



Exploring Teacher Preparedness for Digital Teaching from Chalk Board

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Abstract

The rapid integration of digital technology into education has necessitated a significant shift in teaching methodologies, particularly for educators accustomed to traditional chalkboard-based instruction. This study explores teacher preparedness for digital teaching, focusing on the transition from conventional methods to modern digital platforms. Using a mixed-methods approach, the research draws on survey data from 150 teachers of five colleges in Kolkata. The findings of the study reveal that while many educators recognize the benefits of digital teaching, disparities in training, age of educators, mindset, infrastructure, and confidence levels hinder effective implementation. The study underscores the need for targeted capacity-building programs and policy support to bridge the digital divide and facilitate smooth instructional methods for the transition from lectures. The insights gained contribute to understanding the challenges and opportunities in equipping teachers for a technology-enhanced educational environment.



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Introduction

In the present scenario, education has undergone a remarkable transformation in the teaching–learning process. As educational systems worldwide increasingly integrate technology, the role of teachers is evolving from traditional instructors to digital facilitators. The paradigm shift from traditional chalk-and-talk methods to digitally enabled classrooms has transformed the entire educational landscape. With the rise of e-learning platforms, virtual assessments, and blended learning models, teachers are expected to be digitally competent and pedagogically adaptive. This transformation, however, poses a critical question of whether teachers are truly prepared for this digital leap. Nevertheless, the accelerated shift to online learning has posed significant difficulties for teachers, school leaders, parents, and students of all ages, most of whom were accustomed to traditional in-person education and lacked experience with virtual teaching and learning environments (Burgin, Coli & Daniel, 2022; Jelinska & Paradowski, 2021).

According to the International Telecommunication Union's (ITU) facts and figures 2024 report, young people are more likely to use the Internet, but the gap is rapidly diminishing. Worldwide, an estimated 79% of people aged 15 to 24 use the Internet, which is 13 percent higher than the general population. This generational gap, observed in every region, has been slowly shrinking over the last four years. The modification in the educator's professional life highlights that the professional landscape for teachers has shifted, requiring them to be more adaptive, tech-savvy, and student-engaging than ever before. (Cardullo et al., 2021; Miller, 2021).

The rapid transformation of global education has fundamentally reshaped the entire teaching and learning experience, moving from traditional chalk-and-board classrooms to technology-enabled digital environments. In the post-pandemic world, digital literacy is no longer an optional skill but a core professional competency for teachers. Globally, educational systems are emphasizing digital pedagogy, virtual learning platforms, ICT-integrated curricula, and blended learning models. Countries across Europe, North America, and East Asia have invested substantially in digital training of teachers along with pedagogical innovations, making digital teaching an essential component of modern education. As a result, teacher preparedness for digital teaching has become a critical determinant of instructional quality, student engagement, and overall learning outcomes. Across the world, education systems are undergoing a profound transformation from traditional chalkboard-based instruction to digital and technology-enhanced pedagogy. Teachers' readiness to integrate ICT, digital content, and virtual learning tools has emerged as a key indicator of the effectiveness of modern education.

Different global regions have progressed at varying levels, shaped by economic capacity, technological infrastructure, policy frameworks, and cultural priorities. The U.S. is one of the global leaders in adopting digital teaching. Schools and universities widely use learning management systems, digital textbooks, AI-based assessment tools, and blended learning models. Teacher preparedness is strengthened through continuous professional development, federal technology grants, and district-level ICT standards. During and after the pandemic, the U.S. invested heavily in virtual schooling, enabling teachers to gain extensive experience in remote and hybrid teaching. The American system emphasizes teacher autonomy, technological innovation, and experimentation, making teachers relatively well-prepared for digital pedagogy, and blends traditional teaching culture with advanced technology. Although Japanese classrooms have historically been chalk-and-talk oriented, recent initiatives under the “GIGA School

Program” have significantly expanded digital access. Every student is receiving a digital device, and schools are adopting high-speed networks, which have motivated teachers to develop ICT competencies.

In India, the shift towards digitization in education has accelerated dramatically, especially since the COVID-19 pandemic highlighted systemic inadequacies in access to technology, teacher training, and digital pedagogical skills. India’s diverse education system, spanning from rural to urban, government to private institutions, faces wide variations in digital readiness. National initiatives such as DIKSHA, SWAYAM, NEP 2020, and the PM e-Vidya Programme emphasize building teacher competence in ICT, digital content creation, online assessments, and blended learning methodologies. Despite these efforts, many teachers continue to struggle with inadequate digital infrastructure, limited exposure to ICT, and insufficient professional competency. The transition from chalkboard-based instruction to digital teaching thus remains uneven and challenging across the country.

In West Bengal, the shift to digital teaching has been shaped by regional realities, including infrastructure constraints, socio-economic diversity, linguistic variation, and technological accessibility. While several colleges and schools in urban cities like Kolkata have adopted digital tools, many institutions in semi-urban and rural districts still depend heavily on traditional methods. The state government’s initiatives, such as digital classrooms, ICT labs, and teacher training programmes, have created momentum, yet gaps in teacher preparedness persist. Teachers often face challenges related to the availability of digital resources, training opportunities, and institutional support, which influence their confidence and ability to integrate ICT meaningfully into pedagogy. As West Bengal moves towards a blended, technology-enabled educational future, understanding the level of teacher preparedness becomes essential for designing effective policies and ensuring equitable learning. Overall, exploring teacher preparedness for digital teaching is crucial not only for understanding current capabilities but also for identifying the challenges and support systems required during this transition from chalkboard-based instruction to digital pedagogy. This study contributes to the growing discourse on digital education by analysing teachers’ readiness, barriers, and experiences across different contexts, from the global landscape to India and specifically West Bengal.

Literature Review

Starkey (2018) provided insight into what has and has not been studied across a range of literature and the alignment with the broader context of digital integration in schools. Panda (2019) had shown that high-quality teachers are essential for the future growth of national educational systems and economic vitality. Santoro et al. (2012) revealed that the deteriorating quality of education in the country prompted policymakers and researchers to investigate the possible reasons for the decline in student achievement. Juanda et al. (2021) found that implementing an online learning system requires teachers to integrate educational technology into lesson preparation, selecting teaching strategies, designing learning assessment and evaluation, and improving class management. Jeschke, Knipping, and Pfeiffer (2014) found that e-Chalk was beneficial and usable for teaching, preserving the advantages of traditional chalkboards while extending their reach to multimedia and remote learning. Gepila Jr. (2020) found that the efficient use of technology in lesson delivery signified the success of the teaching

and learning process. Teacher preparation has been regarded as a paradoxical panacea for improving school curricula and teaching and learning, while at the same time being subject to critiques that question its efficacy in training high-quality teachers for the 21st century (Flores, 2016). A substantial body of research underscores the importance of teacher readiness for successfully integrating technology into the classroom (Ertmer & Ottenbreit-Leftwich, 2010). The TPACK model (Technological Pedagogical Content Knowledge) is frequently used to assess how effectively teachers integrate technological proficiency with instructional strategies and subject-matter expertise. However, even with the implementation of national ICT initiatives and professional development efforts, many teachers, especially those in less developed regions, continue to face challenges due to inadequate infrastructure and a lack of digital skills (UNESCO, 2022). In a review of literature on developing and assessing (Technological Pedagogical Content Knowledge) TPACK-ready teachers, Chrystalla Mouza (2016) concluded that there is little research on the effective preparation of pre-service teachers. The literature review identifies key shortcomings, including inadequate in-service training, technological angst or aversion to change, and limited access to current digital tools and internet connectivity.

Methodology

A mixed-method research approach was employed in this study, integrating both qualitative and quantitative techniques to gain a comprehensive understanding of the research problem. Purposive sampling was utilized to select colleges located in Kolkata, ensuring that the institutions chosen were relevant to the research objectives. The criteria for participant selection required that teachers possess a minimum of five to six years of teaching experience and demonstrate competence in Technological Pedagogical Content Knowledge (TPACK). A total of 150 college teachers participated in the study. The sample included a diverse group of educators, including PhD holders, non-PhD holders, and guest educators, providing a broad perspective on the teaching landscape in higher education institutions in Kolkata.

- **Quantitative survey** of 150 teachers from 5 Kolkata colleges

Table 1: *Questionnaire items with response values*

Variable Name	Description	Values / Coding
Q1	Struggle with online teaching	1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Frequently, 5 = Always
Q2	Difficulty selecting software	Same coding as above
Q3	Struggle using meeting platforms	1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Frequently
Q4	Difficulty preparing LMS/PPT	1 = Initially, 2 = Sometimes, 3 = Always
Q5	Difficulty managing blended routine	1 = Never, 2 = Sometimes, 3 = Often
Q6	Difficulty using tech in evaluation	1 = Sometimes, 2 = Always
Q7	Digital literacy in college days	1 = Yes, 2 = No
Q8	Difficulty incorporating online materials	1 = Initially, 2 = Sometimes, 3 = Always
Q9	Institutional support availability	1 = Yes, 2 = No
Q10	Difficulty completing syllabus	1 = Never, 2 = Sometimes, 3 = Always

- **Qualitative interviews** with 30 teachers, 6 teachers each from 5 colleges.

Table 2: *Nature of sample*

S. No.	Gender	Age Group 30–50	Age Group Above 50	Total Participants
1	Male	38	37	75
2	Female	37	38	75
—	Total	75	75	150

This study examined teacher preparedness and technological proficiency in implementing digital and blended teaching methods across two age groups: **30–50 years** and **50+ years**. Using qualitative interviews supported by open-ended and probing questions, the study explored teachers' experiences with ICT tools, software selection, online platforms, digital assessment, content creation, and institutional support.

Result

Table 3: *Frequency distribution of responses of 150 teachers from 5 colleges*

S.No	Questionnaire Item	Age 30–50 (n=75)	Age 50+ (n=75)
1	Struggling in implementing the online teaching–learning process and ICT	Rarely – 55 Sometimes – 20	Frequently – 60 Sometimes – 15
2	Challenging to choose software & low confidence in implementation	Sometimes – 45 Rarely – 30	Always – 55 Sometimes – 20
3	Struggling to use Google Meet, Zoom, MS Teams	Never – 50 Rarely – 25	Rarely – 45 Sometimes – 30
4	Difficulty in preparing LMS & using PPT for illustrations	Initially – 60 Sometimes – 15	Sometimes – 50 Initially – 25
5	Struggling to manage a blended routine	Never – 75	Never – 75
6	Difficulty using technology in evaluation and assessment	Sometimes – 50 Rarely – 25	Always – 55 Sometimes – 20
7	Digital literacy during college days	Yes – 65 No – 10	Yes– 10 No – 65
8	Difficulty incorporating online materials in teaching	Initially – 55 Sometimes – 20	Always – 60 Sometimes – 15
9	Limited support by the institution	Yes – 48 No – 27	Yes– 52 No – 23
10	Struggling to complete the syllabus on time in the semester system	Sometimes – 55 Rarely – 20	Sometimes – 52 Rarely – 23

The overall responses indicate that younger teachers in the 30–50 age group demonstrate stronger digital competence, as most reported. Only some reported rare or occasional difficulty with ICT tools, reflecting better adaptability and prior exposure to digital platforms. In contrast, teachers aged 50 and above frequently faced ICT-related challenges, consistently selecting responses such as “Frequently” or “Always,” suggesting ongoing difficulties in selecting appropriate software, implementing ICT, and integrating online materials. Despite these differences, both age groups managed blended learning effectively, with almost all respondents indicating that they “Never” struggled with blended routines, suggesting that mixed-mode teaching has become a normalized practice. However, older teachers continue to struggle significantly with digital platforms such as Google Meet, Zoom, and Microsoft Teams, highlighting a clear digital learning gap. This generational divide is further emphasized by

responses on digital literacy during college days: the majority of younger teachers reported being digitally literate, while the 50+ group overwhelmingly reported a lack of such exposure. The use of technology during evaluation also remains a major difficulty for both groups, particularly for older teachers, who struggle with digital assessments and online evaluation tools. Across all groups, institutional support was perceived as limited, reflecting a need for improved training, technical assistance, and ICT infrastructure. Additionally, completing the syllabus within the semester timeframe remains a common challenge for teachers of both age brackets, with many selecting “Sometimes,” indicating that ICT-related tasks and time constraints put pressure on timely syllabus completion.

TABLE 4: *Male Female response distribution table*

S.No	Questionnaire Item	Male 30–50 (n=38)	Male 50+ (n=37)	Female 30–50 (n=37)	Female 50+ (n=38)
1	Struggling with implementing online ICT	Rarely – 28 Sometimes – 10	Frequently – 30 Sometimes – 7	Rarely – 27 Sometimes – 10	Frequently – 30 Sometimes – 8
2	Choosing software & confidence issue	Sometimes – 23 Rarely – 15	Always – 28 Sometimes – 9	Sometimes – 22 Rarely – 15	Always – 27 Sometimes – 11
3	Using Meet/Zoom/Teams	Never – 25 Rarely – 13	Rarely – 22 Sometimes – 15	Never – 25 Rarely – 12	Rarely – 23 Sometimes – 15
4	LMS & PPT preparation	Initially – 30 Sometimes – 8	Sometimes – 24 Initially – 13	Initially – 30 Sometimes – 7	Sometimes – 26 Initially – 12
5	Managing blended routine	Never – 38	Never – 37	Never – 37	Never – 38
6	Tech use in evaluation	Sometimes – 25 Rarely – 13	Always – 27 Sometimes – 10	Sometimes – 25 Rarely – 12	Always – 28 Sometimes – 10
7	Digital literacy in college	Yes – 33 No – 5	Yes – 6 No – 31	Yes – 32 No – 5	Yes – 4 No – 34
8	Incorporating online material	Initially – 28 Sometimes – 10	Always – 30 Sometimes – 7	Initially – 27 Sometimes – 10	Always – 30 Sometimes – 8
9	Institutional support	Yes – 25 No – 13	Yes – 26 No – 11	Yes – 23 No – 14	Yes – 26 No – 12
10	Completing the syllabus in time	Sometimes – 28 Rarely – 10	Sometimes – 26 Rarely – 11	Sometimes – 27 Rarely – 10	Sometimes – 26 Rarely – 12

The findings indicate a clear generational gap. Teachers aged 30–50 demonstrated higher adaptability, confidence, and familiarity with digital tools, often struggling only initially. In contrast, teachers aged 50 and above consistently reported difficulties in using software, conducting online evaluations, creating LMS materials, and integrating online resources. Both groups, however, agreed that institutional support for digital teaching was limited and that completing the syllabus within the semester system was challenging.

Table 5: Distribution of qualitative sample

S. No.	College	Number of Teachers Interviewed
1	College 1	6(4 males, 2 females)
2	College 2	6(3 females, 3 males)
3	College 3	6(3 females, 3 males)
4	College 4	6(4 males, 2 females)
5	College 5	6(3 males, 3 females)
—	Total	30

A qualitative study was conducted with **30 teachers**, equally distributed across five **colleges**, with **six participants from each institution**. The purpose of this phase was to gain an in-depth understanding of teachers' lived experiences, professional challenges, and perceived gaps in the use of digital tools and ICT in the teaching–learning process. The interviews revealed several recurring themes. Many teachers reported experiencing technical difficulties, including unreliable internet, insufficient institutional support, and limited access to updated devices. Teachers from both age groups (30–50 and above 50) expressed concerns about inadequate training and the absence of systematic professional development on ICT integration. Senior teachers (50+) particularly highlighted discomfort with rapidly changing technology and felt the need for more continuous, hands-on in-service guidance. Participants also pointed out loopholes at the institutional and systemic level, including inconsistency in policy implementation, lack of time for learning new tools, and minimal collaboration and sharing opportunities via college clusters. Despite these challenges, teachers emphasized their willingness to improve and recognised ICT as an essential tool for enhancing student engagement, blended learning, and innovative pedagogy.

Overall, the qualitative findings complement the quantitative results by highlighting the depth, context, and emotional dimensions behind teachers' struggles and suggestions for improvement.

Findings and Discussions

After summarising the questionnaire, it was found that the teachers have reached the stage of using ICT in education, but some teachers are using PPT presentations in the explanation of topics, and evaluation and assessment in older methods. Some teachers have knowledge of ICT and are digitally savvy during college days, but are still not interested due to poor Wi-Fi connectivity and time constraints for completing the syllabus. Generally, young-generation teachers are digital citizens, but are not prepared to teach students using technology due to limited institutional support. Teachers appointed before 2000 are not confident in using technology in instruction and struggle to conduct classes on Google Meet, Zoom, and other online platforms.

The analysis of responses from 150 teachers reveals a clear generational divide in digital competence and confidence in implementing ICT-based teaching. Teachers in the 30–50 age group demonstrated comparatively greater adaptability, reporting fewer difficulties with using online platforms, preparing digital learning materials, and integrating technology into classroom practices. In contrast, teachers aged 50 and above frequently encountered challenges across most ICT-related tasks, including software selection, use of virtual platforms, and digital evaluation

processes, largely due to limited digital exposure during their formative years. Despite this gap, both age groups reported comfort with managing blended learning routines, indicating that hybrid teaching has become a familiar practice. The findings also highlight insufficient institutional support, as a majority of teachers across genders and age groups perceived inadequate training and technical assistance. Additionally, completing the syllabus within the semester timeline remains a moderate concern for all respondents, reflecting the additional time required for digital preparation and content delivery. Overall, the responses suggest a need for targeted digital training programs, capacity-building initiatives, and institutional strengthening to ensure effective and equitable integration of ICT in teaching–learning processes.

Conclusion

Teacher preparedness and technological proficiency are essential for the successful implementation of digital classes. While frameworks like Technological Pedagogical Content Knowledge (TPACK) support this integration, many educators still face challenges due to limited training, infrastructure, and digital literacy, particularly in under-resourced areas. Strengthening professional development and ensuring equitable access to technology are key components to bridge this gap. The journey from chalkboard to digital classroom is not merely technological; it is cultural, pedagogical, and institutional. While there is a growing willingness among educators to embrace change, true transformation demands sustained investment in capacity-building, supportive leadership, and inclusive policy frameworks. Preparedness is not an endpoint, but a continuous process of evolution and adaptation is the future goal.

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