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Investigation of the impact of integrating digital technology into university teachers' professional development

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ABSTRACT

Following the rapid digital transformation in higher education, integrating digital technology into university teachers' professional development has become increasingly important. However, teachers' perceptions in the Chinese higher education context remain underexplored. This qualitative study investigates Chinese university teachers' views on digital technology integration and related influencing factors. Using a convenience sample of ten university teachers from diverse disciplines, data were collected through unstructured interviews and analyzed using thematic analysis with NVivo. Findings indicate that digital technology supports the development of subject knowledge, reflective practice, interdisciplinary integration, and knowledge sharing, while also enhancing pedagogical competencies such as classroom management and teamwork. Nevertheless, challenges were identified, including overdependence on technology, information overload, limited digital competence among teachers, and reduced interpersonal interaction. Teachers' attitudes toward technology integration are shaped by both internal factors (intrinsic motivation and professional cognition) and external factors (peer influence and evaluation mechanisms). This study provides qualitative evidence on the role and impact of digital technology in teachers' professional development and offers implications for designing effective professional development programs in Chinese higher education.

Contribution/ Originality: This study contributes to the existing literature by providing qualitative evidence on Chinese university teachers' perceptions of digital technology integration in professional development, highlighting both pedagogical benefits and multi-level attitudinal factors that have been largely overlooked in previous research.

1. INTRODUCTION

Ever since the 21st century, digital technology has greatly impacted teaching practices, teachers' professional development, as well as the development and training of teachers for the following 21st-century skills, including critical thinking, collaboration, creativity, and responsible use of technology (Lan, Bailey, & Tan, 2024; Mpuangnan, 2024; Ramaila & Molwele, 2022). Digital technology can facilitate professional growth by supporting reflective teaching, promoting creativity, and enabling flexible learning environments (Althubyani, 2024; Schlebusch, Bhebhe, & Schlebusch, 2024).

Technology integration studies conducted in the past in the realm of teacher training have explored the availability of technology infrastructure and the application of digital technology to manage teaching processes without delving much into the connection between digital technology and the professional development of teachers

(Hrastinski, 2021; Suchita, Devi, Pal, & Mahajan, 2023). Moreover, although technology training may be common in the teaching fraternity, factors such as discomfort, little opportunity for cooperation, and negative perceptions may prevent adequate technology integration and professional development (Kim, Lee, & Cho, 2022; Montero-Mesa, Fraga-Varela, Vila-Couñago, & Rodríguez-Groba, 2023; Wang & Chu, 2023). In the Chinese scenario, the policy guidelines highlight the need to incorporate digital technology into teaching practice, but the difference between policy demands and the professional development of teachers remains vast owing to the disparity in the possession of professional knowledge and skills (Fathi & Yousefifard, 2019; Ministry of Education of the People's Republic of China, 2024; Zhang & Chen, 2022).

As one of the top Chinese provinces in the digital education sector, as well as the development of higher education in the country, Jiangsu Province represents a relevant context in which the issue of the integration of digital technology in the professional development of university lecturers acquires a certain meaningfulness.

For this study, a qualitative method of inquiry is employed to examine Chinese university teachers' attitudes towards integrating digital technology and factors that impact their professional growth. On this basis, the following research questions are developed.

1. How does digital technology affect the development of university teachers' professional knowledge?
2. How does digital technology affect the development of university teachers' practical skills?
3. What factors influence university teachers' attitudes toward integrating digital technology into professional development?

2. LITERATURE REVIEW

2.1. Digital Technology and Professional Development of Knowledge

For instance, attributes of the digital society like smooth information transfer offer profound learning opportunities as well as an ideal digital space for various sectors to develop (Kamel & Rizk, 2019; Parveen & Ramzan, 2024; Sandblad, 2023; Tapalova & Zhiyenbayeva, 2022). Findings have also emerged showing that digital technology can assist learners with more malleable learning strategies to acquire both concept and application knowledge efficiently (Haleem, Javaid, Qadri, & Suman, 2022; Holmes, Anastopoulou, Schaumburg, & Mavrikis, 2018; Tapalova & Zhiyenbayeva, 2022). An empirical analysis was conducted to examine the effects of a design-based professional development intervention on teachers' capability to work with Google application usage (Seboka, Nehru, & Sime, 2025). The findings from both interviews and quantitative analysis confirmed that teachers who participated in the digital learning intervention showed enhanced performance with regard to technological knowledge as well as technological pedagogical knowledge (Seboka et al., 2025).

Additionally, digital technology can support reflective knowledge by helping educators in recording, viewing, and evaluating essential parts of the educational process to improve instructional practices and the quality of teaching content (Fisher, Higgins, & Loveless, 2006; Tanyeri & Özçınar, 2012). Bataller-Català (2025) studied preservice teachers' use of blog tools in digital reflective approaches and reached the conclusion that blog tools, as instruments for reflective practice, helped preservice teachers in reflective thinking on events in education and in constructing knowledge collectively. Additionally, it was found in a study using a mixed-methodology approach that technology-mediated self-reflection helped teachers in comprehending their instructional practices and boosting professional knowledge, determining that digital technology is an aid or support system that helps in reflective practices and contributes to the professional growth of educators (Murny, Ruliany, Martius, Roza, & Nurhasnawati, 2022).

Research has indicated that the application of digital technology by teachers to share information among other educators has contributed to the dissemination of ideas and the creation of a just and collaborative setting, ensuring the success of digital education transformation (Hernandez-de-Menendez, Escobar Díaz, & Morales-Menendez, 2020; Sharlovych, Vilchynska, Danylyuk, Huba, & Zadilska, 2023; Zamiri & Esmaeili, 2024). Research conducted by Peng, Razak, and Halili (2023) among 685 in-service teachers found teacher digital literacy to have a direct impact on

technology integration in the classroom, which indirectly influenced teaching activities and resource sharing among teachers. These studies have indicated that technology application by teachers not only influences resource sharing but also technology integration in various disciplines of teaching activities.

Even though current literature has already confirmed the important role of digital technologies in the integration of disciplinary knowledge, reflexive teaching, integration of interdisciplinary knowledge, as well as sharing of information, the extent of the integration of digital technologies in different areas, the role of digital technologies in equalizing teachers' knowledge, and how teachers update their knowledge in a dynamic technological environment have not been adequately investigated (Liu & Xu, 2025; Mekheimer, 2025). The proposed research study will help fill this gap by examining the application and influence of digital technology on the development of university lecturers.

2.2. Digital Technology and the Professional Development of Teachers' Practical Skills

The potential of digital technologies in teaching has been widely recognized, and teachers' ability to effectively use and integrate digital technologies in classroom practice is considered crucial (Nguyen et al., 2022; Ramaila & Molwele, 2022). A qualitative research study was conducted in Thailand, examining how teachers manage their classrooms in a digital learning environment. The study, based on interview data, found evidence that teachers can utilize digital technology and intelligent learning content to manage instructional and digital activities in the classroom (Nguyen et al., 2022). A survey conducted by Rahayu, Mumtaz, and Khoiriyah (2023) on 36 participants, classified under the teaching faculty, found a significant positive link between digital technology use and classroom management practices.

Moreover, technology allows instructors to be more learner-centered during instructional activities, which aids in differentiated teaching for students (David & Weinstein, 2024; Haleem et al., 2022). For example, a study conducted by Al-Rsa'I and Shugairat (2019) demonstrated that technology-driven differentiated instruction, which employed a number of different technology tools, increased the ability to understand students' needs and led to a teaching practice that could be adapted and responded to accordingly.

Teacher collaborations are also viewed as important in a digitalized teaching process (Pozas & Letzel-Alt, 2023). Digital technologies, as multidimensional tools, open new horizons for effective communication and collaboration among teachers (Mayhoffer, 2024). It has been revealed that teachers' observation and learning from others impact self-development, develop divergent thinking, optimize learning management, and promote team collaboration to achieve enhanced teaching capabilities (Cojorn & Sonsupap, 2024). In a study involving 425 preservice teachers, Dai (2023) found a significant positive relation between ICT self-efficacy and peer collaboration. Annemann, Menge, and Gerick (2025) also confirmed that professional development opportunities related to digital competence enhanced teachers' communication and collaboration capabilities related to the application of digital technologies that could be effectively used in the process of digitalized teaching and learning.

Although positive impacts of digital technology on classroom management, differentiated instruction, and teacher cooperation were identified in previous studies, most of the existing research on digital technology's impact on the teaching profession remained at the K-12 level or involved preservice teachers/special subject classrooms (Al-Rsa'I & Shugairat, 2019; Dai, 2023). Therefore, this study employs a qualitative approach with university teachers in Jiangsu Province, China, to explore the application of digital technologies in the development of teachers' practical skills, providing empirical evidence to inform higher education teacher training and the use of educational technologies.

2.3. Factors That Influence University Teachers' Attitude Toward the Application of Digital Technology to Their Professional Development

Clarke and Hollingsworth (2002) proposed the Interconnected Model of Teacher Professional Growth, which comprises four domains: the personal domain (knowledge, beliefs, and attitudes), the domain of practice (instructional

activities), the domain of consequence (outcomes of professional practice), and the external domain (sources of information and external stimuli). The framework depicts teacher professional growth in an ever-changing situation brought about by the dynamic interaction between knowledge and instructional practice, which simultaneously shape teacher professional growth (Clarke & Hollingsworth, 2002; Sancar, Atal, & Deryakulu, 2021).

According to Su, Zhong, and Ng (2022), professional development for teachers refers to activities that focus on improvement in skills, knowledge, and professional abilities in order to develop better teaching practices. With the enhanced use of technology in educational settings, university educators are forced to demonstrate professional knowledge and skills in order to critically apply and transform technology (Schlebusch et al., 2024). Empirical evidence, as suggested by Nagy and Dringó-Horváth (2024), shows that teacher professional development is affected not only by individual digital skills but also by external factors such as institutional support and collaborative work of educators in an organization. The study also emphasizes that environments that foster communication, cooperation, and helping one another are better in promoting teacher professional development (Nagy & Dringó-Horváth, 2024).

Based on these considerations, it is argued in this study that university teachers' attitudes toward digital technologies in professional development result from the interaction of individual and environmental factors (Nagy & Dringó-Horváth, 2024; Szcyrek, Stewart, & Miklas, 2024). Indeed, prior research has indicated that the intrinsic motivation and personal needs of teachers underlying technology acceptance come into sharp contrast with a lack of ongoing training, limited institutional support, and emotional and technological stress found to reduce sustained technology use and have negative impacts on teaching and learning (Cabaleiro-Cerviño & Vera, 2020; Lai, Cheung, & Chan, 2023; Panisoara, Lazar, Panisoara, Chirca, & Ursu, 2020; Stumbrienė, Jevsikova, & Kontvainė, 2024).

While it has been stated in existing literature that both individual influences (such as digital competence and motivation) and external influences (such as institutional support and collaborative environments) affect teacher development, how these factors interact to shape teachers' attitudes toward and practice of integrating digital technology is not known (Amemasor, Oppong, Ghansah, Benuwa, & Essel, 2025; Nagy & Dringó-Horváth, 2024). As such, the present study looks at how both individual and external influential factors may jointly influence university teachers' attitudes and practices related to the integration of digital technology from a dual perspective.

3. METHODOLOGY

3.1. Research Design

The research paradigm used in this study is qualitative in nature and aims to examine the views of Chinese university lecturers on the application of digital technology in their professional development activities and the influences that affect their attitudes toward such applications. The main data collection method in this study is semi-structured interviews. The method is very common in social sciences and has the advantage of providing an organized structure in a flexible manner, such that the study could be guided while remaining adaptable depending on the responses from the participants (Ruslin, Mashuri, Rasak, Alhabsyi, & Syam, 2022).

3.2. Participants

The research applied purposive sampling that considered age, educational background, and teaching experience, using the principle of maximum variation. The study sampled ten university lecturers from public universities in Jiangsu Province, the People's Republic of China, based on their capacity for pedagogical knowledge, subject matter knowledge, and technological skills. All participants had taught courses using digital technology for over one year.

In consideration of institutional and individual confidentiality, the names of specific universities have not been mentioned in line with the approved ethics protocol. Of these participants, four were male participants M1 through M4, and six were female participants W1 through W6. The participants were accorded a voluntary choice of whether or not to participate in these interviews, and they were also made aware of this choice through a note indicating that

they could withdraw from this research at any time if they wished. The participants' demographic and professional data are listed in Table 1.

Table 1. The basic information of the interviewees.

Code	Discipline	Age	Degree	Teaching Experience
W1	Computer Science	50	Master's	22
W2	Economics	55	Master's	26
W3	Foreign Language (English)	32	Doctorate	1
W4	Business Administration	40	Doctorate	5
W5	Agriculture	39	Doctorate	6
W6	forestry	30	Doctorate	1
M1	Physical Education	43	Master's	13
M2	Education	53	Master's	21
M3	Information Technology	33	Doctorate	2
M4	Art Design	40	Master's	4

3.3. Data Collection

In 2024, individual semi-structured interviews were conducted with each participant by a single researcher. Each interview lasted approximately *30-40* minutes, though no strict time limit was imposed, and was conducted in the participants' native language. With participants' consent, all interviews were audio-recorded and subsequently fully transcribed by the researcher.

The questions for the interview, which targeted understanding teachers' perspectives on integrating digital technology into their professional development activities, were adapted from Chang and Fan (2022), and these questions include.

1. Do you think digital technology can promote the development of professional knowledge? If so, how?
2. Do you think that digital technology can help your learning, research, or teaching activities? In what ways?
3. Have you participated in training based on digital technology? If so, has it influenced your view of the integration of technology in professional development?
4. What factors influence your use of digital technology for professional development? How are these factors manifested?

To ensure the validity of the interview protocol, expert validation was conducted through an online form. Experts were asked to assess the relevance, appropriateness, and clarity of the interview questions and to provide suggestions for improvement. The form concluded with a question about the overall applicability of the instrument. All experts agreed on the protocol's applicability, and the validation was successful.

3.4. Data Analysis

The thematic analysis was carried out by the researchers in accordance with the guidelines presented by Braun and Clarke (2006). The methodology involves a study design based on a qualitative approach and enables the researchers to examine some significant issues in detail with respect to the adoption of digital technology in the teaching staff members' professional development sessions. At the beginning, the researchers engaged in immersion procedures with respect to the transcripts of the interviews administered. Later, a coding process was carried out based on annotating the transcripts with keywords, phrases, and sentences.

For example, when analyzing the statement: "*I often use digital tools to track students' progress and change my teaching practice accordingly*," the initial code was assigned as "Tracking student learning," and this was categorized under the theme of "Differentiated teaching." Another statement analyzed is: "*Digital platforms enable collaboration on research projects remotely*," which was categorized as "Information sharing," with an initial code of "Remote collaboration." These statements demonstrate how interview data can be transformed into meaningful codes and themes.

The initial codes were then categorized into higher-order themes, which represented the perspectives of the study's participants. The overall themes and subthemes were developed using three dimensions of teacher professional development: knowledge, skills, and attitudes.

4. RESULTS

In this research, the factors contributing to the application of digital technologies by teachers at higher education institutions were analyzed. The findings were grouped into three categories: professional knowledge, skills, and elements shaping teachers' attitudes towards application (see Table 2).

Table 2. Topic classification.

Research questions	Themes	Subthemes
Knowledge	Subject knowledge	Academic research, exploring academic frontiers
	Critical reflective teaching	Teaching reflection, adjusting teaching methods, and content
	Discipline integration	Cross-disciplinary projects, interdisciplinary learning
	Information sharing	Information dissemination, rich information resources
Practical skills	Classroom management	Course planning and design, maintaining classroom discipline
	Differentiated teaching	Tracking different students' learning progress and adjusting the teaching content
	Team collaboration	Project planning, joint problem-solving
Attitude	Personal factors	Intrinsic motivation, personal cognition
	External factors	Peer encouragement, evaluation mechanisms

5. FINDINGS

5.1. Theme 1: Impact Of Digital Technology on the Development of Professional Knowledge Subject Knowledge

A large number of participants confirmed that the influence associated with the application of digital technology has a major effect on their subject knowledge. Digital technologies serve as key enablers of professional knowledge integration and academic research. This is supported by the fact that Participant W1 said, *"I often use software like R, AMOS, and Stata for my research work."* These applications make it possible for teachers to analyze data effectively and update their knowledge concerning their subject area. However, there were views aired concerning the risk of depending on digital technology. One participant, M1, observed, *"Not everything needs to be learned and shared with digital tools. Overemphasis on digital technology sometimes neglects the content itself."* The implications of these views indicate that, though digital tools improve research and knowledge updating, there may be a need for a balance between digital tool usage and the subject matter knowledge that teachers may need to preserve.

5.1.1. Critical Reflective Teaching

Again, the provision of support for reflective practice in teaching with the use of digital technology had been reiterated by the respondents. As identified, technology such as the internet enables the teacher to obtain feedback from students, which in turn allows them to adjust their teaching styles accordingly. For instance, Participant W2 stated, *"I can adapt my lectures with the aid of feedback from students via online means because by collecting feedback from students online, I can alter my teaching methods."*

5.1.2. Discipline Integration

The use of digital tools was also cited as improving the integration of different disciplines by providing an opportunity for different departments to collaborate on various projects. One of the participants, W4, said, *"Digital technology gives us many resources, many ways to communicate. For example, the Business Administration Department and the Foreign Language Department recently undertook an interdisciplinary project using digital tools, which has enriched my teaching experience."*

5.1.3. Information Sharing

Digital technology has widened the horizon and speed of dissemination of information, providing access to such resources in great measure for teachers. Alternatively, the participants have shared challenges in coping with such information and making useful use of it, given the enormity of the record and their lack of digital literacy. Participant W4 shared, *"The digital platforms provide a plethora of informational resources, but some platforms appear quite fragmented in their structure and may take a rather long time to access relevant information. Moreover, some databases cannot be accessed since they are not licensed by our institution; thus, we lack authorization to use such databases."* The above-mentioned points clearly establish how digital technology is helpful in disseminating information and collaborating in a professional capacity, but is subject to limitations in digital literacy and an ad hoc organization of digital technology.

In conclusion, it can be inferred from these results that the implementation of digital technology is a multidimensional process concerning the development of teachers. It promotes subject expertise, critical reflective practice, subject integration, and sharing of information. At the same time, overdependence on technology, lack of digital literacy, resource fragmentation, and organizational constraints are evident issues.

5.2. Theme 2: Impact of Digital Technology on the Professional Development of Practical Skills

5.2.1. Classroom Management

It was apparent that digital technology played a major role in the management of classes by teachers. Digital technology allowed teachers not only to instruct but also to monitor the progress and behavior of their students. The management of the class is closely related to the application of digital technology in class management and goes beyond class management. According to one of the respondents (M2), *"In contrast to the traditional subject matter offered in a normal class setting, interactive whiteboards and virtual labs are mandatory in terms of being incorporated in class planning and add to the teaching method."*

However, some teachers indicated that although technology had made class interactions easier, there were challenges in classroom management. For instance, participant M4 mentioned using digital tools like educational apps and online simulations for activities, but students sometimes became so excited that it took time to maintain discipline. This suggests that success in a technology-enabled classroom requires expertise not only in pedagogy but also in classroom control.

5.2.2. Differentiated Teaching

Differentiated teaching and learning were also positively affected by digital technology. In this regard, teachers asserted that they were able to implement differentiated teaching through learning analytics and adaptive platforms in their teaching processes. One of the participants, W1, noted, *"The use of digital tools has greatly simplified course planning and student attendance checking procedures. Also, teachers can track students' progress at different levels during teaching, as well as promote communication and adjust the difficulty of content in real-time."*

5.2.3. Team Collaboration

Cooperation among teachers in teams became quite simple with the use of cooperative platforms available online. The members believed that the use of online platforms helped them coordinate and share best practices for teaching. One participant (W6) said, *"We regularly conduct online seminars, where members from different regions take turns conducting meetings related to different topics or research projects, and provide solutions and suggestions to each other's questions."*

Nevertheless, the participants were also cognizant of the limitations that exist in online communications. This was well captured by participant M1 when she said, *"The online training packages affect me because I feel I am disconnected from others, and the time factor for online meetings sometimes makes it inconvenient for me to ask others for time to discuss."* This reflects the sentiments expressed by participants regarding online approaches that improve efficiency but may reduce personal connections.

Overall, it can be interpreted that the findings tend to suggest that there is a significant impact of digital technology on the professional practices of teachers. It helps enhance class management, individualized teaching practices, and team collaboration. A balanced process involving interaction and order, individualization and student observation, and remote collaboration for teams without destroying interpersonal relationships is required for its effective implementation.

5.3. Theme 3: Factors that Affect Teachers' Attitude Toward the Integration of Digital Technology

Factors influencing teachers' attitudes toward digital technology integration were found to fall into two broad categories: personal and external factors.

5.3.1. Personal Factors

Personal factors include intrinsic motivation and personal cognition, both of which contribute a great degree to shaping teachers' engagement with digital tools. The participants shared how intrinsic motivation was able to drive them to learn about and apply digital technologies proactively. For example, it was found that W2 said, *"As teachers, we are responsible for, and obligated to change with the digital transformation of education and set a good example for students,"* meaning that moral and professional obligation further encourage engagement.

It was also explained as an understanding of the purpose and benefits involved in integrating digital technologies into teaching. M3 mentioned the influence of national policy, *"The current national education policy leans toward using technology to accelerate the digital transformation of education. Integration of digital technology in education is an inevitable trend for social and personal development."* This is a good example of how teachers' awareness of broader trends within education informs their attitude. However, there were also accounts of challenges in putting this into practice. M3 continued: *"The department has organized training courses on the operation of digital technologies, but no dedicated personnel have been assigned to address the questions that may arise during the practical application process. Failure to solve problems in a timely manner may reduce confidence and enthusiasm in using digital tools."* Likewise, M4 also conveyed the need to learn constantly: *"The application of digital technology needs to be considered in terms of experimental designs and analysis of data. I have been learning constantly to learn different types of analysis software in order to perform research work."*

5.3.2. External Factors

These examples show that intrinsic motivation and cognitive understanding result in actual usage. However, constant help is required to sustain self-confidence. These are peer support and mechanisms for evaluation that can also have positive and negative effects. It has been seen that peer support can create both stress and motivation for participants. M2 commented, *"My colleagues are using digital technology to innovate and promote academic research and teaching. I feel that everyone has his or her pace of development, and sometimes his or her 'concern' makes me nervous,"* which clearly reveals how comparison can lead to stress even when there is a positive intention behind an action.

Other contributing factors are the evaluation mechanisms, which also affect the attitudes of the teachers. For instance, W3 discussed the level of anxiety resulting from the mandatory training: *"The school has policies forcing us to undertake courses on digital technology training. Failure to finish them or pass them results in us receiving penalties, making me anxious."* However, in another case, W6 seemed hesitant about the mandatory task necessary for W6, who perceived it as an imposed task, as shown below: *"All of us know how to filter digital technology use, but now it feels like the school is compelling us to undertake these educational courses, even when some of them, in my point of view, are unnecessary."*

Intrinsic motivation and personal cognition form the foundation for teachers' attitudes, while variables like peer influence can support or hinder engagement. Results highlight the need to develop teachers' internal motivation and create favorable external settings for integrating digital technology into education.

6. DISCUSSION

6.1. The Impact of Digital Technology on Teachers' Professional Knowledge

In fact, integrating digital technology into teachers' professional development is an intervention that is affected by the impact of integrating digital technology into teachers' professional knowledge, which includes elements of content knowledge, reflection of practice, discipline integration, as well as information dissemination. It is noted that integrating digital technology into teachers' professional development has not only enhanced teachers' professional knowledge but also had an impact on teaching processes as well as learning processes. This point assumes significance because digital technology must always be treated as a means to an end. Moreover, a relevant study has clarified that integrating digital technology can develop the teacher's knowledge base and promote creativity (Parveen & Ramzan, 2024). In the TPACK model, teacher content knowledge (CK) plays an important role in professional development. Moreover, CK acts as a base for integrating technology in professional development (Su, 2023). Digital technology enables teachers to enjoy different possibilities for accessing, displaying, and analyzing discipline-related content. It enables teachers to develop their content-related knowledge through practice (Raave, Saks, Pedaste, & Roldan Roa, 2024). By integrating technology in organic forms of pedagogy (TCK & TPK), teachers can make the best use of imparting knowledge by merging its theoretical component with practice in order to develop overall professional knowledge (Abebe & Trainin, 2024).

However, the integration of digital technology needs to be dealt with carefully to ensure that digital technologies are used to support the professional development needs of teachers, rather than hindering education or critical thinking because of overuse (Geisinger, 2016; Gumiero & Pazuch, 2024; Schenck, 2024). Using digital technology to integrate the more reflective and inclusive classrooms can increase teachers' autonomy and reflection, effectively converting the translation of teaching, research, and learning into digital spaces (Qadhi, Abu-Shawish, & Alhassan, 2024). The concept streamlines the conceptualization of the DPACK model, as conceptualized by Thyssen, Huwer, Irion, and Schaal (2023) by giving merits to critical reflection, collaboration, and interaction associated with digital learning, as well as referring to the social commitments associated with instructional tasks, such as equity, inclusivity, and socialization into digital literacy, as compared to the TPACK model, by giving merits to teachers' critical awareness associated with digital learning, hence facilitating the overall development associated with both professional knowledge and practical competencies associated with teachers' overall development as indicated by Thyssen et al. (2023).

Moreover, from this research, it was discovered that digital technology enables flexible and open digital environments that contribute to interdisciplinary projects and the exchange of information. This concurs with the views of Nurnaninsih, Muktamar, and Muthmainah (2023) and Thornhill-Miller et al. (2023), who suggested that digital technology can play an important role in facilitating the exchange of information, adaptation, and shared knowledge that ultimately allows teachers to make informed teaching choices. However, there are also concerns raised by a few research participants regarding the accessibility that could be affected by information overload, which might impair the teachers' capability to efficiently access and construct understanding from the digital technology. This reflects a similar observation by other researchers that using digital technology can contribute to information overload and the issue of cognitive load (Chen, Pedersen, & Murphy, 2011; Shahrzadi, Mansouri, Alavi, & Shabani, 2024).

6.2. The Impact of Digital Technology on Teachers' Practical Skills

In this study, it has been observed that teachers' application of digital technology to teaching skills is mainly exemplified in classroom management, differentiated teaching, and collaboration. The application of digital technology to teaching skills in class not only supports teachers' technological competencies but also ensures that core teaching skills are fostered. For example, classroom management using digital technology has been shown to increase efficiency to enable teachers to evaluate students' learning process online and develop an interactive learning

environment to increase management efficiency (Djami, 2022). This has been exemplified in TPACK, which demonstrates an organic combination of technology and teaching to enhance teaching plans and management in class using this technology (Abebe & Trainin, 2024; Mgeladze & Kapanadze, 2025).

However, simultaneously, digital technology can also enable differentiated instruction to give students tailored tasks based on their level and thus ensure an inclusive learning environment (Sandberg, 2022). But it has also been expressed that the use of digital technology can give rise to students' distraction and problems of classroom discipline. Therefore, in some projects, due to the need to create an emotional connection and limitations on time in online sessions, digital technology cannot completely ensure an effective aspect of interaction. These views have been supported by past studies that found inappropriate instruction can generate adverse consequences of technology integration to limit students' possibilities of learning from direct instruction and social interaction (Mok, 2021; UNESCO, 2023).

6.3. Factors Influencing Teachers' Professional Attitudes

Personal and external elements, according to this study, affect the attitude of teachers on the integration of digital technology in the classroom. Personal elements involve intrinsic motivation and cognitive functions, while external elements involve peer support and evaluation systems. These observations conform well to the fundamental elements described in the Teachers' Professional Development (TPD) approach, centering on continuous professional development where teachers can improve their capacities in an ongoing knowledge update, skill mastery, and reflective practice process (Samundeeswari, Angayarkanni, Raju, Rana, & Sharma, 2024). Some studies, conducted by Amemasor et al. (2025), do in fact show how efficient TPD implementation, through collective learning platforms, physical digital training, and encouragement, can dramatically enhance teachers' attitudes, confidence, and abilities in the integration of digital technologies, validating and supporting the idea of continuous professional development. Further, professional developments in teaching, according to studies conducted by both Aulia, Burhanuddin, and Arifin (2025) and Li, Pei, and Zhao (2025), also confirm how, in effect, professional developments in teaching can work both in personal cognitive elements and in favorable external settings, therefore facilitating an effective combination between the two.

The participants in this study are also of the view that, in response to national policies, they understand the important application of digital technology integration in their future professional development. The professional mission of the participants continues to encourage them to work towards integrating digital technology in professional development, which helps them explore even better teaching practices and professional development. The important role of intrinsic motivation in teacher professional development has been addressed in past studies, which take place as it pertains to the cognitive ability, engagement, and understanding of the participants (Avalos, 2011; Han & Yin, 2016; Proudfoot & Boyd, 2024).

The participants also pointed out that, without suitable learning support during the integration of digital technology, the teachers' intrinsic motivation may decrease. This is justified by the statement from Chiu (2022) with the support of Ghavifekr and Rosdy (2015), who stated that the institutional factor may play an extremely important role in increasing the teachers' intrinsic motivation and their persistence in the integration of digital technology. Furthermore, they pointed out that peer support, or the system of peer review, could function as an extremely important factor that may enhance the teachers' participation in the integration of digital technology. Their statement is justified by the findings presented by Enberg, Steen, and Ellingsen (2023) and Proudfoot and Boyd (2024), whereby the intrinsic motivation surpasses the significance of the extrinsic factor, such as the reward system presented by peers and institutions. This may be due to the fact that peer support, together with the institutional manipulation, may arouse feelings of emotional pressure, whereby it may influence the teachers' intrinsic motivation, thus affecting the teachers' attitude and behavior during the integration of digital technology (Proudfoot & Boyd, 2024), with the support of Zhang, Admiraal, and Saab (2022).

7. CONCLUSION AND RECOMMENDATIONS

The findings from the study demonstrate that university lecturers have a positive attitude towards utilizing digital technology in their professional development. Therefore, based on these findings, the following recommendations are made to facilitate the effective application of digital technology.

In the first instance, teachers must be cognizant of the fact that technology integration is inevitable and may result from different imperatives and development requirements. Technological integration into teacher development regarding instructional expertise also involves mastery of technology for instructional purposes while reflecting on teaching pedagogical and subject-related bodies of knowledge.

Secondly, institutions need to provide sufficient human and material resources to address challenges related to digital tool availability and to build effective infrastructure for a steady, fast internet connection.

Thirdly, institutions of learning should organize workshops as well as online tutoring lessons focusing on the use of technology within classrooms. This would help create a learning platform where best practices through technology use could be openly shared among educators.

Finally, institutions can work toward developing training sessions and motivation structures tailored to teachers' needs and differences. This is a positive step that can help fulfill fundamental teachers' training requirements and enhance their commitment to projects involving digital technology integration.

8. STUDY LIMITATIONS AND FUTURE DIRECTIONS

Although the insights brought by this research are very significant regarding the Chinese university teachers' views on the issue of the integration of digital technology, several factors need to be recognized as research limitations. First, the research sample consists of only ten participants from public universities in the province of Jiangsu. Although it is a fact that research based on a small, information-rich sample can provide significant insights, the sample size and its geographically limited representation tend to limit its transferability to other settings. Second, the research tends to lack representation regarding the experiences of the Chinese higher education sector as a whole.

For future studies to address this constraint and provide answers to some unresolved concerns related to this study, it is essential to involve more teachers from diverse fields. Additionally, employing both qualitative and quantitative research methods, including survey studies or mixed methodology designs, would yield better insights. These factors would enhance the representativeness and applicability of the findings while utilizing the rich information collected through this research.

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