

AI-Enabled Experiential Learning in Teacher Education: Fostering Inclusivity under NEP 2020

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Abstract:

Experiential learning is defined as the educational approach in which people learn best by actively engaging in hands-on experiences and then reflecting on them to develop a deeper understanding and connect theories and knowledge learned in the classroom to real-world situations. In recent years, Experiential Learning has emerged as a contemporary pedagogical approach that aligns closely with the learner-centric, holistic, enjoyable, relevant to real-life contexts, and inclusive vision of the National Education Policy (NEP) 2020. This paper examined how AI-Enabled Experiential (AIEL) Pedagogies have transformed teacher education and can be practised and modelled to foster an inclusive learning environment, as advocated under NEP 2020. The study adopts a qualitative and descriptive research methodology, drawing upon an extensive review of national and international literature and policy documents, including NEP 2020, as well as existing empirical studies on Experiential and AI-based learning Pedagogies. The paper analyses how AI-Enabled Experiential Learning (AIEL) Pedagogies support key NEP 2020 priorities such as competency-based education, technology-enabled pedagogy, skill-based education, equity, and lifelong learning. It highlights the role of both Experiential Learning Pedagogies and AI-Enabled Pedagogies in emphasising simulated teaching, AI-driven reflective practice, and personalised development pathways, and bridging the gap between theoretical knowledge and practical, hands-on learning. The study also critically examines challenges related to the digital divide, teacher preparedness, infrastructural limitations, insufficiency of human interaction, Overdependence on technology, and ethical considerations in AI-Enabled Experiential Learning (AIEL) Pedagogies. The findings suggest that when AI-Enabled Experiential Learning Pedagogies are grounded and context-sensitive, they significantly enhance teachers' participation, technological skills, pedagogical knowledge, and digital inclusion. The paper concludes that, within the framework of NEP 2020, AI-Enabled Experiential Learning Pedagogies serve as an effective and sustainable pedagogical strategy for transforming teacher education and enhancing innovation, inclusivity and equity in teacher education.

Keywords: Artificial Intelligence, Experiential Learning Pedagogies, Educational Technology, NEP 2020, Teacher Education.

1. Introduction

Teacher education has a significant impact on the quality of education systems all over the world. In the rapidly transforming knowledge environment of the twenty-first century, traditional teacher-centred educational norms, which primarily emphasise rote learning and the passive reception of information, often fail to address learners' motivation, contextual understanding, and the real-world application of

knowledge. These traditional teacher-centric and heavy theory approaches are increasingly being criticised for failing to sufficiently educate teachers for complex, dynamic, and technology-rich classrooms.

In response to these challenges, Experiential learning, which stresses learning via action, reflection, and real-life application, is now recognised as an effective pedagogical framework capable of overcoming these limitations.

Experiential learning is based on the idea that meaningful learning occurs when people actively engage in activities and reflect on them in order to develop knowledge (Kolb, 1984). In teacher education, this technique enables pre-service and in-service educators to connect educational theory to classroom practice, fostering deeper understanding and professional competence. The rise of Artificial Intelligence (AI) technology has increased the scope and possibilities of experiential learning. AI-enabled tools such as intelligent tutoring systems, simulation learning environments (VR/AR), and adaptive learning platforms enhance experiential learning by providing personalised learning Pedagogies, interactive feedback systems, immersive teaching environments, and data-driven decision-making (Holmes et al., 2019). These AI-Enabled Experiential Learning (AIEL) Pedagogies support reflective practice and continuous professional development, which are essential components of effective teacher education.

The National Education Policy, 2020 (NEP, 2020), marks a significant shift towards learner-centric, holistic, flexible, multidisciplinary, and technology-enabled education. This policy highlights the importance of experiential learning, digital literacy, and continuous professional development for teachers (Ministry of Education, 2020). Within this policy context, AI-Enabled Experiential Learning pedagogies offer promising opportunities to transform teacher education in ways that are aligned with national educational priorities.

Furthermore, Experiential Learning Pedagogies supports NEP 2020's emphasis on equity and inclusion by enabling the use of both digital and non-digital teaching and learning strategies, including project-based learning, simulation and gaming, service learning, field work, etc. Such approaches ensure accessibility for learners from diverse backgrounds while fostering a sense of belonging and collective teaching and learning.

Against this backdrop, the present paper explores AI-Enabled Experiential Learning pedagogies in teacher education, with specific reference to their alignment with the vision and goals of NEP 2020. By synthesising insights from existing literature and policy documents, the study seeks to provide an in-depth understanding of the pedagogical possibilities, benefits, and challenges of integrating AI into experiential learning frameworks, and to highlight its potential to transform teacher education in alignment with contemporary educational goals.

1.1 Conceptual Framework of Experiential Learning

Experiential learning is a learner-centred approach that sees learning as a continuous process based on experience. Kolb (1984) gave the most important theoretical model of experiential learning, defining it as a four-stage cycle that includes "concrete (real) experiences, reflective observation, abstract conceptualisation, and active experimentation". According to this approach, effective learning occurs when learners progress through all four stages, combining experience, reflection, and theory.

In teacher education, experiential learning takes the form of micro-teaching, internships, teaching simulations, classroom observations, action research, and reflective journaling. These practices enable teachers to participate in teaching activities actively, reflect on their experiences, and improve their

pedagogical skills. Thus, experiential learning bridges the disconnect between theory and practice, which has been a barrier in teacher preparation programs for a long time.

Experiential learning has regularly been shown in research to be useful in enhancing teachers' professional skills, critical thinking, and reflective abilities (Darling-Hammond, 2006). However, traditional experiential learning techniques often face limitations in terms of scalability, feedback consistency, and contextual diversity. The integration of AI technologies tackles several of these issues by increasing the reach, adaptability, and responsiveness of experiential learning environments.

1.2 Research Objectives:

1. To understand the concept of Experiential Learning in teacher education.
2. To explore AI-Enabled Experiential Learning pedagogies for pre-service and in-service teachers.
3. To analyse real classroom applications of AI-Enabled Experiential Learning in teacher education.
4. To identify challenges in implementing AI-Enabled Experiential Learning pedagogies.
5. To suggest strategies to overcome challenges for inclusive teacher education

1.3 Research Questions:

1. What is the role of experiential learning in teacher education?
2. How can AI-enabled pedagogies enhance experiential learning for teachers?
3. How are these pedagogies applied in pre-service and in-service teacher training?
4. What challenges exist in implementing AI-Enabled Experiential Learning pedagogies?
5. How can these challenges be mitigated to achieve inclusive education goals?

1.4 Delimitations

1. The study is qualitative and descriptive in nature.
2. It focuses on teacher education contexts.
3. Only secondary data sources have been used.
4. Empirical fieldwork is beyond the scope of this paper.

2. Review of Literature:

The concept of Experiential Learning in education has gained significant scholarly attention over the past decade, particularly in the context of learner engagement, motivation, hands-on experience, and the development of deeper understanding. Researchers broadly agree that experiential learning with artificial intelligence (AI), when applied with clear pedagogical intent, has the capacity to transform traditional teaching-learning processes into interactive and meaningful experiences, especially within teacher education.

2.1 Kolb (1984) introduced Experiential Learning as a process in which knowledge is created through experience and reflection. He proposed a learning cycle involving "concrete experience, reflective observation, abstract conceptualisation, and active experimentation". This model is widely used in teacher education to connect theory with classroom practice.

2.2 Schön (1983) emphasised reflective practice as an essential part of professional learning. According to him, teachers improve their professional skills by reflecting on their actions during and after teaching. Reflective practice strengthens experiential learning in teacher education.

2.3 Darling-Hammond (2006) highlighted that the effective teacher education programs are practice-oriented and focus on real classroom experiences. She emphasised internships, mentoring, and reflective activities as key components of powerful teacher education.

2.4 Dieker et al. (2014) studied simulated learning environments and found that virtual simulations help teachers practice instructional strategies, classroom management, and inclusive teaching in a safe environment. These simulations are especially useful for special and inclusive education.

2.5 Holmes et al. (2019) discussed "the role of AI in education, highlighting its potential for personalised learning, intelligent tutoring, and learning analytics. They noted that AI can support teachers by providing timely feedback and adaptive learning experiences."

2.6 Jamal (2023) highlights AI's transformative role in teacher education by enhancing personalised learning, instructional efficiency, and professional development, while emphasising challenges such as ethical concerns, digital literacy gaps, infrastructure limitations, and the irreplaceable human role of teachers.

2.7 Korthagen (2017) argued that teacher learning becomes meaningful when theory is closely connected with personal experience and reflection. He emphasised experiential and reflective approaches in teacher education.

2.8 Williamson and Eynon (2020) examined the ethical and social dimensions of AI in education and stressed the need for responsible and context-sensitive use of AI technologies.

2.9 Selwyn (2019) critically discussed the limitations of artificial intelligence (AI) in education and warned against replacing human judgment and interaction with technology.

2.10 UNESCO (2021) provided guidelines for ethical and inclusive use of AI in education, focusing on equity, transparency, and teacher empowerment. These principles align closely with NEP 2020 (Ministry of Education, 2020)

3. Methodology

The research methodology used in this study is qualitative. Furthermore, relies on secondary data sources such as:

- National Education Policy 2020 and UNESCO AI frameworks
- Research journals, books and academic publications on experiential learning and AI in education
- Reports related to experiential learning and AI applications.

The data were analysed thematically to understand the pedagogical relevance and challenges of AI-Enabled Experiential Learning.

4. Analysis of Data

This chapter analyses AI-Enabled Experiential Learning as a modern pedagogical strategy to transform teacher education, with specific reference to the principles and goals of the National Education Policy (NEP) 2020 . The analysis is grounded in secondary data, policy documents, and existing research studies,

focusing on a thorough understanding of the pedagogical possibilities, advantages, and challenges associated with integrating AI into experiential learning frameworks.

4.1 AI-Enabled Experiential Learning Pedagogies

AI-Enabled Experiential Learning Pedagogies are teaching–learning approaches that combine learning by doing, reflection, and AI-based support systems. These pedagogies help teachers actively engage in practice, receive constructive feedback, and continuously improve their teaching skills. The major AI-enabled experiential pedagogies relevant to teacher education are explained below:

4.1.1 Simulation-Based Learning Pedagogy

Virtual reality (VR) and augmented reality (AR) simulations enriched by AI allow teachers to practice teaching skills in risk-free, controlled environments. These simulations can replicate diverse classroom scenarios, including student behaviour, learning difficulties, different learning styles, disabilities and cultural contexts. Research indicates that such immersive experiences enhance teachers' confidence, classroom management skills, and instructional effectiveness (Dieker et al., 2014).

Examples:

- In colleges, a teacher trainee teaching mathematics may encounter AI-generated misconceptions among students, forcing the trainee to adjust their teaching strategies.
- Teachers use simulation tools during in-service workshops to practice inclusive classroom management before applying it in real schools.
- Mursion or TeachLivE (mixed-reality simulation for teacher education), PhET (physics, chemistry, math), MATLAB & Simulink (maths work).

4.1.2 Reflective Learning Pedagogy

Reflection is a key component of experiential learning. AI-based tools can support reflective practice by analysing teaching videos, classroom interactions, and assessment data to provide constructive feedback. Automated feedback systems enable teachers to identify their potential and areas for improvement, thereby enhancing continuous professional growth (Korthagen, 2017; Schön, 1983).

Example:

- A teacher trainee records microteaching lessons using a smartphone. AI tools analyse speech clarity, teacher talk time, and student engagement. Trainees reflect on feedback and improve their next lesson.
- Teachers record classroom teaching and receive AI-generated feedback reports during professional development programmes.
- Riffbot.ai, Natural Language Toolkit (NLTK).

4.1.3 Personalised Learning Pedagogy

Personalised learning pedagogies enabled by AI ensure that teachers receive targeted training based on their individual needs and competencies (Kopcha et al., 2020). This approach aligns with the principles of learner-centric and competency-based education and also emphasises continuous professional development and lifelong learning for teachers, as advocated by NEP 2020.

Example:

- AI-based learning platforms suggest customised learning materials to student-teachers based on their strengths and weaknesses.

- On the "DIKSHA (Digital Infrastructure for Knowledge Sharing)" platform, AI recommends specific training modules to teachers based on their subject, grade level, and assessment performance. Teachers apply new strategies in classrooms and reflect on student outcomes.
- "NISHTHA (National Initiative for School Heads' and Teachers' Holistic Advancement)" provides large-scale in-service teacher trainings
- Squirrelai.com, Kira-learning.com, Dreambox.com, web.Diffit.me, Khan Academy's Khanmigo.

4.1.4 Data-Driven Experiential Learning Pedagogy

This pedagogy uses AI-based learning analytics to support teachers in analysing student data and improving teaching practices. Teachers use AI-generated reports to identify learning gaps and adjust lesson plans accordingly. Teachers learn experientially by observing the impact of their instructional changes on student outcomes (Luckin et al., 2016).

Example:

- Teachers use AI dashboards to analyse student assessment results and attendance data. Based on insights, teachers modify lesson plans and teaching strategies.
- A teacher identifies low reading levels among first-generation learners and introduces experiential reading activities.
- Knewton Alta, Gradescope, socrative, otus, Edsby / Brightspace (LMS).

4.1.6 Inclusive and Assistive Learning Pedagogy

AI supports inclusive education through adaptive content, language translation, text-to-speech tools, and assistive technologies that help teachers address diverse learner needs. When designed inclusively, AI-Enabled Experiential Learning can support teachers in disadvantaged and remote areas, thus promoting digital inclusion. (UNESCO 2021; NEP 2020)

Example:

- AI-based tools help teachers create accessible learning materials for students with visual or hearing impairments (UNESCO, 2021).
- Teachers use AI-enabled text-to-speech tools for visually impaired students and translation tools for multilingual classrooms. Teachers learn inclusivity by applying these tools daily.
- Text-to-Speech (TTS): ElevenLabs, Speech-to-Text (STT) / Transcription: Alrite and AudioPen
- theuniversalsandpit, diffit.me, DreamBox, Knewton, Smart Sparrow.

4.1.5 Inquiry-Based Experiential Learning Pedagogy

AI supports inquiry-based learning by providing resources, guiding questions, and feedback, encouraging teachers to explore and experiment. Holmes et al. (2019)

Example:

Student-teachers use AI chatbots to design inquiry-based lesson plans and test them during practice teaching.

Teachers use AI tools to explore innovative teaching strategies and assess their impact in the classroom.

Stanford Mobile Inquiry-based Learning Environment (SMILE) – Focuses on student-generated questions and peer evaluation to deepen inquiry and higher-order thinking

ChatGPT, Google Gemini, QANDA(mathtutoring), Curipod, MagicschoolAI,

CoSpaces Edu, NotebookLM

4.2 Challenges and Ethical Considerations in Implementing AIEL Pedagogies

Despite its potential, AI-Enabled Experiential Learning faces several challenges, including a digital divide, limited infrastructure, and a lack of teacher preparedness (Selwyn, 2016). In many areas, limited access to technology affects the successful adoption of AI-driven pedagogies.

Ethical concerns regarding data privacy, tracking, and algorithmic bias pose significant challenges (Williamson & Eynon, 2020). Ensuring transparency, accountability, and ethical governance is critical for responsible AI use in teacher education.

Overdependence on technology may limit human interaction and negatively affect the relational aspects of teaching and learning (Biesta, 2015). Balancing technology innovation and learner-centred pedagogies is necessary.

Managing these challenges requires comprehensive policy frameworks, government and private investment in infrastructure; offline AI tools, regular training programs and workshops, clear AI ethics policies and monitoring (Williamson & Eynon, 2020), balance AI with human interaction and reflective practice, awareness campaigns, mentoring, and incentivisation programs to ensure the sustainable and ethical implementation of AI-Enabled Experiential Learning pedagogies in teacher education.

5. Conclusion

The present study examined AI-Enabled Experiential Learning (AIEL) as a modern pedagogical method for teacher education within the framework of the National Education Policy, 2020 (NEP, 2020). In an era where teacher education systems are required to address learner diversity, learners' motivation, contextual understanding, and real-world application of knowledge, AI-Enabled Experiential Learning (AIEL) emerges as a powerful instructional approach capable of transforming traditional teaching–learning practices into interactive, inclusive, and develop deeper understanding and able to connect theories and knowledge learned in the classroom to real-world situations.

The analysis reveals that AI-Enabled Experiential Learning Pedagogies enhance teacher engagement, motivation, and professional competence (Darling-Hammond et al., 2017). By providing immersive and interactive learning experiences, these pedagogies foster deeper understanding and skill development.

AI-driven simulations and analytics support competency-based education by enabling teachers to demonstrate and refine specific teaching skills (Holmes et al., 2019). This approach aligns with NEP 2020's focus on competency-based education and promotes lifelong learning.

Additionally, AI-Enabled Experiential Learning promotes digital literacy and technological skills among teachers, which are essential for contemporary classrooms (Koehler & Mishra, 2009). These skills enhance teachers' ability to combine technology effectively into teaching and learning.

AI-enabled pedagogies also support inclusive education by adapting learning experiences to diverse needs and contexts (UNESCO, 2019). This adaptability contributes to equity and access in teacher education.

However, the study also identifies significant challenges that may hinder effective implementation. The digital divide, lack of teacher preparedness, infrastructural limitations, and ethical concerns regarding data privacy, tracking, and algorithmic biases pose significant challenges. Therefore, successful implementation requires proper infrastructure, training of teachers, ethical use of AI, and a balanced approach that values human interaction. When used responsibly and contextually, AI-Enabled Experiential Learning Pedagogies can enhance innovation, equity, and inclusivity in teacher education and contribute to a future teacher education.

In conclusion, AI-Enabled Experiential Learning Pedagogies offer a sustainable and effective strategy for enhancing innovation, inclusivity, and equity in teacher education, thereby contributing to the broader goals of educational reform envisioned in NEP 2020.

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