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Digital Pedagogy under NEP 2020 and Student Academic Engagement: A Policy-Based Analytical Study of Teacher Education Institutions in Tier-2 Cities

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Abstract- ***The National Education Policy (NEP) 2020 emphasizes the integration of technology in teaching and learning to enhance accessibility, quality, and flexibility in higher education. Digital pedagogy, including online and blended learning, virtual labs, Learning Management Systems (LMS), MOOCs, and digital assessment tools, has become central to teacher education institutions, particularly in Tier-2 cities. This paper examines the extent of digital adoption in these institutions and its impact on student academic performance and engagement. Drawing upon both policy analysis and perception-based surveys, the study investigates how the availability of smart classrooms, recorded lectures, faculty digital training, and online learning platforms influence conceptual clarity, assignment completion, attendance, and overall academic outcomes. Additionally, it explores the implementation gap arising from infrastructural constraints, faculty readiness, and socio-economic factors. The study also contextualizes modern digital pedagogy with the traditional guru Kul system, highlighting that just as ancient education emphasized holistic development—moral, intellectual, and practical—effective digital teachers today must combine technical proficiency with pedagogical empathy to foster meaningful learning. The findings suggest that while NEP 2020 has accelerated digital adoption in Tier-2 teacher education institutions, achieving optimal academic engagement requires a balanced approach that integrates technology with human-centric teaching practices.***

Index Terms- ***Digital Pedagogy, NEP 2020, Teacher Education, Tier-2 Cities, Academic Engagement***

I. INTRODUCTION

The National Education Policy (NEP) 2020 of India emphasizes the integration of technology in higher education to enhance quality, accessibility, and inclusivity. With the rise of digital learning platforms, online courses, and blended learning models, teacher education institutions are expected to adopt innovative pedagogical approaches that align with modern educational standards. Digital pedagogy is not merely the use of technology for teaching; it involves the creation of meaningful learning experiences that enhance students' conceptual understanding, engagement, and academic performance.

The role of the teacher in this digital era is crucial. A fully trained and digitally proficient teacher can do more than a robotic system; they can impart knowledge effectively, foster moral and ethical growth, and prepare students for real-life challenges. This aligns with the ancient Indian Gurukul system described in the Bhagavad Gita, where education was holistic, focusing on actual knowledge, moral development, personality, efficiency, effectiveness, and measurable outputs. Historically, the "Uchh Kul" (high knowledge) referred to students who demonstrated excellence in all these dimensions, irrespective of their social or economic background. Modern education, inspired by these principles, seeks to balance technology with human-centered pedagogy to produce well-rounded learners.

In Tier-2 cities, the implementation of digital pedagogy under NEP 2020 presents both opportunities and challenges. Institutions face infrastructural constraints, faculty readiness issues, and variations in student access to digital resources. At the same time, adoption of Learning Management

Systems (LMS), smart classrooms, online lectures, SWAYAM/MOOCs, and digital assessment tools offer a pathway to improve academic performance, engagement, and overall learning outcomes. This study aims to examine how the adoption of digital teaching practices in teacher education institutions of Tier-2 cities influences student academic engagement and performance, while also highlighting gaps between policy intentions and ground-level realities.

II. REVIEW OF LITERATURE

The integration of digital pedagogy in higher education has shifted from an emerging trend to a strategic priority for educational reform globally and in India. Recent studies highlight how post-pandemic transformations accelerated the adoption of online and blended learning, compelling institutions to revisit traditional teaching methods and explore technology-mediated instruction (Kiran & Baidya, 2025).

In India, the National Education Policy 2020 (NEP 2020) serves as a foundational policy framework that foregrounds the role of technology in teaching, learning, and assessment. NEP 2020 recommends the integration of Learning Management Systems (LMS), virtual labs, MOOCs, SWAYAM platforms, and digital content repositories to enhance learning outcomes, encourage personalized learning pathways, and promote inclusive access to education. This policy also emphasizes professional development for teachers, including structured training programs to equip educators with the competencies required for technology-enhanced instruction (Government of India, 2020).

Scholars have argued that effective digital pedagogy requires a holistic perspective on teacher competence that goes beyond mere access to digital tools. Drawing on Aristotelian concepts such as episteme (theoretical knowledge), techne (practical skills), and phronesis (ethical and context-sensitive judgment), contemporary literature situates teacher readiness as central to meaningful technology integration (Kinsella & Pitman, 2012; Eisner, 2002). These dimensions underscore that technological adoption in education is not a purely technical endeavour but a pedagogical transformation, where teachers must apply their professional judgment to various teaching-learning contexts. This multidimensional view aligns with NEP 2020's emphasis on holistic teacher education that moves beyond rote technology use to foster reflective and adaptive instructional practices.

While the policy elaborates an ambitious vision, research suggests that actual adoption is uneven, particularly in semi-urban and Tier-2 contexts. Literature identifies persistent "digital divides" rooted in limited infrastructure, unreliable internet connectivity, and inadequate digital literacy among faculty and students (Malaviya & Bansal, 2022; Mir, 2024). Recent bibliometric analyses of online education research in India highlight that themes such as e-learning, digital transformation, and student engagement have received increasing scholarly attention, reflecting an expanding research impulse in the wake of NEP 2020.

Empirical studies from teacher education contexts show that digital learning environments can enhance students' conceptual clarity, engagement, and flexibility in learning, but success depends heavily on contextual factors such as resource availability and pedagogical support structures. Research among B.Ed. trainees in Uttar Pradesh found moderate levels of virtual learning readiness and open educational practices, with constraints stemming from technological awareness and resource limitations. These findings underscore the need for targeted programs that build both infrastructure and teacher capacity if digital pedagogy is to meaningfully impact academic engagement outcomes.

III. RESEARCH GAP

Despite the growing body of research on digital tools, a critical gap persists: few studies focus on how the specific policy architecture of NEP 2020 manifests in measurable academic engagement within teacher education institutions in Tier-2 cities. Much of the literature either examines broader national trends or urban contexts, leaving a gap in empirical evidence about digital pedagogy's impact in emerging educational hubs with unique infrastructural and socio-economic challenges. This study seeks to address that gap by analyzing digital adoption in

Tier-2 teacher education institutions and its relationship with student engagement and academic performance.

IV. OBJECTIVES OF THE STUDY

To evaluate the extent of digital pedagogy adoption: Examine the integration of Learning Management Systems (LMS), smart classrooms, and digital platforms (SWAYAM/MOOCs) in teacher education institutions in Tier-2 cities as per NEP 2020 guidelines.

To assess teacher digital readiness and competency: Analyze faculty proficiency and willingness to integrate digital tools based on the Technological Pedagogical Content Knowledge (TPACK) framework.

To examine the impact of digital pedagogy on student academic engagement: Investigate how technology-mediated instruction affects student participation, conceptual clarity, and emotional/behavioral involvement in learning.

To analyze the correlation between digital adoption and academic performance: Determine the relationship between the use of digital pedagogical tools and students' measurable academic outcomes (CGPA/Percentage).

To identify infrastructural and systemic barriers: Highlight challenges such as internet connectivity, technical support, and financial constraints that hinder the effective implementation of NEP 2020 in Tier-2 educational hubs.

Hypotheses

H1: There is a significant positive relationship between the architectural alignment of NEP 2020 and the actual adoption of digital pedagogy in Tier-2 teacher education institutions.

H2: Faculty competence, characterized by the integration of Episteme, Techne, and Phronesis, significantly influences the effectiveness of technology-mediated instruction.

H3: The Socio-technical barriers (infrastructural gaps and digital resistance) in Tier-2 cities act as a significant moderator, creating a gap between policy intentions and student academic engagement.

H4: Higher levels of digital pedagogical adoption lead to a measurable increase in students' cognitive and behavioral engagement compared to traditional teaching methods.

V. RESEARCH METHODOLOGY

The present study adopts a systematic analytical approach to explore the intersection of digital pedagogy and student engagement within the framework of NEP 2020. Given the policy-oriented nature of the topic, the methodology is designed to bridge theoretical concepts with ground-level implementation challenges in Tier-2 cities.

1. Research Design

The study employs a Descriptive and Analytical Research Design, utilizing a Scoping Review to synthesize existing literature, policy documents, and empirical reports. This design is particularly effective for examining the "implementation gap" between the objectives of NEP 2020 and the socio-technical realities of Teacher Education Institutions (TEIs) in emerging educational hubs.

2. Nature of Data

The study is primarily based on Secondary Data, allowing a comprehensive policy-based analytical study by aggregating perspectives from national and international contexts, covering reports and studies from 2000 to 2026.

3. Data Sources and Search Strategy

Data was collated from high-impact sources to ensure academic rigor:

Policy Documents: National Education Policy (NEP 2020), NITI Aayog's National Strategy for AI, Ministry of Education (MoE) guidelines on digital infrastructure.

Academic Databases: Peer-reviewed journals indexed in Scopus and Google Scholar (e.g., Computers and

Education: Artificial Intelligence, British Journal of Educational Technology).

Institutional Reports: Global organizations such as UNESCO, OECD, and industry trends from KPMG and Deloitte.

4. Inclusion and Exclusion Criteria

A two-stage screening process ensured relevance:

Inclusion: Research centered on teacher education (TE), digital literacy in India, NEP 2020 frameworks, and academic engagement metrics.

Exclusion: Grey literature (posters/theses), non-English publications, and studies focusing solely on technology without pedagogical or teacher-training components.

5. Theoretical Framework: Analytical Lens

The study uses a dual-framework approach:

TPACK Model: Assesses the intersection of Technological, Pedagogical, and Content Knowledge among faculty.Aristotelian Tripartite Division: Teacher competency is categorized into Episteme (theoretical knowledge), Techne (practical skill), and Phronesis (ethical/contextual judgment), allowing a holistic evaluation of digital adoption beyond technical proficiency.

6. Data Analysis and Synthesis

Qualitative Content Analysis and Comparative Thematic Analysis were employed using an abductive approach, combining inductive themes from literature and deductive insights from NEP 2020. This iterative process identified:

Explicit dimensions: Digital tool availability, LMS integration, smart classrooms.

Implicit dimensions: Faculty digital resistance, empathy, and contextual judgment.

7. Limitations of the Study

The study is limited to documented scientific records and public policy papers. Potential limitations include publication bias and limited access to localized institutional data from rural TEIs not indexed in major databases.

VI. RESULTS AND DISCUSSION

The analysis of secondary data and literature synthesis highlights several key insights regarding the integration of digital pedagogy in teacher education institutions (TEIs) of Tier-2 cities under NEP 2020.

1. Extent of Digital Pedagogy Adoption

The study finds that adoption of Learning Management Systems (LMS), smart classrooms, and digital platforms (SWAYAM/MOOCs) in Tier-2 TEIs is moderate but uneven. Urban-adjacent institutions show higher digital integration, whereas semi-urban and remote TEIs face infrastructural and connectivity constraints. Digital adoption is strongly influenced by institutional prioritization, faculty awareness, and access to technical support, confirming that policy directives alone are insufficient to ensure uniform implementation (Mariya & Ansari, 2026; Malaviya & Bansal, 2022).

2. Teacher Digital Readiness and Competency

Analysis suggests that teacher readiness is multidimensional, combining technological proficiency, pedagogical understanding, and ethical judgment. The TPACK framework highlights that faculty who effectively integrate episteme (theoretical knowledge), techne (practical skills), and phronesis (contextual/moral judgment) can enhance learning outcomes. However, gaps in training programs and limited exposure to AI-based tools lead to varied competency levels across institutions, which affects the quality of student engagement (Celik, 2023; Luckin et al., 2022).

3. Impact on Student Academic Engagement

The study indicates a positive correlation between digital pedagogy adoption and student academic engagement. Smart classrooms, virtual labs, and interactive LMS modules enhance conceptual clarity, assignment completion rates, and attendance. Students exposed to blended and online learning models show higher motivation and participation. However, engagement is moderated by factors such

as socio-economic background, digital access at home, and faculty mentorship, demonstrating that technology alone cannot replace personalized human guidance (Southworth et al., 2023; Bond et al., 2024).

4. Correlation with Academic Performance

Evidence suggests that institutions with higher digital adoption levels report measurable improvements in student performance (CGPA/Percentage). The integration of AI-assisted feedback, automated assessments, and personalized learning pathways enables timely identification of learning gaps and tailored intervention. Nevertheless, TEIs in resource-constrained settings often experience limited impact, emphasizing the need for a balanced approach combining technology with teacher-driven instructional strategies (Holmes & Porayska-Pomsta, 2022; Wang et al., 2023).

5. Infrastructural and Systemic Barriers

Persistent challenges such as unreliable internet connectivity, lack of technical support, financial limitations, and faculty resistance constrain digital pedagogy adoption. The “Digital Divide” remains evident in Tier-2 cities, highlighting inequities in resource distribution and capacity building. Additionally, ethical concerns regarding data privacy, AI transparency, and potential deskilling of teachers emerge as critical considerations in implementing technology-driven pedagogy (Nazaretsky et al., 2022; UNESCO, 2021).

6. Policy-Implementation Insights

The NEP 2020 provides a robust framework for integrating technology in TEIs, emphasizing inclusivity, outcome-based learning, and professional development. However, a noticeable implementation gap persists in Tier-2 contexts. Bridging this gap requires proactive institutional strategies, continuous faculty training, infrastructural investment, and localized adaptation of policy guidelines to the socio-technical realities of emerging educational hubs. Conceptually, this aligns with the Gurukul-inspired paradigm, wherein education aims not merely at technical knowledge but holistic student development—intellectual, moral, and practical (Radhakrishnan, 1948).

7. Synthesis and Interpretation

The findings indicate that effective digital pedagogy requires a hybrid model where technology augments, rather than replaces, human-centric teaching. Tier-2 TEIs can leverage NEP 2020 provisions to improve student engagement by integrating LMS, AI tools, and digital resources with pedagogical empathy and reflective practice. This combination ensures measurable academic outcomes while maintaining the holistic principles of teaching, as advocated in classical educational philosophy.

VII. CONCLUSION

The study concludes that while the National Education Policy (NEP) 2020 has provided a visionary roadmap for the digital transformation of teacher education in India, its implementation in Tier-2 cities remains a work in progress. The transition from traditional instructional methods to technology-mediated pedagogy has accelerated, yet it is currently characterized by an uneven landscape.

The findings confirm that digital pedagogy significantly enhances student academic engagement and performance when supported by institutional readiness and teacher proficiency. However, the study highlights that technology is not a panacea; its effectiveness is strictly mediated by the "Human Factor." True digital excellence in teacher education is achieved when faculty integrate technical skills (Techne) with theoretical depth (Episteme) and ethical pedagogical wisdom (Phronesis).

Ultimately, modern digital pedagogy finds its highest expression when it resonates with the ancient Gurukul ethos—where the objective is not just the transmission of information through screens, but the holistic development of the learner. For Tier-2 cities to emerge as global educational hubs, the "Digital Divide" must be bridged not only through high-speed cables but through a renewed commitment to pedagogical empathy and inclusive policy execution.

VIII. POLICY RECOMMENDATIONS

Based on the analytical findings, the following recommendations are proposed for policymakers and institutional heads:

Localized Infrastructural Support: Special financial grants should be allocated to TEIs in Tier-2 cities to establish dedicated AI-Labs and high-speed campus-wide Wi-Fi to eliminate the rural-urban digital divide.

Contextualized Faculty Training (TPACK focused): Professional development programs should move beyond basic ICT training. Workshops should focus on the TPACK framework, teaching faculty how to align specific digital tools with their unique subject content.

Incentivizing Digital Pedagogy: Universities (like CSJM) should recognize and incentivize faculty members who develop indigenous MOOCs or innovative digital repositories on platforms like SWAYAM.

Blended Gurukul Model: Institutions should adopt a "Hybrid Mentorship" model where digital tools handle content delivery, while face-to-face sessions are reserved for character building, ethical discussions, and practical wisdom (Phronesis).

Digital Inclusion Policy: Low-cost data plans and device-subsidies should be provided to students from lower socio-economic backgrounds in Tier-2 regions to ensure equitable academic engagement.

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