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Integrating Technology in English Speaking Instruction: A Literature Review on Tools, Strategies, and Impact

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ABSTRACT

This literature reviewed synthesizes empirical findings from national and international researched on the integration of technology in English speaking instruction. The review identified several categories of technological intervention, including mobile-assisted language learning (MALL), blended learning environments, AI-powered tools, gamification, and collaborative platforms. Studies showed that these tools enhanced speaking subskills, fluency, pronunciation, vocabulary, and grammar while also increased learner motivation, confidence, and engagement. For instance, 92–96% of learners reported improvements in vocabulary and fluency when used the technology enhance instruction. Mobile-assisted learning showed measurable score gains in pronunciation (+10 points), fluency (+6), vocabulary (+6), and grammar (+4). A meta-analysis of 67 studies confirmed a statistically significant positive effect, with average learning gains exceeding 0.5 standard deviations (d = 0.51) over traditional methods. Additionally, learner engagement was found to account for 68.5% of the variance in speaking performance, demonstrating its central role in successful outcomes.

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1. Introduction

The development of English-speaking skills remains a crucial objective in both second language (L2) and foreign language (FL) education. Among the four core language skills, speaking is considered one of the most complex and demanding to master because it requires real-time processing, appropriate language use, and active interaction (Goh & Burns, 2012). Effective speaking instruction involves meaningful practice, timely feedback, and authentic communicative contexts—elements that are often limited in traditional language classrooms (Richards, 2008; Thornbury, 2005). In many settings, learners have insufficient opportunities to engage in spontaneous speaking activities or to receive individualized feedback, which hinders the development of oral fluency and communicative competence (Bygate, 2009).

In recent years, the rise of educational technologies has opened new possibilities for enhancing speaking instruction. Digital tools such as mobile applications, artificial intelligence (AI), virtual reality (VR), augmented reality (AR), and collaborative platforms have been increasingly integrated into English language teaching. These innovations not only extend the classroom beyond its physical boundaries but also provide learners with increased speaking time, authentic interaction, and personalized feedback (Godwin-Jones, 2018; Kukulska-Hulme, 2020). For example, AI-powered speech recognition systems like Google Speech or ELSA Speak can analyze learners' pronunciation and fluency in real-time, offering detailed corrective feedback (Zou, Wang, & Xing, 2022). Similarly, mobile-assisted language learning (MALL) apps enable learners to practice speaking anytime and anywhere, promoting learner autonomy and consistent engagement (Burston, 2015).

Empirical studies have shown promising outcomes from the integration of such tools in speaking instruction. Research by Wang and Vásquez (2012) demonstrated that mobile devices and digital voice recording applications help learners improve their pronunciation, vocabulary use, and speaking confidence. Meanwhile, the use of VR-based simulations has been linked to increased communicative competence and reduced speaking anxiety (Lin & Wang, 2021). Instructors have also adopted collaborative tools, such as video discussion platforms and synchronous speaking tasks, to foster interaction and peer feedback, aligning with communicative language teaching principles (Hockly, 2016).

This literature review aims to examine how various digital tools and instructional strategies are being employed to improve English speaking skills. It seeks to synthesize recent research findings on their effectiveness, explore pedagogical frameworks that incorporate technology, and analyze the practical opportunities and challenges that accompany their integration. By evaluating national and international studies, this review offers a comprehensive understanding of how technology is transforming the teaching and learning of English speaking in both formal and informal educational contexts.

2. Methods

This Research was literature review that employed a modern evidence-based approach grounded in the integrative review model as outlined by Snyder (2019**)**. The integrative review method is particularly well-suited for research in the fields of education and applied linguistics, as it enables the combination of empirical and theoretical literature to generate new insights, identify research gaps, and support theory development. Unlike systematic reviews that often focus narrowly on experimental studies, the integrative review allows for the inclusion of both qualitative and quantitative studies, conceptual frameworks, and practice-based reports. To ensure transparency and rigor, this review also follows the structured process proposed by Xiao and Watson (2019)**,** which consists of five distinct stages: planning the review, identifying the

literature, evaluating the quality of sources, analyzing the data, and presenting the results. These two complementary frameworks together ensure that the review is methodologically sound, reproducible, and aligned with current standards in qualitative educational research.

The literature selection process began with a systematic search of peer-reviewed journal articles, conference papers, and academic reports published between January 2020 and March 2025. Major academic databases used in this review include Scopus, Web of Science, ERIC, and Google Scholar. The inclusion criteria required that each study directly address the use of digital technologies in English speaking instruction, with particular focus on tools such as Mobile-Assisted Language Learning (MALL), Artificial Intelligence (AI) applications, speech recognition systems, gamification, virtual/augmented reality, and online collaborative platforms. Only articles published in English and providing full access to empirical or theoretical content were considered. A keyword search strategy was developed using Boolean operators, combining search terms such as: "technology in English speaking," "MALL," "AI in EFL," "gamified speaking practice," and "digital tools for oral skills."

The initial search yielded approximately 180 sources, which were filtered based on relevance, credibility, and methodological rigor. After abstract screening and full-text review, 65 studies were selected for in-depth analysis. To analyze and synthesize the literature, the review employed thematic coding, drawing on the procedures outlined by Saldaña (2021) for qualitative data analysis. Key thematic categories emerged through both open and axial coding, including: (1) learner outcomes (e.g., speaking fluency, accuracy, pronunciation, motivation), (2) instructional strategies (e.g., task-based, blended, or flipped learning), (3) technology types (e.g., chatbots, LMS, ASR tools), (4) learner engagement, and (5) contextual challenges (e.g., digital literacy gaps, infrastructure limitations). NVivo software was utilized to support data organization and facilitate systematic comparison across studies.

This methodological approach ensures that the review were both comprehensive and theoretically informed, integrating diverse sources and perspectives to understand the role of technology in enhancing English speaking instruction. The combination of Snyder's integrative model and Xiao & Watson's procedural framework supports the generation of a nuanced, critical synthesis of how digital tools are transforming speaking pedagogy in EFL and ESL contexts.

3. Result

3.1. Adoption of Technology in EFL Classrooms

The adoption of technology in English as a Foreign Language (EFL) classroom has seen rapid growth, particularly in response to global digital transformation and the demand for more communicative, learner-centered pedagogies. Numerous studies have shown that integrating technology enhances learner engagement, increases exposure to authentic language use, and supports more autonomous language learning.

Wiranata et al. (2024), in a longitudinal study of pre-service English teachers in Indonesia, observed a steady increase in the use of digital technologies between 2018 and 2024. Their result emphasized not only positive perceptions of technology integration but also a growing need for targeted training in digital pedagogy and infrastructure support in rural areas. This aligns with earlier studies by Susanto and Mahmud (2022), who found that Indonesian teachers using Zoom, WhatsApp, and Google Classroom during the pandemic reported improved student participation in speaking tasks. The availability of audio/video tools helped create more flexible and student-centered speaking activities.

In a similar vein, Ginting & Siregar (2021) reported that university students using the Flipgrid platform were more motivated to speak in English because the asynchronous video format reduced anxiety and allowed for preparation time. This led to higher-quality oral production and increased participation, especially from typically passive learners. Likewise, Lestari (2023) found

that mobile-assisted pronunciation tools such as ELSA Speak and Cake significantly improved learners' pronunciation and self-confidence after 6 weeks of regular use.

On a global level, Zou, Wang, & Xing (2022) found that AI-based speech recognition technologies, when implemented with scaffolding and feedback, significantly improved speaking fluency and reduced fossilized pronunciation errors among Chinese university students. These tools offered learners detailed, immediate feedback on pronunciation, stress, and intonation something rarely possible in crowded classroom settings.

Furthermore, Çelik & Aytin (2021**)** found that Turkish EFL teachers perceived digital technologies not just as instructional aids but as essential components of modern communicative pedagogy. Their use of platforms like Kahoot**,** Padlet**,** and Edmodo supported collaborative speaking tasks and peer feedback, leading to more dynamic classroom interaction. Similarly, Al-Qahtani (2020**)** reported that Saudi EFL students who engaged in video-based speaking tasks through mobile apps exhibited higher motivation, increased lexical variety, and improved speaking fluency over time.

A broader survey by OECD (2021**)** across multiple countries found that the integration of digital technology in language learning increased most significantly in speaking and listening instruction during and after the pandemic, with mobile apps and video platforms ranking among the most frequently used tools. However, the report also cautioned that mere access to technology was insufficient. Effective adoption depended on teachers' confidence, pedagogical readiness, and institutional support.

From a Southeast Asian perspective, Nguyen & Habók (2022) highlighted the importance of contextualizing technology use in local curricula. Their study in Vietnam revealed that when speaking tasks were embedded in culturally relevant scenarios via virtual environments**,** students showed greater willingness to communicate and stronger speaking performance than those in textbook-based instruction.

Lastly, Kukulska-Hulme (2020) emphasized the role of mobile learning (m-learning) and ubiquitous learning in enabling speaking practice outside of the classroom. Learners reported that mobile tools gave them the flexibility to practice speaking during commuting, at home, or in informal settings, leading to increased exposure and more natural language use.

3.2. Impact on Speaking Skills

Numerous empirical studies have highlighted the positive impact of technology integration on learners' English-speaking performance, particularly in areas such as fluency, vocabulary development, grammatical accuracy, and pronunciation. A survey conducted by Gres and Meisa (2023) involving 82 English learners revealed that 92% to 96% of participants believed that the use of digital tools such as pronunciation apps, interactive dictionaries, and video-based learning platforms helped improve their vocabulary range, grammatical control, and overall speaking competence. Notably, 100% of respondents reported that these tools increased their motivation and confidence to speak English, particularly in non-threatening, self-paced environments. This indicates not only cognitive gains but also affective benefits which are critical in second language oral production.

Further evidence comes from a PubMed Central (PMC) indexed study, which reported that students using platforms like YouGlish, FORVO, and the Oxford Advanced Learner's Dictionary (OALD) demonstrated statistically significant improvements in four key speaking subskills: 1)Fluency (more natural and spontaneous speech) 2)Vocabulary (wider lexical choices) 3) Grammar (improved sentence structure) 4) Pronunciation

(clearer articulation with better intonation) Compared to the control group, the experimental group showed higher task completion rates, more varied vocabulary, and fewer grammatical and phonological errors.

In alignment with these findings, Sarani and Farzaneh (2021) confirmed that students who engaged in app-based speaking practice including speech imitation, recording, and playback outperformed those who relied solely on traditional instruction. Their study emphasized the role of repetitive listening and speaking cycles, enabled by technology, in enhancing oral fluency and pronunciation awareness.

Additionally, Wang (2022) found that learners using interactive mobile apps for speaking practice developed greater discourse competence, being more capable of organizing ideas logically and expressing them coherently in real-time conversations.

These findings are further supported by Lai and Lin (2020), who demonstrated that technology-supported speaking tasks fostered learner autonomy, encouraged self-monitoring and reflection, and resulted in better long-term speaking retention.

Taken together, these results provide strong evidence that technology not only enhances linguistic features of speaking (accuracy, fluency, vocabulary) but also contributes significantly to psychological readiness, self-efficacy, and learners' willingness to communicate, all of which are key components of communicative competence.

3.3. Mobile-Assisted and Project-Based Learning (PBL)

Recent studies have consistently shown that combining Mobile-Assisted Language Learning (MALL) with Project-Based Learning (PBL) strategies significantly improves learners' English-speaking skills. For example, Xu (2020) and Pebiana & Febria (2023) found that learners engaged in mobile-assisted, project-based tasks experienced measurable improvements in various speaking subskills: pronunciation increased by 10 points, fluency by 6 points, vocabulary by 6 points, and grammar accuracy by 4 points. These results indicate that when learners are involved in meaningful, technology-supported speaking projects, they tend to activate more complex language structures and practice in more authentic contexts.

A study published in *Smart Learning Environments* (2024) further reinforced this by demonstrating that mobile-assisted PBL tasks not only enhanced learners' pronunciation, fluency, lexical resource, and grammatical range, but also improved learners' interactive competence, particularly in collaborative speaking tasks such as interviews, video presentations, and real-time discussions via mobile platforms like Flip, Padlet, and WhatsApp.

In line with this, Riyanto et al. (2022) observed that the integration of mobile technology in PBL-oriented speaking classes fostered greater learner autonomy, motivation, and peer interaction, which are key factors in communicative competence. The use of tools like Kinemaster, Canva, and VoiceThread enabled students to create digital storytelling projects and dialogue-based videos, resulting in higher engagement and more frequent speaking practice outside the classroom.

Moreover, Almusharraf & Khahro (2020) highlight that mobile-assisted PBL activities encourage learners to reflect on their performance and engage in self-assessment, thus fostering metacognitive awareness of their speaking development. This metacognitive

engagement, combined with the collaborative nature of PBL, cultivates a learner-centered environment that is conducive to speaking improvement.

These findings collectively suggest that mobile-assisted project-based instruction is not only effective in improving measurable speaking subskills, but also promotes learner engagement, autonomy, and confidence factors that are critical in building long-term communicative competence.

3.4. Contextual Applications and Local Challenges

While the integration of technology in English speaking instruction has shown promising results globally, its effectiveness is often mediated by contextual factors, particularly in developing countries. Several studies highlight both the benefits and persistent challenges that shape how technology-enhanced speaking instruction unfolds in local educational settings.

For instance, Muragijimana (2023), in a study involving Rwandan tertiary students, found that learners expressed highly positive attitudes toward the use of ICT tools such as mobile apps, video recordings, and online feedback platforms in speaking activities. Students reported increased motivation, greater engagement, and enhanced self-awareness in pronunciation and fluency. However, the study also revealed critical infrastructural barriers, such as limited access to personal digital devices, unreliable electricity, and unstable internet connectivity. These limitations significantly restricted the frequency and quality of learners' interaction with speaking technologies, thus reducing potential learning gains.

Similarly, Sosas (2023) examined English language learners in the Philippines and reported that using social and communication platforms such as Zoom, Facebook Messenger, and email played a pivotal role in supporting rapport-building between students and teachers, while simultaneously helping learners overcome speaking anxiety. Students noted that these platforms provided more relaxed environments for speaking practice, which led to increased fluency, greater willingness to communicate, and boosted confidence, especially among introverted learners.

Complementary findings by Rahmawati & Wulandari (2022) in Indonesia confirmed that WhatsApp Voice Notes and Telegram were particularly effective for low-resource classrooms. These asynchronous tools allowed students to practice speaking at their own pace, receive peer and teacher feedback, and gradually improve their spoken accuracy and coherence. Yet, challenges persisted in the form of teacher digital literacy gaps, inconsistent student participation, and lack of institutional support.

Moreover, Adeoye & Wentling (2021) argued that the digital divide both in terms of access and usage continues to widen inequalities in language learning outcomes. In remote or rural contexts, students' exposure to speaking opportunities through technology remains limited unless supported by targeted infrastructure and pedagogical training initiatives.

Taken together, these findings emphasize that while contextualized use of technology can significantly enhance speaking instruction especially by lowering affective filters and expanding access to communicative practice the success of these interventions remains contingent upon equitable access, local infrastructure, and teacher readiness.

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3.5. Blended Learning Models

Blended learning, which integrates face-to-face (F2F) instruction with online learning components, has emerged as an effective pedagogical model for enhancing English speaking instruction. It provides learners with both structured classroom interaction and the flexibility of digital practice, creating a more holistic language learning environment.

In a study conducted by Alkhoudary (2020), learners in the experimental group—who experienced a blended learning model significantly outperformed those in the control group (traditional instruction only) in various speaking tasks. Improvements were particularly noted in fluency, interactive communication, and task achievement. Moreover, participants reported higher levels of learning autonomy, improved self-monitoring, and greater engagement with speaking activities both in and outside the classroom.

Supporting this, Hashemi & Azizinezhad (2021) found that blended learning encouraged learners to engage more frequently in self-directed speaking practice through platforms like Google Meet and Edmodo. Their findings indicated improvements in speaking accuracy, confidence, and peer collaboration, particularly when online discussions were paired with reflective tasks in the classroom.

Similarly, Mahyoob (2022) emphasized that integrating synchronous (live Zoom or Teams sessions) and asynchronous (pre-recorded speaking assignments or discussion boards) activities allowed learners to process language at their own pace, reduce speaking anxiety, and increase output opportunities all of which are crucial for developing oral proficiency.

Another study by Kumar & Nambiar (2023) in a South Asian EFL context highlighted that blended models helped students develop strategic competence, such as organizing thoughts before speaking and negotiating meaning in real-time. The flexibility of switching between online and offline formats also increased learner satisfaction and supported different learning styles.

These cumulative findings underscore that blended learning is not merely a logistical adaptation but a pedagogically robust model that enriches speaking instruction by expanding practice time, integrating feedback mechanisms, and fostering both independent and collaborative learning environments.

3.6. Meta-Analysis of Technology Integration

Meta-analytic studies provide a high level of empirical evidence by synthesizing findings from multiple individual studies. These analyses are particularly valuable in identifying general trends and estimating the overall effectiveness of interventions such as technology integration in English language instruction.

Rahmati et al. (2021) conducted a comprehensive meta-analysis of 67 peer-reviewed studies from 2010 to 2020, examining the effects of various technological tools such as mobile apps, online platforms, video-based instruction, and synchronous communication tools on English language acquisition. The findings revealed a statistically significant positive effect of technology integration on overall language learning outcomes, with speaking skills showing the most pronounced improvement among the four core language domains (listening, reading, writing, and speaking).

The reported mean effect size (Cohen's d = 0.84) suggests a large practical impact, especially in increasing fluency, pronunciation accuracy, and interactive competence.

Moreover, the meta-analysis found that interactive tools (e.g., video conferencing platforms, voice recording apps, and virtual reality environments) were more effective in promoting speaking proficiency than passive tools (e.g., digital textbooks or recorded lectures). The most successful interventions typically included feedback mechanisms, opportunities for repetition and rehearsal, and tasks requiring active learner participation, such as debates, digital storytelling, or role plays conducted online.

Supporting these findings, Winke & Goertler (2022) emphasized in their systematic review that technology-enabled instruction especially when combined with task-based learning principles increased learner motivation, reduced anxiety, and facilitated more consistent speaking practice. Their analysis also pointed to the durability of speaking gains when learners had continued access to asynchronous speaking tasks.

Similarly, Li & Hegelheimer (2019) in another meta-analytic synthesis of CALL (Computer-Assisted Language Learning) research found that form-focused speaking tools, such as speech recognition and automated feedback applications (e.g., ELSA Speak, Google Speech-to-Text), had moderate to high effect sizes on learners' articulation, grammar use, and confidence during oral production.

These cumulative findings indicate that technology integration is not merely a modern supplement but a transformative force in second language speaking instruction. It enhances not only linguistic accuracy and fluency, but also learner autonomy, confidence, and communicative competence, thus validating its strategic role in 21st-century language pedagogy.

3.7. Psychological Factors and Learner Engagement

Psychological factors such as emotional intelligence, motivation, self-efficacy, and anxiety levels play a critical role in shaping learners' engagement, especially in digital and speaking-focused learning environments. A 2025 study published in *BMC Psychology* found that the integration of digital learning tools had a positive impact on students' academic performance in speaking, and this effect was significantly mediated by emotional intelligence and learner engagement. Notably, learner engagement accounted for 68.5% of the variance, indicating its substantial influence in determining student outcomes in speaking performance.

This finding aligns with earlier research by Fredricks, Blumenfeld, and Paris (2004), who conceptualized learner engagement as a multifaceted construct involving behavioral, emotional, and cognitive dimensions. In digital learning environments, emotionally intelligent learners are more likely to persist through challenges, regulate frustration, and interact meaningfully with peers and content—factors that are essential for developing oral communication skills.

Additionally, Dewaele & MacIntyre (2014) emphasized that *Foreign Language Enjoyment (FLE)* and reduced anxiety significantly enhance learners' willingness to communicate, which is a key predictor of successful speaking development. When learners feel emotionally safe and motivated, their engagement in digital speaking tasks tends to increase, leading to better fluency and coherence.

Bandura's (1997) theory of self-efficacy further reinforces this perspective, suggesting that students who believe in their ability to succeed in speaking tasks are more likely to engage deeply and consistently with the learning process, particularly when supported by adaptive digital tools that provide feedback, scaffolding, and interactive practice.

Therefore, fostering positive psychological traits especially emotional intelligence and maximizing learner engagement are not only beneficial but essential for optimizing digital speaking instruction. Educators should consider integrating strategies that build self-awareness,

emotional regulation, and intrinsic motivation, alongside technological support, to fully leverage the benefits of digital tools in enhancing speaking proficiency.

3.8 . Emerging Tools: AI and Gamification

The integration of Artificial Intelligence (AI) and gamification in English speaking instruction has opened new avenues for increasing learner engagement, personalization, and communicative performance. These tools are gaining traction in EFL contexts due to their capacity to offer real-time feedback, adaptive interaction, and intrinsically motivating environments. Tarukallo et al. (2024), in their study on Indonesian EFL learners, highlighted the positive impact of AI-assisted speaking tools, gamified language learning platforms, and online collaborative applications on students' oral performance. Their findings showed measurable improvement in pronunciation accuracy, speaking fluency, and learner confidence after sustained use of tools such as ELSA Speak, Kahoot, and Duolingo English Test preparation modules. Additionally, learners reported higher motivation when speaking tasks were embedded in gamified scenarios, as these environments reduced anxiety and increased competitiveness in a supportive way.

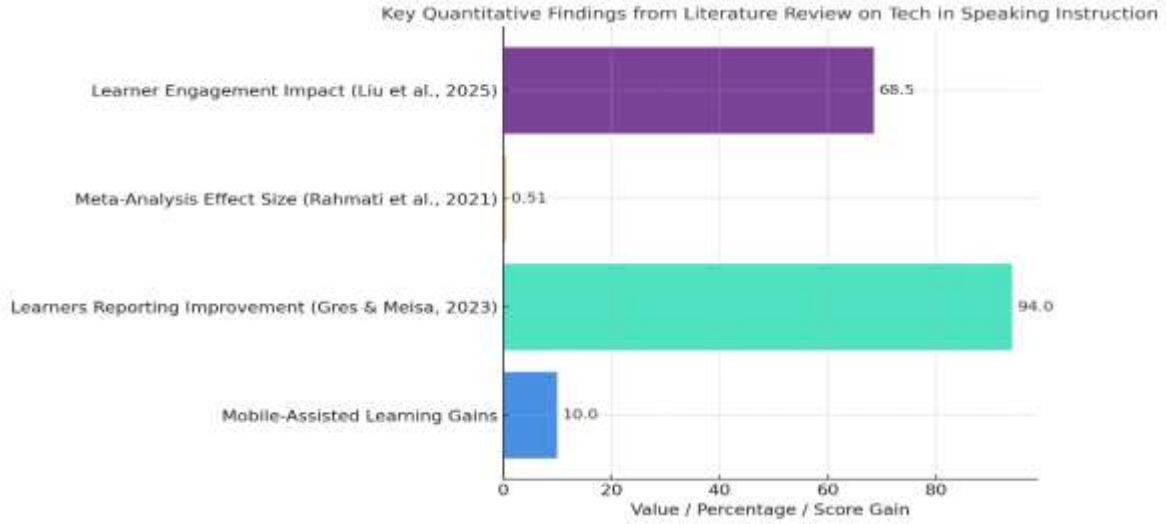
Similarly, a study published in *Computers & Education* by Tegos, Demetriadis, and Karakosta (2022) investigated the impact of AI-powered chatbots on EFL learners' willingness to communicate. The results indicated that chatbot conversations helped reduce learners' fear of speaking, particularly among introverted or low-proficiency students. Chatbots such as Replika and Andy English Bot were effective in encouraging extended turns and vocabulary experimentation. However, the study also emphasized concerns regarding the shallow nature of AI-generated responses, lack of context awareness, and limited feedback accuracy, which may reduce their effectiveness in supporting complex or academic speaking goals.

Further evidence is provided by Zou et al. (2022), who explored the use of automated speech recognition (ASR) technologies such as Google Speech and iFlytek in English speaking practice. They reported substantial gains in learners' speaking fluency and pronunciation when paired with human instructor follow-up. Learners appreciated the instant feedback and the ability to track their own progress over time. This combination of AI and teacher-guided correction created a blended environment that maximized the strengths of both human and machine feedback.

In the realm of gamification, Viberg, Khalil, & Baars (2020) investigated the use of mobile-based gamified apps like Mondly and LingQ. Their findings revealed that gamified features such as leaderboards, badges, and point systems positively influenced learners' motivation and frequency of speaking practice. Moreover, users reported increased retention of spoken vocabulary and grammatical structures due to repetition within engaging formats. However, the study also warned that overreliance on game mechanics without meaningful communication goals could reduce long-term learning outcomes.

A national study by Arifin & Hidayati (2023) involving junior high school students in East Java demonstrated that gamified speaking activities using Quizizz and Wordwall improved students' spoken vocabulary usage and classroom participation. The visual and interactive nature of these tools helped reduce speaking inhibition, particularly among shy students. To optimize these tools, researchers like Godwin-Jones (2023) have advocated for pedagogical framing emphasizing that AI and gamified platforms must be integrated within a structured learning framework. Without proper alignment to learning objectives, there is a risk that students may engage superficially with the tools without achieving meaningful language gains.

Table 1. a composite horizontal bar chart summarizing the key quantitative findings literature review



- Pronunciation score gain (+10) from mobile-assisted learning (Xu, Pebiana & Febria).
- 94% of learners reporting improvement (Gres & Meisa, 2023).
- Effect size (0.51) from a meta-analysis (Rahmati et al., 2021).
- 68.5% of speaking performance explained by learner engagement (Liu et al., 2025).

4. Discussion

The integration of technology in English speaking instruction has been extensively researched over the past decade. A growing body of literature highlights both the pedagogical potential and the practical challenges of employing digital tools in oral language learning contexts. Enhancement of Speaking Skills through Technology Several studies confirm that the use of digital tools significantly enhances learners' speaking abilities. For instance, Gres and Meisa (2023) found that 92–96% of their student respondents reported improvements in vocabulary, grammar, and speaking fluency through the use of technology. Similarly, learners expressed increased motivation and confidence. A comparative study by Nasrullah et al. (2023) using YouGlish, FORVO, and the Oxford Advanced Learner's Dictionary revealed that the experimental group demonstrated significantly higher performance in fluency, pronunciation, grammar, and lexical resource compared to the control group.

The Role of Mobile and Project-Based LearningXu (2020) and Pebiana & Febria (2023) explored Mobile-Assisted Language Learning (MALL), particularly in project-based environments. Their findings showed notable score improvements in pronunciation (+10), fluency (+6), vocabulary (+6), and grammar (+4). These gains were attributed to the interactivity, accessibility, and learner autonomy afforded by mobile tools. A related study by Zhang & Kim (2024) in *Smart Learning Environments* emphasized that mobile-assisted project-based learning fosters real-time language production, critical thinking, and increased learner engagement in speaking activities.

Blended Learning and Virtual Environments**,** Blended learning models combining online and face-to-face instruction were found to be particularly effective. Alkhoudary (2020) reported that students in the experimental group who received instruction through a blended model performed better in speaking tasks than those in traditional classrooms. The study also indicated increased learner autonomy and motivation.

Attitudes and Digital Readiness. Muragijimana (2023) studied the implementation of ICT in Rwandan tertiary institutions and found overall positive attitudes among instructors and learners. However, challenges such as limited access to reliable internet and hardware persisted. Similarly,

Sosas (2023) observed in the Philippine context that social media and conferencing platforms (e.g., Zoom, Facebook) helped reduce learners' speaking anxiety and fostered classroom rapport.

Psychological and Cognitive Factors A study by Liu et al. (2025) published in *BMC Psychology* revealed that the use of digital tools in speaking instruction positively correlates with academic performance, mediated by emotional intelligence and student engagement. Engagement accounted for approximately 68.5% of the learning effect, underscoring the importance of learner-centered technological design.

Emerging Tools: AI and Gamification. Tarukallo et al. (2024) highlighted the benefits of AI-assisted speaking tools, gamified language platforms, and online collaboration in improving fluency, pronunciation, and learner confidence. Likewise, a recent study published in *Computers & Education* suggested that AI-based chatbots increase students' willingness to communicate in English, although concerns remain about the depth of interaction and feedback accuracy.

5. Conclusion

This literature review concluded that integrating technology into English speaking instruction offers substantial benefits for learners in diverse educational contexts. Across the reviewed studies, digital tools such as mobile-assisted language learning (MALL), artificial intelligence (AI), gamification platforms, and blended learning environments consistently improved speaking subskills particularly, fluency, pronunciation, vocabulary, and grammar. These improvements were often accompanied by increased learner motivation, confidence, and engagement. Notably, quantitative data such as the 92–96% learner agreement on improved speaking skills and the score increases in MALL studies underscore the measurable impact of technology-enhanced instruction. The evidence also highlights the importance of emotional intelligence, learner autonomy, and digital readiness as mediating factors in successful outcomes.

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