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The Relationship between Teacher Digital Literacy and the Use of Technology in Learning

Rachel Chan[1], **Marcus Tan**[2], **Aditi Verma**[3]
[1]Singapore University of Social Sciences (SUSS) , Singapore
[2]Duke-NUS Medical School, Singapore
[3]Jawaharlal Nehru University (JNU), India

ABSTRACT

Background. The integration of technology in education has become increasingly essential for enhancing learning experiences, yet the successful use of technology in teaching relies heavily on teachers' digital literacy. Digital literacy refers to the ability to use, understand, and evaluate digital tools effectively, and it has been identified as a critical factor influencing the adoption and implementation of technology in the classroom.
Purpose. This study investigates the relationship between teachers' digital literacy and their use of technology in teaching practices. The primary objective is to assess how teachers' proficiency in digital tools impacts their incorporation of technology into the learning environment.
Method. A quantitative research design was employed, using surveys to collect data from 200 teachers across various educational institutions. Descriptive and inferential statistics were used to analyze the data, revealing a positive correlation between digital literacy and the frequency and effectiveness of technology use in the classroom.
Results. The findings suggest that teachers with higher levels of digital literacy are more likely to utilize technology in diverse and innovative ways to support student learning.
Conclusion. In conclusion, enhancing teachers' digital literacy is crucial for optimizing the integration of technology in education, thus contributing to more effective and engaging learning experiences.
Keywords: Digital Tools, Educational Technology, Teaching Practices

INTRODUCTION

In the digital age, technology has become a driving force in transforming education, offering innovative ways to engage students, enhance learning experiences, and streamline teaching processes (Lee & Seo, 2025; Rakhimzhanova dkk., 2025). The use of technology in the classroom provides teachers with diverse tools to support interactive, personalized, and collaborative learning environments. However, the effective integration of technology into teaching practices depends largely on the digital literacy of educators. Digital literacy, defined as the ability to use digital technologies effectively and responsibly, has emerged as a crucial skill for educators (Mtebe dkk., 2025; Xue, 2025). Teachers' ability to utilize technology in a meaningful and efficient way can significantly influence the quality of teaching and the outcomes of student learning. The rapid evolution of

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Correspondence:
Rachel Chan,
rachelll@gmail.com

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digital tools and educational technologies has led to an increased demand for teachers to be proficient not only in the subject matter but also in the use of technology as an instructional tool.

As education continues to move toward more digital and blended learning models, teachers' digital literacy becomes a central factor in determining the extent to which technology can be effectively incorporated into their teaching practices (Amro & Iversen, 2025; C. Wang & Zhu, 2025). Teachers who are digitally literate are more likely to adopt and adapt new technologies that align with pedagogical goals and enhance student engagement. Furthermore, their proficiency in technology allows them to respond to the diverse learning needs of students, fostering a more inclusive and interactive classroom environment. However, despite the acknowledged importance of digital literacy, not all educators are equally skilled in using digital tools, which raises concerns about the equitable integration of technology across different educational settings.

In many educational systems, there is a gap between the availability of technology and its effective use in classrooms. Schools may have access to cutting-edge digital tools, but without teachers who are well-equipped to use them, the potential benefits of technology remain untapped (Behera dkk., 2025; Manditereza, 2025). The gap between the availability of technology and its actual use in learning environments points to the need for a deeper understanding of the factors influencing teachers' adoption and use of digital tools. This understanding is particularly important as educational policies and initiatives increasingly prioritize the integration of technology in teaching and learning. Exploring the relationship between teachers' digital literacy and their use of technology in the classroom can provide valuable insights into how to bridge this gap and improve educational practices.

Despite the growing recognition of digital literacy as a critical component of modern teaching, there remains a significant variation in how teachers use technology in their classrooms. Some teachers effectively incorporate technology into their teaching practices, while others struggle to adapt or use it minimally (Smith dkk., 2025; Webber dkk., 2025). This disparity can be attributed to several factors, with digital literacy being a primary determinant. However, the relationship between teachers' digital literacy and their use of technology in the classroom is not well understood. While many studies highlight the importance of digital literacy for teachers, there is limited research that explicitly examines how teachers' digital literacy levels correlate with the frequency and quality of technology use in teaching. This study seeks to fill this gap by investigating the relationship between these two variables, exploring whether higher levels of digital literacy lead to more frequent and effective use of technology in teaching practices.

In addition to digital literacy, other factors such as access to resources, institutional support, and teachers' attitudes toward technology play a role in determining the extent to which technology is used in the classroom (Smith dkk., 2025; Webber dkk., 2025). However, the focus of this study is specifically on teachers' digital literacy and its direct impact on technology integration in teaching. Understanding this relationship is essential for identifying the key areas where teachers may require support or professional development. The research will examine whether teachers with higher digital literacy are more likely to embrace innovative technology tools and incorporate them into their instructional practices, thus enhancing the learning experience for students.

The problem addressed by this study is critical in light of the ongoing digital transformation in education. As schools worldwide continue to implement digital learning environments, it is imperative to understand how teachers' digital literacy influences the effectiveness of these technologies in improving educational outcomes (Rahimi & Mosalli, 2025; Webber dkk., 2025). This study aims to provide empirical evidence that can inform teacher training programs, educational policies, and institutional strategies for promoting the effective use of technology in

classrooms. The findings will contribute to a better understanding of how digital literacy shapes teaching practices and, in turn, student learning outcomes.

The primary aim of this study is to investigate the relationship between teachers' digital literacy and their use of technology in the classroom. Specifically, this research seeks to assess how varying levels of digital literacy among teachers influence the frequency and quality of technology use in instructional practices (M. Wang & Guo, 2025a, 2025b). The study aims to determine whether higher levels of digital literacy are associated with greater integration of technology into teaching and whether this integration leads to improved learning outcomes for students. By exploring these relationships, the study will provide valuable insights into the role of teachers' digital literacy in the adoption and implementation of technology in education.

Additionally, this research will identify potential barriers that hinder teachers' effective use of technology, such as inadequate digital skills, limited access to technological resources, or lack of institutional support (Jimenez, 2025; Sel & Demirci, 2025). Understanding these barriers will enable the development of targeted interventions and professional development programs aimed at improving teachers' digital literacy and, consequently, the integration of technology into their teaching practices. The study also aims to explore how digital literacy impacts teachers' pedagogical approaches, such as their ability to design interactive and student-centered lessons that leverage technology. Ultimately, the research seeks to offer practical recommendations for educators, policymakers, and school leaders on how to enhance teachers' digital literacy to maximize the benefits of technology in the classroom.

By achieving these objectives, the study will contribute to the broader conversation about the role of digital literacy in modern education (Gu dkk., 2025). The findings will provide empirical evidence on how enhancing teachers' digital skills can lead to more effective technology integration in teaching, which, in turn, can improve student engagement, learning outcomes, and overall educational experiences. This research will also inform future policies aimed at supporting teachers' digital professional development, ensuring that educators are well-equipped to navigate the rapidly evolving digital landscape in education.

While there is considerable literature on the importance of digital literacy for teachers, much of the existing research focuses on its general significance or the challenges faced by teachers in integrating technology into their teaching (Nacaroğlu & Göktaş, 2025; Quan & Baharom, 2025). Few studies have examined the specific relationship between teachers' digital literacy levels and the actual use of technology in the classroom. Moreover, much of the existing research is qualitative, focusing on individual case studies or small sample sizes, which limits the generalizability of findings. This study fills this gap by using a large sample size and quantitative methods to examine how different levels of digital literacy influence technology adoption in teaching. By focusing specifically on the correlation between digital literacy and technology use in the classroom, this research provides a more focused and comprehensive understanding of the issue.

Additionally, many studies have explored the barriers to technology integration, such as access to resources or institutional support, but have not investigated how teachers' individual competencies, particularly in terms of digital literacy, influence their ability to overcome these barriers. This study expands on existing research by directly addressing the role of digital literacy in overcoming technological challenges faced by teachers (Sapkota, 2025; Yang dkk., 2025). The findings will contribute to the literature by providing a clearer picture of the factors that influence technology integration in education and offering evidence on the importance of teachers' digital skills in this process.

The gap in the literature regarding the specific relationship between digital literacy and technology use in the classroom highlights the need for more empirical studies on this topic (Baymetov dkk., 2025; Sapkota, 2025). As educational systems increasingly focus on technology-driven teaching practices, understanding how teachers' digital literacy levels affect their use of technology is crucial for informing teacher training programs, curriculum development, and policy decisions. This study addresses this gap by providing empirical evidence on the direct link between teachers' digital skills and their ability to effectively integrate technology into their teaching practices.

This study is novel in its focus on the specific relationship between teachers' digital literacy and their use of technology in the classroom. While previous research has acknowledged the importance of digital literacy for educators, few studies have directly examined how varying levels of digital literacy impact teachers' technology usage (Aba Sha'Ar dkk., 2025; Khaldi, 2025). By investigating this relationship, this study provides a deeper understanding of the factors that influence the successful integration of technology in education. The novelty of the study lies in its emphasis on teachers' digital competencies as a key determinant of technology adoption, which has significant implications for both practice and policy.

The importance of this research lies in its potential to inform educational practice by highlighting the need for targeted interventions to improve teachers' digital literacy. As schools continue to embrace digital tools and technologies, it is crucial that educators possess the skills necessary to use these tools effectively in their teaching (Korkeaniemi dkk., 2025; Mizova & Bakracheva, 2025). By providing insights into the specific role of digital literacy in technology integration, this study justifies the need for comprehensive professional development programs that focus on enhancing teachers' digital skills. The research will also contribute to the broader field of educational technology by offering evidence on how digital literacy influences the pedagogical use of technology, which is essential for creating effective and engaging learning environments.

Furthermore, the study's findings will contribute to ongoing discussions about the digital transformation of education and the role of teachers in this process. As the demand for digital literacy increases globally, understanding how teachers' skills in using technology relate to their teaching practices is vital for ensuring that educational systems can fully leverage the potential of technology to improve learning outcomes (Jemetz dkk., 2025; Nasirova, 2025). This study justifies the need for continued research on the intersection of digital literacy and technology use in education, offering valuable insights for educators, researchers, and policymakers seeking to enhance the role of technology in teaching and learning.

RESEARCH METHODOLOGY

This study utilizes a quantitative research design to examine the relationship between teacher digital literacy and the use of technology in the classroom (Hossain, 2025; Ni dkk., 2025). The research design is correlational in nature, aiming to identify whether higher levels of digital literacy among teachers lead to more frequent and effective use of technology in their teaching practices. The use of a quantitative approach allows for the collection of numerical data through surveys, which will be analyzed using statistical methods to determine the strength and direction of the relationship between the two variables.

The population for this study consists of teachers from various educational levels, including primary, secondary, and tertiary education, from different schools and institutions within a specific geographic region. The sample is drawn using a stratified random sampling technique to ensure that teachers from diverse educational backgrounds and disciplines are represented (Paludi, 2025;

Zhunisbayeva & Begaliyeva, 2025). A total of 300 teachers are selected to participate in the study, providing a sufficient sample size for statistical analysis and ensuring generalizability of the results across different educational contexts. This sample includes both experienced and novice teachers, ensuring a broad range of digital literacy levels and technology use practices.

The instruments used in this study include a self-reported digital literacy assessment and a technology usage survey. The digital literacy assessment is designed to measure teachers' proficiency in using digital tools, ranging from basic computer skills to advanced pedagogical technology integration. The survey on technology usage in the classroom focuses on the frequency, types, and effectiveness of technology tools employed by teachers in their daily teaching activities (Paludi, 2025; Zhunisbayeva & Begaliyeva, 2025). Both instruments are validated for reliability and accuracy through pilot testing, ensuring that they accurately capture the intended variables. The digital literacy assessment and technology usage survey are administered online to all participants, allowing for efficient data collection and minimizing the potential for data entry errors.

The procedures for this study involve distributing the digital literacy assessment and technology usage survey to the selected participants via email. Teachers are provided with an informed consent form that explains the purpose of the study, assures confidentiality, and informs them of their voluntary participation (Assefa dkk., 2025; Han & Chen, 2025; He dkk., 2025). The survey is completed by participants over a two-week period, with follow-up reminders sent to ensure a high response rate. Once the data is collected, it will be analyzed using descriptive statistics to summarize the responses and inferential statistics, such as correlation analysis, to examine the relationship between teacher digital literacy and technology usage in the classroom. The study follows ethical guidelines for research involving human subjects, ensuring the protection of participants' privacy and the integrity of the research process.

RESULTS AND DISCUSSION

The data collected from 300 teachers across primary, secondary, and tertiary education institutions were analyzed to explore the relationship between teacher digital literacy and the use of technology in the classroom. Descriptive statistics were computed for the key variables of interest, including the teachers' digital literacy levels and the frequency of their use of technology in teaching. The digital literacy levels were measured on a scale from 1 to 5, with the mean score of 3.8 and a standard deviation of 0.6, indicating that most teachers had a moderate level of digital literacy. For technology usage, teachers reported an average of 4.2 on a 5-point scale, with a standard deviation of 0.8, suggesting that technology is frequently used in the classroom. The following table presents the breakdown of digital literacy and technology use across different educational levels.

Table 1. Teacher Digital Literacy and Technology Usage by Educational Level

Educational Level	Digital Literacy (Avg.)	Technology Usage (Avg.)
Primary	3.5	3.8
Secondary	3.9	4.2
Tertiary	4.2	4.5

The data reveals that teachers in tertiary education reported the highest levels of both digital literacy and technology usage, with average scores of 4.2 for digital literacy and 4.5 for technology usage. Secondary school teachers reported slightly lower digital literacy (3.9) but similar levels of technology use (4.2). Primary school teachers, on the other hand, had the lowest digital literacy (3.5) and technology usage (3.8) scores. This suggests that higher levels of digital literacy are

associated with more frequent and varied use of technology in the classroom. However, the relationship between digital literacy and technology usage appears to be more pronounced in tertiary education, where both variables show a stronger correlation.

Inferential analysis using Pearson's correlation coefficient revealed a strong positive correlation between digital literacy and technology usage ($r = 0.73$, $p < 0.01$). This indicates that teachers with higher levels of digital literacy are more likely to integrate technology into their teaching practices. The correlation was particularly strong among tertiary education teachers ($r = 0.82$, $p < 0.01$), suggesting that digital literacy plays a more critical role in the use of technology at higher educational levels. In contrast, the correlation was weaker among primary school teachers ($r = 0.60$, $p < 0.05$), implying that factors other than digital literacy, such as access to resources or institutional support, may influence technology use in primary education more significantly.

The analysis also revealed that teachers with lower levels of digital literacy tend to use technology less frequently or rely on basic tools such as projectors or whiteboards rather than interactive learning platforms or digital resources. Teachers with higher digital literacy, however, were more likely to use a variety of advanced technological tools, such as learning management systems, educational apps, and multimedia presentations. This pattern suggests that digital literacy influences not only the frequency of technology use but also the complexity and diversity of the technology employed in teaching. Additionally, the findings indicate that the adoption of more advanced tools is linked to a greater sense of confidence and familiarity with digital technologies, which is a direct result of higher digital literacy levels.

A case study of a secondary school teacher illustrates how digital literacy impacts the use of technology in teaching. The teacher, who scored 4.0 on the digital literacy scale, reported regularly using an interactive whiteboard and educational apps to enhance student engagement. The teacher's high digital literacy allowed for seamless integration of these technologies into lessons, leading to improved student participation and better learning outcomes. In contrast, another teacher at the same school, who scored 2.8 on the digital literacy scale, used technology only occasionally, mostly for showing videos or slides, and reported challenges in fully incorporating digital tools into lesson plans. This case highlights the varying degrees to which teachers' digital literacy influences the effective use of technology in the classroom.

The data from this case study corroborates the findings from the larger sample, where teachers with higher digital literacy scores were more confident and innovative in integrating technology into their teaching. The use of advanced digital tools was more prevalent among those with strong digital literacy, suggesting that improving teachers' digital skills can lead to better utilization of available technologies in educational settings. In contrast, teachers with lower digital literacy scores appeared to struggle with incorporating technology effectively, often relying on basic functions and missing opportunities for more interactive or innovative uses of technology.

In conclusion, the results confirm that teacher digital literacy plays a crucial role in the effective use of technology in the classroom. The correlation between digital literacy and technology usage supports the notion that teachers with higher digital skills are more likely to integrate technology into their teaching practices, enhancing student engagement and learning outcomes. The findings suggest that teacher training programs should focus on improving digital literacy to ensure that educators are equipped to leverage technology effectively. As education continues to embrace digital tools, fostering digital literacy among teachers will be essential for maximizing the benefits of technology in learning environments.

The results of this study reveal a strong positive correlation between teacher digital literacy and the use of technology in the classroom. Teachers with higher levels of digital literacy are more

likely to use a wider range of technological tools and integrate them effectively into their teaching practices. The data indicates that tertiary education teachers, who reported higher digital literacy levels, used technology more frequently and in more innovative ways compared to their counterparts in primary and secondary education. These findings suggest that as teachers' digital literacy improves, their confidence and ability to use technology to enhance student learning also increase. The study also highlights a weaker correlation between digital literacy and technology use among primary school teachers, implying that other factors, such as resource availability or institutional support, might play a more significant role at this educational level.

The findings align with previous research that emphasizes the importance of digital literacy for educators. For instance, studies by Ertmer (1999) and Tondeur et al. (2017) have demonstrated that teachers with higher digital literacy are more likely to integrate technology into their teaching. However, this study contributes to existing literature by highlighting the varying degrees of correlation across different educational levels. While many studies suggest a general link between digital literacy and technology use, this study provides specific insights into how this relationship manifests in primary, secondary, and tertiary educational settings. The research also extends earlier work by demonstrating that digital literacy not only influences the frequency of technology use but also the complexity and diversity of technology integrated into teaching practices.

The results of this study signal the importance of fostering digital literacy among educators. The stronger use of technology by teachers with higher digital literacy levels highlights the need for ongoing professional development programs focused on enhancing digital skills. Teachers who possess a solid understanding of digital tools and how to apply them in the classroom can create more dynamic and interactive learning experiences. This finding also suggests that schools and educational systems must provide teachers with adequate resources and training opportunities to improve their digital literacy. It further emphasizes that digital literacy should be seen as a fundamental skill for teachers, one that is essential for meeting the demands of modern education.

The implications of this research are significant for educational policy and practice. Improving teachers' digital literacy can lead to more effective technology integration, ultimately enhancing student engagement and learning outcomes. This study suggests that teacher training programs should prioritize digital literacy as a core component of professional development. Institutions should consider offering workshops, courses, or certifications focused on developing teachers' ability to use technology in meaningful ways. Additionally, policymakers should ensure that teachers have access to the necessary technological resources and support systems to incorporate technology into their classrooms. If teachers are adequately equipped with digital skills, they will be more likely to harness the potential of technology to improve the learning experience for students.

The results of this study are likely influenced by several factors, including the availability of digital resources, institutional support, and the teachers' attitudes towards technology. Teachers with higher digital literacy likely feel more confident in using advanced technologies and may have access to better resources, allowing them to integrate technology more effectively into their teaching. Additionally, the difference in digital literacy and technology use across educational levels suggests that higher education institutions may have more opportunities for digital training and support compared to primary and secondary schools. The lack of digital literacy training at lower levels of education may explain the weaker correlation observed in primary school teachers. Thus, the results underscore the need for a more comprehensive approach to teacher training that addresses the digital divide across educational stages.

Moving forward, this study opens up several avenues for future research. Longitudinal studies could explore how digital literacy influences technology usage over time and its impact on student learning outcomes. Additionally, future research could investigate the role of institutional support and professional development in improving teachers' digital literacy and, in turn, the integration of technology into classrooms. Understanding how external factors such as school infrastructure, peer collaboration, and administrative support influence technology use could provide a more nuanced understanding of the relationship between digital literacy and technology integration. Finally, exploring the impact of specific technological tools and platforms on teachers' practices would offer insights into how different types of technology influence the pedagogical approaches of digitally literate teachers. These directions will provide a more comprehensive picture of how digital literacy can be enhanced and utilized for more effective teaching practices.

CONCLUSION

One of the most important findings of this study is the strong positive correlation between teachers' digital literacy and the frequency and quality of technology use in the classroom. Unlike previous studies that often generalized the relationship between digital literacy and technology integration, this study provides specific insights into how digital literacy influences the depth and variety of technological tools used across different educational levels. Tertiary education teachers were found to have a higher degree of technology usage and digital literacy, while primary school teachers, despite similar resource access, exhibited lower levels of both. This finding suggests that digital literacy plays a more significant role in technology use at higher educational levels and that improvements in teachers' digital skills may have a more noticeable impact in these settings.

The value of this research lies in its contribution to understanding the nuanced relationship between digital literacy and technology use across different educational stages. It introduces a methodological approach that uses a quantitative framework to capture not only the frequency of technology usage but also the quality and diversity of technological tools used in teaching. The study advances the concept of digital literacy by linking it directly to the practical integration of technology in the classroom, providing new insights into how digital proficiency can enhance pedagogical practices. Additionally, the research highlights the varying levels of digital literacy and technology integration across different educational sectors, thus offering a broader understanding of these factors in shaping teachers' teaching practices.

Despite its contributions, the study has certain limitations. First, it relies on self-reported data, which can introduce biases related to teachers' perceptions of their digital literacy and technology usage. Future research could utilize more objective measures of technology use, such as classroom observations or digital tool usage tracking. Another limitation is the focus on a single geographic region, which may limit the generalizability of the findings to other contexts. Expanding the study to include a more diverse sample of teachers across different countries or educational systems would provide a more comprehensive understanding of the global factors that influence the relationship between digital literacy and technology use. Furthermore, longitudinal studies could explore how the development of digital literacy over time impacts technology integration and teaching outcomes, providing valuable insights into the long-term effects of digital literacy training.

AUTHORS' CONTRIBUTION

Look this example below:

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

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