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Investigating Teachers' Pedagogical Adaptations for Effective Technology Integration in EFL Classrooms

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ABSTRACT

Background: The rapid integration of digital technologies in secondary education has transformed English as a Foreign Language instruction, yet effective implementation remains uneven and highly contextual. While prior studies often focus on access or technological competence, less attention has been given to how teachers adapt pedagogically within real classroom conditions, particularly in regional Indonesian contexts.

Aims: This study investigates how EFL teachers adapt their instructional practices in technology integrated classrooms, examining forms of implementation, contextual factors influencing adaptation, and teachers' perceptions of instructional effectiveness.

Methods: A qualitative multiple site case study was conducted at SMA Negeri 1 Palu and SMA Alkhairaat Palu in Central Sulawesi, Indonesia. Ten EFL teachers were selected through purposeful sampling. Data were collected through semi structured interviews and classroom observations between March and May 2025. The data were analyzed using thematic analysis following Braun and Clarke's six phase framework, integrating inductive coding with theoretically informed interpretation.

Results: The findings indicate that technology integration operates as a dynamic process of pedagogical negotiation rather than linear adoption. Teachers reorganized lesson structures, modified digital tasks in response to classroom contingencies, and recalibrated instructional decisions when facing infrastructural limitations. Professional experience influenced adaptive flexibility, with more experienced teachers demonstrating greater capacity for instructional redesign. Although digital tools enhanced student engagement, their effectiveness depended on deliberate scaffolding and pedagogical orchestration.

Implications: This study advances a process-oriented understanding of pedagogical adaptation in technology-mediated EFL classrooms. The findings underscore the

centrality of teacher agency and reflective judgment in sustaining meaningful digital learning environments. Professional development initiatives should therefore prioritize adaptive expertise and pedagogical reasoning rather than technical skill acquisition alone.

Keywords: *Adaptive pedagogy; EFL teachers; technology integration; thematic analysis*

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1. INTRODUCTION

Technological development has fundamentally reshaped English as a Foreign Language (EFL) education, transforming not only the tools used in classrooms but also the pedagogical reasoning that underpins instructional practice. The post-pandemic educational landscape has intensified expectations for teachers to integrate digital technologies into routine instruction rather than treat them as supplementary resources (Yeh, 2024; Renandya et al., 2023). As digital platforms, learning management systems, and interactive applications become institutional norms, the central question is no longer whether teachers use technology, but how they adapt their pedagogy to ensure meaningful learning outcomes.

Recent empirical research underscores that technology integration does not automatically enhance instructional quality. Instead, its effectiveness depends on teachers' capacity to align technological affordances with pedagogical intentions and content demands (Akram et al., 2022; Dindar et al., 2021). The Technological Pedagogical Content Knowledge (TPACK) framework has provided a foundational model for understanding such integration (Mishra, 2019; Mishra et al., 2022). However, contemporary studies suggest that TPACK alone does not sufficiently capture the dynamic, context-responsive decision-making processes teachers engage in, particularly in settings marked by infrastructural limitations and uneven professional development (Sharma & Srivastava, 2020; Ergado et al., 2021; Menzli et al., 2022).

In the Indonesian secondary school context, technology integration remains deeply influenced by regional disparities in digital infrastructure, access to devices, and institutional support. Schools outside major metropolitan centers often experience fluctuating internet connectivity and limited access to structured pedagogical training. Such conditions require teachers to negotiate between technological possibilities and contextual constraints in real time. While previous research has examined teacher attitudes and technology acceptance, much of it relies on survey-based designs that measure frequency of use rather than exploring the reflective processes through which teachers restructure lesson design, interactional patterns, and classroom management strategies (Yeh, 2024; Ray & Sikdar, 2024).

1.1 Research Gap and Novelty

Recent publications (2023-2025) have advanced discussions on digital pedagogy and teacher readiness; however, three limitations remain evident. First, many studies quantify levels of adoption without examining how teachers interpret and respond to technological disruptions during instruction (Renandya et al., 2023). Second, contextual

barriers such as unstable connectivity and limited institutional support are frequently described as obstacles, yet insufficient attention is given to how teachers strategically adapt in response to those barriers (Ray & Sikdar, 2024). Third, qualitative evidence from Indonesian provincial secondary schools remains limited, particularly studies that connect teacher reflection with observable classroom adaptation.

This study addresses these gaps by examining EFL teachers' pedagogical adaptation processes in two secondary schools in Central Sulawesi: SMA Negeri 1 Palu and SMA Alkhairaat Palu. These schools represent public and private institutional contexts within the same regional environment, providing a focused yet contextually grounded setting for examining technology integration practices. Rather than concentrating solely on tool adoption, this research investigates how teachers implement technology, what factors support or constrain their adaptive processes, and how they interpret the instructional effectiveness of their adjustments.

By foregrounding teachers' lived experiences and decision-making processes, this study proposes a process-oriented understanding of pedagogical adaptation that extends existing TPACK and diffusion perspectives. It conceptualizes adaptation not as a linear adoption trajectory but as a recursive cycle involving experimentation, reflection, and strategic reorganization within context-specific constraints. Through this lens, the study contributes a more nuanced account of teacher agency in technology-mediated EFL classrooms and provides empirically grounded insight into how pedagogical transformation unfolds in resource-limited educational settings.

1.2 Research Questions

This study is guided by the following research questions:

1. How do EFL teachers implement technology integration in their classroom instruction?
2. What supporting and constraining factors influence teachers' pedagogical adaptation processes?
3. How do teachers perceive the effectiveness of their pedagogical adaptations when integrating technology?

2. METHODS

2.1 Research Design

This study employed an exploratory qualitative design to examine how EFL teachers enact pedagogical adaptation when integrating technology into classroom instruction. A qualitative approach was selected because the study seeks to understand processes rather than measure frequency or effectiveness. Recent scholarship has emphasized that technology integration cannot be fully explained through adoption metrics alone but must be examined through teachers' situated reasoning and classroom decision-making (Renandya et al., 2023; Özdere, 2023; Yeh, 2024). Accordingly, this design enabled an in-depth investigation of how teachers interpret contextual constraints, restructure instructional practices, and negotiate technological affordances in real teaching environments.

The study adopted an interpretive orientation, positioning teachers as reflective agents whose pedagogical actions are shaped by experience, institutional context, and professional judgment. This approach aligns with the study's objective of articulating the processes underlying implementation, enabling and constraining factors, and perceived instructional effectiveness.

2.2 Research Subjects

The research was conducted in two secondary schools in Central Sulawesi, Indonesia, namely SMA Negeri 1 Palu and SMA Alkhairaat Palu. These schools were selected because both had formally incorporated digital platforms into classroom instruction following the post pandemic transition, yet they operate under different institutional characteristics as a public and a private school. This distinction enabled contextual comparison within similar regional conditions. A total of ten EFL teachers participated in the study. Purposeful sampling was applied to ensure that participants met the following criteria: actively teaching EFL at the secondary level, having at least one year of experience integrating digital tools in classroom instruction, and being willing to participate in both semi structured interviews and classroom observations.

The participating teachers were categorized into early career teachers with one to five years of experience, mid-career teachers with six to ten years, and senior teachers with more than ten years. This classification allowed examination of how professional experience shaped adaptive decision making in technology integrated instruction. Teachers who had not implemented technology in their teaching were excluded to maintain alignment with the study's focus. Data saturation was reached after the eighth interview when no substantially new codes emerged. Two additional interviews were conducted to confirm thematic stability, resulting in a final sample of ten participants.

2.3 Research Procedures

Data were collected through semi structured interviews and classroom observations conducted between March and May 2025. Prior to data collection, formal permission was obtained from the school administrators of SMA Negeri 1 Palu and SMA Alkhairaat Palu, and all participants provided written informed consent. Each teacher participated in one in depth interview lasting between 60 and 90 minutes. The interviews were designed to generate detailed accounts aligned with the research questions and explored three core dimensions: forms of technology implementation in classroom practice; supporting and constraining factors influencing pedagogical adaptation; and teachers' perceptions of instructional effectiveness. All interviews were audio recorded and transcribed verbatim to ensure accuracy. Probing questions were employed to encourage participants to describe specific classroom events and decision-making processes rather than provide general or abstract statements, thereby strengthening the evidentiary basis of the analysis.

To complement the interview data, each teacher was observed two to three times during technology-integrated lessons, resulting in approximately 14 hours of observational data. The observations focused on several key aspects of pedagogical adaptation: lesson structuring and sequencing; teacher-student interaction during digital tasks; real-time adjustments to technological disruptions; and scaffolding strategies enacted within technology-mediated activities. Field notes were written immediately after each session to preserve contextual nuance and minimize retrospective distortion. The integration of interview and observational data enhanced analytic credibility through methodological triangulation, enabling a more comprehensive understanding of how teachers articulated and enacted their adaptive practices.

2.4 Research Instruments

The semi structured interview guide was developed through a careful review of recent scholarship on digital pedagogy, teacher agency, and pedagogical adaptation in technology-mediated instruction. The construction of the instrument was explicitly aligned with the three research questions, ensuring conceptual coherence between the study objectives and data generation. The interview guide consisted of open-ended questions organized into three domains: implementation of technology in classroom practice, supporting and constraining contextual factors, and teachers' perceptions of instructional effectiveness. Within each domain, prompts were designed to elicit detailed descriptions of classroom events, instructional choices, and reflective evaluations (Castleberry & Nolen, 2018; Ding et al., 2019; Canals & Al-Rawashdeh, 2019). For example, participants were asked to explain how they redesigned lesson sequences when using digital platforms, how they responded to internet disruptions during instruction, and how they evaluated student engagement and learning outcomes following technology integration. The instrument was reviewed by two experts in language education and educational technology to assess clarity, relevance, and alignment with contemporary theoretical discussions. Minor revisions were made after pilot testing with one EFL teacher who was not part of the main study, particularly to refine question sequencing and improve the specificity of probing prompts.

The classroom observation protocol was structured to capture enacted pedagogical adaptation rather than surface level technology use. The protocol included analytic categories derived from the study framework, namely instructional decision making, task modification, classroom orchestration, interactional mediation, and real-time problem solving. Specific attention was given to how teachers structured lesson openings and transitions when digital tools were introduced, how they adjusted pacing in response to student difficulties, and how they scaffolded comprehension during multimedia activities. The protocol also documented instances where teachers shifted strategies due to technical disruptions or student engagement patterns. This design ensured that observations focused on the pedagogical reasoning underlying technology integration rather than merely recording the presence of digital tools. By systematically connecting observed practices with interview accounts, the protocol supported a deeper interpretation of how teachers conceptualized and enacted adaptive instructional strategies.

2.5 Data Analysis

Data were analyzed using Braun and Clarke's thematic analysis framework, following six systematic phases: familiarization with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. This analytic approach was selected because it allows both structured rigor and interpretive flexibility, enabling the researchers to capture patterned meanings while remaining sensitive to contextual nuances in teachers' accounts of pedagogical adaptation (Nowell et al., 2017; Gerring, 2017; Brannen, 2017; Gehman et al., 2018).

The first and second authors independently read and reread the interview transcripts and observation field notes to achieve analytic immersion. Initial coding was conducted across the entire dataset to identify segments related to three central domains aligned with the research questions, namely implementation of technology integration, supporting and constraining contextual factors, and teachers' perceptions of instructional effectiveness. Coding combined inductive sensitivity to participants' language with theoretically informed attention to adaptation processes discussed in recent digital pedagogy scholarship. Rather than imposing predefined categories, the

researchers allowed patterns to emerge from the data while examining how teachers described instructional restructuring, decision making under technological constraints, and evaluative reflections on classroom outcomes.

Following initial coding, codes were compared, refined, and clustered into candidate themes. Coding discrepancies were discussed in analytic meetings until interpretive consensus was reached. An audit trail was maintained throughout the process to document coding revisions, theme development, and analytic decisions, thereby enhancing transparency and dependability. Themes were then reviewed against the full dataset to ensure internal coherence and clear distinction between categories. In the final stage, themes were explicitly organized according to the three research questions to maintain structural clarity and analytic alignment, ensuring that the findings directly addressed the study's conceptual focus and responded systematically to the concerns raised in the literature.

3. FINDINGS AND DISCUSSION

3.1 Findings

This section presents the findings and discussion of the study, organized to address the three research questions: (1) How do EFL teachers implement technology integration in their classroom instruction? (2) What supporting and constraining factors influence teachers' pedagogical adaptation processes? and (3) How do teachers perceive the effectiveness of their pedagogical adaptations when integrating technology?

The Various Ways Teachers Implement Technology in Their Classroom Instruction

The findings indicated that technology integration in SMA Negeri 1 Palu and SMA Alkhairaat Palu extended beyond the mere use of digital tools. Teachers demonstrated a gradual shift from viewing technology as a delivery mechanism toward employing it as a structuring device that reshaped lesson organization, task sequencing, and classroom interaction.

Most participants reported adopting a blended instructional model that combined face to face teaching with digital platforms such as Learning Management Systems, Google Classroom, instructional videos, and online quizzes. However, the integration was not uniform. While some teachers used digital platforms primarily to distribute materials and collect assignments, others restructured lesson flow by sequencing pre lesson materials online, facilitating in class discussion, and assigning reflective tasks through digital forums. One senior teacher explained that "when I started using LMS, I only uploaded materials. But later I realized I could organize the lesson differently. Students could access materials earlier, so class time was used more for discussion."

Classroom observations confirmed this restructuring. Teachers moved fluidly between digital and non-digital resources to scaffold comprehension and maintain continuity. In several sessions, teachers paused digital activities to clarify linguistic points, demonstrating that technology did not replace pedagogy but was embedded within it.

Adaptive implementation also became visible during moments of technological disruption. In one observed lesson, when an online quiz platform failed to load, the teacher immediately shifted to small group discussion using printed prompts. In a follow up interview, she noted that "now I always prepare alternative activities. Technology is helpful, but I cannot depend on it fully." Such episodes illustrate that implementation involved anticipatory planning and, in the moment, pedagogical judgment rather than rigid adherence to digital tools.

The Multifaceted Supporting and Constraining Factors that Shape Their Pedagogical Adaptation Processes

Teachers identified both enabling and constraining factors that shaped their adaptive practices. Supporting factors included prior teaching experience, collegial collaboration, and a positive disposition toward experimentation. More experienced teachers tended to draw on established pedagogical principles when modifying digital tasks. For instance, one senior teacher used online discussion forums not merely for submission but to monitor the progression of students' reasoning over time.

In contrast, early career teachers were more likely to rely on the technical features of platforms. As one participant stated that "I usually follow the structure already available in the application. I am still learning how to adjust it."

Constraining factors were consistently associated with infrastructural limitations and insufficient pedagogical training. Teachers reported unstable internet connectivity, limited student access to devices, and a lack of structured professional development focused on pedagogical integration rather than technical operation. Table 1 presents the distribution of dominant adaptation themes across participants.

Table 1 Frequency of Pedagogical Adaptation Themes Identified Across Participants

Main Theme	Number of Teachers	Illustrative Focus
Adaptation of Teaching Strategies	9	Lesson restructuring using LMS and hybrid sequencing
Technical and Pedagogical Challenges	7	Internet instability and limited training
Reflective Evaluation of Effectiveness	6	Monitoring student engagement and autonomy

While the table provides an overview of thematic prominence, qualitative analysis revealed that constraints did not simply hinder instruction. Instead, they prompted reflective adjustment. Several teachers described developing hybrid routines that allowed lessons to continue even when connectivity was unstable. One teacher noted that "sometimes I ask students to download materials first, so even if the internet drops, the activity can continue." This indicates that contextual barriers functioned not only as obstacles but also as catalysts for adaptive planning.

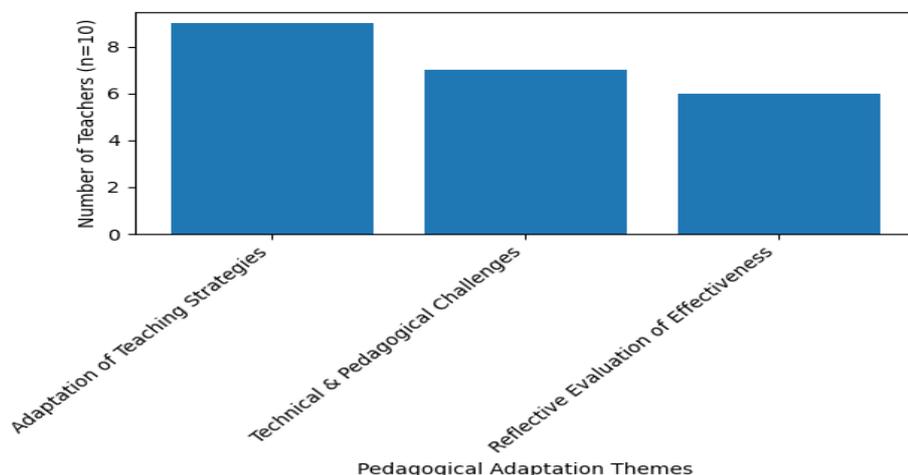


Figure 1. Pedagogical Adaptation Themes Identified Across Participants

Figure 1 illustrates patterns of technology use and commonly reported challenges. The majority of teachers implemented blended learning approaches and used digital platforms regularly. However, infrastructural constraints and limited pedagogical training remained recurring concerns. The diagram is presented descriptively to illustrate thematic tendencies rather than statistical generalization due to the qualitative nature of the study.

Teachers' Perceptions of Technology Adaptation Effectiveness

Teachers' perceptions of effectiveness centered on student engagement, participation, and emerging autonomy. Most participants observed that digital tools increased students' willingness to respond, particularly in online quizzes and multimedia activities. One mid-career teacher remarked that "students who are usually quiet become more active when using online quizzes. They feel less afraid to answer."

Observations corroborated these claims, particularly in lessons where videos were paired with guided questioning. Teachers who combined multimedia resources with structured follow up discussion reported deeper student interaction compared to lessons that relied solely on presentation slides.

However, perceptions of effectiveness were not uniformly positive. Some teachers expressed concern that students' engagement was sometimes superficial, especially when tasks emphasized completion rather than critical language use. A participant stated that "They enjoy the activity, but I still need to check whether they really understand the grammar point."

These reflections suggest that teachers evaluated effectiveness not only in terms of participation but also in relation to content mastery and interaction quality. More experienced teachers demonstrated greater confidence in aligning technological affordances with pedagogical objectives, whereas less experienced teachers were still negotiating that alignment.

Overall, the findings reveal that pedagogical adaptation in technology integrated EFL classrooms is a recursive process involving experimentation, contextual negotiation, and reflective evaluation. Teachers in SMA Negeri 1 Palu and SMA Alkhairaat Palu did not merely adopt digital tools; they continuously recalibrated instructional strategies in response to infrastructural conditions, student responses, and professional judgment.

3.2 Discussion

The findings of this study demonstrated that pedagogical adaptation in technology integrated EFL classrooms at SMA Negeri 1 Palu and SMA Alkhairaat Palu extends beyond technical adoption and reflects a continuous negotiation between instructional goals, contextual realities, and professional judgment. Consistent with the Technological Pedagogical Content Knowledge framework, teachers' decisions revealed the interplay between technological knowledge, pedagogical reasoning, and content representation (Ding et al., 2019; Mishra, 2019; Mishra et al., 2022). However, the data suggest that adaptation is not merely a matter of possessing integrated knowledge domains but involves iterative recalibration in response to classroom contingencies.

In relation to RQ1, teachers' implementation practices illustrate that technology integration reshaped lesson sequencing and classroom interaction rather than functioning solely as a delivery mechanism. When teachers reorganized lesson flow by assigning preparatory materials through LMS and reserving class time for discussion, they enacted the integration of technological and pedagogical knowledge in practice. This finding reinforces arguments advanced by Daniela (2018), Makarova and Makarova (2018), and Malik et al. (2019), who emphasize that meaningful technology integration requires the blending of pedagogical intent with digital affordances. Yet, unlike studies

that treat integration as a stable competence, this study shows that such blending remains dynamic and situational.

The adaptive responses observed during technological disruptions further illuminate this dynamic character. Teachers' readiness to shift from online quizzes to small group discussions reflects context sensitive pedagogical reasoning. These findings resonate with Rogers' Diffusion of Innovations theory (2003), particularly the stages of evaluation and reinvention during adoption. Similar patterns have been documented by García-Avilés (2020) and Menzli et al. (2022), who argue that innovation adoption involves continuous reinterpretation rather than linear acceptance. In this study, adaptation emerged not as compliance with institutional mandates but as strategic mediation between technological affordances and classroom realities.

In relation to RQ2, supporting and constraining factors significantly shaped the adaptation process. Experienced teachers demonstrated greater flexibility in modifying digital tasks, aligning with research suggesting that prior pedagogical expertise enhances meaningful integration (Nelson et al., 2019; Hannache-Heurteloup & Moustaghfir, 2020). Conversely, early career teachers were more inclined to follow platform structures without substantial modification, indicating that technological familiarity does not automatically translate into pedagogical transformation. This distinction underscores the importance of pedagogical reasoning over technical proficiency, a concern also highlighted by Kessler (2018) and Ma and Lee (2019) in discussions of digital adoption barriers.

Infrastructure limitations and insufficient pedagogical training were repeatedly identified as constraints. However, rather than halting instructional practice, these constraints prompted teachers to develop hybrid routines and alternative instructional pathways. Such findings complicate deficit-based narratives of technological limitation. As Ergado et al. (2021) argue, contextual barriers do not solely function as obstacles but can stimulate organizational and pedagogical adaptation. In this study, teachers' reflective adjustments illustrate how contextual constraints are negotiated through professional agency rather than passively endured.

Regarding RQ3, teachers' perceptions of effectiveness centered on student engagement and participation, yet were tempered by concerns about depth of understanding. The increased participation observed during online quizzes and multimedia activities aligns with findings reported by Cassum and Gul (2017) and Srinivasa et al. (2022), who emphasize that digital environments can enhance interaction when accompanied by structured guidance. At the same time, teachers' critical reflections regarding superficial engagement indicate an evaluative stance consistent with constructivist principles articulated by Vygotsky (1978). Technology alone did not guarantee meaningful learning; rather, effectiveness depended on scaffolding, guided questioning, and deliberate orchestration.

Taken together, the findings suggest that pedagogical adaptation unfolds through a recursive process involving experimentation, reflection, and strategic reorganization. This pattern extends earlier theoretical perspectives by integrating TPACK's knowledge domains (Mishra & Koehler, 2006; Mishra, 2019; Mishra et al., 2022) with the reinvention dimension of Diffusion of Innovations (Rogers, 2003). Unlike survey-based studies that measure adoption levels, this research foregrounds teachers' interpretive work as they balance digital affordances with pedagogical commitments. In doing so, it contributes a process-oriented understanding of teacher agency in technology mediated EFL classrooms.

The study also highlights the centrality of reflective practice. Teachers did not merely implement prescribed digital strategies; they evaluated student responses, adjusted pacing, and reconfigured tasks in light of classroom interaction. This finding aligns with Swain (2018) and Peel (2020), who emphasize that qualitative analysis can reveal the

nuanced processes through which practitioners interpret and act upon complex educational conditions. By documenting how teachers in SMA Negeri 1 Palu and SMA Alkhairaat Palu navigate infrastructural and pedagogical challenges, this study provides empirical grounding for theoretical claims regarding adaptive expertise in digital pedagogy.

Nevertheless, the scope of the study remains bounded by its qualitative design and regional focus. While the findings offer transferability through thick description, broader generalization requires caution. Future research may expand the analysis to include student perspectives, longitudinal observation of adaptation processes, and comparative studies across diverse institutional contexts. Additionally, further investigation into the emotional dimensions of adaptation may enrich current understandings of teacher resilience, as suggested by Ergado et al. (2021) and Akram et al. (2022).

Overall, this study advances the discourse on technology enhanced language education by demonstrating that effective integration depends less on tool mastery and more on sustained pedagogical reasoning within contextual constraints. Teachers emerge not as passive adopters of innovation but as reflective agents who continuously reinterpret, adjust, and refine their instructional practice. Such a perspective invites a reconsideration of professional development models, emphasizing adaptive thinking and contextual judgment as foundational components of digital pedagogy.

4. CONCLUSION

This study examined how EFL teachers at SMA Negeri 1 Palu and SMA Alkhairaat Palu adapt their pedagogical practices in technology integrated classrooms by analyzing implementation strategies, contextual influences, and perceived instructional effectiveness. The findings indicate that technology integration is not a linear act of adoption but a continuous process of pedagogical negotiation. Teachers reorganized lesson structures, modified digital tasks in response to classroom contingencies, and recalibrated instructional decisions when encountering infrastructural constraints. Professional experience influenced the degree of flexibility in adaptation, with more experienced teachers demonstrating greater capacity to redesign tasks and mediate disruptions. Importantly, contextual limitations did not simply hinder instructional practice; rather, they stimulated reflective adjustments and hybrid strategies, underscoring the centrality of teacher agency in shaping meaningful digital learning environments.

The study further demonstrates that while technology enhanced student engagement and participation, its instructional effectiveness depended on deliberate scaffolding and pedagogical orchestration. Digital tools functioned as mediational resources whose value was contingent upon reflective instructional judgment rather than technical mastery alone. Theoretically, this research advances a process-oriented understanding of pedagogical adaptation by situating technology integration within dynamic classroom realities and professional reasoning. Methodologically, the integration of interview and observational data offers a grounded account of enacted practice beyond perception-based measures. Although limited to two secondary schools, the findings suggest that strengthening adaptive expertise should become a central focus of professional development initiatives aimed at sustaining pedagogically meaningful technology enhanced language learning.

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Authors' Contribution

Abdul Gafur Marzuki initiated and conceptualized the study, formulated the research design, coordinated data collection, and led the overall manuscript preparation. Vemmy Maidita Nur Aisyiah contributed to the development and validation of research instruments and conducted in depth interviews. Erizar Erizar participated in data coding and thematic analysis, ensuring analytical consistency across datasets. Ila Amalia supported classroom observations and assisted in the organization and verification of field data. Huriyah Huriyah contributed to literature synthesis and strengthened the theoretical framework of the study. Risa Triassanti assisted in data triangulation and contributed to the interpretation of findings in relation to existing scholarship. Dewi Kencanawati critically reviewed the manuscript, refined the academic argumentation, and ensured coherence between findings, discussion, and conclusion. All authors approved the final manuscript and agreed to be accountable for the integrity and scholarly rigor of the work.

AI Generative Statement

The authors declare that artificial intelligence tools were used in a limited capacity to support language refinement and clarity of expression during manuscript preparation. All conceptual development, data collection, analysis, interpretation, and final academic decisions were conducted independently by the authors. The authors take full responsibility for the originality, accuracy, and integrity of the content presented in this article.

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