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Original Research

From Augmentation to Redefinition: ICT-Integrated EFL Learning Tasks Based on SAMR Framework

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Abstract

The integration of Information and Communication Technology (ICT) into English as a Foreign Language (EFL) education is increasingly vital for fostering twenty-first-century competencies. Although digital pedagogy has gained global momentum, few studies thoroughly examine ICT integration in classroom tasks from both instructor and learner perspectives, particularly in the context of Indonesian higher education. Addressing this gap, the present study investigates the extent and depth of ICT use in EFL classrooms through the lens of the Substitution, Augmentation, Modification, and Redefinition (SAMR) framework. Employing a qualitative case study design, data were collected from ten English lecturers and 250 students across three private universities in Jakarta via classroom observations, semi-structured interviews, and document analysis. Guided by Miles and Huberman's interactive model, the analysis triangulated findings across multiple sources. Results indicate that ICT use is concentrated at the substitution and augmentation levels, especially for reading and listening tasks. In contrast, speaking and writing activities show more advanced integration, including instances of redefinition such as multimedia storytelling and collaborative blogging. Key barriers to deeper ICT integration include uneven digital literacy, inadequate infrastructure, and limited pedagogical training. This study contributes to digital language pedagogy by mapping language skills to SAMR stages and identifying pedagogical, institutional, and policy implications. It offers actionable insights for educators and policymakers to promote more systemic, equitable, and student-centered digital learning environments in EFL contexts.

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1. Introduction

In the current digital era, the integration of technology into education is no longer a matter of choice but a fundamental requirement. As education systems around the world respond to the challenges posed by the Fourth Industrial Revolution, Information and Communication Technology (ICT) has become a key driver of pedagogical transformation. ICT reshapes teaching methodologies, enhances communication, and redefines the role of students as active participants in the learning process. Within the context of English as a Foreign Language (EFL) education, ICT plays a pivotal role in facilitating learner-centered approaches that align with twenty-first-century competencies (Mirzajani et al., 2016; Hu et al., 2018; Liesa-Orús et al., 2020; Supriyatno et al., 2020).

The use of ICT in language instruction is widely recognized for its potential to promote learner autonomy, foster creativity, and encourage collaboration. A diverse range of digital tools supports personalized learning experiences, increases student engagement, and enables authentic language use. Tools

such as smartboards, mobile applications, and digital learning platforms provide opportunities for differentiated instruction and real-time feedback (M. Lestari & Wahyudin, 2020; Shadiev & Wang, 2022). However, these advantages are not inherent. Their impact depends on the intentional and meaningful integration of technology into teaching, guided by pedagogical frameworks that promote transformation rather than superficial replacement of traditional practices.

Extensive research highlights the benefits of ICT in enhancing EFL instruction. Previous studies show that digital technology can enrich the learning experience by offering access to authentic resources, facilitating collaboration, and increasing student motivation (Azmi, 2017; Sabiri, 2019; Hariffin & Mohd Said, 2019; Gilakjani, 2017a). For instance, the use of vlogs, mobile learning platforms, and collaborative digital tools has been shown to enhance learners' speaking and writing skills (N. Lestari, 2019; Abugohar et al., 2019; González Otero, 2016). Other research emphasizes the utility of grammar checkers, multimedia tools, and online forums in supporting reading and writing development (Kupchyk & Litvinchuk, 2021; Hidayati, 2022; Haerazi, 2024). Informal digital environments such as WhatsApp and YouTube have also proven effective in supporting vocabulary acquisition and pronunciation practice (Wibowo et al., 2024; Muhammad, 2020). Despite these promising developments, evidence indicates that the application of ICT in classrooms often remains at a basic level, focusing on surface-level digital functions without fundamentally transforming instructional design or learner engagement (Gilakjani, 2017b; Pettersson, 2021).

In Indonesia, the integration of ICT into EFL education faces a number of specific challenges. Most existing studies emphasize teacher perceptions, technological infrastructure, and access to digital tools. While these factors are certainly relevant, there remains a shortage of empirical research that examines how ICT is implemented in actual classroom activities (Atmojo & Nugroho, 2020; Santosa et al., 2022; Apuke & Iyendo, 2018; Feng et al., 2019). Moreover, while theoretical models such as TPACK and Bloom's Revised Taxonomy are often applied in studies of technology integration, the Substitution, Augmentation, Modification, and Redefinition (SAMR) framework has received relatively little attention in analyzing the depth of ICT use across language skill areas (Savignano, 2017; Lee & Kim, 2017; Ramadiani et al., 2020). Much of the literature remains fragmented and often focuses on isolated tools or teacher-centered approaches, without offering a comprehensive analysis of how technology-enhanced learning is experienced by both students and lecturers in real instructional contexts.

This study addresses existing gaps by applying the SAMR framework (Puentedura, 2006; 2013) to explore ICT integration across language learning tasks such as speaking, writing, reading, and listening. It contributes by incorporating both student and lecturer perspectives, providing a more comprehensive and skill-specific view of ICT use in EFL classrooms. Unlike earlier research that tends to focus on individual tools or specific skills, this study provides empirical evidence that connects actual classroom practices to the stages of the SAMR model. The SAMR framework categorizes technology use into four stages: Substitution, Augmentation, Modification, and Redefinition. The integration of digital tools into educational methodologies continues to be reinforced by research highlighting their potential to enhance learning in meaningful and transformative ways. When technology aligns with learners' needs, it increases engagement and facilitates interactive experiences beyond traditional educational practices (Henderson et al., 2015; Alshayeb, 2018; Pham, 2022). This integration fosters immersive environments where students engage with digital content to develop deeper understanding and active participation (Onah et al., 2021; Alshayeb, 2018).

Furthermore, customizing digital tools to accommodate diverse learner profiles is crucial for achieving successful learning outcomes (Rashid & Asghar, 2016; Yang, 2024). Recognizing individual differences allows educators to optimize technology use, empowering learners through enhanced adaptability and self-regulation (Hannafin, 2017; Muthmainnah et al., 2023; Ibrahim, 2024; Norton et al., 2019). In the context of Indonesian higher education, digital inequalities among students and educators demand careful attention to how technological tools are implemented. Research emphasizes that technology can help bridge access gaps, enabling students to acquire skills essential for academic and professional success (Ewin et al., 2020; Suvandy et al., 2024; Alioon & Delialioğlu, 2017). Longitudinal studies affirm that digital integration transforms static instructional models into dynamic, responsive pedagogies that enhance educational effectiveness (Pramono et al., 2023). Therefore, institutions must prioritize technology that promotes student engagement and critical thinking, both vital in the digital era (Henderson et al., 2015; Rashid & Asghar, 2016). Amid ongoing technological challenges, the evolution of digital learning environments offers promising opportunities to create more interactive, inclusive, and effective higher education experiences (Hafizi et al., 2024; Hannafin, 2017).

The strength of this research lies in its capacity to connect theoretical frameworks with practical classroom realities in the domain of digital language education. By identifying the types of digital tools used, evaluating how these tools align with the SAMR stages, and analyzing the challenges that influence ICT implementation, this study sheds light on both the potential and limitations of technology in EFL learning. It offers guidance for educators and institutional leaders who aim to improve digital learning practices. Furthermore, it contributes to broader discussions on digital literacy by illustrating how structured ICT integration can facilitate interactive, student-centered learning environments. Rather than serving merely as a substitute for traditional materials, digital tools are shown to offer opportunities for more meaningful student engagement with language tasks.

These findings carry important implications for curriculum designers, teacher trainers, and policymakers who seek to advance inclusive and sustainable digital pedagogy. Ultimately, this study emphasizes the need for coherent digital strategies that align technological innovation with strong instructional design in order to strengthen EFL instruction in the evolving educational landscape.

2. Literature Review

2.1 ICT Integration in EFL Task

Information and Communication Technology (ICT) continues to play a transformative role in English as a Foreign Language (EFL) education by enhancing learner engagement, improving accessibility, and increasing instructional flexibility (Azmi, 2017; Sabiri, 2019). A wide variety of digital tools, including computers, smart boards, mobile devices, and multimedia applications, enrich the language learning experience by accommodating diverse learner needs and enabling adaptive teaching approaches (Hariffin & Mohd Said, 2019; Gilakjani, 2017a). Researchers consistently emphasize that ICT promotes learner-centered instruction by fostering autonomy, creativity, and active participation in the classroom (Hennessy et al., 2022; Hidayati, 2022; Trinidad & Ngo, 2019).

According to Haerazi (2024), ICT integration in English instruction provides several advantages, such as improving task relevance, promoting learner agency, increasing authenticity, and supporting self-assessment practices. Muhammad (2020) further explains that technology motivates students and allows for personalized learning experiences tailored to individual needs. The use of multimedia and simulations helps recreate real-world language contexts, offering learners experiential learning opportunities that are often missing in traditional instruction (Otero, 2016; Wibowo et al., 2024). In addition, ICT supports language assessment by enabling real-time feedback, facilitating differentiated instruction, and allowing for multimodal learning pathways (Kupchyk & Litvinchuk, 2021; Pettersson, 2021). Furthermore, digital tools contribute to increased student motivation and collaboration, foster higher-order thinking, and strengthen pedagogical practices among educators (Becuwe et al., 2017; Aşık et al., 2020; Falloon, 2020; Lawrence & Tar, 2018).

Despite these positive developments, current research often lacks a task-specific focus or fails to apply a structured framework to assess the depth of ICT integration in language teaching. This gap is particularly evident in the context of Indonesian higher education. Many studies primarily address the general benefits of technology use or explore teacher perceptions, without offering an analysis of how ICT supports specific language skills in instructional practice. To address this issue, the present study adopts the Substitution, Augmentation, Modification, and Redefinition (SAMR) framework developed by Puentedura (2006, 2013). This framework is applied to examine ICT use in speaking, writing, reading, and listening tasks by incorporating input from both lecturers and students. By mapping digital tools to the corresponding levels of the SAMR model, the study reveals how technology either enhances or restricts learning outcomes across different language domains. The findings aim to inform the development of teaching models, curriculum design, teacher professional development, and education policy. Most importantly, the study emphasizes the importance of meaningful ICT integration that supports inclusive, engaging, and skill-oriented language learning experiences.

2.2 SAMR Framework

The SAMR framework by Puentedura (2006) outlines four levels of technology use in education: Substitution, Augmentation, Modification, and Redefinition. These were later grouped into Enhancement and Transformation categories. The model guides educators in selecting and evaluating technology integration, as shown in Figure 1.

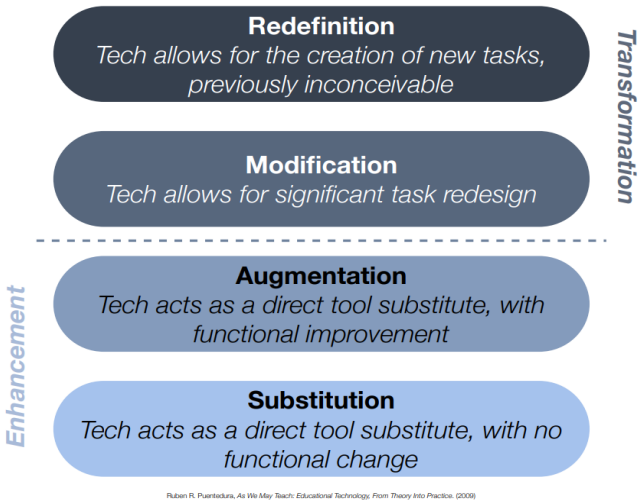

Figure 1. The SAMR Framework adapted from Puentedura (2006, 2013)

Based on Figure 1 above, the SAMR model consists of four stages, each representing a distinct level of technology integration in classroom assignments:

1) *Substitution:* At this stage, technology acts as a direct replacement for traditional tools without changing their fundamental function. For example, using a computer with word processing software like Microsoft Word to replace handwriting on paper. The task itself remains the same; only the medium used to complete it differs.

2) *Augmentation:* Technology not only replaces traditional tools at this stage but also enhances their functionality. For instance, Microsoft Word's built-in features such as spell check, grammar check, and word prediction improve efficiency and accuracy, providing benefits beyond what traditional methods offer.

3) *Modification:* At this level, technology allows for significant task redesign, transforming how tasks are performed. Instead of working individually on a document, students can collaborate in real time using Google Docs. This platform enables multiple users to edit the same document simultaneously, leave comments, and track changes, fostering a more interactive and dynamic learning environment.

4) *Redefinition:* The highest stage of the SAMR model, redefinition, involves using technology to create entirely new tasks that were previously impossible. For example, students can use multimedia tools to create digital storytelling projects, interactive presentations, or video essays. They can also collaborate with peers or experts worldwide through virtual meetings, online discussions, or cloud-based platforms, fundamentally changing how learning and communication occur.

The SAMR framework illustrates the evolving role of technology in education, progressing from substituting traditional tools to transforming learning experiences. It was designed to examine how technology integrates into educational practices (Aprinaldi et al., 2018; Wahyuni et al., 2020). A key strength of the framework is its structured roadmap that guides educators from substitution to redefinition, and from augmentation to transformation, while highlighting the vast potential of technological innovation in teaching and learning (Cáceres-Nakiche et al., 2024). It enables educators to evaluate their technological competence by tracking changes in how they design and implement technology-enhanced activities. The SAMR framework is frequently applied in EFL contexts, especially in mobile learning, where it has proven effective in assessing technology use in instructional practices (Romrell et al., 2014).

Research by Fathurohman and Rahmawan (2021) and Zou et al. (2022) further supports its relevance by examining teacher and student perspectives on smartphone integration in EFL classrooms. Grounded in instructional processes and capable of categorizing ICT integration levels, the SAMR framework serves as the most suitable analytical tool for this study. It offers a systematic structure to assess both pedagogical depth and the transformative potential of digital tools in language learning.

3. Method

This study employs a qualitative case study approach to investigate ICT integration in EFL learning tasks, using the SAMR model as the analytical framework. A case study was selected for its capacity to provide an in-depth exploration of how lecturers and students incorporate technology into classroom activities. The research took place at three private universities in Jakarta, Indonesia, where ICT integration is actively implemented in EFL instruction.

3.1 Research Design

This study was designed as a case study, a method commonly associated with qualitative research (Dey, 2005). Case studies aim to provide detailed and comprehensive descriptions of specific units, with this research focusing on lecturers and students. The primary objective is to investigate participants' behaviors and interactions within a particular educational context. This approach is especially suitable when the goal is to explore a single unit in depth and to capture the complexity of the phenomenon under study (Ary et al., 2010).

The study employed multiple data collection methods, including classroom observation, semi-structured interviews, and document analysis. Classroom observation allowed for direct examination of interactions during the teaching and learning process. Semi-structured interviews provided flexibility in gathering participants' insights and experiences. Document analysis was used to review instructional materials and other relevant documents. The data collected through these methods formed a comprehensive foundation for constructing a holistic understanding of ICT integration in the EFL classroom.

3.2 Site and Participants

Participants in this study were selected using a purposive sampling technique to ensure they met specific criteria aligned with the research objectives. The population consisted of lecturers and students from three private universities in Jakarta. The sample was determined based on the following criteria. First, lecturers were required to actively integrate ICT into their EFL instruction and have a minimum of three years of teaching experience in higher education. Second, students needed to be enrolled in EFL courses that incorporated digital tools into classroom activities.

Based on these criteria, a total of 10 English lecturers and 250 students were selected to participate. All participation was voluntary and conducted with full approval from both the institutions and the individuals involved. In addition, the lecturers provided formal consent to take part in interviews. The demographic breakdown of the participants is presented in Table 1.

Table 1. Participant Demographics

Category	Lecturers (n=10)	Students (n=250)
Gender	6 Male, 4 Female	110 Male, 140 Female
Teaching Experience	3-5 years (4 lecturers) 6-10 years (3 lecturers) 10-15 years (3 lecturers)	Not applicable
Year of Study	Not applicable	Third semester (all students)
Major	English Literature	English Literature

3.3 Data Collection

Data To gain a comprehensive understanding of ICT integration in EFL learning tasks, data were collected through multiple techniques and instruments. The following methods were employed:

- *Classroom Observation:* Researchers conducted direct classroom observations to examine how lecturers and students utilized ICT in learning activities. The aim was to identify the types of technology used and their alignment with the SAMR framework. An observation sheet was used to record specific applications and categorize their usage according to the SAMR stages. These observations spanned a full academic semester to capture a wide range of tasks and technology integration patterns.

- *Semi-Structured Interviews:* Ten lecturers participated in semi-structured interviews guided by an instrument that explored their perceptions of ICT use, encountered challenges, and views on its impact on teaching quality. The interviews also examined how lecturers evaluated the effectiveness of technology in achieving EFL learning objectives, the extent to which they integrated digital tools into their instruction, and how they assessed the outcomes of such integration.
- *Document Analysis:* The study also analyzed instructional documents, including individual and group assignments, technology-based projects, and lesson plans. These documents were examined to assess how technology was embedded into task design and the extent to which SAMR levels were reflected. A document analysis checklist was used to identify technological elements in assignments and evaluate their role in supporting learning objectives.

3.4 Data Analysis

In this study, data were analyzed using Miles and Huberman's interactive model (Miles & Huberman, 1984; Miles et al., 2014), which consists of three stages: data reduction, data display, and conclusion drawing. This model provided a systematic framework for organizing and interpreting data collected through classroom observations, semi-structured interviews, and document analysis. Additionally, the SAMR framework (Puentedura, 2006, 2013) served as the primary analytical lens for categorizing the depth of technology integration within EFL learning activities.

3.4.1 Data Reduction

Data reduction involves sifting and filtering information from numerous data sources to make it more focused on the study objectives. This technique involves:

- *Classroom Observation:* Data from the observation sheet were classified based on factors related to technology integration, such as the type of technology used, its function within the learning task, and the nature of interactions between lecturers and students.
- *Interviews:* Data collected from interviews with lecturers were analyzed using thematic coding to identify patterns in their perceptions and practices related to the use of ICT in EFL classrooms.
- *Document Analysis:* Learning documents, including lesson plans, technology-based assignments, and instructional materials, were examined using a SAMR-based checklist to determine the level of technology integration applied in each task.

Data that did not align with the study objectives were excluded. Relevant and valuable data were then grouped into appropriate categories to support further analysis.

3.4.2 Data Display

Following data reduction, the next stage is to display the data through a systematic description that facilitates interpretation and analysis. This involves organizing findings from observations, interviews, and document analysis into themes aligned with the study objectives. Data from classroom observations are presented by describing how technology is applied during the learning process, including the types of technology used by lecturers and the nature of student-lecturer interactions during technology-supported tasks. This section also explains how technology is integrated at different instructional levels and how it promotes active student participation in academic activities.

The interview findings highlight common patterns and trends in lecturers' beliefs and instructional practices related to ICT integration. This includes their motivations for using technology, the challenges they face, and their assessments of how effectively various digital platforms support students' English learning outcomes. Additionally, analysis of instructional documents provides insights into how technology is embedded within academic assignments. These findings illustrate how lesson plans and task designs incorporate digital tools, and they evaluate the extent to which student assignments correspond with the stages of the SAMR model: Substitution, Augmentation, Modification, and Redefinition.

The overall goal of the data display process is to present a coherent narrative that integrates evidence from multiple sources. This approach enables the study to offer a comprehensive view of technology use in English language instruction within private university settings, revealing both the challenges and pedagogical benefits associated with ICT-enhanced learning.

3.4.3 Drawing Conclusion

Following the data presentation, the next step is to draw conclusions by comparing the findings with existing theories and previous studies. These conclusions are based on patterns identified in the data, which were analyzed in relation to the SAMR framework to evaluate the level of technological integration in EFL education.

To ensure the reliability of the findings, data validity was assessed through source and method triangulation. Source triangulation involved comparing data from classroom observations, interviews, and document analysis to confirm consistency in the results. Method triangulation was conducted by cross-referencing interview data with information from documents and observations, thereby strengthening the overall credibility of the conclusions. This approach allowed the study to present a comprehensive view of ICT integration in EFL learning, while also identifying the challenges and opportunities associated with the use of technology in academic settings.

3.5 Ethical Consideration

This study adhered to several ethical principles to ensure responsible research conduct and protect participants' rights. All participants received a clear explanation of the study's purpose, procedures, and data use through informed consent. Participation was completely voluntary, with the option to withdraw at any time without consequences. To maintain confidentiality and anonymity, personal information was omitted from reports and replaced with codes or pseudonyms. The research was conducted transparently and honestly, with all data handled fairly and in accordance with institutional ethical guidelines. The study also minimized potential emotional or psychological risks by allowing participants to withdraw if they felt uncomfortable. All collected data were used exclusively for academic purposes and securely stored, with access restricted to the research team. These measures ensured both ethical integrity and the reliability of the study's outcomes.

4. Results

This part displays the findings of the study, focusing on the data analysis results. It discusses the many forms of technology used in EFL classrooms and how they were incorporated.

4.1 Technology Types Used in EFL Classrooms

This section maps the broad range of technologies employed by lecturers and students in EFL classrooms. The technologies are categorized into devices, learning platforms, learning applications/media, and social media. Using triangulated data from interviews, classroom observations, and document analysis, this section illustrates how these technologies support language learning and highlights the limitations in their pedagogical integration. Table 2 summarizes the key technologies used..

Table 4.1 Technology Types Used in EFL Classroom

Technology	Lectures	Students
The Devices	Laptop, Computer, Tablet, Smartphone	Laptop, Computer, Tablet, Smartphone
Learning Platform	Google Classroom, Zoom Meeting	Google Classroom, Zoom Meeting
Learning Applications/Media	Google Drive, Google Docs, Quillbolt, Quizizz, Kahoot, CapCut, Canva, Grammarly, and Blog.	Google Drive, Google Docs, Google Translate, Quillbolt, Quizizz, Kahoot, Kine Master, CapCut, Canva, Prezi, Grammarly, and Blog.
Social Media (Networking)	WhatsApp, e-mail, Telegram, Instagram, YouTube	WhatsApp, e-mail, Telegram, YouTube, Instagram, Twitter, Line

Table 4.1 shows that both lecturers and students utilized technology in the learning process, based on data from interviews and researcher observations. This confirms that ICT integration is evident in EFL learning, although its depth of implementation varies among different users. Both lecturers and students reported using laptops, computers, smartphones, and tablets for learning and instructional purposes. They predominantly use laptops to store and analyse data, as well as to access educational materials and learning media. Smartphones are mainly used to interact, acquire information, accessing online learning materials and facilitating quick research.

3.1.1 Devices

Laptops and smartphones are the primary devices used by both lecturers and students in the EFL classrooms. Lecturers consistently reported using laptops for lesson preparation, grading, and content management, particularly through Google Classroom.

> "*I use my laptop for everything related to teaching, preparing slides, grading assignments, and uploading materials on Google Classroom. It makes my workflow more efficient and helps me stay organized*." [Interview-Lecturer: L1]

Observations confirmed the centrality of laptops in teaching practices, with lecturers navigating presentations and online platforms in real time.

> "During observed lessons, lecturers frequently utilized laptops to deliver content and manage classroom tasks through Google Classroom." [Observation-Classroom: OC2]

Students relied on smartphones and laptops to access learning materials and submit assignments. Smartphones facilitated flexible, anytime access to learning resources and language support apps.

> "*Smartphones help me quickly check assignments and read lecturer feedback. I also use them to access online dictionaries and grammar checkers*." [Interview-Student: S1]

> "Many students used smartphones to browse course materials during breaks." [Observation-Classroom: OC4]

Tablets were mainly used by lecturers for annotating writing assignments during workshops, but this use was sporadic.

> "*Tablets allow me to give immediate corrections on student essays."* [Interview-Lecturer: L2]

> "Tablets appeared mostly in writing workshops and were absent from other class types." [Observation-Classroom: OC3]

The data clearly illustrate that laptops and smartphones form the backbone of the technological ecosystem in EFL classrooms due to their accessibility and multifunctionality. For lecturers, laptops not only streamline pedagogical preparation and assessment but also support the management of online platforms that organize student learning. For students, smartphones provide a portable, user-friendly device that facilitates continuous engagement with course materials and learning aids outside formal classroom hours.

Despite the availability of tablets, which offer unique interactive opportunities such as real-time annotation and dynamic feedback, their limited use points to a significant gap between technological potential and actual practice. This gap may stem from insufficient training or lack of institutional emphasis on embedding these devices into daily instruction. Consequently, the rich affordances of tablets for personalized feedback and active learning remain underexploited, signaling an area for targeted capacity-building and strategic resource allocation. The imbalance in device usage also reflects broader challenges in digital equity and pedagogical innovation, highlighting the need for more systemic support to encourage varied and effective device integration in language learning.

3.1.2 Learning Platforms

Google Classroom functions as the key platform for content distribution, assignment submission, and basic communication. Lecturers reported that it efficiently streamlines administrative tasks.

> "Google Classroom simplifies managing assignments and tracking submissions." [Interview-Lecturer: L3]

However, document analysis revealed limited use of Google Classroom's interactive features such as discussion forums or peer collaboration spaces.

"Most assignments require students to upload files, with few prompts encouraging online discussions or peer feedback." [Document-Assignment: DA5]

Students acknowledged Google Classroom's convenience for accessing materials but expressed a preference for face-to-face discussions.

"*Google Classroom is useful for materials, but I prefer discussing topics in person."* [Interview-Student: S3]

Zoom Meeting is widely used for synchronous activities, especially for speaking practice and group discussions. Despite its benefits, connection problems frequently disrupted sessions.

"*Zoom offers great live speaking practice, but internet instability sometimes interrupts participation*." [Interview-Student: S4]

"Several Zoom sessions had dropouts that affected interaction and flow." [Observation-Classroom: OC6]

The prominence of Google Classroom and Zoom reflects a strong institutional push toward integrating digital platforms to sustain teaching and learning continuity, especially in blended or remote contexts. These platforms fulfill crucial organizational functions by enabling efficient distribution of course materials and facilitating synchronous communication. Nevertheless, their underutilization beyond administrative tasks reveals a tension between technology availability and pedagogical innovation.

The limited use of Google Classroom's interactive features, coupled with students' expressed preference for in-person dialogue, points to a broader issue of engagement and community building in virtual learning environments. Technology, while facilitating access and logistics, may not yet fully replicate the social and cognitive richness of face-to-face interactions. Similarly, Zoom's potential to foster interactive speaking practice is frequently compromised by connectivity challenges, which disproportionately affect learners and constrain real-time participation.

These dynamics suggest that simply adopting platforms is insufficient. Rather, deliberate pedagogical strategies are required to harness these tools' interactive capabilities. Furthermore, infrastructural improvements such as more reliable internet access and professional development focused on interactive online teaching are vital to maximize the platforms' transformative potential. Ultimately, these findings underscore the complex interplay between technology infrastructure, pedagogical design, and learner experience that shapes the efficacy of digital learning platforms.

3.1.3 Learning Applications and Media

Gamified applications like Kahoot and Quizizz are frequently employed to increase student engagement, particularly in vocabulary and grammar drills.

"Kahoot makes learning fun and competitive, which motivates me to focus during quizzes." [Interview-Student: S5]

"Quizizz helps with grammar practice but is less effective for essay writing or deeper learning." [Interview-Student: S6]

Lecturers recognize the motivational benefits but caution that such apps do not sufficiently promote higher-order cognitive skills.

"*These tools are useful for memorization but do not encourage critical thinking or complex language use."* [Interview-Lecturer: L4]

Grammarly is widely adopted for writing accuracy support. However, lecturers warn about students' passive acceptance of automated corrections without understanding.

"*Grammarly must be integrated with instruction so students learn why changes are necessary rather than just accepting corrections*." [Interview-Lecturer: L5]

"*I use Grammarly to check essays, but sometimes I do not understand its suggestions.*" [Interview-Student: S6]

"Documents reveal encouragement to use Grammarly, but not enough on how to interpret its feedback critically." [Document-Assignment: DA8]

Creative tools such as Canva and CapCut enable students to produce visually engaging presentations and multimedia projects.

"I find Canva easier and more creative than PowerPoint for presentations." [Interview-Student: S7]

"CapCut makes video editing accessible and adds polish to my presentations." [Interview-Student: S8]

"Observed assignments included videos edited with CapCut and visually rich Canva presentations." [Observation-Classroom: OC5]

The incorporation of gamified tools like Kahoot and Quizizz is a pragmatic response to the challenge of engaging students, particularly in reinforcing vocabulary and grammar. These tools' competitive and game-like nature undoubtedly enhances motivation and attention, which are critical factors in sustaining learner participation. However, the reliance on such applications primarily for lower-order learning objectives indicates a missed opportunity to cultivate deeper critical thinking and language production skills within technology-mediated tasks.

Similarly, Grammarly's popularity highlights students' desire for immediate and tangible writing support, reflecting an awareness of linguistic accuracy as central to language competence. Yet, without pedagogical scaffolding that encourages metacognitive engagement with corrections, students risk developing dependency on automated feedback, potentially undermining long-term autonomous learning. The gap between usage and pedagogical integration identified in document analyses suggests that curricular frameworks have yet to fully evolve to capitalize on Grammarly's educative potential.

Creative multimedia tools, notably Canva and CapCut, represent a significant pedagogical advance by merging digital literacy with language learning. Their use encourages students to engage multimodally, combining linguistic expression with visual and auditory elements, which aligns well with contemporary communicative competencies. Despite this, the relatively limited and elective nature of their deployment reveals the need for more systematic curricular incorporation to broaden access and impact. Overall, these applications exemplify how technology can bridge motivation, skill-building, and creativity when thoughtfully integrated but require institutional and instructional commitment to realize their full potential.

3.1.4 Social Media

Social media platforms are widely used for informal communication and increasingly for academic purposes. WhatsApp groups are central to rapid academic communication and peer support.

"*WhatsApp groups allow us to quickly discuss assignments and ask questions*." [Interview-Student: S9]

YouTube is a popular platform for supplementary self-study, especially for pronunciation and listening practice.

"I learn more from YouTube videos than textbooks, especially for pronunciation." [Interview-Student: S10]

Lecturers acknowledge social media's educational benefits but stress the importance of student self-regulation.

"Social media can support learning, but students need to manage distractions effectively." [Interview-Lecturer: L8]

Observations show that social media use during breaks is predominantly informal and unrelated to coursework.

"Social media chats were mostly casual during class breaks." [Observation-Classroom: OC7]

Document analysis showed few assignments or activities explicitly integrating social media platforms.

The pervasive use of social media among students reflects its role as both a social nexus and an informal learning environment. Platforms like WhatsApp facilitate peer collaboration and timely academic communication, which are vital for supporting out-of-class engagement and fostering a sense of community. YouTube's role as a self-directed learning resource underscores students' proactive approach to

supplementing formal instruction with multimedia input, particularly for improving listening and pronunciation skills. However, the largely informal and unregulated nature of social media use presents challenges. The lack of explicit curricular integration and pedagogical frameworks limits its potential to function as a structured educational tool. Furthermore, concerns about distraction and time management highlight the double-edged nature of social media in learning contexts. The absence of formal guidelines or digital literacy instruction to help students navigate these platforms responsibly restricts their utility and may compromise learning outcomes.

Addressing these issues requires developing comprehensive digital literacy programs and embedding social media strategically within learning activities. Such approaches would enable students to harness the communicative and motivational affordances of social media while minimizing negative impacts. This dual focus can help transform social media from a peripheral distraction into a powerful adjunct to language education.

4.2 Level of ICT Integration in EFL Classrooms

This section assesses the depth and quality of ICT integration in EFL classrooms using the four-tier SAMR model, which consists of substitution, augmentation, modification, and redefinition stages. Table 3 provides an overview of how these levels manifest across language skills and the three universities studied.

Table 4.2. Level of ICT Integration in EFL Classroom

Language Skill	SAMR Level	University A	University B	University C
Speaking	**Substitution**	Students record their speeches using smartphone cameras instead of presenting live.	Students record their speeches using smartphone cameras instead of presenting live.	Students record their speeches using smartphone cameras instead of presenting live.
	Augmentation	Students upload their recordings to Google Classroom and make basic edits using CapCut or KineMaster.	Students upload their recordings to Google Classroom.	Students upload their recordings to Google Classroom.
	Modification	Interactive discussions take place via Zoom and Google Classroom, with AI tools like Elsa Speak assisting with pronunciation analysis.	Students present via Zoom, using recording and automated feedback features.	Students present in an online forum, receiving real-time feedback from peers and instructors.
	Redefinition	Students create digital storytelling projects using CapCut/KineMaster and publish them on blogs or online portfolios.	-	-
Listening	**Substitution**	YouTube videos replace traditional cassette tapes for listening exercises.	YouTube videos replace traditional cassette tapes for listening exercises.	YouTube videos replace traditional cassette tapes for listening exercises.
Writing	**Substitution**	Google Docs is used instead of	Google Docs is used instead of	Google Docs is used instead of handwritten assignments.

Language Skill	SAMR Level	University A	University B	University C
		handwritten assignments.	handwritten assignments.	
	Augmentation	Students collaborate on Google Docs, receive peer feedback, and enhance formatting with Canva.	Google Docs is used for peer feedback and teacher comments.	Google Docs allows for annotation and digital feedback.
	Modification	Students write collaborative blogs, integrating multimedia elements, and use Grammarly for advanced grammar checking.	Students write blogs with Grammarly assistance and create engaging presentations using Prezi.	Students create blogs with Canva for more visually appealing designs.
	Redefinition	Students publish their academic blogs with multimedia content, allowing for wider audience engagement.	-	-
Reading	**Substitution**	Reading materials are provided in Google Docs instead of printed textbooks.	Reading materials are provided in Google Docs instead of printed textbooks.	Reading materials are provided in Google Docs instead of printed textbooks.
	Augmentation	-	-	E-books are used with annotation features and online discussion forums.

The data in table 3 above is the result of classroom observations conducted at three private universities in Jakarta, Indonesia. Evaluating the extent of ICT integration in the EFL classroom was undertaken to ascertain the extent of comprehension and utilization. It indicated that the application of ICT in the process of learning be categorized into four levels: substitution, augmentation, modification, and redefinition (SAMR Framework), as outlined in Figure 1 and the accompanying framework (Puentedura, 2006, 2013). The data from the provided table above suggest that while technology is actively present, its transformative use remains limited, with speaking and writing showing the most progress, while listening and reading remain at the lower of integration. The following sectionsdelineate how technology is integrated into each of the SAMR levels in this study:

4.2.1 Substitution Level

At the substitution level, technology serves as a direct replacement of traditional tools without altering the fundamental nature of the learning task. Across all three universities, this was evident in several language skills. For instance, students replaced cassette tapes with YouTube videos for listening exercises and shifted from handwritten assignments to Google Docs for writing tasks. Although these substitutions modernize the medium, they do not transform learning experiences.

> "Students watched YouTube videos for listening exercises but were not assigned interactive follow-up activities to deepen engagement." [Observation-Classroom: OC4]

> "Google Docs usage was primarily for typing assignments rather than fostering collaboration or active learning." [Document-Assignment: DA7]

Substitution represents an initial but limited form of ICT integration, focused on convenience and efficiency rather than pedagogical enhancement. This stage allows students to access digital versions of traditional materials, reducing logistical barriers but often maintaining passive learning modes. The passive consumption of content, such as watching videos without critical interaction or simply typing instead of handwriting, suggests that learners are not yet fully engaged in higher-order thinking or interaction facilitated by technology. This stage may be necessary for digital acclimatization but needs to evolve to foster deeper cognitive involvement.

4.2.2 Augmentation Level

Augmentation introduces functional improvements that enhance the original tasks, typically by providing additional features or easing processes. In speaking, students uploaded recorded speeches with basic editing via tools like CapCut and KineMaster. Writing activities included collaborative writing on Google Docs with peer and teacher feedback. University C demonstrated progress in reading through e-books featuring annotation and online discussion forums.

> "Students upload and lightly edit their speech recordings before submission." [Interview-Lecturer: L6]

> "Collaborative writing with peer feedback is becoming more common through Google Docs." [Interview-Student: S11]

Augmentation reflects a meaningful step towards improving learning efficiency and engagement. The ability to edit and upload multimedia assignments adds layers of learner control and creativity. Collaborative writing tasks signal movement toward social constructivist learning paradigms, where peer interaction contributes to language development. The inclusion of e-books with annotation functions supports more active reading strategies, promoting engagement with texts beyond mere consumption.

Despite these advances, augmentation often still operates within the original task's scope, improving usability but not fundamentally changing the learning experience. While learners gain from enhanced convenience and preliminary interaction, the learning activities may not yet foster the transformative skills and deeper collaboration that technology can enable. This suggests a need for intentional instructional design that fully leverages the augmentative capacities of ICT.

4.2.3 Modification Level

Modification entails significant task redesign, often incorporating interactivity, collaboration, and personalized feedback. At this level, speaking tasks included interactive Zoom discussions supported by AI pronunciation tools that provide immediate corrective feedback.

> "The AI feedback helps students identify pronunciation errors they might not notice themselves." [Interview-Lecturer: L7]

> "I feel more confident speaking when I receive instant feedback from AI tools." [Interview-Student: S12]

Writing practices evolved to include collaborative multimedia blogs supported by Grammarly and dynamic presentations via Prezi, encouraging creativity and audience awareness.

> "Writing blogs with multimedia elements encourages creativity and audience awareness." [Document-Assignment: DA9]

> "Grammarly helps improve my grammar, but I also learn from peer comments." [Interview-Student: S13]

The modification stage represents a transformational use of ICT that reshapes how learning tasks are conceptualized and enacted. The integration of AI tools in speaking offers personalized, timely support that goes beyond traditional teacher feedback, enhancing learner autonomy and accuracy. Collaborative multimedia blogging and presentations develop multimodal literacy, encouraging students to engage with language in diverse formats and authentic communicative contexts.

This stage marks a critical shift from passive reception to active participation, fostering higher-order thinking and reflection. However, the uneven distribution of modification-level activities across language skills suggests that listening and reading lag behind speaking and writing in terms of interactive and adaptive technological use. This disparity highlights an area for further pedagogical innovation and resource investment to ensure balanced ICT integration across all language domains.

4.2.4 Redefinition Level

Redefinition involves creating entirely new learning tasks made possible by technology. Only University A demonstrated redefinition-level integration, particularly in speaking and writing, where students engaged in digital storytelling projects and published multimedia academic blogs, extending learning beyond traditional classroom boundaries.

> "Creating and sharing digital stories has motivated students to improve both language and digital skills." [Interview-Lecturer: L8]

> "Publishing my blog made me realize my writing can reach a real audience, not just the teacher." [Interview-Student: S14]

Universities B and C had not yet implemented redefinition activities, pointing to disparities in institutional support and pedagogical innovation.

Redefinition represents the pinnacle of ICT integration, where technology enables learning experiences that were previously unimaginable. Digital storytelling and public blogging empower students to become authentic communicators and creators, enhancing motivation, ownership, and real-world relevance. This level cultivates 21st-century skills, including digital literacy, creativity, and critical thinking, while simultaneously reinforcing language proficiency.

The absence of redefinition-level practices in Universities B and C indicates systemic barriers such as insufficient technological infrastructure, limited faculty expertise, or curricular rigidity. This underscores the importance of institutional commitment to fostering innovation, professional development, and resource provision to bridge gaps and promote equitable access to transformative ICT learning experiences.

In sum, the integrated findings reveal an uneven progression of ICT integration across language skills and institutions. Speaking and writing benefit from relatively higher levels of interactivity, creativity, and learner autonomy through modification and redefinition stages. In contrast, listening and reading primarily remain at substitution or augmentation levels, relying on passive and functional use of technology. To advance beyond administrative and superficial uses of ICT, universities must prioritize comprehensive professional development, curriculum redesign emphasizing collaborative and interactive learning, and the embedding of digital literacy skills. Strengthening infrastructure and promoting faculty capacity to design transformative technology-enhanced learning tasks are essential for preparing learners to meet the complex demands of 21st-century communication.

5. Discussion

This study identifies varied patterns of ICT integration in EFL classrooms across three private universities in Jakarta. The analysis, guided by the SAMR framework, indicates that most classroom activities are situated at the Substitution and Augmentation levels. Only a limited number of practices extend into the more advanced stages of Modification and Redefinition. These findings are consistent with prior research suggesting that although the use of ICT tools among educators is increasing, it often remains confined to surface-level digital substitution rather than achieving deeper pedagogical transformation (Drajati et al., 2018; Santosa et al., 2022). The discussion that follows places these findings within the broader landscape of existing literature, offering a critical examination of the opportunities, constraints, and practical implications related to the integration of ICT in EFL teaching and learning.

5.1. ICT Integration for Speaking: Developments and Difficulties

The integration of advanced Information and Communication Technology (ICT) into speaking instruction is most evident at the Modification and Redefinition stages, particularly within the universities examined in this study. Tools such as Zoom and AI-based applications like Elsa Speak enable students to receive immediate feedback on pronunciation and fluency, supporting more interactive and responsive language learning. This observation aligns with the findings of Wahyuni et al. (2020), who note that AI-

assisted platforms significantly enhance oral proficiency by providing real-time corrective feedback, which in turn helps reduce learner anxiety during speaking tasks (Serrano and Pellicer-Sánchez, 2019). Similarly, Burns (2017) emphasizes that the development of communicative competence is closely linked to access to interactive, immediate feedback, a capability that AI-powered speech analysis tools can offer effectively (Peters, 2019).

While these technologies present notable benefits, their adoption is not without challenges. The results of this study indicate that students, although able to complete digital speaking assignments, often rely heavily on instructor encouragement and structured guidance to remain engaged. This pattern echoes the findings of Lee and Kim (2017), who observed that students are frequently hesitant to participate in online speaking forums unless explicitly prompted by instructors (Twomey et al., 2017). To address this challenge, structured scaffolding becomes essential. Ellis et al. (2019) recommend the implementation of well-defined digital speaking frameworks that incorporate elements of gamification and facilitate organized peer interaction, which can enhance motivation and engagement (Eiteljoerge et al., 2018).

Among the three institutions studied, University A emerged as a leading example in the use of ICT for speaking tasks, particularly at the Redefinition level. Students were involved in creating digital storytelling projects using tools such as CapCut and KineMaster in combination with CapPol. The integration of multimedia into speaking activities reflects the pedagogical foundations of Mobile-Assisted Language Learning (MALL), which suggest that multimodal input supports more engaging and authentic communication experiences (Huang et al., 2022). However, the effectiveness of digital storytelling in language learning depends heavily on both the digital literacy of students and the ability of instructors to facilitate and manage such activities successfully. Research by Srinivasan et al. (2021) emphasizes that without sufficient training, both educators and learners may struggle to fully realize the pedagogical potential of digital storytelling initiatives.

5.2. ICT Integration for Listening: Passive Adoption and Lost Possibilities

The findings reveal that listening remains the least transformed skill area in terms of Information and Communication Technology (ICT) integration. This limited transformation is primarily due to the predominance of instructional activities that operate at the Substitution level of the SAMR model. Although students frequently use platforms such as YouTube to access audiovisual content, their engagement tends to be passive and lacks structured tasks that promote deeper comprehension or critical listening. This observation aligns with research indicating that technology alone does not automatically enhance listening skills unless accompanied by active learning strategies and interactive engagement (Polat and Erişti, 2022). Moreover, while passive exposure to digital media may support surface-level understanding, it does not sufficiently foster the complex cognitive processes required for advanced listening proficiency (Kereba, 2021).

Despite these limitations, a growing body of evidence supports the effectiveness of interactive technologies in enhancing listening skills. Tools such as listening simulations and AI-based speech-to-text transcription systems have been shown to improve learners' comprehension and engagement (Al-Azzemy and Al-Jamal, 2019). Furthermore, the incorporation of metacognitive strategies, including self-assessment and reflective practices, has been identified as essential for promoting active listening and long-term retention (Arslan and Çifçi, 2023). However, the classrooms observed in this study lacked access to these advanced tools and methods. The absence of adaptive learning technologies that can tailor listening activities to individual student needs further limits the potential for effective ICT-based listening instruction. Existing platforms such as FluentU demonstrate the benefits of personalized and interactive listening practice by helping students develop auditory processing skills in more targeted and meaningful ways (Li, 2024).

To move beyond this stagnation, future research should explore how interactive technologies can be systematically incorporated into English as a Foreign Language (EFL) curricula. Such efforts would help shift classroom practices from passive reception toward active, strategy-driven learning. Within this framework, educators need to acknowledge the central role of metacognitive strategies and advanced digital tools in supporting comprehensive listening development. Studies have shown that the absence of explicit instruction in effective listening strategies can significantly hinder learners' progress in mastering this critical language skill (Ngwoke et al., 2022). By fostering classroom environments that support ICT integration beyond basic content delivery, students can develop both receptive comprehension and active listening abilities that are essential for successful language acquisition.

5.3. ICT Integration in Writing: Interactive and Cooperative Possibilities

In educational settings, the integration of Information and Communication Technology (ICT) into writing instruction has shown substantial potential, particularly at the Modification and Redefinition levels of the SAMR model. A variety of digital tools, including Google Docs, Grammarly, and Canva, have significantly enhanced peer review practices and collaborative writing activities. These developments support earlier studies that emphasize the advantages of digital collaboration in writing education (Schcolnik, 2018; Bakar, 2021). For instance, Google Docs facilitates real-time peer editing and feedback, making it an effective platform for collaborative authorship (Bakar, 2021). However, students' perceptions of these tools are not uniform. While many recognize the value of collaborative features, others tend to view applications like Canva primarily as design software, overlooking their potential as tools for supporting the writing process. This variation suggests that the success of ICT integration in writing is closely tied to learners' prior exposure, digital competence, and instructional guidance (Rahim et al., 2023; Curry, 2023).

At University A, writing instruction demonstrated a more advanced level of ICT integration through the development of multimedia-enriched blogs designed for authentic audiences. This approach corresponds with findings that online publication can significantly increase student motivation and engagement with writing tasks (Bonneton-Botté et al., 2019; Hynninen, 2018). Blogs used in educational contexts offer students opportunities to communicate their ideas creatively while receiving feedback from a broader readership, thereby fostering a greater sense of ownership and purpose in their writing (Bozgün and Can, 2022). Additionally, the integration of digital tools has been associated with improvements in the quality of written output and a more enriched writing process, as supported by research on collaborative academic writing practices (Hynninen, 2018; Taraf and Doğan, 2023).

The importance of digital literacy in maximizing the benefits of ICT tools in writing is further emphasized by Curry (2023), who explains that a lack of familiarity with technology may prevent learners from fully engaging with its capabilities. As students transition to digital environments, they may not fully understand how to use tools like Grammarly and Google Docs to support their writing development effectively (Nazari et al., 2021; Joseph and Khan, 2020). For this reason, educators must offer explicit and structured support to help students navigate these platforms, ensuring they are used as instruments for deeper learning rather than superficial enhancement (Hidayati et al., 2024; Heryandi et al., 2020). The thoughtful integration of teaching methodologies with digital technologies not only improves the writing environment but also holds promise for cultivating students' critical thinking and creativity in academic composition (Tang and Yang, 2024; Rahim et al., 2023).

5.4. ICT Integration for Reading: Low Interactive Involvement

The integration of ICT in the reading curriculum mostly aligns with the Substitution level, with fixed digital textbooks dominating many colleges. However, some institutions, like University C, adopt Augmentation by using online discussion forums and annotation tools, though such practices remain limited (Sarimanah et al., 2022). Research highlights that digital annotations can foster dynamic text interaction and critical reading skills (Cui & Wang, 2023; Li & Wang, 2022), yet students often engage superficially by merely highlighting text. This reflects earlier findings stressing the need for targeted training to develop effective interactive reading skills (Wilson et al., 2024; Jim et al., 2024).

The limited development in reading activities signals an opportunity to incorporate advanced interactive tools like Perusall, which supports real-time annotations and group discussions. Studies show platforms like Perusall improve reading comprehension and engagement through peer interaction (Cui & Wang, 2023; Li & Wang, 2022). Future ICT efforts should move from passive consumption toward encouraging collaborative and critical engagement with texts (Li & Wang, 2022; Gubbels et al., 2020). Moreover, students' socio-economic status and attitudes toward ICT affect reading outcomes, indicating that integration must consider user context and evolving digital literacy (Sarimanah et al., 2022; Xiao & Hew, 2022).

The ongoing reliance on traditional ICT tools in reading highlights the need for pedagogical frameworks guiding educators and students in effective technology use. Mumtaz (2000) argues educational strategies must align with available software to fully harness ICT's potential. This requires continuous professional development to help users competently navigate these tools, fostering deeper reading experiences (Zhang, 2023). Advancing reading education thus demands innovative approaches that build on technology and develop necessary skills for effective use (Mumtaz, 2000; Xiao et al., 2019).

5.5. The implications for Future ICT Integration in EFL Learning Environment

The future integration of Information and Communication Technology (ICT) in English as a Foreign Language (EFL) education must evolve beyond basic technological substitution and toward the creation of transformative, participatory learning experiences. This progression is necessary because the potential of ICT is often hindered by limited digital literacy, uneven institutional support, and insufficient pedagogical training. Existing studies consistently demonstrate that without being embedded within coherent instructional frameworks, the educational benefits of ICT remain marginal (Voogt et al., 2012; Alayyar et al., 2012; Chai et al., 2013). Although digital tools are increasingly present in educational contexts, many of their pedagogical possibilities remain underutilized, which underscores the urgent need for more strategic and thoughtful ICT integration in EFL classrooms (Harris et al., 2017; Sarumaha, 2020).

To address these challenges, comprehensive professional development is essential. Teachers must be equipped with the skills necessary to integrate digital technologies effectively, not merely as tools for content delivery, but as instruments that support engaging and interactive learning environments (Widodo, 2018; Lee, 2011; Raihanah et al., 2024). Training programs should place emphasis on collaborative and cooperative learning strategies that harness the full potential of ICT. When educators are trained to use technology in ways that foster interaction, they are more likely to increase student engagement and learning outcomes (Tondeur et al., 2015; Chai et al., 2013). Moreover, collaborative professional development opportunities that encourage shared learning and peer support have been shown to enhance teachers' confidence and competence in applying ICT meaningfully (Bueno et al., 2023; Lee, 2011).

In addition to empowering educators, policymakers should implement standardized ICT literacy initiatives that target both teachers and students. These programs are essential for helping all stakeholders navigate digital environments effectively and with confidence (Karaseva et al., 2017; Lubuva et al., 2022). Such efforts would not only elevate the digital competence of individuals but also contribute to a more consistent and pedagogically sound integration of ICT into educational practice. The existing literature repeatedly highlights the value of sustained and comprehensive teacher training, particularly within the Technological Pedagogical Content Knowledge (TPACK) framework, as a foundation for meaningful ICT-based instruction (Voogt et al., 2012; Harris et al., 2017; Raihanah et al., 2024).

6. Conclusion

This study investigated the incorporation of ICT in EFL classrooms at three private universities in Jakarta using the SAMR framework, focusing on how digital tools support speaking, listening, reading, and writing skills. The findings reveal that although ICT is widely adopted, its use mainly remains at the Substitution and Augmentation levels. Speaking and writing skills demonstrate relatively more transformative applications, such as AI-supported pronunciation feedback, collaborative digital writing, and multimedia storytelling. In contrast, listening and reading activities mostly involve passive engagement with limited interactivity. The study's novelty lies in providing a localized, skill-specific analysis within the Indonesian higher education context, a perspective rarely addressed in previous research. It systematically maps language tasks onto SAMR stages to show the extent to which technology enhances or simply replaces traditional learning methods. Importantly, the research identifies critical pedagogical and institutional barriers, including uneven digital literacy, limited infrastructure, and lack of comprehensive professional development, that impede deeper and more meaningful ICT integration.

These insights highlight the need for coherent instructional design, sustained institutional support, and capacity building to move beyond superficial technology use toward interactive, student-centered learning experiences that foster twenty-first-century competencies. For future research, longitudinal studies are recommended to track the sustainability of ICT practices over time and to explore how institutional policies and frameworks affect the promotion of innovative and equitable technology-enhanced language learning environments. Ultimately, this study emphasizes that successful ICT integration in EFL education depends not only on access to technology but also on deliberate pedagogical innovation and systemic support to optimize student outcomes in increasingly digital learning environments.

References

Abugohar, M. A., Yunus, K., & Rashid, R. A. (2019). *Smartphone applications as a teaching technique for enhancing tertiary learners' speaking skills: Perceptions and practices. International Journal of Emerging Technologies in Learning (iJET), 14*(9), 74–89. https://doi.org/10.3991/ijet.v14i09.10375

Al-Azzemy, A., & Al-Jamal, D. (2019). Evaluating cognitive, metacognitive and social listening comprehension teaching strategies in Kuwaiti classrooms. *Heliyon, 5*(2), e01264. https://doi.org/10.1016/j.heliyon.2019.e01264

Alayyar, G., Fisser, P., & Voogt, J. (2012). Developing technological pedagogical content knowledge in preservice science teachers: Support from blended learning. *Australasian Journal of Educational Technology, 28*(8), 1321–1340. https://doi.org/10.14742/ajet.773

Alioon, Y., & Delialioğlu, Ö. (2017). The effect of authentic m-learning activities on student engagement and motivation. *British Journal of Educational Technology, 50*(2), 655–668. https://doi.org/10.1111/bjet.12559

Alshayeb, M. (2018). Promoting student engagement using social media technologies. *Computer Science & Information Technology, 8*(8), 95–105. https://doi.org/10.5121/csit.2018.80807

Aprinaldi, A., Widiaty, I., & Abdullah, A. G. (2018). *Integrating SAMR learning model in vocational education. IOP Conference Series: Materials Science and Engineering*, *434*(1), 012309. https://doi.org/10.1088/1757-899X/434/1/012309

Apuke, O. D., & Iyendo, T. O. (2018). *University students' usage of the internet resources for research and learning: Forms of access and perceptions of utility. Heliyon*, *4*(12), Article e01052. https://doi.org/10.1016/j.heliyon.2018.e01052

Arslan, G., & Çifçi, S. (2023). Developing A1 level Turkish as a foreign language learners' discriminational listening skills. *International Journal of Education and Literacy Studies, 11*(3), 21–30. https://doi.org/10.7575/aiac.ijels.v.11n.3p.21

Ary, D., Jacobs, L. C., & Razavieh, A. (2010). *Introduction to research in education* (8th ed.). Wadsworth.

Aşık, A., Köse, S., Yangın Ekşi, G., Seferoğlu, G., Pereira, R., & Ekiert, M. (2020). *ICT integration in English language teacher education: Insights from Turkey, Portugal and Poland. Computer Assisted Language Learning*, *33*(7), 708–731. https://doi.org/10.1080/09588221.2019.1588744

Atmojo, A. E. P., & Nugroho, A. (2020). *EFL classes must go online! Teaching activities and challenges during COVID-19 pandemic in Indonesia. Register: Journal of English Language Teaching*, *13*(1), 49–76. https://doi.org/10.18326/rgt.v13i1.49-76

Azmi, N. (2017). *The benefits of using ICT in the EFL classroom: From perceived utility to potential challenges. Journal of Educational and Social Research*, *7*(1), 111–118. https://doi.org/10.5901/jesr.2017.v7n1p111

Bakar, E. (2021). Towards digital engagement: Exploring academic writing conferencing and collaborative writing using Google Docs. *International Journal of Academic Research in Business and Social Sciences, 11*(9), 111-? [confirm pages]. https://doi.org/10.6007/ijarbss/v11-i9/11140

Becuwe, H., Pareja Roblin, N., Tondeur, J., Thys, J., Castelein, E., & Voogt, J. (2017). *Conditions for the successful implementation of teacher educator design teams for ICT integration: A Delphi study. Australasian Journal of Educational Technology*, *33*(2), 159–172. https://doi.org/10.14742/ajet.2789

Bonneton-Botté, N., Beucher-Marsal, C., Bara, F., Muller, J., Corf, L., Quéméneur, M., … Dare, M. (2019). Teaching cursive handwriting: A contribution to the acceptability study of using digital tablets in French classrooms. *Journal of Early Childhood Literacy, 21*(2), 259–282. https://doi.org/10.1177/1468798419838587

Bozgün, K., & Can, F. (2022). Digital reading and writing attitudes of preservice elementary teachers: A correlational research. *International Journal of Education and Literacy Studies, 10*(3), 25–32. https://doi.org/10.7575/aiac.ijels.v.10n.3p.25

Bueno, R., Henriques, A., & Galle, L. (2023). Mathematics preservice teachers' perceptions regarding ICT use in teaching and learning practices. *Acta Scientiae, 25*(5), 227–249. https://doi.org/10.17648/acta.scientiae.7633

Burns, A. (2017). *Research and the teaching of speaking in the second language classroom.* In E. Hinkel (Ed.), *Handbook of Research in Second Language Teaching and Learning: Volume III* (3rd ed., pp. 242–256). Routledge.

Cáceres-Nakiche, K., Carcausto-Calla, W., Arrieta, S., & Tupiño, R. (2024). *The SAMR model in education classrooms: Effects on teaching practice, facilities, and challenges. Journal of Higher Education Theory and Practice*, *24*(2), 1–15. https://doi.org/10.33423/jhetp.v24i2.6816

Chai, C. S., Ng, E. M. W., Li, W., Hong, H.-Y., & Koh, J. H. L. (2013). Validating and modelling technological pedagogical content knowledge framework among Asian preservice teachers. *Australasian Journal of Educational Technology, 29*(1), 59–71. https://doi.org/10.14742/ajet.174

Cui, T., & Wang, J. (2023). Empowering active learning: A social annotation tool for improving student engagement. *British Journal of Educational Technology, 55*(2), 712–730. https://doi.org/10.1111/bjet.13403

Curry, N. (2023). How should digital tools for writing be evaluated? Reflections from digital pedagogies and applied linguistics. *Journal of Academic Writing, 13*(1), 53–58. https://doi.org/10.18552/joaw.v13i1.970

Dey, I. (2003). *Qualitative data analysis: A user friendly guide for social scientists*. Routledge.

Drajati, N. A., Tan, L., Haryati, S., Rochsantiningsih, D., & Zainnuri, H. (2018). *Investigating English language teachers in developing TPACK and multimodal literacy. Indonesian Journal of Applied Linguistics*, *7*(3), 575–584. https://doi.org/10.17509/ijal.v7i3.9806

Eiteljoerge, S. F. V., Adam, M., Elsner, B., & Mani, N. (2019). Consistency of co-occurring actions influences young children's word learning. *Royal Society Open Science, 6*(8), Article 190097. https://doi.org/10.1098/rsos.190097

Ellis, R. (2003). *Task-based language learning and teaching* (7th ed.). Oxford University Press.

Ellis, R., Skehan, P., Li, S., Shintani, N., & Lambert, C. (2019). *Task-Based Language Teaching: Theory and Practice* (1st ed.). Cambridge University Press. https://doi.org/10.1017/9781108643689

Ewin, C., Reupert, A., McLean, L., & Ewin, C. (2020). The impact of joint media engagement on parent–child interactions: A systematic review. *Human Behavior and Emerging Technologies, 3*(2), 230–254. https://doi.org/10.1002/hbe2.203

Falloon, G. (2020). *From digital literacy to digital competence: The teacher digital competency (TDC) framework. Educational Technology Research and Development*, *68*(5), 2449–2472. https://doi.org/10.1007/s11423-020-09767-4

Fathurohman, D. F., & Rahmawan, A. D. (2021). *Teacher's technology integration ELT based on SAMR model in writing skill. JEdu: Journal of English Education*, *1*(3), 180–187. https://doi.org/10.30998/jedu.v1i3.5983

Feng, S., Wong, Y. K., Wong, L. Y., & Hossain, L. (2019). *The Internet and Facebook usage on academic distraction of college students. Computers & Education*, *134*, 41–49. https://doi.org/10.1016/j.compedu.2019.02.005

Gilakjani, A. P. (2017). *A review of the literature on the integration of technology into the learning and teaching of English language skills. International Journal of English Linguistics*, *7*(5), 95–105. https://doi.org/10.5539/ijel.v7n5p95

Gubbels, J., Swart, N., & Groen, M. (2020). Everything in moderation: ICT and reading performance of Dutch 15-year-olds. *Large-Scale Assessments in Education, 8*(1), Article 7. https://doi.org/10.1186/s40536-020-0079-0

González Otero, R. (2016). *Innovative resources based on ICTs and authentic materials to improve EFL students' communicative needs.* In A. Pareja-Lora, C. Calle-Martínez, & P. Rodríguez-Arancón (Eds.), *New perspectives on teaching and working with languages in the digital era* (pp. 83–93). Research-publishing.net. https://doi.org/10.14705/rpnet.2016.tislid2014.424

Haerazi, H. (2024). *ICT integration into English language teaching-learning: Insights from some private higher education institutions. Englisia: Journal of Language, Education, and Humanities*, *11*(2), 48–66. https://doi.org/10.22373/ej.v11i2.19913

Hafizi, R., Zubaedah, P., Amaliah, A., Saleh, M., & Chamami, R. (2024). Assessing the impact of remote learning on student engagement: Lessons from global educational responses to crisis. *Educenter Jurnal Ilmiah Pendidikan, 3*(1), 42–48. https://doi.org/10.55904/educenter.v3i1.1118

Hannafin, N. (2017). Diversity poster and presentation: Blending diversity scholarship and evidence-based practice into scholarly work for nurse practitioners. *Journal of Healthcare Communications, 2*(4), Article 84. https://doi.org/10.4172/2472-1654.100084

Hariffin, A., & Mohd Said, N. E. (2019). *The effects of captioned videos on primary ESL learners' vocabulary acquisition in a Malaysian rural setting. International Journal of Humanities, Philosophy and Language*, *2*(7), 23–37. https://doi.org/10.35631/ijhpl.27003

Harris, J., Phillips, M., Koehler, M., & Rosenberg, J. (2017). TPACK research and development: Past, present, and future directions. *Australasian Journal of Educational Technology, 33*(3), Article 3907. https://doi.org/10.14742/ajet.3907

Hennessy, S., D'Angelo, S., McIntyre, N., Koomar, S., Kreimeia, A., Cao, L., Brugha, M., & Zubairi, A. (2022). *Technology use for teacher professional development in low- and middle-income countries: A systematic review. Computers and Education Open*, *3*(1), Article 100080. https://doi.org/10.1016/j.caeo.2022.100080 eprints.soton.ac.uk

Heryandi, Y., Said, I., & Herlina, R. (2020). Online teaching in writing by means of Slack application. *Journal of English Education and Teaching, 4*(1), 49–68. https://doi.org/10.33369/jeet.4.1.49-68

Henderson, M., Selwyn, N., & Aston, R. (2015). What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. *Studies in Higher Education, 42*(8), 1567–1579. https://doi.org/10.1080/03075079.2015.1007946

Hidayati, I., Dewanti, R., Rasyid, Y., & Putra, P. (2024). Advancing essay writing with DIGLIT: Application and effectiveness of a digital literacy teaching tool. *English Review: Journal of English Education, 12*(1), 95–104. https://doi.org/10.25134/erjee.v12i1.9298

Hidayati, T. (2022). *Integrating ICT in English language teaching and learning in Indonesia. JEELS (Journal of English Education and Linguistics Studies)*, *3*(1), 38–61. https://doi.org/10.30762/jeels.v3i1.173

Hu, X., Gong, Y., Lai, C., & Leung, F. K. S. (2018). *The relationship between ICT and student literacy in mathematics, reading, and science across 44 countries: A multilevel analysis. Computers & Education*, *125*, 1–13. https://doi.org/10.1016/j.compedu.2018.05.021

Huang, Y., Zhang, Z., Yu, J., Liu, X., & Huang, Y. (2022). English phrase learning with multimodal input. *Frontiers in Psychology, 13*, Article 828022. https://doi.org/10.3389/fpsyg.2022.828022

Hynninen, N. (2018). Impact of digital tools on the research writing process: A case study of collaborative writing in computer science. *Discourse, Context & Media, 24*, 16–23. https://doi.org/10.1016/j.dcm.2018.01.005

Ibrahim, U. (2024). Assessing the impact of mobile applications on student engagement in ICT and computer science education. *International Journal of Applied Education and Research, 2*(1), 51–62. https://doi.org/10.59890/ijaer.v2i1.1457

Jim, C., Campusano, J., Tadal, S., & Niño, D. (2024). Use of social learning tools improves engagement and performance in undergraduate medical physiology education. *Physiology, 39*(S1), Article 1137. https://doi.org/10.1152/physiol.2024.39.s1.1137

Joseph, V., & Khan, N. (2020). Digital literacy tools to enhance English reading and writing skills: A detailed literature review. *Global Language Review, 5*(III), 21–33. https://doi.org/10.31703/glr.2020(v-iii).03

Karaseva, A., Pruulmann-Vengerfeldt, P., & Siibak, A. (2017). Relationships between in-service teacher achievement motivation and use of educational technology: Case study with Latvian and Estonian teachers. *Technology, Pedagogy and Education, 27*(1), 33–47. https://doi.org/10.1080/1475939X.2017.1339633

Kereba, E. (2021). Effects of computer assisted task based listening learning on Ethiopian students' listening skills development. *Lingua Didaktika: Jurnal Bahasa dan Pembelajaran Bahasa, 15*(1), 71–? [confirm end page]. https://doi.org/10.24036/ld.v15i1.111856

Kupchyk, L., & Litvinchuk, A. (2021). *Constructing personal learning environments through ICT-mediated foreign language instruction. Journal of Physics: Conference Series*, *1840*(1), Article 012045. https://doi.org/10.1088/1742-6596/1840/1/012045

Lawrence, J. E., & Tar, U. A. (2018). *Factors that influence teachers' adoption and integration of ICT in teaching/learning process. Educational Media International*, *55*(1), 79–105. https://doi.org/10.1080/09523987.2018.1439712

Lee, C.-J., & Kim, C. (2017). *A Technological Pedagogical Content Knowledge based instructional design model: A third version implementation study in a technology integration course. Educational Technology Research and Development*, *65*(6), 1627–1654. https://doi.org/10.1007/s11423-017-9544-z

Lee, I. (2011). Teachers as presenters at continuing professional development seminars in the English-as-a-foreign-language context: 'I find it more convincing'. *Australian Journal of Teacher Education, 36*(2), Article 3. https://doi.org/10.14221/ajte.2011v36n2.3

Lestari, M., & Wahyudin, A. Y. (2020). *Language learning strategies of undergraduate EFL students. Journal of English Language Teaching and Learning*, *1*(1), 25–30. https://doi.org/10.33365/jeltl.v1i1.242

Lestari, N. (2019). *Improving the speaking skill by vlog (video blog) as learning media: The EFL students perspective. International Journal of Academic Research in Business and Social Sciences*, *9*(1), 915–925. https://doi.org/10.6007/IJARBSS/v9-i1/5490

Li, M., & Wang, M. (2022). Examining the relationship of information and communication technologies use and reading literacy: A moderated-mediation analysis of metacognition across ICT use intensity. *Frontiers in Psychology, 13*, Article 916497. https://doi.org/10.3389/fpsyg.2022.916497

Li, X. (2024). Personalized learning path recommendation algorithm for English listening learning. *Journal of Educational Science, 20*(6 Suppl.), 2188–2199. https://doi.org/10.52783/jes.3133

Liesa-Orús, M., Latorre-Cosculluela, C., Vázquez-Toledo, S., & Sierra-Sánchez, V. (2020). *The technological challenge facing higher education professors: Perceptions of ICT tools for developing 21st century skills. Sustainability*, *12*(13), Article 5339. https://doi.org/10.3390/su12135339

Ling, S. (2024). *Mobile-assisted language learning (MALL), interdisciplinary competences and L_2 speaking strategies among Chinese higher vocational college students. International Journal of Research Studies in Language Learning*, *10*(2), Article e1234. https://doi.org/10.5861/ijrsll.2024.021

Lubuva, E., Ndibalema, P., & Mbwambo, E. (2022). Assessment of tutors' level of ICT competencies in teaching in teacher education in Tanzania. *Journal of Learning for Development, 9*(3), 436–454. https://doi.org/10.56059/jl4d.v9i3.705

Miles, M. B., & Huberman, A. M. (1984). Drawing valid meaning from qualitative data: Toward a shared craft. *Educational researcher*, *13*(5), 20-30.

Mirzajani, H., Mahmud, R., Fauzi Mohd Ayub, A., & Wong, S. L. (2016). *Teachers' acceptance of ICT and its integration in the classroom. Quality Assurance in Education*, *24*(1), 26–40. https://doi.org/10.1108/QAE-06-2014-0025

Muhammad, M. (2020). *Promoting students' autonomy through online learning media in EFL class. International Journal of Higher Education*, *9*(4), 320–330. https://doi.org/10.5430/ijhe.v9n4p320

Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: A review of the literature. *Journal of Information Technology for Teacher Education, 9*(3), 319–342. https://doi.org/10.1080/14759390000200096

Muthmainnah, M., Yakin, A., & Seraj, P. (2023). Impact of metaverse technology on student engagement and academic performance: The mediating role of learning motivation. *International Journal of Computations, Information and Manufacturing (IJCIM), 3*(1), 10–18. https://doi.org/10.54489/ijcim.v3i1.234

Nazari, N., Shabbir, M., & Setiawan, R. (2021). Application of artificial intelligence-powered digital writing assistant in higher education: Randomized controlled trial. *Heliyon, 7*(5), e07014. https://doi.org/10.1016/j.heliyon.2021.e07014

Ngwoke, F., Ugwuagbo, W., & Nwokolo, B. (2022). Refocusing on listening skills and note-taking: Imperative skills for university students' learning in an L2 environment. *Theory and Practice in Language Studies, 12*(7), 1241–1251. https://doi.org/10.17507/tpls.1207.01

Norton, E., Li, Y., Mason, L., & Washington-Allen, R. (2019). Assessing the impact of a geospatial data collection app on student engagement in environmental education. *Education Sciences, 9*(2), Article 118. https://doi.org/10.3390/educsci9020118

Onah, D., Pang, E., Sinclair, J., & Uhomoibhi, J. (2021). An innovative MOOC platform: The implications of self-directed learning abilities to improve motivation in learning and to support self-regulation. *International Journal of Information and Learning Technology, 38*(3), 283–298. https://doi.org/10.1108/IJILT-03-2020-0040

Peters, E. (2019). The effect of imagery and on-screen text on foreign language vocabulary learning from audiovisual input. *TESOL Quarterly, 53*(4), 1008–1032. https://doi.org/10.1002/tesq.531

Pettersson, F. (2021). *Understanding digitalization and educational change in school by means of activity theory and the levels of learning concept. Education and Information Technologies*, *26*(1), 187–204. https://doi.org/10.1007/s10639-020-10239-8

Pham, T. (2022). Effects of using technology to engage students in learning English at a secondary school. *International Journal of Language Instruction, 1*(1), 86–98. https://doi.org/10.54855/ijli.22118

Pramono, R., Surjaningrum, E., & Yoenanto, N. (2023). The use of technology at the higher education level and student engagement: A meta-analysis. *Journal of Educational Health and Community Psychology, 1*(2), 383–399. https://doi.org/10.12928/jehcp.v1i2.24606

Polat, M., & Erişti, B. (2022). The effects of authentic video materials on foreign language listening skill development and foreign language listening anxiety at different levels of English proficiency. *International Journal of Contemporary Educational Research, 6*(1), 135–154. https://doi.org/10.33200/ijcer.567863

Puentedura, R. R. (2006, August 18). *Transformation, technology, and education* [Conference presentation]. Strengthening Your District Through Technology Workshops. http://hippasus.com/resources/tte/

Rahman, E., Yunus, M., Hashim, H., & Rahman, N. (2024). A digital approach to teach synthesis writing for a defence university: A needs analysis. OSF preprint. https://doi.org/10.31235/osf.io/gtnk8

Rahim, W., Emon, M., & Haque, T. (2023). Technological advancements in tertiary-level writing: Insights from Bangladeshi students and their evolving writing practices. *World Language, Literature & Cultural Studies, 2*(2), 26–32. https://doi.org/10.26480/wllcs.02.2023.26.32

Raihanah, D., Putri, N., Fatmawati, T., & Nurjayadi, M. (2024). Analysis of technological pedagogical content knowledge (TPACK) ability for prospective chemistry teacher students and chemistry teachers: A literature review. *Jurnal Pijar MIPA, 19*(1), 67–74. https://doi.org/10.29303/jpm.v19i1.6395

Ramadiani, R., Azainil, A., Hidayanto, A. N., Khairina, D. M., & Jundillah, M. L. (2020). *Teacher and student readiness using e-learning and m-learning. Bulletin of Electrical Engineering and Informatics*, *9*(3), 1176–1182. https://doi.org/10.11591/eei.v9i3.2006

Rashid, T., & Asghar, H. (2016). Technology use, self-directed learning, student engagement and academic performance: Examining the interrelations. *Computers in Human Behavior, 63*, 604–612. https://doi.org/10.1016/j.chb.2016.05.084

Romrell, D., Kidder, L. C., & Wood, E. (2014). *The SAMR model as a framework for evaluating mLearning. Online Learning*, *18*(2), Article 435. https://doi.org/10.24059/olj.v18i2.435

Sabiri, K. A. (2019). *ICT in EFL teaching and learning: A systematic literature review. Contemporary Educational Technology*, *11*(2), 177–195. https://doi.org/10.30935/cet.665350

Santosa, M. H., Senawati, J., & Dang, T. T. (2022). *ICT integration in English foreign language class: Teacher's voice in perceptions and barriers. Pedagogy: Journal of English Language Teaching*, *10*(2), 183–200. https://doi.org/10.32332/joelt.v10i2.5168

Sarimanah, E., Soeharto, S., Dewi, F., & Efendi, R. (2022). Investigating the relationship between students' reading performance, attitudes toward ICT, and economic ability. *Heliyon, 8*(6), e09794. https://doi.org/10.1016/j.heliyon.2022.e09794

Sarumaha, Y. (2020). Introduction of TPACK in mathematics education realm. *Intersections, 5*(2), 48–58. https://doi.org/10.47200/intersections.v5i2.606

Savignano, M. A. (2017). *Educators' percpetions of the substitution, augmentation, modification, redefinition model for technology integration*. University of Northern Colorado.

Schcolnik, M. (2018). Digital tools in academic writing? *Journal of Academic Writing, 8*(1), 121–130. https://doi.org/10.18552/joaw.v8i1.360

Serrano, R., & Pellicer-Sánchez, A. (2019). Young L2 learners' online processing of information in a graded reader during reading-only and reading-while-listening conditions: A study of eye-movements. *Applied Linguistics Review, 13*(1), 49–70. https://doi.org/10.1515/applirev-2018-0102

Shadiev, R., & Wang, X. (2022). *A review of research on technology-supported language learning and 21st century skills. Frontiers in Psychology*, *13*, Article 897689. https://doi.org/10.3389/fpsyg.2022.897689

Srinivasan, K., Raman, K., Chen, J., Bendersky, M., & Najork, M. (2021). WIT: Wikipedia-based Image Text dataset for multimodal multilingual machine learning. In *Proceedings of the 44th International ACM SIGIR Conference on Research and Development in Information Retrieval* (SIGIR '21), 2443–2449. https://doi.org/10.1145/3404835.3463257

Supriyatno, T., Susilawati, S., & Ahdi, H. (2020). *E-learning development in improving students' critical thinking ability. Cypriot Journal of Educational Sciences*, *15*(5), 1099–1106. https://doi.org/10.18844/cjes.v15i5.5154

Suvandy, A., Chatwattana, P., & Nilsook, P. (2024). The micro-learning activities via metaverse platform: The outcomes of students at Pakse Teacher Training College, Lao PDR. *TEM Journal, 13*(2), 1675–1683. https://doi.org/10.18421/TEM132-80

Tang, X., & Yang, X. (2024). Applying large language models in teaching business English writing: A case study of business proposal writing. *SHS Web of Conferences, 181*, Article 01052. https://doi.org/10.1051/shsconf/202418101052

Taraf, H., & Doğan, C. (2023). Examining the role of digital tools in pre-service English language teachers' self-efficacy in writing. *Ahmet Keleşoğlu Eğitim Fakültesi Dergisi.* https://doi.org/10.38151/akef.2023.108

Tondeur, J., Aesaert, K., Pynoo, B., Braak, J., Fraeyman, N., & Erstad, O. (2015). Developing a validated instrument to measure preservice teachers' ICT competencies: Meeting the demands of the 21st century. *British Journal of Educational Technology, 48*(2), 462–472. https://doi.org/10.1111/bjet.12380

Trinidad, J. E., & Ngo, G. R. (2019). *Technology's roles in student-centred learning in higher education. International Journal of Action Research*, *15*(1), 81–94. https://doi.org/10.3224/ijar.v15i1.06

Twomey, K., Ma, L., & Westermann, G. (2017). All the right noises: Background variability helps early word learning. *Cognitive Science, 42*(S2), 413–438. https://doi.org/10.1111/cogs.12539

Voogt, J., Fisser, P., Roblin, N. P., Tondeur, J., & Braak, J. (2012). Technological pedagogical content knowledge – A review of the literature. *Journal of Computer Assisted Learning, 29*(2), 109–121. https://doi.org/10.1111/j.1365-2729.2012.00487.x

Wahyuni, S., Mujiyanto, J., Rukmini, D., & Fitriati, S. W. (2020). *Teachers' technology integration into English instructions: SAMR model.* In *Proceedings of the International Conference on Science and Education and Technology (ISET 2019)* (pp. 478–482). Atlantis Press. https://doi.org/10.2991/assehr.k.200620.109

Wibowo, C., Rahman, A., Jumadil, & Hwang, H. Y. (2024). *Teachers' challenges on ICT implementation using Google Meet as teaching media in English language teaching. Journal of Language and Literature Studies*, *4*(2), 392–405. https://doi.org/10.36312/jolls.v4i2.1932

Widodo, H. (2018). Needs assessment in professional development (PD). In *Encyclopedia of Language and Education* (pp. 1–7). Wiley. https://doi.org/10.1002/9781118784235.eelt0887

Wilson, N., Dussling, T., Adams, B., Stevens, E., Baumann, J., Yang, S., … Wig, A. (2024). What a multi-institutional collective case study of social annotation data reveals about graduate students' metacognitive reading practices. *Literacy, 58*(2), 190–203. https://doi.org/10.1111/lit.12364

Xiao, Y., Liu, Y., & Hu, J. (2019). Regression analysis of ICT impact factors on early adolescents' reading proficiency in five high-performing countries. *Frontiers in Psychology, 10*, Article 1646. https://doi.org/10.3389/fpsyg.2019.01646

Xiao, Y., & Hew, K. F. (2022). The relationships among ICT-related psychological factors, school contextual factors and secondary students' reading performance: A multilevel analysis across 47 economies. *Journal of Educational Computing Research, 60*(5), 1166–1196. https://doi.org/10.1177/07356331211070975

Yang, Z. (2024). Examining the relationship between teacher self-efficacy and student engagement in technology-enhanced learning environments. *International Journal of New Developments in Education, 6*(2), 115–119. https://doi.org/10.25236/IJNDE.2024.060219

Zhang, N. (2023). A comparative analysis of the relationship between ICT resources and students' reading performance: Evidence from China, Japan and Singapore. *Advances in Education, Humanities and Social Science Research, 5*(1), 469–? [confirm pages]. https://doi.org/10.56028/aehssr.5.1.469.2023

Zou, C., Li, P., & Jin, L. (2022). *Integrating smartphones in EFL classrooms: Students' satisfaction and perceived learning performance. Education and Information Technologies*, *27*(9), 12667–12688. https://doi.org/10.1007/s10639-022-11103-7