Volume 1 Issue 2 Year 2025 Pages 75-93
e–ISSN 3090-6245 | DOI: 10.70152
https://journal.akademimerdeka.com/ojs/index.php/matcha/index

Digital Literacy among EFL Teachers: Navigating Technological Demands in 21st-Century Classrooms

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DOI: https://doi.org/10.70152/matcha.v1i2.202

Abstract: This study investigates the digital literacy of English as a Foreign Language (EFL) teachers and the challenges and support systems they encounter in integrating technology into 21st-century classrooms. Drawing on qualitative data from semi-structured interviews and classroom observations with seven EFL teachers, the research explores the multidimensional nature of teachers' digital literacy, the systemic and emotional obstacles they face, and the informal strategies they adopt to cope. The findings reveal that digital literacy among EFL teachers extends beyond technical skill to include pedagogical adaptability and critical awareness. However, limitations such as infrastructural instability, lack of institutional guidance, and emotional resistance often hinder full digital engagement. Despite these challenges, teachers demonstrate agency by forming peer support networks, engaging in self-directed learning, and drawing encouragement from student feedback. These informal mechanisms, while valuable, highlight the absence of coordinated institutional support. The study concludes that sustainable digital integration in EFL contexts requires a holistic approach that combines technological access, emotional support, and professional learning communities. By reframing digital literacy as a dynamic and context-sensitive practice, the study contributes to ongoing dialogues around teacher agency, equity, and innovation in language education.

Keywords: Digital Literacy, EFL Teachers, Pedagogical Innovation, Teacher Agency, Technology Integration

INTRODUCTION

The 21st century has ushered in an era of rapid digital transformation, profoundly influencing education systems worldwide. Within this shifting landscape, English as a Foreign Language (EFL) teaching has increasingly incorporated digital tools and platforms to enhance instructional delivery, learner engagement, and language acquisition (Williyan, Ilyas, et al., 2025). As a result, digital literacy has become a core competency for language educators, shaping how they plan, teach, and assess in technology-enhanced environments (Cao et al., 2023). No longer limited to basic computer skills, digital

literacy in education encompasses a broad set of abilities, including evaluating online content, selecting pedagogically appropriate tools, and adapting to emerging technologies to support student learning (Wei, 2023). For EFL teachers, these competencies are particularly crucial, as they navigate multilingual, multicultural classrooms often mediated by digital communication.

Research suggests that digitally literate teachers are more confident and creative in using educational technologies, leading to more dynamic and personalized learning experiences (Getenet et al., 2024; Temirkhanova et al., 2024). However, global disparities in infrastructure, training, and institutional readiness mean that many EFL educators, especially in developing contexts, continue to face substantial barriers in adopting technology effectively. In many cases, limited access to digital resources, insufficient professional development opportunities, and a lack of ongoing support contribute to fragmented or superficial technology integration (Masoumi & Noroozi, 2023). These challenges raise important questions about how well-prepared EFL teachers are to meet the technological demands of modern classrooms and what kinds of systemic support are necessary to enable meaningful digital transformation in language education.

Despite the increased attention given to digital tools in ELT, much of the current research focuses on student engagement and learning outcomes (Ariani et al., 2024; Cao et al., 2023; Simelane-Mnisi, 2023), often overlooking the specific experiences and competencies of teachers themselves. There remains a pressing need to understand not only what digital literacy looks like among EFL teachers, but also how it is enacted in diverse educational settings, and what obstacles hinder or enable its development. Such insights are crucial, as teacher readiness is a determining factor in the success of technology-enhanced instruction (Pathiranage & Karunaratne, 2023). Moreover, examining both competencies and constraints provides a more holistic understanding of digital integration in ELT.

This study adopts a multidimensional perspective on digital literacy, viewing it as more than just a technical skillset but a complex interplay of knowledge, practices, and contextual factors. Following Alkalai (2004), this study conceptualizes digital literacy as comprising three interrelated dimensions: technical, cognitive, and socio-emotional. In particular, the study is framed by the assumption that digital literacy must be both functional and pedagogically intentional to support effective teaching. As such, the research not only maps the current levels and dimensions of digital literacy among EFL teachers but also explores the institutional and socio-cultural conditions that shape their digital practices. Accordingly, this study seeks to investigate the following research questions:

1. What levels and dimensions of digital literacy, including technical, cognitive, and socio-emotional, do EFL teachers demonstrate in integrating technology into their teaching practices?
2. What challenges and support systems do EFL teachers encounter when navigating the technological demands of 21st-century classrooms?

By addressing these questions, the study aims to contribute to the growing discourse on teacher preparedness in digitally mediated language education. It offers empirical insights

for teacher education programs, institutional decision-makers, and policy developers seeking to promote more equitable and sustainable digital integration in EFL teaching. Ultimately, the findings are intended to inform strategies for empowering educators as digitally competent agents of change in an increasingly interconnected world.

LITERATURE REVIEW

Conceptualizing Digital Literacy in Education

Digital literacy has evolved from a narrow focus on basic technological skills to a broader, more dynamic construct encompassing a range of cognitive, technical, and socio-cultural competencies. Weninger (2023) defined digital literacy as the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers. The concept has expanded significantly. Erdat et al. (2023) proposed a three-dimensional model of digital literacy comprising technical, cognitive, and socio-emotional domains, highlighting that effective digital users must not only operate tools but also critically evaluate content and navigate online interactions responsibly.

In the context of education, digital literacy involves the ability to integrate digital tools in ways that support teaching and learning goals. For language teachers, this includes selecting appropriate platforms for communication, curating digital resources, designing interactive tasks, and managing digital assessment (Meniado, 2023; Williyan & Sirniawati, 2020). Moreover, digitally literate educators are expected to maintain ethical standards, ensure online safety, and foster digital citizenship among learners (Mirra et al., 2022). This evolving definition necessitates continuous professional development to ensure teachers' competencies align with pedagogical and technological advances.

Digital Literacy in EFL Teaching

The integration of digital technologies in EFL instruction has gained momentum over the past two decades, driven by the increased availability of digital tools and the global shift toward learner-centered, communicative pedagogy. Research indicates that when effectively implemented, digital technologies can enhance vocabulary acquisition, grammar practice, reading comprehension, and collaborative writing (El-Esery, 2023; Rasti-Behbahani, 2021). Tools such as online discussion forums, learning management systems (LMS), mobile apps, and AI-powered writing aids have enabled more flexible, multimodal, and interactive learning environments.

However, successful integration depends significantly on teachers' digital literacy. Guillén-Gámez et al. (2022), Kassymova et al. (2023), Muslimin et al. (2023), and Williyan et al. (2025) found that EFL teachers with higher levels of digital competence were more confident in using ICT tools and demonstrated more diverse and student-centered teaching strategies. In contrast, teachers with limited digital skills often defaulted to traditional, teacher-fronted methods, using technology only for administrative or presentation purposes. The Technological Pedagogical Content Knowledge (TPACK) framework provides a useful lens here, illustrating that effective digital teaching requires the interplay of technological, pedagogical, and content knowledge (Demeshkant et al., 2022; Saubern et al., 2020; Su, 2023). For EFL teachers,

this means understanding both how technology works and how it can meaningfully enhance language learning.

Barriers to Digital Integration in EFL Classrooms

Despite widespread enthusiasm for digital innovation, research consistently identifies a range of barriers that hinder the development of digital literacy among EFL educators. These include external factors, such as limited access to reliable internet, outdated equipment, and insufficient institutional support, as well as internal challenges like low digital self-efficacy, lack of training, and resistance to change (Soekamto et al., 2022; Wohlfart & Wagner, 2023). In many low- and middle-income countries, such issues are exacerbated by systemic constraints in education policy and infrastructure.

The COVID-19 pandemic served as a critical turning point that accelerated the adoption of digital technologies in education. While it initially highlighted both the potential and limitations of teachers' digital preparedness, the post-pandemic period continues to reveal enduring challenges in sustaining and deepening digital integration. Recent studies emphasize that, beyond emergency remote teaching, teachers now face evolving demands such as managing hybrid learning models, integrating AI-assisted tools, and maintaining learner engagement in increasingly digitalized environments (Bolliger & Halupa, 2022; Li, 2022; Reynolds et al., 2022). These ongoing developments underscore the need for long-term, context-sensitive investment in capacity-building that addresses not only technical competence but also pedagogical adaptability, equity, and emotional resilience.

Toward Sustainable Digital Literacy Development

Building sustainable digital literacy among EFL teachers requires a holistic approach that integrates pre-service and in-service training, ongoing mentoring, and policy alignment. Research emphasizes the role of professional learning communities (PLCs), peer collaboration, and reflective practice in helping teachers become confident digital practitioners (Carmi et al., 2025). Furthermore, context-sensitive frameworks are essential; what constitutes digital literacy in one region or school may differ considerably in another due to cultural, technological, and institutional variations (Reddy et al., 2022; Zilka & Cohen, 2022). In addition, teacher agency plays a vital role in how digital literacy is enacted. Reinius et al. (2022) argued that teacher agency is shaped by structural conditions, professional capacity, and individual beliefs. In the case of digital integration, this means that even well-designed tools and training may not result in meaningful change unless teachers have the autonomy, confidence, and support to experiment with and adapt technologies to their specific classroom needs.

Research Gap

While a growing body of research addresses digital tools and student outcomes in EFL contexts, fewer studies explore the digital literacy of EFL teachers themselves, particularly from an integrated perspective that considers competencies, challenges, and institutional support systems. Existing studies often focus on either technical skillsets or infrastructure gaps, overlooking the complex interplay of personal, pedagogical, and systemic factors that shape digital practices. Therefore, this study aims to fill this gap by offering a nuanced understanding of how EFL teachers demonstrate digital literacy and how they navigate the practical demands of 21st-century language classrooms.

METHODS

Research Design

This study adopted a qualitative descriptive research design to explore the digital literacy practices of EFL teachers and the challenges they face in integrating technology into their classrooms. A qualitative approach was chosen due to its suitability for capturing participants' lived experiences, contextual realities, and nuanced perspectives (Dawson, 2007). Rather than testing hypotheses or measuring variables, the study aimed to describe and interpret the complex interplay between teachers' digital competencies and their teaching environments.

Participants

The participants consisted of eight EFL teachers from secondary and tertiary education levels in Indonesia, selected through purposive sampling. Criteria for inclusion were: (1) having a minimum of three years of teaching experience in an EFL context, (2) actively using digital tools in instructional activities, and (3) willingness to participate in interviews and classroom observations. The sample aimed to include teachers from both urban and semi-urban institutions to reflect diverse technological access and teaching conditions. Pseudonyms were used to ensure confidentiality.

Data Collection Methods

Data were collected using two primary methods. First, each teacher participated in a one-on-one interview lasting 45–60 minutes. The interview protocol included open-ended questions addressing teachers' understanding of digital literacy, the types of tools they use, their integration strategies, and the challenges and supports they encounter. Follow-up questions were used to probe deeper into their experiences and beliefs. Second, for triangulation and to capture actual digital practices, classroom observations were conducted for each participant over two teaching sessions. An observation checklist, adapted from TPACK-based digital integration indicators (Guggemos & Seufert, 2021), was used to document the presence, purpose, and pedagogical relevance of digital tool use. Field notes and reflective memos were also written after each data collection session to aid in contextual interpretation and emerging theme development.

Data Analysis

The collected data were analyzed using thematic analysis, following Braun and Clarke's (2006) six-step framework: (1) familiarization with data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. All interviews were transcribed verbatim, and classroom observation notes were coded alongside interview transcripts. Coding was both inductive (emerging from the data) and deductive (informed by digital literacy frameworks such as Alkalai's (2004) model and the TPACK framework). Themes were developed to capture common patterns across the data while accounting for variations in institutional context and teacher experience. Peer debriefing and member checking were employed to enhance credibility and trustworthiness.

In operationalizing these frameworks, the analysis began with a set of deductive codes derived from Alkalai's (2004) three dimensions of digital literacy, technical, cognitive, and socio-emotional, and the components of the TPACK framework, namely

technological, pedagogical, and content knowledge. These categories served as an initial analytical scaffold for identifying relevant patterns in teachers' practices. As coding progressed, inductive subcategories were developed to capture nuances emerging from the data that were not fully represented by the predefined dimensions (e.g., emotional resilience, informal peer learning, and identity negotiation). The final thematic structure thus reflected a hybrid coding process that balanced theoretical grounding with openness to new insights, ensuring that the frameworks were not applied prescriptively but dynamically, in response to the data's contextual richness.

FINDINGS

Levels and Dimensions of EFL Teachers' Digital Literacy in Technology Integration

To answer this question, the analysis draws on Alkalai's (2004) framework of digital literacy, which includes three key dimensions: technical, cognitive, and socio-emotional. Based on interview and observation data, EFL teachers in this study demonstrated varied levels of digital literacy, ranging from emerging to proficient. These levels reflected not only how well teachers could use digital tools but also how critically and ethically they engaged with them in pedagogical contexts. The digital literacy levels of participants were analyzed across the three dimensions. The results are summarized below.

Table 1.
Summary of EFL Teachers' Digital Literacy Profiles

Participant	Technical Literacy	Cognitive Literacy	Socio-Emotional Literacy	Overall Level
T1	Proficient in LMS, apps, AI tools	Critically selects digital content	Promotes respectful digital conduct	**Proficient**
T2	Basic use of PowerPoint and Zoom	Limited evaluation of online sources	Avoids social media in class	**Emerging**
T3	Competent with diverse platforms	Adapts materials for learners' needs	Maintains digital etiquette	**Developing**
T4	Advanced use of interactive tools	Designs cognitively engaging tasks	Encourages peer digital feedback	**Proficient**
T5	Reluctant technology user	Rarely customizes digital resources	Feels anxious about online spaces	**Emerging**
T6	Uses YouTube, Padlet, Google Docs	Applies digital storytelling	Builds online collaboration norms	**Developing**
T7	Proficient in AI-based feedback	Designs scaffolded learning paths	Encourages critical online discussion	**Proficient**
T8	Competent with video platforms	Selects tools for learning objectives	Promotes digital responsibility	**Developing**

Technical literacy refers to the ability to operate digital tools, platforms, and devices for pedagogical purposes. The data showed that most teachers had basic operational knowledge of common educational tools, but only a few integrated them meaningfully

into instruction. For example, T1 and T4 consistently incorporated learning management systems (LMS), Google tools, Padlet, and AI-based assistants into lesson planning, delivery, and assessment. These tools were not only used functionally but were chosen strategically to enhance student engagement and interactivity.

> *"I use Google Classroom for organizing materials and Padlet for collaborative writing. Recently I also introduced QuillBot for paraphrasing tasks so students can learn how to reword academic texts effectively."* – T1

This quote reflects a high level of tool fluency. T1 demonstrates not just knowledge of tools but the pedagogical reasoning behind their use. By introducing QuillBot as a paraphrasing aid, T1 supports students' development of academic integrity and paraphrasing skills, a crucial aspect in EFL writing. In contrast, T2 and T5 used only basic presentation tools like PowerPoint and WhatsApp. While these tools were functional, their use remained static and teacher-centered, offering little interactivity or adaptability.

> *"I don't use many platforms. I usually send materials through WhatsApp and use PowerPoint in class. I'm afraid students will get confused if we try too many apps."* – T2

This excerpt suggests technological hesitation. T2's reliance on familiar tools is partly due to anxiety about student reactions, but it also reflects a lack of confidence in managing digital complexity, an indicator of low technical literacy.

Cognitive literacy refers to the ability to critically evaluate, select, and apply digital content in meaningful ways. Teachers with proficient cognitive literacy (e.g., T4 and T7) demonstrated clear decision-making processes when integrating technology into lesson objectives.

> *"I design writing tasks where students generate drafts using ChatGPT, then compare the AI-generated text with their own. We discuss which expressions are appropriate and what to revise."* – T7

T7's practice illustrates metacognitive engagement. The use of AI is not passive; rather, students are encouraged to critically evaluate and justify their linguistic choices, promoting deep learning. This shows that the teacher not only understands how to use the tool but also aligns it with constructivist pedagogy. Meanwhile, teachers like T3 showed developing cognitive literacy. They adapted content but did so without always aligning it with clear instructional goals.

> *"Sometimes I find good slides on the internet and just use them in class. I make small changes to suit my students, but I don't have much time to redesign everything."* – T3

Here, T3 is semi-critically using materials, but the approach lacks deliberate evaluation or customization. The excerpt reveals the tension between convenience and pedagogical quality, indicating room for growth in cognitive literacy. In contrast, teachers with emerging literacy (e.g., T5) admitted to selecting resources based on search engine ranking rather than reliability.

> *"I usually use the first link that comes up on Google. I'm not sure how to evaluate whether it's good or not."* – T5

Socio-emotional literacy involves understanding appropriate behavior in digital environments, promoting collaboration, and managing ethical issues such as privacy and plagiarism. This dimension was the least developed among several participants. Teachers like T4 and T7 integrated explicit instruction in digital etiquette and responsibility, often through group activities and online peer review.

> *"Before using Google Docs for peer feedback, I remind students about respectful language. I give examples of constructive vs. destructive comments so they understand tone in written feedback."* – T4

This quote exemplifies how T4 embeds digital citizenship education into classroom routines. The teacher anticipates possible misunderstandings in tone and mitigates them proactively, reflecting a high level of socio-emotional awareness. In contrast, some participants like T2 and T5 preferred to avoid digital interaction entirely, often due to fear of conflict or miscommunication.

> *"I avoid using class forums because students often argue or misread each other's messages. It's hard to control what they say."* – T2

Rather than fostering socio-emotional competencies, T2's avoidance may limit students' development of digital collaboration and empathy, skills essential in 21st-century communication. Other participants, like T6, showed developing proficiency by creating structured online spaces with clear norms but still lacked systematic instruction on managing digital behavior.

Interestingly, high technical proficiency did not always correlate with high levels in the other two dimensions. For example, T3 was technically competent but had limited cognitive and socio-emotional integration in classroom activities. This suggests that true digital literacy is multidimensional, one cannot rely on tool mastery alone.

> *"I can use Padlet and video apps well, but I'm not sure how to design questions that really make students think critically. Usually, I just let them post freely."* – T3

Here, while T3's technical literacy is advanced, the cognitive literacy remains undeveloped, resulting in surface-level engagement with digital tools. The findings indicate a diverse spectrum of digital literacy among EFL teachers. While some demonstrate an integrated, multidimensional approach to digital pedagogy, others still operate within limited frameworks. These disparities are shaped by factors such as training, institutional support, individual initiative, and exposure to best practices. Strengthening all three dimensions, technical, cognitive, and socio-emotional, is essential for empowering teachers to meet the complex demands of 21st-century classrooms.

Challenges and Support Systems in Navigating 21st-Century Technological Demands in EFL Classrooms

The participants revealed several interrelated obstacles that affected their ability to integrate digital tools meaningfully. These included infrastructural barriers, time-related constraints, and emotional factors that undermined their confidence in using technology.

> *"Sometimes the Wi-Fi just stops during class. I have to switch to mobile data, and it doesn't always work. I've even had to cancel some online lessons."* – T6

This excerpt reflects the acute fragility of school infrastructure. T6's comment underscores how technological inconsistency disrupts instructional continuity, forcing teachers into improvisational coping mechanisms such as relying on mobile data, an unsustainable solution. The mention of class cancellation illustrates how these breakdowns directly compromise students' access to learning.

> *"We don't have any standardized platform from the school. Each teacher just finds their own way to teach online or hybrid."* – T5

This response reveals a policy vacuum at the institutional level. In the absence of standardized digital platforms or training, teachers are left to self-organize their pedagogical methods, resulting in fragmentation. It not only increases the cognitive and logistical burden on educators but also leads to disparities in student learning experiences. To synthesize the challenges reported by teachers, Table 2 below outlines the most frequently cited barriers.

Table 2.
Key Challenges in Navigating Technological Demands

Challenge Theme	Description	Illustrative Evidence
Infrastructural Issues	Poor internet access, outdated hardware	"Wi-Fi just stops…" (T6)
Lack of Institutional Direction	Absence of centralized tools, guidelines, or training	"Each teacher finds their own way…" (T5)

The table above consolidates the recurring difficulties that impede meaningful technology integration. However, what becomes more concerning is how these external limitations intersect with personal and emotional struggles, compounding the barriers to effective practice.

> *"Creating a good online lesson takes hours. Between grading, meetings, and teaching, I just can't do it consistently."* – T4

T4 articulates a dilemma many teachers face: **balancing pedagogical creativity with operational feasibility**. The preparation of engaging digital materials often exceeds what regular workloads allow. This mismatch between demand and capacity can lead to digital integration being **abandoned in favor of simpler, traditional methods**, especially under time pressure.

> *"I feel like I'm always behind. My students know more than I do. Sometimes it makes me feel embarrassed or reluctant to try new things."* – T2

This quote highlights the emotional cost of perceived technological incompetence. T2's reluctance to experiment reveals how affective barriers, such as fear of failure or comparison with students, can be as obstructive as technical ones. This form of self-doubt inhibits innovation, reinforcing a cycle of underconfidence and limited engagement. Taken together, these challenges illustrate that digital literacy development is not just about access to devices, it is deeply intertwined with policy clarity, workload structure, and emotional readiness.

In contrast to the obstacles, participants also identified enablers that helped them navigate and overcome technological demands. These supports were both formal and informal, and often teacher-initiated.

> *"We have a WhatsApp group where we share tips, links, and sometimes even ready-made materials. It helps a lot, especially when we don't have time to create from scratch."* – T3

This statement reveals that collegial collaboration serves as a powerful buffer against isolation. Such peer networks reduce individual preparation time, promote knowledge sharing, and serve as emotional scaffolding. These teacher-formed communities of practice are particularly valuable where institutional support is lacking.

> *"Most of what I know, I learned from watching YouTube videos. I try things out and ask my students for feedback."* – T7

T7's experience reflects a high degree of self-initiative, where teachers supplement institutional gaps by turning to informal online learning. This practice shows not only resilience but also agency in shaping one's professional development, although it also underscores the absence of structured training pathways.

> *"When students tell me they enjoy using Padlet or that the online quizzes are fun, I feel encouraged to keep learning."* – T1

Student engagement emerges as a motivational driver. T1's quote indicates how positive reinforcement from learners can help teachers persevere in the face of challenges. It validates their efforts and fosters a reciprocal growth dynamic, where learner feedback becomes a catalyst for teacher learning. To present a holistic view of these support systems, Table 3 below summarizes the recurring enablers reported by participants.

Table 3.
Support Systems Facilitating Digital Teaching

Support Mechanism	Function	Example Quote
Peer Collaboration	Sharing resources and emotional encouragement	"We have a WhatsApp group…" (T3)
Self-Initiated Learning	Acquiring skills through informal online platforms	"I learned from YouTube…" (T7)
Student Motivation	Encouraging persistence and innovation	"Students enjoy Padlet…" (T1)

The data in Table 3 reveal that grassroots support mechanisms, such as informal peer groups, teacher-initiated learning communities, and spontaneous resource sharing, play a pivotal role in sustaining digital teaching practices among EFL educators. These organic, teacher-led initiatives illustrate a high degree of adaptability, professional resilience, and collaborative spirit, especially in contexts where institutional support is limited or inconsistent. Teachers often turn to these networks not only for technical guidance but also for emotional encouragement and pedagogical inspiration, underscoring their value as both practical and psychological lifelines.

However, while such grassroots mechanisms offer immediate and context-sensitive support, they also underscore a deeper systemic issue: the lack of structured, equitable, and sustained professional development frameworks. The reliance on individual initiative and peer collaboration, although commendable, can result in uneven access to expertise and varying quality of pedagogical practice. In the absence of coordinated institutional efforts, these informal systems may inadvertently widen professional development gaps, especially for teachers in isolated or under-resourced settings. This highlights the urgent need for institutional recognition and integration of grassroots strategies into formal teacher development models, ensuring that professional learning is not left solely to chance or personal motivation.

The findings show that EFL teachers operate within complex environments shaped by both systemic constraints and grassroots support. While institutional gaps in infrastructure and policy hinder digital engagement, many teachers demonstrate remarkable resourcefulness, building peer networks, embracing informal learning, and drawing motivation from students. Importantly, the co-existence of high motivation and structural barriers suggests a mismatch between teacher readiness and systemic provision. This calls for a more responsive institutional framework that not only supplies technical infrastructure but also fosters collaborative cultures, emotional support, and structured professional development.

DISCUSSION

The findings reveal that digital literacy among EFL teachers is a nuanced and multifaceted construct, rather than a simple measure of technical competence. Teachers demonstrated a range of digital literacy dimensions, extending beyond basic tool usage to include critical and pedagogical awareness. Many were not only navigating digital platforms but also evaluating the appropriateness and effectiveness of tools within their instructional contexts. This supports the notion advanced by Martínez-Bravo et al. (2022) that digital literacy must be understood in terms of technical, cognitive, and socio-emotional domains.

For instance, several participants actively customized digital content, curated YouTube videos, or adapted lesson formats to accommodate student needs. These actions reflect deeper competencies, what Vasinda and Pilgrim (2023) describe as new literacies, characterized by collaborative, adaptive, and critically reflective engagement with digital tools. Yet, the variability across participants also underscores how digital literacy is shaped by access, prior exposure, and institutional support. Teachers in rural or under-resourced settings appeared less confident or relied heavily on trial-and-error methods, indicating that digital proficiency is not evenly distributed but conditioned by

sociocultural and infrastructural factors. Thus, digital literacy must be viewed as a dynamic, evolving practice, an interplay between personal initiative, contextual challenges, and the professional expectations imposed by modern education systems.

While many teachers demonstrated high levels of initiative in integrating digital technologies, their actions also revealed the extent to which agency is situated within broader structural conditions. Drawing on Priestley et al.'s (2023) ecological model, it becomes evident that teacher agency cannot be understood in isolation from the material, cultural, and relational contexts that either enable or constrain it. Teachers who reported proactive efforts, such as designing new digital assessments or experimenting with interactive tools, often operated within supportive school environments or had access to peer mentoring. In contrast, others encountered institutional inertia, limited training, or inconsistent internet access, all of which significantly curtailed their willingness to experiment.

The emotional landscape of digital teaching further complicates the enactment of agency. Teachers expressed feelings of frustration, anxiety, and, at times, embarrassment, particularly when they perceived their students as more digitally fluent. These affective responses shaped how willing they were to take risks or seek help. Rather than being purely technical barriers, these emotional responses signal the presence of identity threats, where the pressure to adapt is interpreted as a challenge to professional competence. Consequently, as Qureshi (2023) explains, digital agency is not just a matter of skill, but of confidence, recognition, and the psychological safety to engage in ongoing transformation.

The finding that some teachers, particularly senior lecturers, exhibited technological hesitation and anxiety highlights how digital literacy is also generational and identity-based. As seen in T2's case, reluctance to move beyond familiar tools often stems not only from skill gaps but also from deep-rooted professional paradigms shaped before the digital era (Nagel et al., 2023). For such teachers, adopting new technologies can be perceived as a threat to established expertise, leading to lower confidence and reduced willingness to experiment. This pattern reinforces the importance of structured and empathetic support systems such as mentoring programs, peer collaboration, and ongoing, non-evaluative training opportunities that address not just technical competence but also emotional readiness and professional identity reconstruction (Diab & Green, 2024). Without such multidimensional support, digital innovation risks being unevenly adopted across teacher generations.

The data also underscore the crucial role of peer networks in shaping teachers' digital engagement. Although institutional support was often described as insufficient or too generic (Bergdahl, 2022), peer communities, especially those facilitated through informal platforms like WhatsApp or internal forums, emerged as powerful vehicles for both technical guidance and emotional encouragement (Chandler, 2025; Cronje & Van Zyl, 2022). These communities functioned as dynamic spaces for idea-sharing, problem-solving, and moral support, closely aligning with Nicolini et al.'s (2022) concept of Communities of Practice.

Interestingly, such networks not only bridged knowledge gaps but also sustained teachers' motivation, especially during periods of uncertainty or technological failure. The

reciprocity within these groups fostered a sense of collective efficacy, which in many cases compensated for the absence of formal professional development. However, while these organic systems offer great potential, their reliance on individual initiative raises equity concerns. Not all teachers had access to active communities, and the absence of structured institutional integration meant that valuable insights from these groups remained localized and undocumented (Roundy, 2022). These findings suggest a need for educational institutions to formally recognize and support peer collaboration, integrating it into broader professional development strategies rather than treating it as incidental or supplementary.

A less frequently discussed but critical aspect highlighted by the study is the emotional labor involved in digital integration. Teachers did not merely learn new tools, they navigated feelings of vulnerability, uncertainty, and self-doubt (Starrett et al., 2023). As one participant expressed, being unable to effectively manage classroom technologies made them feel "incompetent," revealing a deep entanglement between digital skill and professional self-concept. This emotional labor is not peripheral; it shapes how teachers perceive themselves and their roles within the classroom. As Feerrar (2022) and Ilmi et al. (2023) emphasize, any significant shift in pedagogical practice, such as the incorporation of technology, inevitably triggers reflection on one's values, capacities, and legitimacy as a teacher. When this transition is unsupported or rushed, it may result in what has been termed "change fatigue," where teachers disengage not due to unwillingness but due to emotional exhaustion. Acknowledging emotional labor as central to professional growth is therefore vital. Institutions must go beyond technical training and consider interventions that also foster emotional resilience, such as reflective coaching, collaborative inquiry, or safe spaces for trial and error (Pozo-Rico et al., 2023; Sauli et al., 2022). Only by addressing both the cognitive and affective dimensions of digital change can sustainable transformation be achieved.

The findings further highlight that teachers' capacity to sustain digital engagement depends on the interplay of several support systems. These systems operate at multiple levels, including institutional structures, collegial networks, and individual agency. Institutional support was often limited, prompting teachers to rely on collegial mechanisms such as peer collaboration through WhatsApp groups, which provided both technical assistance and emotional reassurance. At the individual level, teachers drew on self-initiated learning and student feedback as motivational supports. Taken together, these interconnected systems form an adaptive framework that enables teachers to navigate technological challenges even in the absence of formal institutional guidance.

However, the findings also point to important disparities in how these support systems are accessed and sustained. While the findings underscore the importance of peer collaboration and self-initiated learning, they also reveal critical disparities in access to these support systems. Teachers in urban and digitally connected contexts had greater opportunities to participate in online peer groups and access high-quality informal resources, whereas those in rural or under-resourced institutions were often excluded from such networks. This uneven access reinforces existing professional development inequalities and suggests that informal mechanisms, although effective for some, cannot substitute for equitable institutional provision. A comparison of support types further highlights that informal systems offer immediacy, emotional reassurance, and contextual adaptability, while formal supports, when well-designed, can ensure consistency,

scalability, and long-term sustainability. Therefore, institutions bear a crucial responsibility to bridge these systems: by recognizing, formalizing, and integrating teacher-initiated practices into structured professional learning frameworks. Without such systematization, grassroots initiatives risk remaining fragmented, accessible only to the most proactive teachers, and unsustainable over time.

Perhaps the most significant implication of the findings is the need to shift from a teacher-centered to a systems-oriented view of digital integration. While much attention has been given to improving individual teacher competence, the study demonstrates that lasting change depends on the alignment of institutional infrastructure, leadership, and policy. For example, even the most motivated teachers were limited by time constraints, lack of technical support, or inconsistent expectations regarding technology use. Moreover, the absence of clear institutional guidelines often left teachers unsure of what constituted effective digital instruction, leading to fragmented and individualized approaches. Without a coherent framework or shared vision, innovations remained isolated and difficult to scale. Institutions, therefore, bear a critical responsibility, not just to train teachers but to create an ecosystem in which digital teaching is viable, recognized, and rewarding. This includes providing stable internet, allocating dedicated time for innovation, and aligning performance evaluations with digital competencies. More importantly, it means embedding digital teaching within a shared pedagogical culture rather than treating it as an external add-on.

CONCLUSION

This study examined the levels and dimensions of digital literacy demonstrated by EFL teachers and the challenges and support systems they navigate in meeting the technological demands of 21st-century classrooms. The findings reveal that digital literacy is a multidimensional and evolving practice shaped by individual agency, institutional conditions, and emotional and sociocultural contexts. Teachers displayed diverse competencies across technical, cognitive, and socio-emotional domains, reflecting the interplay between skill, confidence, and access. While many teachers exercised considerable agency through informal mechanisms such as peer collaboration and self-initiated learning, these supports were not equitably distributed, with rural and under-resourced teachers facing limited access to digital networks and professional communities. This inequality highlights that informal supports, though valuable, cannot replace structured and equitable institutional systems. Sustainable digital literacy development requires institutions to recognize, formalize, and integrate grassroots initiatives into coherent professional learning frameworks that combine the immediacy and adaptability of informal supports with the scalability and inclusivity of formal structures. Furthermore, institutional responsibility extends to fostering emotionally supportive environments that strengthen teachers' confidence and well-being. By embedding equity, collaboration, and emotional resilience within digital literacy development, institutions can empower teachers to act as adaptive, critical, and innovative agents of pedagogical transformation in the digital era.

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