SIGEH ELT: Journal of Literature and Linguistics
Volume 6 Number 1, March 2026, pp: 1012-1025
E-ISSN: 2775-8834

Perceptions of English Language Teachers on the Effectiveness of Technology-Enhanced Learning in Secondary School

Muhammad Miftah Fauzan[1], Fadil Bilal Hamdi[2], Maemuna Muhayyang[3]
[123]English Language Education, Faculty of Language and Literature, Universitas Negeri Makassar

Article Info

Submitted:
6 April 2026
Reviewed:
26 July 2026 – 1 September 2026
Accepted:
4 September 2026
Published:
24 September 2026

Keywords:
English language teaching; teachers' perception; technology-enhanced learning

Abstract

The post-pandemic digital transformation has fundamentally reshaped secondary education, placing learning management systems (LMS) and mobile learning applications at the center of English language teaching (ELT). However, a significant disconnect persists between national digital policy mandates and classroom-level execution in vocational secondary schools. This study aims to analyze English language teachers' perceptions of the effectiveness of technology-enhanced learning (TEL), identify the operational challenges encountered during implementation, and examine the adaptive strategies deployed to overcome these barriers. Using a descriptive qualitative research design, the study examined three English language teachers (N = 3) at SMK Negeri 1 Makassar, who were selected through purposive sampling. Data were collected using semi-structured interviews and systematic classroom observations and analyzed using the interactive model of data analysis proposed by Miles, Huberman, and Saldaña (2014). The findings reveal that teachers have favorable perceptions of TEL, highlighting its capacity to foster student engagement, enhance instructional efficiency, and create dynamic learning environments. However, implementation is often hindered by severe infrastructural limitations, unequal device access among students, digital skill disparities, and reluctance to embrace rapid technological changes. In conclusion, although TEL can improve English teaching practices, its long-term success in vocational high schools depends on improving institutional infrastructure and providing targeted professional development to support adapting teaching methods to specific contexts. This study contributes to vocational English language teaching (ELT) literature by offering an empirically grounded framework that illustrates how teacher pedagogical agency and adaptive strategies sustain digital learning in resource-constrained secondary school environments.

Correspondence Author: Muhammad Miftah Fauzan Email: miftah.fauzan@unm.ac.id
DOI: https://doi.org/10.36269/sigeh.v6i2.5098
Publisher: Universitas Muhammadiyah Lampung
Journal Homepage: https://journal.uml.ac.id/index.php/ELt/index
Journal SIGEH ELT licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

INTRODUCTION

The rapid expansion of Information and Communication Technology (ICT) has transformed global educational paradigms, shifting instruction toward interactive, student-centered digital learning environments (Akram et al., 2022). Within English Language Teaching (ELT), integrating technological tools supports receptive and productive skill development, enhances instructional quality, and fosters cognitive understanding among digital learners (Akram et al., 2022; Suwarni & Natsir, 2024). Global initiatives, such as the United Nations Sustainable Development Goal 4 and

UNESCO frameworks, underscore the imperative of leveraging educational technology to deliver equitable, inclusive quality education across diverse student demographics (Alorani et al., 2025). Furthermore, national curriculum policies such as Indonesia's Merdeka Curriculum explicitly mandate digital competence as an essential 21st-century skill integral to modern ELT instruction (Suwarni & Natsir, 2024). However, the successful realization of these institutional mandates ultimately hinges on how classroom teachers perceive, accept, and pedagogically implement digital technologies in their daily practices.

To analyze how educators process and execute digital integration under variable classroom conditions, this study grounds its investigation in two core theoretical frameworks: the Technology Acceptance Model (TAM) (Davis, 1989) and the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006). TAM posits that educators' willingness to adopt digital innovations is governed by Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), suggesting that positive teacher attitudes are essential precursors to sustained technological integration. Concurrently, the TPACK framework asserts that effective TEL requires more than technical operational skills; it demands a sophisticated synergy between technological knowledge, pedagogical strategies, and subject-specific content delivery. Examining teacher practices through TAM and TPACK provides a comprehensive conceptual lens to evaluate both affective perceptions and practical instructional capabilities.

Reflecting these theoretical dimensions, empirical research highlights complex dynamics regarding how teachers perceive and execute technology integration in ELT practice. Systematic evidence demonstrates that teachers generally hold positive attitudes toward ICT, acknowledging its capability to create interactive classrooms, sustain learner motivation, and facilitate seamless connectivity (Akram et al., 2022). In game-based learning contexts, gamified platforms such as Quizizz have gained widespread acceptance among teachers due to their user-friendly interface, feasibility, and capacity to stimulate both intrinsic and extrinsic student motivation during language acquisition (Lim & Yunus, 2021). Systematic reviews indicate that a significant majority of language teachers are willing to continue incorporating gamified digital assessments in future instruction (Lim & Yunus, 2021). Similarly, educational technology serves a vital role in special education ELT contexts, where assistive devices bridge learning barriers, boost self-esteem, and improve academic self-efficacy for students with sensory, physical, or health impairments (Alorani et al., 2025).

However, a critical discrepancy persists between teachers' favorable perceptions of technology and their actual classroom implementation. In the Indonesian ELT context, empirical evaluation reveals a marked gap between teachers' highly positive theoretical perceptions (M = 4.21) and their moderate actual technology integration practices (M = 3.15) (Suwarni & Natsir, 2024). Classroom observations indicate that digital tools are frequently restricted to passive substitution such as replacing traditional chalkboards with digital presentations rather than fostering transformative, student-centered language production (Suwarni & Natsir, 2024). Furthermore, studies in specialized ELT domains show that language teachers often exhibit a low overall knowledge level (M = 2.22) regarding specific technological applications, with no statistically significant variance across gender, teaching experience, or specialization field (Alorani et al., 2025).

This implementation gap is governed by a combination of internal pedagogical factors and external structural barriers. Regression analysis confirms that teacher digital competence (β = 0.43), institutional support (β = 0.38), pedagogical beliefs (β = 0.35), and infrastructure accessibility (β = 0.32) significantly predict the extent of classroom technology integration (Suwarni & Natsir, 2024).

In developing regions, systemic obstacles—including sluggish internet speeds, frequent power outages, insufficient hardware infrastructure, and a lack of structured professional development programs—severely hinder teachers from embedding ICT effectively into their pedagogical routines (Akram et al., 2022; Lim & Yunus, 2021; Suwarni & Natsir, 2024). Without clear educational policies, continuous training, and tailored institutional facilitation, teachers struggle to align digital tools with learning objectives and classroom management demands (Akram et al., 2022; Alorani et al., 2025; Suwarni & Natsir, 2024).

While existing literature has examined isolated aspects of educational technology, such as gamified applications (Lim & Yunus, 2021) or general ICT systematic reviews (Akram et al., 2022), a comprehensive understanding of how teacher perceptions directly align with classroom practices across diverse instructional settings remains underdeveloped (Alorani et al., 2025; Suwarni & Natsir, 2024). To address this gap, this study qualitatively investigates how English teachers at SMK Negeri 1 Makassar perceive and integrate ICT into their classroom instruction, while identifying the practical challenges and adaptive strategies they deploy. Grounded in the TAM and TPACK frameworks, this study addresses three central research questions:

1. How do vocational English teachers perceive the usefulness and ease of use of TEL?
2. What operational challenges hinder their technological-pedagogical integration?
3. What adaptive strategies do they employ to sustain digital learning in resource-constrained contexts?

By examining these real practices, this study provides empirical insights for developing context-specific teacher professional development and improving digital ELT implementation in vocational secondary education.

METHOD

Research Design

This study employed a descriptive qualitative research design to investigate English language teachers' perceptions, implementation challenges, and adaptive strategies regarding Technology-Enhanced Learning (TEL). Descriptive qualitative research focuses on providing a comprehensive, contextualized summary of specific everyday educational phenomena in their natural settings without manipulating variables (Creswell & Creswell, 2018; Merriam & Tisdell, 2016). This design was selected because exploring pedagogical perceptions and real-time classroom adaptation requires rich narrative data capturing the subjective experiences of language practitioners, which cannot be adequately captured through quantitative metrics (Tracy, 2020).

Research Setting and Participants

The research was conducted at SMK Negeri 1 Makassar, a vocational high school located in South Sulawesi, Indonesia. The participants consisted of three English language teachers (N = 3) selected through purposive sampling. Purposive sampling is a non-probability sampling technique where informants are intentionally selected based on specific, predefined criteria relevant to the research objectives (Patton, 2015; Etikan et al., 2016). The inclusion criteria established for participant selection required that the teachers: (1) held an active appointment teaching English at SMK Negeri 1 Makassar, (2) possessed a minimum of professional ELT experience, and (3) actively integrated digital tools (e.g., Learning Management Systems, interactive quiz platforms, media presentation tools) into their English instruction. In qualitative research, a focused sample of three key informants is methodologically valid when the objective is to gain deep, detailed conceptual insights into shared institutional practices rather than statistical generalization (Creswell & Creswell, 2018; Hennink et al., 2020).

Data Collection

Data were collected using two primary qualitative instruments: semi-structured interviews and non-participant classroom observations. The use of dual data collection methods aligns with established qualitative standards for data triangulation in case research (Kvale & Brinkmann, 2009; Spradley, 2016). Semi-structured interviews served as the primary data collection tool to elicit in-depth information regarding teachers' perceived usefulness, perceived ease of use, experienced operational barriers, and adaptive coping mechanisms. An interview protocol was developed based on TAM and TPACK constructs, and each participant completed face-to-face interview sessions lasting 30 to 45 minutes, which were audio-recorded with explicit written consent and transcribed verbatim. In addition, direct non-participant classroom observations were conducted across English lessons to examine the real-time implementation of TEL. Non-participant observation enabled the researcher to record authentic interactions and situational disruptions without altering the natural classroom environment (Spradley, 2016). A structured observation checklist was utilized to document technical issues (e.g., internet disconnection, device unavailability), student engagement levels, and the immediate pedagogical adaptations executed by teachers.

Data Analysis

Data were analyzed using the Interactive Model of Data Analysis formulated by Miles, Huberman, and Saldana (2014). This analytical framework operates as an iterative, continuous process comprising three concurrent streams: data condensation, data display, and conclusion drawing/verification. During data condensation, raw interview transcripts and observational field notes were systematically reviewed, coded, and categorized. Unnecessary data were filtered out, while key extracts and behavioral patterns relating to perceptions, challenges, and coping strategies were organized into descriptive and interpretive codes. Next, during data display, the condensed data were organized into structured thematic matrices and narrative networks, allowing the researcher to systematically examine logical connections across participants' experiences and cross-check observational logs with interview accounts. Finally, during conclusion drawing and verification, preliminary conclusions were derived from the displays and continuously verified against the raw empirical data to ensure analytical consistency and validity.

Data Trustworthiness

To establish methodological rigor and academic validity, this study implemented the four quality criteria proposed by Lincoln and Guba (1985): credibility, transferability, dependability, and confirmability. Credibility was achieved through method triangulation synthesizing interview narratives with direct classroom observation logs and member checking, wherein interview transcriptions and thematic summaries were reviewed by participants to confirm analytical accuracy. Transferability was supported by providing a thick description of the research setting, participant profiles, institutional environment, and classroom conditions, enabling future researchers to determine applicability to similar vocational educational contexts. Dependability was maintained through a detailed audit trail documenting every stage of the research process, including raw recordings and verbatim transcripts. Finally, confirmability was ensured through reflexivity and peer debriefing with ELT research experts to guarantee that interpretations were derived strictly from participant data rather than researcher subjectivity.

RESULT AND DISCUSSION

Result

1. Teachers' Perceptions of the Effectiveness of TEL.

The results of the interviews revealed that English teachers at SMK Negeri 1 Makassar perceived technology as effective in supporting English language learning. Their perceptions were categorized into several aspects, including helpfulness, efficiency, student engagement, joyful learning, and effectiveness as a learning tool. The description of these perceptions is presented in the following sections.

Teachers mentioned that technology was a helpful tool in English language learning. They believed that technology supported the teaching and learning process by facilitating assessment, material delivery, creativity, and student motivation, as seen in the following extracts.

Extract 1 (MY/18/09/2025)

"…it's very helpful because there are usually quizzes, and I usually use tools like Kahoot, Quizizz, or Bluecat. I use them after explaining the material, and there's usually a short evaluation to assess how much the students have understood. I use tools like that, and then I see how much they have understood…".

This extract shows that teachers find technology helpful because it allows them to conduct evaluations efficiently through interactive quiz platforms. This perception is supported by observation results, which showed that teachers used Quizizz to assess students' understanding during learning activities.

Extract 3 (MM/26/09/2025)

"…yes, I say it's very helpful, and they're enthusiastic. In fact, if we use conventional methods, it's just ordinary, but if we play music they like and ask them to draw, their enthusiasm is extraordinary, and they're highly motivated…".

This extract demonstrates that technology is considered helpful because it increases students' enthusiasm. Observation results showed that teachers used digital materials such as videos and PowerPoint presentations, contributing to an engaging learning environment.

Teachers perceived technology as efficient because it saved time, reduced physical effort, and streamlined lesson delivery.

Extract 4 (MY/18/09/2025)

"…it is more helpful because we don't have to spend time writing on the blackboard, it makes it easier for teachers to explain to students, and I also often use an LCD projector to display the important points to students, and then add explanations to them…".

This extract suggests that technology increases efficiency by replacing manual activities. Observation results confirmed that teachers used digital materials and screen sharing to deliver content efficiently.

Extract 5 (ASN/20/09/2025)

"…I find it easy to teach, it saves time and energy, and I don't need to write on the board because everything is displayed directly, so we can immediately explain. The students are also interested because it is colorful and has pictures…".

Teachers believed that technology increased student engagement by promoting active participation and interactive learning.

Extract 6 (MY/18/09/2025)

"…students prefer to use cell phones and have lessons interspersed with games, so they can learn while playing…".

This extract indicates that game-based learning enhances student engagement. Observation results showed active student participation during digital activities.

Extract 7 (ASN/20/09/2025)

"…they understand more quickly, especially when given discussions. Teachers shouldn't be monotonous and just lecture because the children will fall asleep. Discussions using technology are very good because they are active…"

This extract highlights that technology supports interactive discussions. Observation results showed that teachers facilitated discussions through WhatsApp.

Teachers stated that technology helped create a joyful learning atmosphere by reducing boredom and increasing enjoyment.

Extract 10 (ASN/20/09/2025)

"...I also often find that when the children are bored, as soon as I play music, I play appropriate Western songs, and then they become more enthusiastic..."

This extract shows that teachers use technology flexibly to restore enthusiasm.

Extract 11 MM (MM/26/09/2025)

"…if I play songs or movies, it will challenge the students. This is a good lesson we do it this way…"

This extract indicates that digital media contribute to enjoyable and motivating learning experiences.

Teachers perceived technology as an effective learning tool that supports material delivery, assessment, and understanding.

Extract 12 (MY/18/09/2025)

"…it's more effective because it's easier for us, and to create questions, for example, we prepare them in the application and it takes effort to create the questions, but it definitely makes things easier in class and the students like it too…"

This extract shows that technology facilitates assessment and classroom management. Observation results confirmed the use of digital quizzes and materials.

Extract 13 (MM/26/09/2025)

"…it's definitely effective. As for the workload, I don't think it's a burden. It's not a burden, but it has become a necessity for us as teachers. Technology is important, and we must be responsible for it…"

This extract indicates that technology is viewed as essential rather than burdensome. Observation results showed effective use of videos and presentations.

2. Challenges in Integrating TEL.

This section presents the findings related to the second research question, which focuses on identifying the challenges faced by English teachers in integrating Technology- Enhanced Learning (TEL) into their teaching practices. The results reveal several key challenges, including internet connection issues, infrastructure and equipment problems, student motivation, and limited facilities. The detailed descriptions of these challenges are presented on the table below:

Table 1. Challenges in Integrating TEL

No	Challenges	Observation	Teachers		
			MY	ASN	MM
1	Infrastructure limitations	Internet connection, running platform, Facilities	✓	✓	✓
2	Teacher Readiness	Technical mastery, use of basic features	✓	×	✓
3	Change Resistence	Reluctance to use TEL Features	×	✓	×
4	Digital Divide	Passive students due to devices/access	×	×	×
5	Content Development	Relevant & purposeful digital materials	✓	✓	✓

Observation results indicate that infrastructure challenges appeared with different characteristics across teachers. In MY's class, platforms such as Google Meet, videos, and digital evaluation tools were used without significant disruption, although interviews revealed potential student network constraints. In ASN's class, technology use was limited to WhatsApp, and learning was adapted to available facilities; interviews confirmed that quota and network limitations influenced this choice. In MM's class, Google Meet, PowerPoint, and videos were used smoothly during observation, yet interviews revealed prior experiences with unstable networks and power outages, requiring alternative learning preparation.

MY demonstrated adequate technical and pedagogical readiness by effectively operating features such as screen sharing, videos, and digital evaluation tools, supported by interview data indicating positive perceptions of technology. ASN showed basic readiness, using only WhatsApp, with interviews linking this to limited training and ongoing adaptation. MM appeared confident using Google Meet, PowerPoint, and videos; however, interviews indicated the need for further competence development through training.

Implicit resistance was reflected in the extent of TEL use. MY actively integrated various technological features without observable reluctance, supported by interview findings highlighting positive attitudes. ASN limited technology use to WhatsApp, indicating practical resistance influenced by workload, time constraints, and technical readiness rather than direct rejection. MM consistently implemented TEL without signs of resistance, viewing technology as a necessity despite technical challenges.

Although not explicitly visible during observations, the digital divide emerged contextually. In MY's class, students participated actively, though interviews indicated unequal access outside learning sessions. ASN's reliance on WhatsApp reflected adaptation to students' device and quota limitations, as confirmed by interviews. Similarly, MM's class ran smoothly during observation, yet

interviews revealed some students faced limited access beyond class time, requiring alternative learning options.

Content development challenges varied. MY effectively integrated videos and digital quizzes aligned with learning objectives, with interviews confirming deliberate material adaptation. ASN relied mainly on written WhatsApp messages, indicating limited interactive content development, as supported by interview findings citing time constraints and contextual relevance. MM used PowerPoint, videos, and contextual reading materials aligned with objectives; however, interviews revealed ongoing efforts to adapt online materials to students' levels.

3. Strategies Used to Integrate TEL.

This section presents the findings related to the third research question, which focuses on describing the strategies used by English teachers in integrating Technology-Enhanced Learning (TEL) into their teaching practices. Several strategies were identified in addressing TEL implementation challenges. The detailed descriptions of these strategies are presented on the table below:

Table 2. Strategies Used to Integrate TEL

No	Strategies	Observation	Teachers		
			MY	ASN	MM
1	Digital Pedagogy	Technology supports learning objectives	✓	×	✓
2	Contextualized Technology Use	Adapting tools to classroom conditions	✓	✓	✓
3	Flexible Environment	Asynchronous, evaluation, reflection	✓	×	✓
4	Reflective Collaboration	Discussion, chat, interaction	✓	✓	✓
5	Adressing Technology Misperceptions	TEL is used actively, not just as an addition	✓	×	✓
6	Assessment Adjustment	TEL-based quizzes/evaluations	✓	×	✓

Observation results indicate varying levels of digital pedagogy integration. In MY's class, technology was used not only to deliver material but also to evaluate understanding and enhance engagement, functioning as part of a pedagogical strategy that supported reflection; interviews confirmed this intention. In ASN's class, technology use was limited to communication and material distribution via WhatsApp, with minimal pedagogical integration. Interviews revealed this approach was chosen due to student needs and contextual limitations. In MM's class, technology such as PowerPoint and videos was integrated with appropriate pedagogical approaches to support conceptual understanding, although student interaction could be further improved; interviews supported these findings.

Technology use reflected adaptation to student conditions and learning contexts. In MY's class, digital tools and materials were selected according to objectives and student ability levels, supported by interview data indicating consideration of student readiness. ASN's reliance on WhatsApp demonstrated adaptation to limited internet access and device ownership, as confirmed

by interviews. Similarly, MM selected accessible and topic- relevant digital media, with interviews highlighting teachers' awareness of contextual adaptation.

Technology supported varying degrees of learning flexibility. In MY's class, digital materials and evaluation activities enabled students to review and reflect on content, reinforcing flexibility, as confirmed by interviews. ASN's use of WhatsApp allowed asynchronous access, accommodating student limitations, though reflective activities remained limited. In MM's class, platforms such as Google Meet and digital materials facilitated flexible learning, although reflective technology-based activities could be further enhanced; interview data supported these observations.

Efforts to foster reflection and collaboration differed across classes. MY used technology to encourage participation and brief evaluations, supporting student reflection, though peer collaboration remained limited. ASN's learning was largely one-way via WhatsApp, with minimal collaborative or reflective activities due to platform and contextual constraints. MM facilitated teacher–student interaction during online learning, supporting reflection, although student collaboration through technology was not yet optimal; interviews reinforced these findings.

Teachers' attitudes toward technology varied in practice. MY consistently integrated technology as an essential instructional tool, not an additional burden, as supported by interviews. ASN demonstrated functional but limited use of technology without negative attitudes, reflecting cautious adaptation. MM actively and structurally integrated technology, viewing it as supportive of learning despite technical challenges; interview findings confirmed minimal misperceptions and ongoing adjustment efforts.

Assessment practices showed gradual adaptation to TEL. In MY's class, technology was used for brief digital evaluations to monitor understanding, supported by interview data. ASN relied on simple assignments and responses via WhatsApp, with limited reflective or critical assessment due to contextual constraints. In MM's class, technology supported evaluation through online discussions and questioning, focusing on understanding and participation; although reflective and creative assessment was not fully optimized, interviews indicated awareness of the need to align assessment with TEL.

DISCUSSION

Teachers' Perceptions of the Effectiveness of TEL.

The empirical findings from this study demonstrate that English language teachers at SMKN 1 Makassar hold positive perceptions regarding the pedagogical effectiveness of Technology-Enhanced Learning (TEL). They view digital integration as a key driver for improving instructional efficiency, student engagement, and classroom interaction. Theoretically, these favorable attitudes align with the core constructs of the Technology Acceptance Model (TAM) by Davis (1989), particularly Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). The active adoption of digital tools such as Quizizz, Kahoot, YouTube videos, PowerPoint, and WhatsApp is based on the teachers' realization that technology reduces manual tasks, optimizes material delivery, and increases student attention. Viewed through the TPACK framework (Mishra & Koehler, 2006), the participants showed a good capacity to connect Technological Knowledge (TK) with Pedagogical Knowledge (PK) and Content Knowledge (CK) during language instruction.

In the broader theoretical landscape, these positive perceptions show strong thematic alignment with contemporary literature on gamified educational tools. The finding that tools like Quizizz and Kahoot create an interactive and motivating learning environment supports previous studies by Lim and Yunus (2021) and Alorani et al. (2025), which argue that digital assessments

lower students' affective filters and reinforce active learning. Additionally, these results corroborate the findings of Akram et al. (2022), who stated that teacher willingness to use ICT depends heavily on how technology streamlines lesson delivery. This is clearly seen in the practices of informants MY, ASN, and MM, who replaced traditional chalkboards with digital slides and quizzes to save time and energy. However, the positive results in this qualitative study show a divergence from the quantitative findings of Suwarni and Natsir (2024). In their broader survey in Indonesia, they found a gap between teachers' high theoretical perceptions (M = 4.21) and moderate actual practices (M = 3.15), where technology was often limited to passive substitution. Methodologically, while quantitative surveys capture broad implementation gaps, this qualitative study shows that at the micro-level, giving teachers localized pedagogical autonomy allows Perceived Usefulness to translate directly into active classroom execution.

Challenges in Integrating TEL.

Analyses grounded in TAM (Davis, 1989) and TPACK (Mishra & Koehler, 2006) indicate that the operational challenges found at SMKN 1 Makassar—such as unstable internet connections, power disruptions, varying teacher readiness, the digital divide, and content adaptation difficulties—are not just isolated technical issues. Instead, these constraints act as external variables that directly reduce Perceived Ease of Use (PEOU) and create friction in Technological Pedagogical Knowledge (TPK) and Technological Content Knowledge (TCK) integration. Rather than stopping digital implementation entirely, these vulnerabilities functioned as boundaries that shaped the teachers' instructional choices.

Juxtaposing these challenges against wider empirical research reveals clear thematic and methodological alignments. The fact that internet deficits and hardware shortages limited the use of advanced applications aligns with empirical studies by Akram et al. (2022) and Suwarni and Natsir (2024), who observed that infrastructure shortages in developing contexts compromise PEOU and force teachers to rely on basic communication tools. Furthermore, the difficulty of adapting digital materials to match students' English proficiency levels and vocational contexts supports the findings of Alorani et al. (2025), who highlighted that language teachers frequently face TCK misalignments due to the lack of specialized digital resources. Crucially, while quantitative reports often label a limited choice of digital tools as teacher resistance or low competence (Suwarni & Natsir, 2024), the qualitative data in this study offer alternative evidence. The pedagogical choice of informant ASN to rely on WhatsApp did not mean negative attitudes or technical illiteracy. Instead, it was a deliberate, empathetic TPK adaptation to bridge the digital divide and prevent the exclusion of students with data quota limitations. Methodologically, this shows that limited tool selection should not always be seen as low professional competence, but can be a deliberate strategy to maintain educational equity.

Strategies Used to Integrate TEL.

When evaluated through TAM constructs and adaptive TPACK configurations, the data show that the English teachers at SMKN 1 Makassar used pragmatic strategies to maintain learning continuity. Successful digital pedagogy was achieved not through sophisticated infrastructure, but through the teachers' ability to align their Technological Knowledge (TK) with Pedagogical Knowledge (PK) and Content Knowledge (CK) to sustain Perceived Usefulness (PU) and student access.

Synthesizing these strategies with previous empirical literature shows clear thematic alignments and structural insights. The decision to use low-bandwidth platforms like WhatsApp for asynchronous learning aligns with the empirical observations of Akram et al. (2022) and Suwarni

and Natsir (2024), who confirmed that in resource-constrained secondary schools, mobile pedagogy is essential to bridge infrastructure gaps. Similarly, using short digital quizzes for formative assessment and tracking student participation parallels the findings of Lim and Yunus (2021) and Alorani et al. (2025), affirming that these tools strengthen TPK by providing immediate feedback loops. Nevertheless, a distinct divergence emerges when these localized strategies are compared to westernized, resource-abundant theoretical standards. While traditional TPACK frameworks suggest that mature integration leads to highly collaborative, student-centered digital projects (Suwarni & Natsir, 2024), the strategies at SMKN 1 Makassar reveal a survival-oriented matrix. In this vocational school context, successful TPACK implementation is defined by resilience, accessibility, and basic curriculum delivery rather than complex digital collaboration.

CONCLUSION

This study explored English teachers' perceptions, challenges, and adaptive strategies regarding Technology-Enhanced Learning (TEL) at SMK Negeri 1 Makassar. Overall, teachers held positive views toward TEL, finding digital tools helpful, efficient, and effective for enhancing student motivation, interaction, understanding, and creativity. However, classroom implementation was affected by several practical challenges, including internet instability, limited facilities, varying teacher readiness, resistance to change, the digital divide, and content development issues. To address these obstacles, teachers applied adaptive strategies such as digital pedagogy, contextualized technology use, flexible learning environments, reflective collaboration, addressing technology misperceptions, and adjusting assessments to fit technology-based learning.

These results indicate that successful TEL implementation depends on positive teacher attitudes as well as institutional support and pedagogical adaptability. Therefore, schools and educational stakeholders should provide better technological infrastructure, stable internet access, and continuous professional training to support effective TEL integration. Finally, future research could involve broader groups of participants or different educational contexts to deepen the understanding of TEL in English language teaching.

This study contributes to the literature on vocational English language teaching by offering empirical insights into how teachers navigate technology integration under infrastructural constraints. Theoretically, it extends the application of the TAM and TPACK frameworks within resource-constrained vocational contexts, demonstrating that technological-pedagogical competence manifests as pragmatic adaptation such as leveraging low-bandwidth tools and flexible learning spaces rather than relying solely on advanced digital platforms. Practically, the findings provide actionable guidance for ELT educators, school administrators, and policy makers to design context-sensitive professional development programs and implement accessible digital learning strategies.

Several methodological limitations of this study should be noted. First, data collection coincided with physical renovations at SMKN 1 Makassar from August to November 2025, which prevented on-site observations during the research period in September. Consequently, interviews were conducted online or through home visits, and classroom observations were limited to virtual sessions via Google Meet. This constraint reduced the depth of direct classroom observation, relying partly on online interactions and teachers' recall of face-to-face instruction prior to the renovation. Second, the study involved a small sample of three English teachers (N = 3) at a single vocational high school, meaning the findings reflect a specific institutional context rather than broader educational settings.

Based on these limitations, future research should examine technology integration in fully operational, face-to-face school environments to observe direct classroom dynamics. Researchers could also expand the sample size across different types of schools, such as general high schools, private institutions, and schools in rural areas. Additionally, employing longitudinal or mixed-methods designs would provide clearer insights into how teachers' technological and pedagogical practices develop over time in regular instructional contexts.

Acknowledgements

The authors express their sincere gratitude to the Dean of the Faculty of Languages and Literature, Universitas Negeri Makassar, as well as the principal, English language teachers, and staff at SMK Negeri 1 Makassar for their support and cooperation during the research process. Special thanks are also extended to the Department of English Education, Universitas Negeri Makassar, for facilitating this academic study.

Credit Author

Muhammad Miftah Fauzan: Conceptualization, Methodology, Supervision, Validation, Writing – Review & Editing. **Fadil Bilal Hamdi**: Conceptualization, Methodology, Investigation, Formal Analysis, Data Curation, Writing – Original Draft. **Maemuna Muhayyang:** Conceptualization, Methodology, Supervision, Validation, Writing – Review & Editing.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflic of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Use of Artificial Intelligence

DeepL Translator was used to assist in translating selected interview extracts from Bahasa Indonesia to English, and ChatGPT/Gemini tools were used solely for language editing and readability enhancement during manuscript preparation. The authors reviewed, verified, and approved all outputs and take full responsibility for the accuracy and integrity of the final content.

REFERENCE

Akram, H., Abdelrady, A. H., & Al-adwan, A. S. (2022). Teachers ' Perceptions of Technology Integration in Teaching-Learning Practices : A Systematic Review. *Front. Psychol.* 13:920317. https://doi.org/10.3389/fpsyg.2022.920317

Alorani, O. I., Erkir, S., Rababa'h, S. Y., Bani-Khair, B. M., Alkhaldi, A., Rababah, M., Al-Hawamdeh, B. M., Al-Awamrah, A. F., & Al-Habies, F. (2025). English Language Teachers' Perspectives on Technological Applications Used for Students With Disabilities. *Journal of Language Teaching and Research , 16(1),* 168-179. https://doi.org/10.17507/jltr.1601.18

Boonmoh, A., Thidaporn, J., & Karpklon, S. (2021). Teachers ' Perceptions and Experience in Using Technology for the Classroom. *Review of Literature. Computer Assisted Language Learning Electric Journal, 22*(1), 1–24. https://callej.org/index.php/journal/article/view/320

Carroll, L. S. L. (2017). A comprehensive definition of technology from an ethological perspective. *Social Sciences, 6*(4). 126. https://doi.org/10.3390/socsci6040126

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Cushion, C. J., & Townsend, R. C. (2019). Technology-enhanced learning in coaching: a review of literature. *Educational Review, 71*(5), 631–649. https://doi.org/10.1080/00131911.2018.1457010

Dananjaya, I. W. W. (2024). Pengaruh Media Komunikasi Dan Metode Technology- Enhanced Learning Terhadap Penguasaan Bahasa Inggris Di Sekolah Menengah Kejuruan Pertanian And Pembanguna. *Jurnal Intelek Insan Cendekia, 1*(4) 972–983. https://jicnusantara.com/index.php/jiic

Daniela, L., Visvizi, A., Gutiérrez-Braojos, C., & Lytras, M. D. (2018). Sustainable higher education and Technology-Enhanced Learning (TEL). *Sustainability, 10*(11), 3883. https://doi.org/10.3390/su10113883

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1-4. https://doi.org/10.11648/j.ajtas.20160501.11

Graham, C. R. (2011). Theoretical considerations for understanding technological pedagogical content knowledge (TPACK). *Computers and Education, 57*(3), 1953– 1960. https://doi.org/10.1016/j.compedu.2011.04.010

Hennink, M., Kaiser, B. N., & Marconi, V. C. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine, 292*, 114523. https://doi.org/10.1016/j.socscimed.2021.114523

Jogezai, N. A., Ismail, S. A. M. M., & Baloch, F. A. (2018). Secondary school teachers' concerns about ICT integration: Perspectives from a developing part of the Globe. *Eurasia Journal of Mathematics, Science and Technology Education, 14*(12). https://doi.org/10.29333/ejmste/95124

Kyza, E.A. (2023). Technology-Enhanced Learning: A Learning Sciences Perspective. In: *Spector, J.M., Lockee, B.B., Childress, M.D. (eds) Learning, Design, and Technology*. Springer, Cham. https://doi.org/10.1007/978-3-319-17461-7_56

Lim, T., & Yunus, M. (2021). Teachers' Perception towards the Use of Quizizz in the Teaching and Learning of English: A Systematic Review. *Sustainability* , *13*(11), 6436. https://doi.org/10.3390/su13116436

Luthfiyyah, R., Aisyah, & Gunadi Hary, S. (2021). Technology-enhanced formative assessment in higher education : A voice from Indonesian EFL teachers. *EduLite: Journal of English Education, Literature, and Culture, 6*(1), 42–54. http://dx.doi.org/10.30659/e.6.1.42-54

Manegre, M., & Sabiri, K. A. (2022). Online language learning using virtual classrooms: an analysis of teacher perceptions. *Computer Assisted Language Learning*, *35*(5–6), 973–988. https://doi.org/10.1080/09588221.2020.1770290

Miles, M. B. a., Huberman, A. M. a., & Saldaña, J. a. (2014). *Qualitative data analysis a methods sourcebook*. Thousand Oaks, Califorinia SAGE Publications, Inc. https://doi.org/10.1177/239700221402800402

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record: The Voice of Scholarship in Education, 108*, 1017 - 1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Naviantara, D., Suwartono, T., & Romdona, Y. (2024). Enhancing Students' Motivation in English Language Learning Through Gamification. *Jurnal PTK Dan Pendidikan, 9*(2), 119–128. https://doi.org/10.18592/ptk.v9i2.11080

Ngo, H. K., & Md Yunus, M. (2021). Flipped Classroom in English Language Teaching and Learning: A Systematic Literature Review. *International Journal of Academic Research in Business and Social Sciences, 11*(3), 185–196. http://dx.doi.org/10.6007/IJARBSS/v11-i3/8622

Nuraeni, C., Carolina, I., Supriyatna, A., Widiati, W., & Bahri, S. (2020). Mobile-Assisted Language Learning (MALL): Students' Perception and Problems towards Mobile Learning in English Language. Journal of Physics: Conference Series, 1641(1). https://doi.org/10.1088/1742-6596/1641/1/012027

Prabawa, H. W., Rorjanuardi, R., & Nurlaelah, E. (2024). Development of Mathematical Maturity through the Amalgamation of Computational Thinking and Technology- Enhanced Learning. 8(3), 1012–1025. https://doi.org/10.31764/jtam.v8i3.23766

Remedios, D., Lopez, S., Auxiliadora, M., Ayuela, D., Gonzalez-burgos, E., Serrano-gil, A., & Lalasta, K. (2019). Technology Enhanced Learning in Higher Education : How to Enhance Student Engagement through Blended Learning. *European Journal of Education 54*(2), 273–286. https://doi.org/10.1111/ejed.12330

Sugiyono. (2013). *Metode Penelitian Kuantitatif, Kualitatif*, dan R&D. ALFABETA,Cv.

Suwarni, A., & Natsir, N. (2024). Technology Integration in English Language Teaching : Analysis of Teachers' Perceptions and Practices in the Digital Era. *International Journal of Educational Research*. *1*(2), 74-98. https://doi.org/10.62951/ijer.v1i2.282

Tracy, S. J. (2020). *Qualitative research methods: Collecting evidence, crafting analysis, communicating impact (2nd ed.)*. Wiley-Blackwell.

Ulmane-Ozolina, L., Jansone, A., Magazeina, I., & Barute, D. (2019). Technology enhanced learning in teachers' professional development. 7(1), 216–221. https://doi.org/10.21533/pen.v7i1.400