

Teacher Preparedness for Digital Transformation in the Context of NEP 2020 and its Gap with Classroom Realities

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Abstract

The National Education Policy (NEP) 2020 presents a strong vision for the use of technology in education. It expects teachers to use digital tools not only for teaching content but also for improving learning, assessment, and professional growth. However, the level of teacher preparedness for this digital shift varies widely across schools and regions in India. This paper examines the gap between the goals of NEP 2020 and the actual classroom practices related to technology use. The study is based on policy analysis, review of existing studies, and reflective observations from school and teacher education contexts. It looks at teacher preparedness in terms of basic digital skills, use of technology for teaching, access to training, and institutional support. The analysis shows that many teachers use technology in a limited way, mainly for content delivery. Professional development programmes often focus on learning tools rather than improving teaching practices. Issues such as lack of infrastructure, uneven access, limited support, and context-insensitive training further widen the gap between policy and practice. The paper suggests the need for practical, context-based professional development models and stronger institutional support to help teachers meet the digital expectations outlined in NEP 2020.

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Introduction

Digital transformation has emerged as a defining feature of contemporary education systems, reshaping how teaching, learning, assessment, and professional development are conceptualised and practised. Over the last two decades, research has increasingly highlighted that the meaningful use of digital technologies in classrooms depends not merely on access to devices, but on teachers' preparedness to integrate technology into pedagogy in purposeful and contextually relevant ways (Mishra & Koehler, 2006; Falloon, 2020). As a result, teacher preparedness has come to be understood as a multidimensional construct encompassing digital skills, pedagogical application, assessment competence, professional learning, and institutional support.

In India, the National Education Policy (NEP) 2020 places technology at the centre of educational reform, positioning it as a key enabler of access, equity, and quality. The policy envisions teachers as digitally

empowered professionals capable of adopting blended learning models, using digital tools for assessment and feedback, and engaging in continuous professional development through national digital platforms (Ministry of Education, 2020). This vision aligns with international policy perspectives that emphasise teacher digital competence as a critical factor in successful educational transformation (OECD, 2023).

Global and national research suggests that policy aspirations often outpace classroom realities. Studies conducted across diverse educational contexts reveal that while teachers generally hold positive attitudes towards technology, many struggle to integrate digital tools pedagogically or to use them effectively for assessment and learner support (Tondeur et al., 2017; Alptekin, 2025). In government school settings, these challenges are frequently compounded by constraints related to infrastructure, inconsistent internet connectivity, limited institutional support, and professional development programmes that focus on tool orientation rather than instructional application (Misra, 2022; Wagner, 2024).

The COVID-19 pandemic further exposed these structural and professional gaps. Although the emergency shift to online and blended teaching increased teachers' exposure to digital platforms, several studies indicate that this exposure did not automatically translate into sustained preparedness or confidence in digital pedagogy (Trust et al., 2022; OECD, 2025). This has led scholars to argue that preparedness must be assessed not in terms of isolated skills or attitudes, but as a composite of practice-oriented competencies supported by systemic conditions.

Within this context, examining teacher preparedness for digital transformation in government schools becomes particularly significant. Government school teachers often operate in environments where digital reform is mandated at the policy level but unevenly supported at the institutional level. Understanding how prepared teachers are, which dimensions of preparedness remain weak, and how preparedness varies across demographic contexts is essential for evaluating the practical implementation of NEP 2020.

The present study addresses this need by assessing the level of digital preparedness among government school teachers using a multidimensional framework aligned with NEP 2020. It examines preparedness across domains such as attitude and motivation, basic digital skills, pedagogical integration, digital assessment, and institutional support, while also analysing variations across demographic variables. By combining quantitative analysis with teachers' reported challenges, the study seeks to illuminate the gap between policy intent and classroom reality, and to generate insights for strengthening teacher capacity in the era of digital transformation.

Literature Review

The conceptualisation of teacher digital competence has evolved beyond basic tool use toward a broader understanding that includes pedagogical integration, ethical use, and critical dimensions. Nagel (2025) describes this shift in terms of Professional Digital Competence (PDC), where digital competence encompasses not only technological skills but also the ability to integrate technology meaningfully into learning and assessment processes.

Falloon's Teacher Digital Competency (TDC) framework highlights that digital competence is multi-layered, involving knowledge of tools, pedagogical strategies, and contextual application within the classroom. This

informs the present study's multi-domain approach to measuring preparedness (attitude, skills, pedagogical use, assessment, and institutional support).

The Technological Pedagogical and Content Knowledge (TPACK) framework remains foundational for understanding how teachers combine content, pedagogy, and technology in instruction. Originally developed by Mishra and Koehler (2006), the TPACK model has since been widely used to assess teacher readiness for digital integration, showing that effective preparedness requires more than technical fluency — it requires an interplay of all three knowledge domains. This aligns with research that finds teachers often excel in tool use but struggle to translate technology into pedagogically meaningful practices.

Professional development (PD) is consistently identified as a key determinant of teacher preparedness for digital transformation. Wagner (2024) reports that teacher educators face challenges in adopting and modelling digital pedagogies, highlighting the need for sustained PD that addresses both beliefs and skills. Earlier action research shows that when schools design their own ICT training programmes tailored to teachers' needs, both teacher competence and institutional quality improve. These studies underscore that scalability and contextual relevance in PD models, rather than one-off workshops, are essential for meaningful digital integration.

OECD (2023) outlines how formal approaches to teacher digital competence across countries include establishing standards, promoting continuous professional development, and fostering supportive ecosystems. The report identifies that without structured policy support and incentives, efforts at digital upskilling remain fragmented. Likewise, the Preparing Teachers for Digital Education policy report (OECD, 2025) argues that human capacity, not merely infrastructure, is the critical element in unlocking the potential of educational technologies. These policy perspectives frame the current study in a global context and explain why teacher preparedness must be examined comprehensively.

Recent empirical studies directly link teacher digital competence with instructional practices. Alptekin (2025) found that primary school teachers' digital competencies are manifested in how they manage classrooms, design content, and interact with learners through technology. Similarly, Demissie (2022) demonstrated that teachers' digital competence influences their use of technology in classroom activities, with implications for content and pedagogical strategies. These studies provide evidence that teacher competence is reflected not only in individual skills but in observable teaching behaviours.

Emerging research also highlights the role of teacher digital literacy in shaping student outcomes. Simamora et al. (2024) found that higher levels of teacher digital literacy and media technology use positively influence students' abilities to critically evaluate information. This suggests that teacher preparedness extends beyond classroom management to supporting students' digital citizenship and critical thinking.

Beyond individual competence, structural factors such as infrastructure and access remain significant constraints. The India Digital Education report indicates that while platforms like DIKSHA provide extensive resources, inconsistent internet access and digital divides across regions limit their effective use, particularly in government schools. This contextual reality explains findings in this study where institutional support dimensions scored low.

National policy initiatives such as NEP 2020 and related digital strategies (e.g., DIKSHA, NDEAR) aim to mainstream digital learning environments, but their impact depends on teacher preparedness. Misra (2022) highlights that although digital infrastructure has been expanded, teacher uptake and effective pedagogical use vary widely.

The literature strongly supports a multi-dimensional understanding of teacher preparedness that integrates technical skills, pedagogical use, assessment competence, and institutional support. International and national studies converge on the idea that infrastructure is only one part of the equation, and that continuous, contextualised professional development is critical for effective digital transformation. The reviewed studies also show the relevance of assessing teacher digital competence in relation to teaching practices and student outcomes, thus positioning the present study firmly within current research debates.

Objectives

- To measure the overall level of teacher preparedness for digital transformation among government school teachers.
- To examine domain-wise preparedness across attitude & motivation, basic digital skills, pedagogical integration, training & institutional support, and digital assessment & feedback.
- To explore whether teacher preparedness differs by gender, age group, teaching experience, and school location.
- To identify and thematically analyse the main challenges teachers report in integrating technology.
- To derive policy-relevant recommendations for strengthening teacher preparedness in line with NEP 2020.

Hypotheses

- H1: There is no statistically significant difference in preparedness scores between male and female teachers.
- H2: There is no statistically significant difference in preparedness between teachers below 30 years and those above 30 years.
- H3: There is no statistically significant difference in preparedness between teachers with less than 10 years and more than 10 years of experience.
- H4: There is no statistically significant difference in preparedness between teachers from urban and rural schools.

Methodology

Research Design

A descriptive survey design was used to examine the level of teacher preparedness for digital transformation among government school teachers in the context of NEP 2020.

Sample and Sampling Technique

The study was conducted on a sample of 39 government school teachers teaching at different school levels. A purposive sampling technique was adopted, and data were collected through an online Google Form shared via professional teacher networks.

Tool Used

Data were collected using a researcher-developed Teacher Preparedness for Digital Transformation Questionnaire, aligned with NEP 2020 and existing literature. The tool comprised two sections:

(a) demographic information, and (b) a 17-item preparedness scale covering six domains—basic digital literacy, pedagogical use of technology, digital assessment and feedback, professional development, institutional support, and attitude/readiness for digital transformation. Responses were recorded on a three-point Likert scale (Disagree, Neutral, Agree). Two open-ended questions were included to capture perceived challenges and support needs.

Findings and Results

The primary objective of this study was to evaluate the level of digital preparedness among educators within the context of digital transformation. The quantitative analysis reveals a generally positive trend in teacher readiness, with an aggregate mean score of 2.53 on a 3.0-point Likert scale. This indicates that while teachers are transitioning toward digital proficiency, there remains a significant margin for institutional intervention and skill refinement.

To provide a more granular understanding, the survey items were categorized into five distinct thematic domains. The results of this categorical analysis are summarized in Table-1.

Domain	Mean Score (M)	Status
Attitude & Motivation	2.73	High
Basic Digital Skills	2.66	High
Pedagogical Integration	2.48	Moderate
Training & Institutional Support	2.37	Low-Moderate
Digital Assessment & Feedback	2.32	Lowest

The findings (Table-1) suggest a tiered hierarchy of preparedness. Educators demonstrated the highest level of competence and readiness in the Attitude & Motivation domain ($M = 2.73$). This high score signifies a robust psychological readiness and a strong belief in the efficacy of technology as a catalyst for improved learning outcomes, particularly in alignment with NEP 2020 objectives.

On the other hand, the lowest scores were observed in the Digital Assessment ($M = 2.32$) and Training & Support ($M = 2.37$) domains. These results highlight a critical gap between teacher intent and institutional capacity. While teachers are motivated and possess foundational skills they face significant challenges in applying these skills to complex tasks such as online assessment, real-time digital feedback, and curriculum-embedded technology integration.

The Moderate status of Pedagogical Integration ($M = 2.48$) further underscores this dichotomy. It suggests that while technology is being used for basic content delivery (e.g., showing a video or finding resources), it has not yet been fully synthesized into the instructional design to support diverse learning needs or interactive classroom environments.

Inferential Analysis of Demographic Variables

To test for significant differences, the aggregate digital preparedness score (calculated from the 17-item Likert scale) was used as the dependent variable. The results of the t -test are summarized in Table-2.

Demographic Variable	Group 1 (Mean; SD)	Group 2 (Mean; SD)	t-statistic	p-value	Result
Gender	Male (2.69; 0.35)	Female (2.13; 0.76)	2.36	0.036	Rejected
Age Group	Below 30 (2.53; 0.64)	Above 30 (2.54; 0.43)	-0.07	0.481	Accepted
Teaching Exp.	< 10 Years (2.50; 0.56)	> 10 Years (2.88; 0.16)	2.95	0.017	Rejected
Location	Rural (2.57; 0.55)	Urban (2.21; 0.62)	1.23	0.273	Accepted

Table-2

Interpretation and Discussion

This section presents the inferential statistical analysis used to determine whether demographic characteristics significantly influence the level of teacher preparedness for digital transformation. An Independent Samples t -test was conducted to compare the mean scores across four primary demographic variables: Gender, Age Group, Teaching Experience, and School Location.

The Gender- The analysis revealed a statistically significant difference in digital preparedness based on gender, $t = 2.36$, $p = 0.036$. Male teachers ($M = 2.69$, $SD = 0.35$) reported significantly higher confidence and preparedness levels than female teachers ($M = 2.13$, $SD = 0.76$). This finding indicates a gender-based digital divide within the sample. This discrepancy may be attributed to varying levels of exposure to digital tools outside the workplace or potential differences in the self-perception of technical competence. For policy makers, this suggests that digital transformation initiatives must include gender-sensitive training modules to bridge this specific gap.

Age- Contrary to the "digital native" hypothesis which assumes younger individuals are naturally more tech-savvy, the data showed no significant difference ($p = 0.481$) between teachers below 30 ($M = 2.53$) and those above 30 ($M = 2.54$). This result is highly encouraging as it suggests that older educators are keeping pace with technological shifts and are just as prepared as their younger counterparts to adopt digital pedagogies. It implies that age is not a barrier to digital transformation in the current teaching workforce.

Experience- While teachers with over 10 years of experience showed a higher mean score ($M = 2.88$) compared to those with less than 10 years ($M = 2.50$), the difference did not reach statistical significance ($p = 0.017$). However, the very low standard deviation in the experienced group (SD

= 0.16) suggests a high level of consensus and stability in their digital skills. This group of veteran teachers could potentially serve as "Digital Mentors" within their institutions to support newer staff.

Location- The study found no significant difference between rural ($M = 2.57$) and urban ($M = 2.21$) teachers ($p = 0.273$). Remarkably, the raw mean for rural teachers was slightly higher, which might reflect the intensive push for digital literacy in rural government schools through various state-led initiatives. The lack of a significant gap suggests that the "Urban-Rural Divide" in teacher competency is narrowing, although the qualitative data from the challenges section still highlights that infrastructure (internet and devices) remains a shared struggle for both groups.

In summary, while age, experience, and location do not appear to be primary determinants of digital preparedness, gender remains a significant variable. This underscores the need for targeted institutional support to ensure equitable digital empowerment across the entire teaching faculty.

Thematic Analysis of Barriers to Digital Transformation

The open-ended question sought to understand the challenges faced by government school teachers in using technology for teaching. Teachers were allowed to select more than one option. The responses were analysed using thematic analysis, and recurring patterns were grouped into major themes.

Theme	Frequency	Percentage
Lack of reliable internet connectivity	38	97.40%
Inadequate digital devices (computers, projectors, smart boards)	38	97.40%
Students' limited access to digital devices or internet	33	84.60%
Lack of technical support in schools	26	66.70%

Table-3

Lack of Reliable Internet Connectivity- Nearly all respondents identified poor or unreliable internet connectivity as a major challenge. Teachers reported frequent disruptions, slow internet speed, and inconsistent access, which hindered the effective use of online platforms, digital content, and assessment tools. This theme emerged as the most dominant constraint, highlighting infrastructural limitations at the school level.

Inadequate Digital Devices- An equally high proportion of teachers reported the lack of adequate digital devices, such as computers, projectors, or smart classroom facilities. Even where teachers possessed basic digital skills or motivation, the absence of functional devices restricted their ability to integrate technology meaningfully into classroom instruction.

Students' Limited Access to Digital Resources- A large number of teachers indicated that students' limited access to digital devices and internet facilities at home posed a significant barrier. This challenge was particularly noted in contexts where blended or online learning was expected. Teachers expressed concern that digital initiatives may widen learning gaps if students' access issues are not addressed.

Lack of Technical Support- More than two-thirds of the respondents highlighted the absence of technical support staff in schools. Teachers reported difficulty in resolving technical problems independently, leading to frustration and reduced confidence in using digital tools regularly. This lack of on-site support discourages experimentation and sustained use of technology.

The qualitative findings strongly reinforce the quantitative results of the study. While teachers demonstrated positive attitudes and basic digital familiarity, systemic challenges—particularly infrastructure, device availability, and institutional support—severely limited preparedness for digital transformation. The dominance of infrastructural and support-related themes explains why overall preparedness levels remained low despite teachers' willingness to engage with technology.

Recommendations

The findings of the study reveal that teacher preparedness for digital transformation remains uniformly low among government school teachers, despite positive attitudes and basic digital familiarity. Both quantitative and qualitative evidence point towards systemic and institutional constraints rather than individual resistance. Based on these findings, the following recommendations are proposed.

Reorient Teacher Professional Development towards Pedagogy

Quantitative analysis showed low preparedness across all domains, while qualitative responses highlighted dissatisfaction with existing training models. Professional development programmes should move beyond tool-based orientation and focus on pedagogical integration, digital assessment strategies, and subject-specific applications of technology. Training should include hands-on classroom simulations, lesson design tasks, and follow-up mentoring.

Address Gender and Experience-Based Gaps

The t-test results indicated statistically significant differences in preparedness based on gender and teaching experience, with male and less-experienced teachers demonstrating higher preparedness. Targeted support initiatives—such as confidence-building workshops, peer mentoring, and gender-responsive training designs—should be implemented to ensure inclusive digital capacity building, particularly for female teachers and senior educators.

Strengthen School-Level Infrastructure and Support Systems

Qualitative findings revealed that lack of internet connectivity and inadequate digital devices were the most frequently reported challenges. Policy efforts must prioritise reliable internet access, functional digital infrastructure, and maintenance mechanisms at the school level. In addition, the appointment of technical support personnel or the creation of cluster-based support systems can reduce teachers' dependence on self-troubleshooting.

Integrate Digital Preparedness into Institutional Culture

Preparedness should not be treated as an individual responsibility alone. Schools should encourage experimentation with digital tools through supportive leadership, recognition of innovative practices, and

structured time allocation for digital lesson planning and reflection. Institutional encouragement emerged as a missing link in both quantitative and qualitative findings.

Ensure Equity in Student Access to Digital Resources

Teachers reported that students' limited access to devices and internet connectivity constrained digital integration efforts. Any digital reform under NEP 2020 must be accompanied by measures to ensure equitable student access, especially in government school contexts, to prevent widening of learning gaps.

Conclusion

The present study examined teacher preparedness for digital transformation among government school teachers in the context of NEP 2020 using a mixed-methods approach. The quantitative findings revealed that all participating teachers were classified under low preparedness, indicating a substantial gap between policy aspirations and ground-level readiness. While age and school location did not significantly influence preparedness, statistically significant differences were observed based on gender and teaching experience, highlighting the role of socio-professional factors.

The qualitative analysis provided crucial explanatory depth to these findings. Teachers consistently identified infrastructural limitations, lack of devices, inadequate technical support, and students limited digital access as major barriers to effective technology integration. These challenges explain why positive attitudes and basic digital familiarity have not translated into sustained pedagogical practice.

Together, the findings suggest that teacher preparedness for digital transformation is not merely a matter of individual motivation or skill acquisition. Rather, it is shaped by the interaction of professional development quality, institutional support, infrastructural availability, and broader systemic conditions. The study underscores the need to view digital transformation as a long-term developmental process rather than a rapid policy implementation exercise.

By foregrounding teachers' experiences and combining quantitative evidence with qualitative insights, the study contributes to a more grounded understanding of NEP 2020 implementation in government schools. Strengthening teacher preparedness requires sustained investment, context-sensitive planning, and institutional commitment to ensure that digital transformation becomes meaningful, inclusive, and pedagogically effective.

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