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PRE-SERVICE TEACHERS' READINESS FOR DIGITAL TECHNOLOGY INTEGRATION: THE CASE OF ECOLE NORMAL SUPERIEURE EL KATIBA ASSIA DJEBAR

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Abstract: In today's digital education landscape, effectively preparing pre-service teachers to integrate technology into their teaching practices is essential. This study investigated the preparedness of 146 final-year EFL pre-service teachers at the Teacher Training School of Constantine, Algeria, for integrating digital technologies into their pedagogical practices. Utilizing an explanatory sequential mixed-methods design, data were collected via a survey assessing pre-service teachers' self-reported digital literacy levels and knowledge of technology integration frameworks, achieving a 69% response rate (N=101). Subsequently, semi-structured interviews were conducted with a purposive sample of 8 student teachers to explore the quantitative findings in greater depth. While pre-service teachers demonstrated high self-reported digital literacy and positive attitudes towards technology integration, interviews results revealed a discrepancy between their perceived abilities and their practical application of technology in teaching. These findings highlight the need for teacher education programs to emphasize practical training in technology integration and to equip teacher educators with the skills and knowledge necessary to effectively model digital technology integration for pre-service teachers. Moreover, the study suggests that improving access to technological resources and providing targeted training on utilizing diverse technological tools are crucial steps in preparing pre-service teachers for the demands of 21st-century education.

Keywords: Digital Literacy; Preservice Teachers; Teacher Education; Technology Integration

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1. Introduction

The rapid progress of technology has made it essential to incorporate technological resources into language education. This integration, primarily referred to as Computer-Assisted Language Learning (CALL), dates back to the 1960s (Bax, 2003) and has earned significant attention from numerous pioneers in the field, such as Warschauer and Healey (1998). Since then, the discipline has expanded to encompass a broader range of technologies aimed at enhancing learning for contemporary learners, often referred to as digital natives (Prensky, 2001). In particular, incorporating technology in education plays a key role in fostering essential skills for the 21st century, which is an increasingly prominent area of interest among educators. This integration brings numerous advantages such as facilitating effective communication, promoting creativity and critical thinking, encouraging collaboration, and overcoming geographical limitations by offering access to authentic learning resources (Kessler, 2018; Keane et al., 2014; Shadiev & Wang, 2022).

Technology's role in education is grounded in a strong theoretical framework. Siemens' connectivism theory highlights learning through digital connections, integrating and enhancing concepts from other educational theories like behaviourism and cognitivism. Online learning systems exemplify this by monitoring student advancement and offering instant feedback, aligning with behaviourist principles of reinforcement and reward. (Ertmer & Newby, 2013). While numerous other theoretical connections exist, it is not feasible to cover all of them within the confines of this paper.

According to Mayer (2003), digital instruments can reinforce various principles of cognitivism. Specifically, technology can improve cognitive functions such as information processing and analytical reasoning by assisting in meaningful learning through visual representations of intricate ideas. Moreover, Mayer (2003) further asserts that interactive multimedia materials offered by digital tools can involve learners in problem-solving tasks, fostering a deeper comprehension.

An expanding range of studies has investigated the incorporation of technology in English language teaching. Literature reviews examining this integration have revealed a favorable perspective towards it. A recurring theme is that technology integration enhances both learning and teaching processes, contingent upon meeting a set of conditions such as access to quality technology and continuous professional development (Ahmed, 2018; Gilakjani, 2017; Kawinkoonlasate, 2019). However, despite these benefits, one cannot overlook the challenges of integrating technology into education. According to Ertmer (2005), one such challenge is teachers' pedagogical beliefs. he continues to explain that teaching practices make tacit teachers' beliefs explicit. These beliefs, generally false when it comes to technology in education, may influence how teachers perceive the role of technology in the classroom and shape their willingness to incorporate it into their teaching methods. In some cases, technology is seen as just an additional tool to capture the learner's attention. One explanation for these challenges is the low level of digital literacy among educators (Ertmer & Ottenbreit-Leftwich, 2010), coupled with the insufficient training provided in technology integration during teacher education programs.

Therefore, to effectively harness today's technological tools, educators are required to have a broader range of competencies beyond subject matter expertise and pedagogical knowledge. One essential skill is digital literacy, coined by Gilster (1995) as the ability to proficiently navigate and utilize digital resources. This foundational competence enables teachers to teach effectively in a manner that aligns with the digital natives.

The growing use of digital technologies and the emergence of learners who are comfortable with digital tools have emphasized the constraints of conventional teaching

approaches. Notably, one significant challenge lies in effectively meeting the diverse needs of these learners. Therefore, it is imperative to develop innovative strategies to address these challenges and engage digital natives effectively. Furthermore, language instruction and learning in the 21st century go beyond simply acquiring language abilities; they also involve promoting creativity, critical thinking, collaboration, and digital literacy. It is clear that knowing how to incorporate technology, the level of integration involved, and how well it aligns with learning goals are important elements of educational transformation. Therefore, the following research queries arise:

1. What are the current levels of digital literacy among EFL pre-service teachers?
2. How effectively do pre-service teachers understand and implement technology integration frameworks (e.g., TPACK) in their teaching practices?
3. What are their perceptions and attitudes toward technology in language education?
4. What are the difficulties that face pre-service teachers when trying to incorporate digital technologies into their teaching practices?

In order to address these research inquiries efficiently, it is crucial to explore the notion of digital literacy and comprehend various categories of digital integration frameworks.

2. Literature Review

2.1 The Multifaceted Nature of Digital Literacy

Educators who effectively integrate digital technologies with teaching methods require a strong command of digital skills. However, the difficulty lies in defining these abilities as studies indicate that digital literacy is a complex and multi-dimensional concept (Biezā, 2020). Ferrari (2012) aptly describes the complexity of digital competence, calling it a "jargon jungle" due to its varying interpretations across policy documents, academic literature, and educational practices (p. 11). This ambiguity persists within the teaching and learning context. The literature often lacks clear definitions for the digital competencies expected of future educators, and there is uncertainty surrounding how to measure this crucial skill (Gu & Ding, 2022; Tomczyk et al., 2022). This suggests a need for a more unified understanding of what constitutes digital competence among teachers, as well as effective methods for evaluating it.

Yet, despite the discrepancies in conceptualizing digital literacy, some common themes emerge across these definitions. One common element of digital literacy is the ability to find, evaluate, create, and communicate digital content (ALA's Digital Literacy Task Force, as cited in American Library Association, 2017; European Commission, 2018). This includes using technology and digital media to access information, assess its credibility, create new content, and share it with others.

As previously explored, critical thinking and problem-solving skills are nurtured through the appropriate use of technology in educational settings. They are also skills that constitute digital literacy (Eshet-Alkalai, 2012). These skills, in turn, enable individuals to analyse and interpret digital information, identify potential biases or misinformation, and make informed decisions about how to use technology and digital media.

Many definitions of digital literacy emphasize the importance of ethical and responsible behaviour in the digital world (Gilster, 1997). This includes respecting intellectual property rights, protecting personal data, and using technology in a way that is respectful of others.

When it comes to teachers, the definition of digital literacy can be even more debatable. Some researchers argue that teachers need a specialized form of digital literacy that includes

not only the general skills mentioned above but also the ability to use technology effectively for teaching and learning (Crompton,2017).

Voogt et al. (2013) underscored the importance of equipping teachers with the necessary knowledge and competencies to effectively utilize technology in educational contexts. Central to this endeavour is ensuring that educators grasp the pedagogical principles that underpin the integration of technology (Ertmer, 2005). By aligning digital technologies with sound pedagogical practices, educators can draw upon a range of established models that serve as invaluable guides. These frameworks provide educators with the necessary navigation tools for effectively integrating technology and pedagogy, thereby promoting more accurate and effective instructional practices.

2.2 Frameworks of Technology Integration in Education

Effectively integrating technology into the classroom requires a thoughtful approach. Several frameworks have been developed to guide educators in this process, each offering a unique lens for analysing how technology can impact teaching and learning. This section will explore four prominent frameworks: The Replacement, Amplification, Transformation (RAT) model, the Substitution, Augmentation, Modification, Redefinition (SAMR) model, the Technological Pedagogical Content Knowledge (TPACK) framework, and Bloom's Digital Taxonomy.

Introduced by Hughes in 2000, the RAT model examines how technology impacts teaching at three different levels. At the first level, Replacement, technology is utilized as a substitute for traditional methods without fundamentally changing the way information is taught. Amplification, the second level, utilizes technology to enhance existing teaching practices. Finally, transformation, the most advanced level, leverages technology to facilitate entirely new and creative approaches to teaching and learning. This taxonomy provides a framework for understanding how teachers use technology in the English language classroom.

Puente Duran's Substitution, Augmentation, Modification, Redefinition (SAMR) framework (2003) builds upon the RAT model's foundation by offering a more granular analysis of technology integration in education. Unlike the RAT model, SAMR progresses through a hierarchy with distinct levels: Substitution (replacing tools), Augmentation (enhancing tasks), Modification (redesigning tasks for deeper learning), and Redefinition (enabling entirely new tasks). This framework's strength lies in its clear structure, guiding educators towards more transformative uses of technology, and its emphasis on modification and redefinition encourages innovative learning experiences.

Mishra and Koehler (2006) introduced the Technological Pedagogical Content Knowledge (TPACK) framework to highlight the multifaceted knowledge necessary for educators to effectively leverage technology in their teaching practices. TPACK posits three core domains: Technological Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK). TK refers to the understanding and capabilities of various educational technologies. PK encompasses knowledge of teaching and learning theories and methodologies. Finally, CK represents a deep understanding of the subject matter being taught. According to the TPACK framework, effective technology integration hinges on educators possessing a strong foundation in all three domains and the ability to integrate them. This framework sheds light on the importance of TPACK in preparing teachers for the evolving demands of the modern educational landscape.

Another framework, Bloom's Digital Taxonomy, was introduced by Churches in 2008. Based on the traditional stages in Bloom’s taxonomy, this framework acknowledges the

substantial impact of digital media in contemporary education and guides teachers to create learning experiences that cultivate higher-order thinking skills in a digital environment.

Indeed, technology integration is not an easy task. Therefore technology integration models serve as a guide to stakeholders in education to integrate and understanding the related challenges (Kimmons et al., 2020).Even so, there are several flaws with every module, including a lack of clarity, a disproportionate emphasis on technology, and a neglect of student-centred learning. Kimmons et al. (2020) suggested the PIC-RAT (Passive, Interactive, Creative-Replacement, Amplification, Transformation) model as an enhanced strategy in an effort to address these shortcomings. With a strong emphasis on students as the primary focus of the first half of the model and the second half on the function of integrated technology in learning, the PICRAT model provides a coherent and cohesive framework that highlights technology as a means to an end.

Having laid this foundation by discussing the different approaches to technology integration, the following section focuses on the specific issue of pre-service teacher preparedness and training in educational technology.

3. Methodology

This research employs a mixed methods design, specifically an explanatory sequential design. In this approach, quantitative data collection and analysis occur first, followed by qualitative data collection and analysis (Creswell, 2018). The purpose is to use qualitative insights to explain and interpret the quantitative findings in greater depth, ultimately providing a comprehensive understanding of pre-service teachers' readiness for digital technology integration. This is achieved by assessing their digital literacy level, knowledge of technology integration frameworks and through interviews.

3.1 Context

In the 21st-century educational landscape, the integration of digital technology is no longer a luxury but a necessity for effective teaching and learning. Pre-service teachers, as future educators, must be adequately prepared to navigate this digital shift and confidently incorporate technology into their pedagogical practices. While various initiatives and frameworks emphasize the importance of digital literacy for teachers, there remains a need to comprehensively understand how pre-service teachers perceive their own readiness for technology integration after gaining real-world teaching experience.

This study addresses this need by focusing on pre-service teachers at the Teacher Training School of Constantine, Algeria, during the 2023/2024 academic year. They have completed their full-time training and gained practical experience in real classroom settings. By examining this specific group, the research aims to provide insights into the perceived digital literacy levels and knowledge of technology integration frameworks among pre-service teachers who have had the opportunity to apply and reflect on their skills in authentic teaching environments.

3.2 Participants and Sampling

This study employed a convenience sampling method to recruit participants from a population of 146 EFL pre-service teachers enrolled in the Teacher Training School of Constantine, Algeria. Initially, all 146 pre-service teachers were invited to participate in the study through two diffusion emails: one specifically addressed to pre-service teachers pursuing careers in middle schools and another tailored for those intending to teach at the secondary school level. Of the 146 pre-service teachers, 101 completed the initial questionnaire.

Convenience sampling, while not yielding a perfectly representative sample, is a common and often necessary approach in educational research, particularly when access is limited to a specific group or population (Emerson, 2021). This method is especially valuable for exploratory research or when the primary objective is to gather targeted information from a readily available group. In this case, the study aimed to gather insights from pre-service teachers regarding their perceived readiness and knowledge related to technology integration.

Following the analysis of the quantitative data from the initial phase, a subset of 8 pre-service teachers demonstrating high levels of digital literacy was purposefully selected for in-depth interviews. The semi-structured interview, conducted online, allowed participants to elaborate on their experiences and perceptions regarding technology integration. This selection strategy was particularly relevant given that several participants, despite reporting high digital literacy and moderate knowledge of technology integration frameworks, indicated in open-ended survey questions that they did not integrate technology during their teaching practice.

3.3 Procedures

This study employed a mixed-methods sequential explanatory design, which involved two distinct phases: an initial quantitative data collection followed by a qualitative phase to further explore and contextualize the initial findings.

3.3.1 Quantitative phase

In the quantitative Phase, a Likert Scale Questionnaire was used to quantitatively measure pre-service teachers' self-perceived digital competencies and knowledge related to technology integration frameworks. To assess pre-service teachers' digital literacy, this study leveraged a validated instrument developed by Tondeur et al.(Developing a validated instrument to measure preservice teachers' ICT competencies: Meeting the demands of the 21st century, 2015). This instrument was initially designed to measure pre-service teachers' Information and Communication Technology competencies based on established frameworks. However, to better align with the current study's objectives and reflect the evolving technological landscape, the term "ICT competencies" was replaced with "digital technology competencies." This adaptation ensures that the instrument remains relevant and applicable to contemporary understandings of digital literacy. A section on participants' familiarity and understanding of technology integration frameworks was included.

For data analysis, descriptive statistics (mean, standard deviation) were used to determine the central tendency and variability of the pre-service teachers' self-assessed digital literacy and knowledge of technology integration frameworks.

3.3.2 Qualitative phase

In the subsequent phase, qualitative, a subset of 8 pre-service teachers demonstrating high levels of digital literacy was purposefully selected for semi-structured interviews based on the quantitative findings. This selection was particularly relevant given the emergence of a key finding: several participants, despite reporting high digital literacy, indicated in an open-ended question item that they did not integrate technology during their teaching practice. This apparent paradox, possessing the skills but not applying them, suggested the presence of other hindering factors. Therefore, focusing on highly digitally literate participants allowed for a deeper exploration into what might prevent these seemingly "ready" individuals from fully embracing technology integration within their teaching.

After interviewing preservice teachers online via google meet, recordings were transcribed and analysed to extract recurring themes manually.

Below is a figure illustrating the explanatory sequential mixed methods design employed in this study. The quantitative phase, using a Likert scale questionnaire, provided initial insights into pre-service teachers' digital literacy. These findings informed the selection of participants for the qualitative phase, which involved semi-structured interviews and thematic analysis to explore factors hindering technology integration

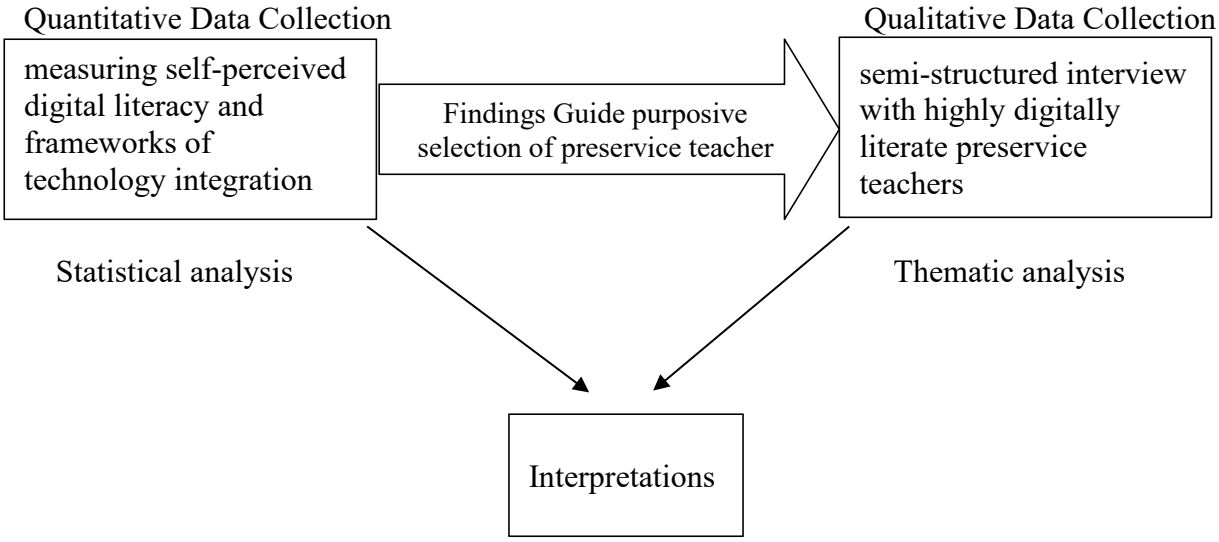

Figure 1:

Visual Representation of the Explanatory Sequential Design

Note. Adapted from Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (5th ed.), by J. W. Creswell & J. D. Creswell, 2018, SAGE Publications. Copyright 2018 by SAGE Publications.

4. Results

4.1 Pre-service Teachers' Profile

The demographic characteristics of the 101 EFL pre-service teachers who participated in the initial questionnaire are as follows:

Table 1.

Preservice teachers' profile

		%
Gender	Male	5
	Female	96
Age range	18-24	101
	25-34	0
ICT or Digital literacy completion course		
	Yes	88
	No	13
Technology integration professional development/ training	Yes	1
	No	100

The sample predominantly consisted of female pre-service teachers. Furthermore, all participants fell within the 18-24 age bracket, indicating a homogenous age group. In terms of their prior training, a large majority of the pre-service teachers reported having completed an ICT or digital literacy course. However, almost all participants indicated that they had not received any formal professional development or training specifically focused on technology integration.

4.2 Pre-Service Teachers' Familiarity with Technology Integration Frameworks

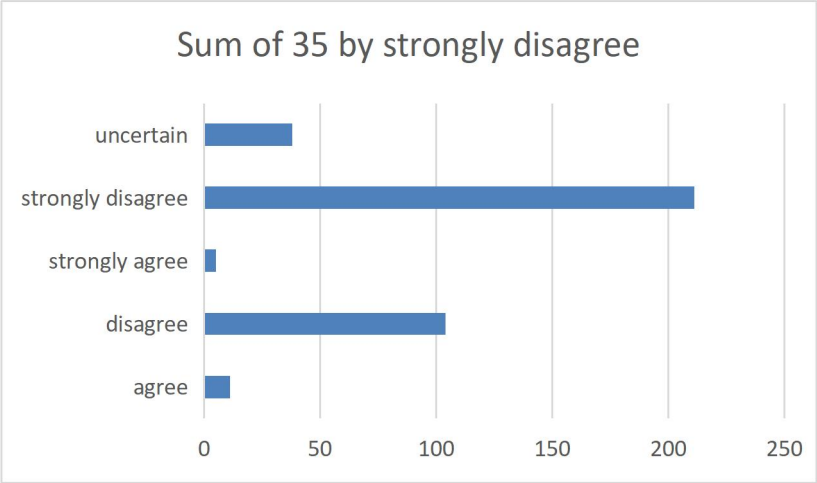

Figure 2:

Participants' Self-Reported Familiarity with Technology Integration Frameworks

As visualized, the significant portion of respondents indicated a lack of familiarity with these frameworks. Most responses to questions like (I know what RAT is) fall in the category of strongly disagree to disagree.

4.3 Self-Assessment of Digital Literacy Skills

Table 2.

Self-Assessment of Digital Literacy Skills

	strongly disagree		*disagree*		*uncertain*		*agree*		*strongly agree*	
	F	*%*	*F*	*%*	*F*	*%*	*F*	*%*	*F*	*%*
Item 1	4	4,0%	14	13,9%	15	14,9%	40	39,6%	28	27,7%
Item 2	7	6,9%	9	8,9%	31	30,7%	36	35,6%	18	17,8%
Item 3	6	5,9%	9	8,9%	22	21,8%	28	27,7%	36	35,6%
Item 4	4	4,0%	13	12,9%	23	22,8%	34	33,7%	27	26,7%
Item 5	0	0,0%	13	12,9%	19	18,8%	40	39,6%	29	28,7%
Item 6	4	4,0%	17	16,8%	11	10,9%	29	28,7%	40	39,6%
Item 7	0	0,0%	9	8,9%	29	28,7%	28	27,7%	35	34,7%
Item 8	3	3,0%	7	6,9%	23	22,8%	38	37,6%	30	29,7%
Item 9	0	0,0%	10	9,9%	29	28,7%	37	36,6%	25	24,8%
Item 10	0	0,0%	18	17,8%	16	15,8%	32	31,7%	34	33,7%
Item 11	1	1,0%	11	10,9%	18	17,8%	50	49,5%	21	20,8%
Item 12	3	3,0%	9	8,9%	16	15,8%	45	44,6%	28	27,7%
Item 13	10	9,9%	29	28,7%	24	23,8%	23	22,8%	15	14,9%
Item 14	4	4,0%	15	14,9%	24	23,8%	35	34,7%	23	22,8%
Item 15	0	0,0%	20	19,8%	15	14,9%	37	36,6%	29	28,7%
Item 16	0	0,0%	6	5,9%	27	26,7%	37	36,6%	31	30,7%
Item 17	5	5,0%	18	17,8%	9	8,9%	38	37,6%	31	30,7%
Item 18	0	0,0%	19	18,8%	18	17,8%	36	35,6%	28	27,7%
Item 19	1	1,0%	6	5,9%	34	33,7%	49	48,5%	11	10,9%

Pre-service teachers' self-assessed digital literacy skills were measured using a 19-item questionnaire adapted from Tondeur et al.,2015 (see Appendix for the full instrument). The questionnaire assesses two categories of digital competencies: those related to supporting pupils in the use of digital technologies (11 items) and those related to supporting instruction (8 items). Pre-service teachers reported a relatively high level of competence in supporting pupils' use of digital technologies (M = 3.81). They expressed slightly lower confidence, though still moderately high, in their competencies related to supporting instruction through technology (M = 3.65).

98% of pre-service teachers reported not using technology during their teaching practicum in a quantitative survey question. However, responses to an open-ended question about facing challenges related to technology integration yielded a mix of "yes" and "no" answers. This discrepancy prompted the second, qualitative phase of the study. To gain deeper insights, we conducted interviews with pre-service teachers who had self-reported

good levels of knowledge and understanding of technology integration. The goal was to unpack the nuanced realities behind their experiences and perspectives

4.4 Pre-Service Teachers' Perspectives on Technology Integration: Emerging Themes

Qualitative data from the interviews revealed a common theme: inadequate targeted preparation for technology integration in their teacher education programs and weak infrastructure in Algerian Public school. Furthermore, data revealed a concerning disconnect between perceived digital literacy and actual preparedness for technology integration in the classroom. While some participants described positive experiences, such as one who noted their training "included an interesting module called TICE (technologie de l'information et de la communication dans l'eneignement)" the majority expressed feeling ill-equipped to effectively integrate technology into their teaching practice.

Table 3.

Key themes with insights from pre-service teachers

	Themes	*Insights from pre-service teacher*
1.	Limited Practical Experience	Preservice teachers highlighted a lack of practical, hands-on experience with integrating technology into their teaching. Theoretical knowledge without practical application was a recurring concern. *"If you meant the practical training (7 weeks) I developed a basic understanding of how to integrate tech into my teaching (this included a small exposure to some tools and platforms); However, It was very limited and theoretical"* They noted that their training teachers rarely or never used technology in their own teaching, creating a disconnect between theory and practice. *"Fairly speaking, my teacher training doesn't integrate technology in her teaching, so she didn't prepare us for it" and "She never uses technology"*
2.	Lack of Specific Training Content	Preservice teachers desired more specific training on selecting, adapting, and implementing various technological tools and platforms to support diverse learners and teaching goals
3.	Limited Access to Resources and weak technological infrastructure.	Preservice teachers shed light on limited access to technology resources (e.g., equipment, software) during their training as a barrier to developing their technology integration skills. *"the school wasn't equipped, and the training teacher did not allow me, he assumed it is a waste of time and energy*

5. Discussion

This study explored the perceived preparedness of pre-service English as a Foreign Language teachers for technology integration, uncovering a critical gap between digital literacy and practical application. While the quantitative data indicated a high level of self-reported digital literacy among participants, qualitative findings revealed significant concerns regarding their actual readiness to effectively integrate technology into their future teaching practices.

The findings resonate with existing literature highlighting the limitations of solely focusing on technical skills in technology integration training (Archambault & Barnett, 2010). Despite reporting prior ICT and digital literacy training, participants in this study expressed a lack of confidence in their ability to meaningfully incorporate technology into their teaching. This gap highlights the importance of moving beyond basic digital literacy towards fostering technological pedagogical content knowledge, a framework that emphasizes the interplay of technology, pedagogy, and content knowledge (Ginting & Linarsih, 2022).

The qualitative data further illuminated the need for teacher education programs to bridge the gap between theory and practice. Participants' emphasis on the lack of practical, hands-on experience aligns with research advocating for experiential learning opportunities in technology integration training (Ali et al., 2023; Christensen & Trevisan, 2023; Lee, 2023; Soepriyanti et al., 2022). Simulations, micro-teaching, and collaborative projects, for instance, can provide pre-service teachers with authentic contexts to develop their skills and confidence in using technology effectively. (Kopcha, 2012)

Furthermore, the inconsistencies observed in technology use by training teachers present a significant challenge. This finding aligns with previous research highlighting the critical role of teacher educators in modeling effective technology integration (Duan et al., 2022). Teacher education programs must prioritize professional development opportunities for training teachers, equipping them with the necessary skills and motivation to confidently integrate technology into their own practice and serve as effective role models for pre-service teachers.

Recent research by Pop and Marc (2025) further reinforces this perspective, demonstrating that pre-service teachers benefit from exposure to AI-powered tools such as Padlet and TalkPalAI, which support personalized feedback, collaborative planning, and resource curation. However, their findings also caution that overreliance on such technologies may risk diminishing interpersonal interaction and critical pedagogical reflection. This duality mirrors the concerns expressed by participants in the current study, who, despite digital fluency, often struggled to implement technology meaningfully in real classroom contexts.

Addressing the limited access to technology resources reported by some participants is crucial. While not extensively explored in this study, this finding points to a potential area for further investigation. Future research could delve deeper into the specific resource constraints faced by pre-service teachers and explore strategies for ensuring equitable access to technology within teacher education programs.

6. Pedagogical Implications

The findings from this study suggest several important pedagogical implications for teacher education programs, particularly in the context of Algeria, where access to technology remains inconsistent.

First, teacher education programs should place greater emphasis on developing pre-service teachers' technological pedagogical content knowledge (TPACK). This approach not

only enhances their digital skills but also equips them with the ability to integrate these skills effectively within pedagogical settings. It is crucial to move beyond basic technical training and focus on the meaningful incorporation of technology into teaching practices.

In light of the gap between theory and practice identified in this study, it is recommended that teacher education programs incorporate more experiential learning opportunities. Activities such as simulations, micro-teaching sessions, and collaborative projects would provide pre-service teachers with authentic teaching experiences, fostering their confidence and competence in using technology in the classroom.

Furthermore, teacher educators must serve as role models for pre-service teachers by integrating technology into their own teaching practices. This can be achieved through targeted professional development opportunities that ensure teacher educators are not only proficient in using technology but are also able to demonstrate effective integration strategies within the classroom.

Additionally, it would be beneficial for teacher education programs to revise curricula to include a stronger focus on how technology can enhance teaching and learning. By better preparing future teachers to use digital tools effectively, these programs can contribute to the overall improvement of teaching quality in the region.

7. Conclusion and limitations

This study has illuminated a critical challenge within pre-service EFL teacher education: bridging the gap between digital literacy and practical, pedagogically sound technology integration. The findings, echoing recent research on the topic, highlight an urgent need for a paradigm shift in how we prepare future educators for the realities of a digitally driven world with digital native learners. Equipping pre-service teachers with basic digital literacy is no longer sufficient. Teacher education programs in Algeria have to undergo a reform to critically examine their approach to technology integration. By embracing a more holistic and experience-driven approach, we can empower future educators to confidently and effectively leverage technology, not merely as a supplementary tool, but as a powerful catalyst for transforming learning and preparing students for the challenges and opportunities of the 21st century.

This study acknowledges several limitations. First, while the mixed-methods design allowed for a deeper exploration of the issue, the reliance on self-reported data, particularly in assessing pre-service teachers' digital literacy and confidence levels, introduces the possibility of bias. Participants may have overestimated their abilities or felt pressured to respond positively. Future research could incorporate more objective measures of technology integration skills, such as through performance-based tasks or analysis of lesson plans incorporating technology. Second, focusing on pre-service English as a Foreign Language teachers in a one specific geographic location (Constantine) limits the generalizability of findings. Different teacher education programs and contextual factors can significantly influence pre-service teachers' experiences and preparedness for technology integration. Future research expanding the sample to include pre-service teachers from diverse geographical locations, subject areas, and program types would provide a more comprehensive understanding of this critical issue.

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Appendix(ces)

Appendix I

Self-Assessment of Digital Literacy Skills:

Items	SD	D	N	A	AS
I am able to motivate pupils to use digital technology in a positive way.					
I am able to stimulate pupils to use digital technology in a critical manner.					
I am able to provide pupils with activities to exercise knowledge/skills by means of digital technology.					
I am able to provide pupils with activities on subject matters to learn with digital technology.					
I am able to offer pupils opportunities to express ideas in a creative way by means of digital technology.					
I am able to support pupils in searching information by means of digital technology.					
I am able to support pupils in processing and managing information by means of digital technology.					
I am able to support pupils to present information by means of digital technology.					
I am able to support pupils to communicate with digital technology in a safe, responsible, and effective manner.					
I am able to support pupils to work together with digital technology.					

I am able to educate pupils to use digital technology in a conscious way (giving proper credit to the creators of digital content, intellectual property, etc.).					
I am able to choose the best digital tools for a particular classroom or learning situation.					
I am able to (re)design digital tools like applications for a particular classroom or learning situation.					
I am able to use digital technology to differentiate learning and instruction.					
I am able to track the learning progress of pupils in a digital way.					
I am able to evaluate pupils with the help of digital technology.					
I am able to use digital technology appropriately to communicate with pupils.					
I am able to design a learning environment with the available infrastructure.					
I am able to select digital tools or applications selectively in creating a learning environment (e.g., in view of the group size).					

Appendix II

Interview questions:

- Can you describe any specific training or modules related to technology integration that were included in your teacher education program? How effective do you feel these were in preparing you for classroom practice?
- In your practical training experiences, to what extent were you encouraged or supported in using technological tools?
- What challenges did you encounter when trying to integrate technology into your teaching practice during your training?
- Reflecting on your teacher training, what additional support or resources do you think would have better prepared you to use technology effectively in your teaching?
- How important do you believe the integration of technology is in contemporary teaching practices?