The NEP 2020 emphasizes the importance of responsible integration and encourages policy frameworks to address these issues (NITI Aayog, 2021). It is clear that through thoughtful integration, AI will play an integral part in determining the future of education by ensuring that teachers have the skills they need to support their students as their needs continue to evolve.

References

1. Dwivedi YK, Mishra SK, Hughes L. Artificial intelligence: Challenges and opportunities for India. YOJNA, 2020. <http://www.yojana.gov.in/YojanaEnglish-February-2020-final.pdf>
2. Kaur B. Artificial intelligence in education. In: Surekha RV (ed). A Reference Book on Interdisciplinary Studies. Social Research Foundation, 2024. <https://socialresearchfoundation.com/new/publishbook.php?editID=8922>
3. Kengam J. Artificial intelligence in education. Research Gate, 2020. https://www.researchgate.net/publication/347448363_ARTIFICIAL_INTELLIGENCE_IN_EDUCATION
4. Krstić M, Aleksić V. Artificial intelligence in education: A review. Technics and Informatics in Education TIE,2022:223–228.
5. Ministry of Education. National education policy 2020. Government of India, 2020. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf
6. Nasrin R, Mete J. Educational reforms in India: The opportunities and challenges of implementing NEP 2020. International Journal of Research Publication and Reviews,2024:5114–5120.
7. NITI Aayog. Responsible AI for all: Implementing AI in education. Government of India, 2021. <https://www.niti.gov.in/sites/default/files/2021-02/Responsible-AI-22022021.pdf>
8. Rangaiah M. 6 applications of AI in education sector. analyticssteps, 2024
9. Sadiku M, Ashaolu T, Ajayi-Majebi A, Musa S. Artificial intelligence in education. International Journal of Scientific Advances,2021:5–11.
10. Saklani S. Role of artificial intelligence in education: An overview. International Journal of Multidisciplinary Research and Development,2024:115–118.
11. Sirish A. Discover the role of artificial intelligence in education. K.R. Mangalam University (KRMU), 2024. <https://www.krmangalam.edu.in/blog/role-of-artificialintelligence-in-education/>
12. Tripathi S, Rosak-Szyrocka J. Impact of artificial intelligence on society. Chapman and Hall/CRC, 2024.
13. Google. AI for educators' course with certification. Google,
14. Central Institute of Educational Technology. Online training on artificial intelligence (AI) in education. NCERT
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