Thai Secondary EFL Teachers' Use of Digital Literacy Tools in Post-COVID-19 Teaching

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ABSTRACT

This study investigates the reasons behind pre-service and in-service teachers' decisions to use digital literacy tools in their teaching following the COVID-19 pandemic. The objective is to understand the factors influencing their choices and to identify areas where support and training are needed. Semi-structured interviews were conducted with eight teachers from a university demonstration school in Thailand, evenly divided between pre-service and in-service teachers. The Technology Acceptance Model (TAM) framework guided the creation and adaptation of the interview questions. The findings indicate that pre-service teachers prefer digital tools that are easy to use, accessible, and affordable, with features such as templates, multimedia, and engaging functionalities. In contrast, in-service teachers prioritize familiar tools that save time and enhance the quality of teaching materials. Both groups value tools that facilitate collaboration and ensure privacy. The study highlights the significant generational differences in technology adoption, with younger teachers showing a greater inclination towards exploring a variety of digital tools, while more experienced teachers tending to stick with familiar technologies due to time constraints and comfort levels. These insights underscore the necessity for ongoing, tailored professional development programs that address the specific needs of both pre-service and in-service teachers. Such programs should focus on enhancing digital literacy, providing practical examples of new tools' benefits, and fostering a supportive community for technology integration. By understanding these differences, educational institutions can better support teachers in integrating digital literacy tools effectively, thereby improving teaching practices and professional development opportunities. The implications of this study suggest that a one-size-fits-all approach to technology training may not be effective, and differentiated support is essential to cater to the diverse needs of educators.

Key words: ICT Teachers, Teacher Education Program, Ict Integration, Revised Teacher Education Curriculum.

INTRODUCTION

In the late 20th century, education relied heavily on textbooks and chalkboards, lacking technological advancement. Computer advances then transformed education, the workplace, and everyday life (Raja & Nagasubramani, 2018). The increasing adoption of computers paved the way for researchers and teachers to use technological tools for teaching and learning. Technological tools have become a global phenomenon, providing opportunities for teachers and learners to adapt effectively, especially for educational purposes, including authentic materials, game-based learning, e-learning, learner-centered approaches, and unlimited resources. The use of technological tools has influenced various aspects of education, enhancing engagement, motivation, authenticity, active learning, and autonomous learning (Gür & Karamete, 2015; Serhan, 2020).

The COVID-19 pandemic forced the closure of educational institutions worldwide, affecting over 90% of the global population (UNESCO, 2020). In response, Thailand implemented educational reforms using a blending approach (BL) and integrating technological tools to provide effective teaching and learning processes while preventing virus spread. Online learning became crucial for supporting student learning, leading to the mandatory use of technological tools in schools and universities (Subedi et al., 2020; Mustakim et al., 2020). Studies by Hamid (2020) and Fuady et al. (2021) found that Google Classroom, WhatsApp, Zoom, Google Meet, and LMS were commonly used online learning platforms by EFL teachers and students during the pandemic. Hamid's study shows that students with visual impairments responded positively to these platforms, while Fuady et al. found that Zoom was the easiest to use and the most useful, with LMS being the most difficult and least useful. Both studies emphasize the importance of online learning platforms in facilitating distance education during the pandemic.

One Thai secondary school also required teachers to provide completely remote teaching and learning during the COVID-19 outbreak. This mandate left teachers with no choice but to use technological tools. In May 2021, the Education Ministry announced five ways of New Normal Learning: On-site, On-Air, On-Line, On-demand, and On-hand, based on their context. The school decided to use On-site and On-Line approaches for effective student learning. In May 2022, the school fully reopened On-site following the Office of Basic Education Commission (OBEC) and Public Health Ministry requirements. During On-site teaching, the researcher observed that teachers continued using technological tools.

The school also has a program providing pre-service teachers with opportunities for professional development through practicum teaching, enhancing their teaching skills and pedagogical knowledge through practical experience in an authentic school environment. Thus, the school consists of two groups of teachers: in-service teachers and pre-service teachers who completed their teacher training through the practicum program. Four pre-service and four in-service teachers from these groups participated in this study to explore the rationale behind their intentions to integrate technological tools into their teaching practices.

The COVID-19 pandemic made using technology for teaching and learning essential, but it also increased challenges for pre-service and in-service teachers to teach remotely without prior preparation (Figg et al., 2020). Many teachers lack experience in integrating technological tools into their teaching, making it difficult to create online courses, develop digital teaching materials, and adjust content to meet changing needs. They are also unfamiliar with new learning platforms, classroom management, enhancing classroom engagement, and effectively integrating technological tools, posing significant obstacles to implementing these tools in teaching and learning (Thammachat & Kerdtip, 2021; Boonmoh et al., 2022a).

However, despite the growing integration of technology, gaps remain in understanding how pre-service and in-service teachers rationalize the adoption of these tools, particularly in the context of sudden shifts to remote learning as necessitated by the pandemic (Wiangsima & Boonmoh, 2018). This study builds on previous research by examining these challenges and rationales within the Thai educational context, addressing gaps identified by Saenkhot and Boonmoh (2019) regarding insufficient training and resources for technology integration.

To address this issue, it is crucial to investigate the rationales affecting pre-service and in-service teachers' intentions to integrate digital literacy tools. The acceptance of these tools among teachers demonstrates a willingness to employ them and provide effective teaching and learning. Therefore, this study aims to examine the rationales behind the usage of digital literacy tools by both groups of teachers under the TAM theoretical framework. The findings will be useful to teachers, school administrators, and pre-teachers to effectively improve teaching and learning, teacher training, and professional development.

LITERATURE REVIEW

Technology Acceptance Model

The TAM model is used to reveal a user's willingness to adopt a particular technology explained by five variables: perceived ease of use (PE), perceived usefulness (PU), attitude towards using, behavioral intention to use, and actual use. The model explains the relationship between attitudes, intention to use technology, and behaviors (Davis, 1986). In conjunction with two variables, the perceived usefulness and the perceived ease of use determine the behavior and influence actions of technology adoption. The model refers to perceived usefulness as the belief that using technology is advantageous for working performance. It means whether or not a person perceives that the technology would be beneficial. The perceived ease of use refers to the degree of free effort to use a particular technology. It means whether or not the technology is easy to use. According to Figure 1, perceived ease of use influences two variables, perceived usefulness and attitude toward use. If it is challenging to use, people will have a negative attitude toward it, which could affect the intention to use the technology and the actual system usage.

Moreover, the perceived usefulness influences solely the attitudes toward use. It means that the technology's usefulness does not determine whether the technology is effortless to use. Perceptions are different due to individual beliefs and attitudes. In addition, external factors like social influence also play a significant role in determining attitude. People will have different perceptions and intentions to use the technology once these elements in the TAM model are in place. In addition, people have different perceptions that may vary based on age, gender, and experiences. This theoretical model predicts and clarifies the users' behaviors with perceptions, attitudes, and behavioral intentions in adopting technological tools in various contexts such as health care, business, games, technology information, and education.

Recent research has suggested that several demographic variables, such as age (Ertmer et al., 2019), personal beliefs
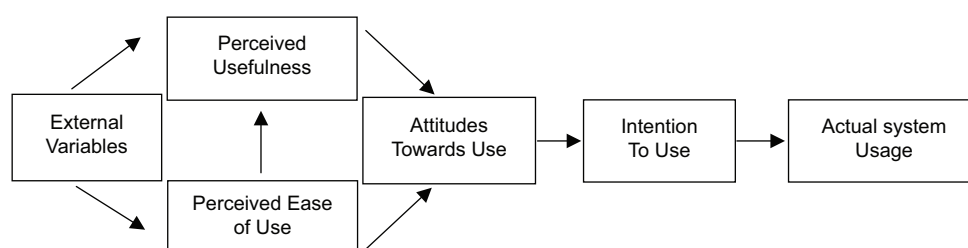

Figure 1. Technology acceptance model (Davis, 1986)

and values (Kim et al., 2013), gender (Hsu, 2016), and teaching experience (Barni et al., 2019), can shape teachers' attitudes towards technology adoption. According to the technology acceptance model, these external variables affect behavioral intention. Experience is one of the most significant keys in integrating technological tools into teaching, which can influence the intention to use technology differently among teachers. Many studies have also indicated that experience with technology tools can influence technological adoption differently (Ball, 2008; McGill et al., 2011; Teo, 2015).

Studies by Christensen and Knezek (2016), Cruz and Díaz (2016), and Papadakis (2018) showed that younger teachers tended to have higher levels of technical proficiency than older teachers. Younger teachers showed positive attitudes towards technology integration in education and may be well-equipped to use technology in their future teaching practices. Younger teachers use technology more frequently than older teachers. Overall, these studies suggest that teachers, both pre-service and in-service, have the necessary digital competencies to utilize technology in the classroom, with their attitudes towards technology integration being influenced by experience and perceived usefulness.

Obviously, the diverse professional standards, experiences, and working environments could impact the volition of technological tools implementation between pre-service and in-service teachers differently (Teo, 2015). Regardless, some studies lack information on the specific years using technological tools in teaching, the technological tools and learning experiences comparing pre-service and in-service teachers in similar environments, and who oversee making decisions in employing innovation in classes (e.g. Purcell et al., 2013; Teo, 2015; Papadakis, 2018).

Updated TAM and Other Technological Acceptance Models

In addition to the traditional TAM, other models have been developed to explain technology acceptance. The Unified Theory of Acceptance and Use of Technology (UTAUT), proposed by Venkatesh et al. (2003), integrates elements from eight different models, including TAM. UTAUT identifies performance expectancy, effort expectancy, social influence, and facilitating conditions as key factors influencing technology use. Another model, the TAM2, extends the original TAM by including additional variables such as subjective norms and cognitive instrumental processes (Venkatesh & Davis, 2000). These models provide a more comprehensive understanding of the factors influencing technology acceptance and can offer deeper insights into the adoption of digital literacy tools by teachers

Although updated models like UTAUT and TAM2 offer comprehensive insights into technology acceptance, this study chose the original TAM due to its simplicity and focus on perceived ease of use and perceived usefulness, which were the primary variables of interest in understanding the differences between pre-service and in-service teachers.

Pre- and In-service Teachers' Acceptance of Technology

In recent years, technology has played a crucial role in enhancing the education system, leading to better learning outcomes and professional development for teachers (Kong et al., 2014; Farjon et al., 2019). Digital natives, the current generation of pre-service teachers, have a natural inclination towards technology use due to their exposure to it from an early age (Junco, 2014). Researchers have emphasized the potential of technology to improve 21st-century skills, creativity, and engagement in learning (Christensen & Knezek, 2016), with positive impacts on both teachers' and students' attitudes. For successful implementation, teachers must be willing to integrate technology into their teaching and learning processes (Boonmoh et al., 2022b; Huang et al., 2019), given that they are the key decision-makers in this regard. Both pre-service and in-service teachers have a significant role in utilizing technological tools, and studies have investigated the rationales that influence the intention of both teacher groups to adopt and integrate technology into teaching.

Several studies have examined what influences technology acceptance among pre-service teachers, yielding varying results. Ranellucci et al. (2020) discovered that pre-service teachers' intention to use technology was significantly influenced by their perceived usefulness, ease of use, and attitude toward technology. Similarly, Gyamfi's (2016) study in Ghana found that pre-service teachers' pedagogical beliefs had a significant impact on their perceived ease of use and perceived usefulness, ultimately shaping their attitudes towards computer use and actual usage of computers. Wong (2015a) also found that pre-service teachers' positive attitude toward technology's usefulness was the most influential element in their intention to use it. However, Batane and Ngwako (2016) discovered that a lack of adequate resources was the primary reason for the non-usage of technology by pre-service teachers. To encourage technology use among pre-service teachers, it is crucial to establish a supportive culture and organizational structure and to demonstrate how technology can save time and effort in teaching and learning.

Recent studies have shed light on the behavioral intentions of in-service teachers toward technology adoption. Sánchez-Mena et al. (2019) found that perceived usefulness directly and positively influenced teachers' behavioral intention to use educational video games in their courses, while perceived ease of use indirectly influenced intention through perceived usefulness. However, internal and external constraints hindered technology use among foreign-language teachers in China, according to Hong et al. (2021). These constraints included prior experience with technology, technological pedagogical content knowledge, habit, beliefs in students, Chinese teaching culture, and assessment pressure. Meanwhile, MacDonald et al. (2020) and Sangkawetai et al. (2020) have shown that a lack of self-confidence in teaching with educational technology, especially if the educator has low digital teaching self-efficacy, can lead to avoidance of technology in the classroom. This avoidance can result in lower self-confidence, which further hinders technology use, creating a circular causal relationship. Additionally, teachers' lack of knowledge, resources, and official assistance and

misconceptions about technological tools' utility, ease of use, and applicability contribute to their uncertainty, anxiety, or fear regarding digital media use in their daily teaching practice.

Although several studies have investigated pre-service and in-service teachers' adoption of technology separately, few have analyzed these two groups of teachers concurrently to compare their intention to use technology in learning. In addition, Wong (2015b) asserted that in-service teachers could be studied and compared with pre-service teachers to identify greater insight into the differences in views toward technology usage between these two groups. Batane and Ngwako (2016), Teo et al. (2018), and Naqvi and Zehra (2021) suggested that qualitative researchers could gain deeper insights into practical issues, beliefs, and understandings of the predictors of technology acceptance with the reasons behind the intentions of both groups of teachers. Therefore, this study was conducted to fill the existing gap in the technology acceptance literature, investigating both groups of teachers' reasons behind their digital literacy tools integration in learning for better understanding to improve future teaching and learning more effectively.

Research Question

- What are the rationales behind the intention to use digital literacy tools between pre-service and in-service teachers?

METHODOLOGY

Research Design and Instrument

This study used a qualitative research design. The research instrument was a semi-structured interview, designed to explore the reasons behind pre-service and in-service teachers' decisions to use digital literacy tools in their teaching following the COVID-19 pandemic. This qualitative approach allows for a deep understanding of the participants' experiences, perspectives, and rationales. The interview questions focused on perceived ease of use, perceived usefulness, and other factors influencing technology adoption based on the Technology Acceptance Model (TAM).

Participants

The participants were four pre-service and four in-service teachers at a Thai secondary school. These teachers were selected based on their active involvement in integrating digital literacy tools into their teaching practices. This school serves as a demonstration school affiliated with a university, providing a practical training ground for pre-service teachers and a dynamic educational environment for in-service teachers. Demonstration schools in Thailand are typically associated with higher education institutions and are designed to model exemplary teaching practices, innovative educational methods, and effective classroom management strategies. These schools played a critical role in the professional development of pre-service teachers by offering hands-on teaching experiences under the supervision of experienced educators. The demographic profile of the eight teachers is shown in Table 1.

This study used a qualitative approach method for rich data. According to previous studies of the TAM model, the number of participants is typically between 6-14 teachers to ensure that the data is effectively manageable (Huang el al., 2019). The key criterion for the study was the experience of in-service teachers who had been teaching in a school context for at least two years and pre-service teachers who have participated in teaching practice as part of their degree program. The inclusion criteria for the pre-service teachers were that they were in the final year of their teacher education program and had completed at least one semester of teaching practicum. For the in-service teachers, the criteria included having at least three years of teaching experience and actively using digital tools in their classrooms. This diverse participant pool allowed for a comprehensive exploration of the different perspectives and rationales behind the integration of digital literacy tools in teaching.

Research Instrument

The semi-structured interview was designed following the theoretical framework of the technology acceptance model and the research question to collect data on teachers' reasons for integrating technological tools into their teaching and learning processes. The participants were interviewed individually by one of the researchers in Thai to minimize language barriers and facilitate clear communication. Each interview lasted approximately half an hour and was recorded for accuracy. The guiding questions as follows:
- How long have you experienced integrating technological learning tools in your teaching?
- What digital literacy tools did you integrate during online teaching? How was your experience?
- What digital literacy tools did you integrate when learning onsite? How was your experience?
- What are the disadvantages/advantages of integrating digital literacy tools in teaching?

Table 1. Teacher demographics with age, gender, educational background, and teaching experience

Teacher ID	Age	Gender	Educational Background	Teaching Experience (in years)
T1	23	Female	Bachelor's Degree	0
T2	23	Female	Bachelor's Degree	0
T3	22	Male	Bachelor's Degree	0
T4	22	Female	Bachelor's Degree	0
T5	27	Male	Bachelor's Degree	3
T6	37	Female	Doctorate degree	10
T7	51	Male	Doctorate degree	26
T8	64	Female	Bachelor's Degree	40

- Why did you choose the digital literacy tools you mentioned when you were teaching? Why not others?

These questions are the guideline questions for the interviews, and follow-up questions allowed the interviewer to gain more in-depth information from the participants according to the research area.

The interview questions were created and adapted based on the TAM framework to ensure they addressed the study's objectives. They were designed to elicit responses related to perceived ease of use, perceived usefulness, and other TAM-related variables, providing a comprehensive understanding of the participants' technology integration experiences.

The interview questions underwent a process to ensure content validity and clarity. Initially, two experts in educational technology reviewed the questions, and their feedback was incorporated into revisions. Conducting the interviews in Thai minimized language barriers, allowing participants to express their thoughts freely. To enhance credibility, two independent researchers analyzed a subset of transcripts to ensure consistency in coding and interpretation, resolving any discrepancies collaboratively.

Data Analysis

This study aimed to investigate the technological teaching and learning tools that pre-service and experienced in-service teachers use to provide effective classrooms and to gain insights into their rationales for integrating technological tools. To achieve this, the following steps were taken:

- Data for the study were collected through semi-structured interviews with participating teachers, and the interviews were recorded and transcribed verbatim.
- The transcripts were read repeatedly to ensure accuracy and a thorough understanding of the data. Specifically, the researcher looked for information related to the technological tools that the teachers had been using.
- Following the initial reading, the transcripts were then systematically categorized based on the functions of the tools that teachers use, such as communication or teaching platforms.
- Finally, the transcripts were further analyzed to identify the rationales behind the teachers' use of these tools. This allowed for a deeper understanding of the rationales that could influence their intention to integrate digital literacy tools into their teaching practices.

The data were analyzed using thematic coding, a process involving several steps to ensure reliability. The transcripts were initially coded manually to identify key themes and patterns. Irrelevant information was excluded, and only relevant data was included in the analysis. To ensure the validity of the findings, one set of data was validated by an expert in educational technology. The coding process involved multiple readings of the data, cross-checking by independent researchers, and collaborative resolution of any discrepancies to ensure consistency and reliability.

FINDINGS

The study's results are divided into two sections: (1) the teachers' use of technology in teaching and learning and (2) the teachers' rationales behind the technological tools integration. The first section categorizes the information into topics and subtopics, accompanied by numerical data and explanations. The second section presents the results based on insightful interviews with both groups of teachers, offering a more comprehensive understanding of the teachers' reasoning behind incorporating technology into their teaching and learning methods. For this study, Group 1 is defined as pre-service teachers (T1 to T4) at the age range of 22-23 years. Group 2 is defined as in-service teachers (T5 to T8) at the age range of 27-64 years. Both groups were also characterized by their year of teaching experiences.

Teachers Use Of Technology In Teaching And Learning

The teachers' utilization of technology in teaching and learning is illustrated in Table 2. The table categorizes participants as pre-service and in-service teachers and shows how they used technology to enhance their teaching and learning. Experience level influences how technology is used, and in-service teachers used technology less often than pre-service teachers.

The COVID-19 pandemic has impacted education, leading to a shift toward virtual teaching. The most commonly used tool among the pre-service teachers (T1-T4) is Zoom, with two out of the four participants using it. Another pre-service teacher (T3) used Zoom and Line, while the remaining pre-service teacher (T4) used Discord. Among the in-service teachers (T5-T8), the most commonly used tool is Google Meet, with three out of the four participants using it. The other in-service teacher (T5) used Zoom. Overall, it seems that Zoom and Google Meet are the most popular tools among the teachers in this study, with Zoom being used by both pre-service and in-service teachers, and Google Meet being more commonly used among the in-service teachers.

Regarding student engagement tools, pre-service teachers (T1-T4) employed a wider range of tools, including Quizizz, Vonder Go, Wheel of Name, and YouTube, while in-service teachers mainly relied on Kahoot and Quizizz. In terms of developing teaching materials, all teachers utilized school-provided materials, with PowerPoint being a commonly used tool for both pre-service and in-service teachers. However, pre-service teachers demonstrated a more diverse range of tools, including Canva, Goodnotes, and Freepik, while in-service teachers mainly relied on PowerPoint. Interestingly, in-service teacher T7 utilized Bandlab for creating teaching materials.

In terms of communication and evaluation, pre-service and in-service teachers used different tools. Line was used by both groups for communication, while Google Classroom was exclusively used by one in-service teacher. For evaluation purposes, Google Forms was used by T2, T7, and T8, while Quizizz and Kahoot were used by T2.

In general, the results indicate that pre-service teachers employed a more comprehensive range of pedagogical tools than in-service teachers concerning engaging students in the learning process, developing instructional materials, and assessing student performance. The subsequent section of the study explores how this discrepancy in experience levels between pre- and in-service teachers influenced their purposeful application of specific pedagogical tools

Rationales for Teachers' Integration of Technological Tools

The results are divided into two sections: similarities and differences. By examining these aspects, the results provide insights into the shared motivations and unique perspectives of these two groups of in-service and pre-service teachers.

1. Similarities in Rationales for Teachers' Integration of Technological Tools

Ease of use

The ease of use was emphasized by both groups as one of the major rationales to integrate digital tools into the classroom. They recognized the importance of tools that are user-friendly and easy to navigate. The ease of registration, accessibility, file uploading, and other features were considered significant in their decision-making process. They preferred tools that require fewer steps and are straightforward to use.

> "*I prefer using Google Meet over Zoom because I believe that Zoom has certain limitations as to access all of Zoom's features, one must purchase the application, which can be a barrier for some users. In contrast, Google Meet is a free tool that requires fewer steps.*" (Pre-service Teacher 1)

> "*I prefer to use Google Meet over Zoom because it is easier to use and does not have a time limit for meetings, unlike Zoom which requires a license for longer meetings. Additionally, the fact that all students and teachers use the same email system provided by the university makes it convenient to use without the need for reapplication.*" (In-service Teacher 7)

Familiarity and student preference

The familiarity and student preference played a role in their selection of tools. Teachers from both groups expressed a preference for tools that students are already familiar with, such as Google Meet. This familiarity reduces potential barriers and enhances student engagement. Additionally, familiar tools facilitate tasks like attendance tracking and submission of recorded teaching videos.

> "*I prefer to use Google Meet because most students are familiar with it more than other tools. It makes checking attendance easier. Lastly, as intern teachers, we need to submit the recorded video of our teaching, so I think Google Meet is more suitable.*" (Pre-service Teacher 2)

> "*When I choose the technological tool, I look for the tools that are easy for me as a teacher to use and my students are accustomed to using it, which is a good reason*

to continue using it in the future since everyone already knows how to use it. This reduces the chances of problems arising during studies.*" (In-service Teacher 5)

Enhancing teaching and learning management

Another important rationale for both pre-service and in-service teachers is that they look for tools that can help them manage their teaching and learning material more efficiently, while also facilitating effective communication, and material arrangement with embedded assessment tools that can categorize and instantly give the students feedback. Discord was mentioned as a preferred communication tool among pre-service teachers due to its unique features and file-sharing capabilities.

> "*I use Quizizz because this tool incorporates gamification features that can work individually or as a team, creating a fun and competitive atmosphere students strive to win. It helps me assess the student's learning and makes the learning process more engaging and enjoyable for them.*" (Pre-service Teacher 2)

> "*During the Covid pandemic, I chose to employ Google Classroom to assign coursework and upload instructional materials for students to access and learn independently. The platform's built-in exercise features enabled students to receive instantaneous feedback on their work. The system helps the teacher track student progress and submission times.*" (In-service Teacher 8)

Enhancing collaboration and students' engagement

Collaboration and student engagement were influential reasons for pre-service teachers when choosing technology tools. They believed that collaboration among peers can significantly impact their motivation and interest in using technology tools for student engagement. Platforms like Vonder Go, which allows students to work in groups, were mentioned as promoting active participation and creating a more enjoyable learning experience.

> "*I use Vonder Go because it allows me to divide my students into groups, which helps them to answer questions, collect points, and dress up their characters. By using Vonder Go, I can make learning more fun and increase student participation in the classroom.*" (Pre-service Teacher 3)

> "*The use of tools, such as competitive games, can effectively engage students' motivation. However, there is a risk that students may focus more on the enjoyment of the game rather than on the learning objectives. This can make it difficult to accurately measure how much knowledge and understanding they have gained from the activity.*" (In-service Teacher 5)

2. Divergent Rationales for Teachers' Integration of Technological Tools

Enhance teaching with technological tools' educational functionalities

Regarding educational features, pre-service teachers expressed a preference for tools like Zoom that offer additional

educational functionalities such as breakout rooms to facilitate active and collaborative learning. In contrast, this rationale was not explicitly mentioned by in-service teachers, indicating a potential difference in their perception of the importance of such features.

> "*If the school announces online instruction for the entire academic year, I'd use Zoom due to its superior educational features. Zoom's ability to create breakout rooms for brainstorming activities or discussion sessions would be valuable in facilitating active and collaborative learning in the virtual classroom.*" (Pre-service Teacher 3)

Enhance Quality of Teaching Materials

Pre-service teachers prioritize educational tools with added features, such as Canva's tailored templates for educational materials. They utilize Canva's search engine to create visually appealing content. In contrast, in-service teachers may not prioritize these features and often rely on PowerPoint. This indicates a potential divergence in their perception of the importance of these tools. Additionally, pre-service teachers predominantly choose Canva as their preferred platform for creating teaching materials.

> "*While PowerPoint and Canva share some functions, Canva offers more options and templates which can make presentations more professional. Even if a teacher lacks art skills, using a trendy template that matches students' preferences can save time when creating teaching materials. For instance, creating a star figure in PowerPoint can be time-consuming, whereas Canva provides numerous ready-made illustrations.*" (Pre-service Teacher 2)

> "*I prefer using Canva because it has a search engine within the website's resources. I can easily search for and add any image, icon, or graphic element without using other tools. It's an all-in-one tool that offers a variety of templates, customizable options, and visual effects that help to enhance professional-looking designs quickly.*" (Pre-service Teacher 3)

> "*I have been using PowerPoint mainly before the Covid-19 pandemic and have become familiar with its features and functionalities, which allows me to create visually appealing presentations easily.*" (In-service Teacher 7)

Protecting Students' Privacy

Privacy was highlighted as an important consideration by pre-service teachers. They emphasized the need for secure platforms that allow them to categorize students and files effectively. Discord, with its unique features and secure file-sharing capabilities, was mentioned as a preferred communication tool. In-service teachers, however, did not mention privacy as an influential factor in their choice of tools, suggesting a divergence in their priorities.

> "*Discord is a preferred communication tool for managing classes because of its unique features. I can create channels for each class of students to share information,*

make schedules, or assign work. One of the most significant benefits is that it provides a private environment without asking for personal information." (Pre-service Teacher 4)

Teachers' Willingness in Technological Tools Usage

Resistance to learning new tools was expressed by in-service teachers. They cited time constraints and the need to create teaching materials daily as reasons for their hesitation in adopting new technologies. This rationale was not mentioned by pre-service teachers, suggesting a difference in their willingness to explore and adapt to new tools.

> "*If I need to edit a video, I prefer to use an editing program called BandLab, which I have already learned to use over several years. I do not want to learn new tools because learning something new would be a waste of time from my perspective. Also, it would be challenging to master new tools since I need to create teaching material for the class daily.*" (In-service Teacher 7)

In conclusion, the information provided reveals that both pre-service and in-service teachers strive to integrate technological tools into their teaching practices to provide higher education for their students. Each teacher endeavors to select tools that they believe are suitable for enhancing the learning experience and meeting the needs of their students. While there are similarities in their rationales, such as considering ease of use, familiarity, assessment, and collaboration, there are also differences in their priorities and approaches. Pre-service teachers may prioritize educational functionalities and utilize tools like Canva to create visually engaging materials, while in-service teachers may focus on their existing familiarity with certain tools and be hesitant to adopt new technologies.

Regardless of these differences, the underlying intention of every teacher is to provide the best possible education for their students. Each teacher aims to leverage technological tools in their own way, aligning them with their teaching style and students' requirements. By recognizing and respecting these individual approaches, educational institutions can support teachers in their quest to provide high-quality education and create an environment conducive to effective teaching and learning.

DISCUSSION

The findings of this study revealed significant variations in the perspectives and practices of teachers based on their teaching experience and utilization of technology. The participants were classified into two distinct groups: pre-service teachers engaged in teaching internships with limited prior experience and in-service teachers with a minimum of three years of teaching experience. This categorization allowed for a comprehensive analysis of the data, providing valuable insights into the differences between these two groups of educators.

Pre-service teachers used a wider range of digital tools compared to in-service teachers. Both groups emphasized the ease of use, familiarity, and student preference as key

Table 2. Teachers' use of technology in teaching and learning

Teachers (age/year (s) of experience)		T1 (23/0)	T 2 (23/0)	T 3 (22/0)	T 4 (22/0)	T5 (27/3)	T6 (37/10)	T7 (51/26)	T8 (64/40)	Total
Teaching platform	Zoom	√		√		√	√	√		5
	Google Meet	√	√				√	√	√	5
	Discord				√					1
	Line			√						1
Engage students	Kahoot		√	√	√		√		√	5
	Quizizz		√				√		√	3
	Vonder Go			√	√					2
	YouTube			√			√	√		3
	Wheel of name			√			√			2
Teaching Material	School Material	√	√	√	√	√	√	√	√	8
	PowerPoint	√	√	√		√		√	√	6
	Canva		√	√	√					3
	GoodNote				√					1
	Freepik				√					1
	BandLab							√		1
Communication	Line	√		√			√	√		4
	Google Classroom								√	1
Evaluation	Google Form		√					√	√	3
	Quizizz		√							1
	Kahoot		√							1

rationales for tool selection. These findings align with the Technology Acceptance Model (TAM), which posits that perceived ease of use and perceived usefulness are critical factors influencing technology adoption (Davis, 1986). However, pre-service teachers also highlighted the importance of additional educational functionalities, privacy, and engagement features, while in-service teachers showed resistance to adopting new tools due to time constraints and familiarity with existing tools. These findings are consistent with recent literature, indicating a pervasive adoption of technology among teachers for pedagogical purposes (Crompton et al., 2017; Kordaki & Gousiou, 2017; Petri & Von Wangenheim, 2017; McGarr and Gallchóir, 2020; Serin & Bozdağ, 2020; Schmid et al., 2021).

Similar to previous studies (Christensen and Knezek, 2016; Cruz and Díaz, 2016; Papadakis, 2018), pre-service teachers were found to use a more extensive range of technological tools compared to their in-service counterparts. This aligns with research indicating that younger teachers tend to possess higher levels of technical proficiency and are more frequent users of technology in the classroom. However, the findings of this study are inconsistent with Graziano's (2018) research, which suggested that younger teachers may lack a deep understanding of how to integrate technology throughout the curriculum. Graziano's study highlighted that although pre-service teachers demonstrated proficiency with technology, they might have faced difficulties in creating files, determining when to use audio and video, and experiencing concerns and anxiety (Graziano, 2018).

The results indicate that pre-service teachers purposefully selected a wider range of technological tools, including Discord, GoodNotes, Freepik, and Vonder Go, to support their instructional objectives and teaching preferences. This finding aligns with Wong's (2015b) research, which emphasizes the influence of the perceived usefulness of technological tools on pre-service teachers' intention to use them. According to the study's results, pre-service teachers made intentional choices based on specific reasons that aligned with their desired outcomes in the classroom. For instance, privacy concerns influenced the selection of Discord, while tools like GoodNotes and Freepik were favored for their time-saving benefits due to ready-made templates for instructional materials. Additionally, pre-service teachers recognized the value of gamification features in tools like Vonder Go, which effectively enhanced student engagement and motivation.

In-service teachers tend to be more apprehensive about adopting new technologies and often stick to familiar tools they already know. This is consistent with studies indicating a lack of self-confidence in teaching with educational technology, particularly in cases where educators have low digital teaching self-efficacy (Hong et al., 2021; Sangkawetai et al., 2020). Additionally, Saenkhot and Boonmoh (2019) found that teachers often face challenges such as insufficient training and lack of resources, which make them even less willing to incorporate new technologies. Time constraints and daily teaching responsibilities often make in-service teachers hesitant to adopt new technologies. During the

COVID-19 pandemic, they focused on familiar platforms like Zoom and Google Meet provided by their schools. Concerns about disruptions and technical difficulties further discourage them from exploring new tools (MacDonald et al., 2020). These findings extend the TAM framework by highlighting the importance of external factors such as training, resources, and institutional support in influencing teachers' technology adoption decisions.

Pedagogical Implications

The findings have significant pedagogical implications for education stakeholders. Policymakers and curriculum developers must acknowledge and address the generational disparities in technology adoption among teachers. Wiangsima and Boonmoh (2018) highlighted that aligning technological integration with teachers' perceptions and future teaching strategies is crucial for effective adoption. Similarly, addressing the barriers identified by Saenkhot and Boonmoh (2019), such as insufficient training and resources, can help in developing more effective professional development programs. Collaborative professional development programs can facilitate knowledge exchange and foster a culture of peer learning between younger and more experienced teachers. This is corroborated by studies indicating that tailored professional development programs encourage teachers to incorporate technology in their classrooms (Boonmoh et al., 2022a; Akkaya, 2016). Schools should prioritize comprehensive support and resources tailored to teachers' needs, focusing on enhancing technological skills and addressing concerns about ease of use and relevance. Creating an environment that encourages innovation and experimentation, valuing teachers' efforts, and providing ongoing support and training are crucial steps.

To overcome the barriers faced by in-service teachers, targeted professional development and support are crucial. By addressing their specific needs and offering inspiring examples, educational institutions can empower in-service teachers to embrace new technologies and enhance their teaching practices. Strategies such as providing time-saving tools, demonstrating the practical benefits of new technologies, and creating a supportive community of practice can help in-service teachers build confidence and competence in using digital literacy tools.

Limitations and Suggestions for Future Research

One potential limitation of this study is its small sample size, consisting of teachers from a single province. This could hinder the ability to generalize the findings to a wider population of teachers. The study's focus on a specific region and the inclusion of a limited number of participants may also restrict the applicability of the results to different educational contexts. Moreover, relying solely on in-depth interviews with a few participants may provide valuable insights but might not capture the full breadth of perspectives and experiences regarding technology integration in the classroom. Therefore, caution should be exercised when interpreting the findings, considering the study's limited sample size and the

qualitative nature of the data collected. Future research with larger and more diverse samples would be valuable for further exploration and validation of the study's findings.

In conclusion, the integration of technological tools into teaching practices is influenced by several factors, including ease of use, familiarity, educational functionalities, privacy, and engagement features. While pre-service teachers are more inclined to explore and adopt a wider range of tools, in-service teachers often prefer familiar technologies due to time constraints and existing competencies. Addressing these differences through tailored professional development and support can enhance the effective use of digital literacy tools in educational settings. By fostering a culture of innovation and collaboration, educational institutions can support teachers in providing high-quality education that meets the needs of 21st-century learners.

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