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Exploring the role of Google Assistant in enhancing EFL learners' speaking skills: A systematic review

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This study explores how Google Assistant can enhance the speaking skills of English as a foreign language (EFL) learners with an emphasis on involvement, pronunciation, accuracy, and fluency. The study addresses the main question of whether Google Assistant helps EFL students become more proficient speakers through various approaches. A total of 31 studies were selected and examined using a Systematic Literature Review (SLR) methodology. Criteria such as an empirical study on the use of Google Assistant to enhance speaking skills were taken into consideration, and data were obtained from Scopus, Web of Science, ERIC, Science Direct and Google Scholar. Employing a deductive content analysis, the studies were coded into groups about speaking practice, improving specific speaking skills (pronunciation, fluency, or grammar), and the advantages and disadvantages of using specific methods or technologies for speaking practice. The main conclusions show that Google Assistant enhances learners' autonomy, offers instantaneous feedback, and minimizes speaking nervousness, which in turn promotes better fluency and more accurate pronunciation. However, there are limitations, such as trouble keeping up with complex conversations and challenges in comprehending non-native accents. According to the study's findings, Google Assistant significantly enhances the speaking skills of EFL students, although it works best when paired with conventional teaching techniques. These results highlight the potential for autonomous, accessible, and engaging learning experiences that Artificial Intelligence-driven learning technologies may provide in language teaching.

Keywords: Google Assistant, EFL learners, speaking skills, interaction, autonomous learning

1. Introduction

1.1 Role of Google Assistant technology in language learning

In today's interconnected world, knowing how to communicate well in English is becoming more and more important. English serves as a bridge for information access and international engagement (Fazil et al., 2024a). However, for English as a Foreign Language (EFL) learners, comprehending spoken English often presents challenges, largely due to the limited speaking opportunities within conventional classrooms, where reading and writing frequently control instruction (Pakula, 2019; Suparlan, 2021). At this juncture, technology offers significant advantages. In particular, the way we learn and engage with the outside world is changing dramatically because of innovations such as voice interface and virtual reality (Hadi et al., 2021). These developments have entered EFL courses, providing fresh resources to improve speaking proficiency. Among these innovations, Google Assistant is one such technology that might revolutionize the way EFL learners practice spoken English. It is a voice-activated Artificial Intelligence (AI) assistant capable of understanding natural language, responding conversationally, and performing a wide range of tasks based on user commands.

What sets Google Assistant apart from traditional tools is its ability to have virtual chats (Underwood, 2021). Unlike conventional language learning software, it can assess users' speech, identify challenging areas, and suggest remedial tasks (Sarah, 2019), thus facilitating self-correction and targeted development (Kinsella, 2020). In addition to these features, Google Assistant has a vast library of voice apps (more than 18,000 as of 2019) that offer engaging educational opportunities (Kinsella, 2020). By engaging learners, these apps make practice sessions more enjoyable. The utilization of Google Assistant can result in notable enhancements in pupils' self-assurance, communicative preference, and reduction in speech apprehension. Another important advantage of Google Assistant is its universal accessibility. Additionally, Google Assistant is widely accessible via smartphones and tablets, providing learners with continuous, on-the-go opportunities to practice English beyond the classroom environment (Tai & Chen, 2023). Thus, as voice-activated technology becomes more commonplace, Google Assistant offers EFL students a viable way to improve their speaking skills and become more confident communicators.

1.2 Research gap

While language learning has been greatly influenced by technology improvements, there is a research gap regarding the precise role that voice-activated tools, such as Google Assistant, play in improving the speaking skills of EFL learners. The incorporation of computer-assisted language learning (CALL) systems and mobile applications for enhancing listening, vocabulary, and reading skills has been investigated in earlier research (Barjesteh & Isaee, 2024; Hosseini & Amirkhani, 2024; Abdolmaleki, N., & Saeedi, 2024; Eragamreddy, 2019; Chandio et al., 2021). Few studies, nonetheless, focused on the direct ways



in which these technologies could assist in the enhancement of speaking abilities, which are essential for efficient communication. Though AI-powered tools are being employed in educational settings more and more frequently, little is known about how well they can support interactive speaking practice. While digital tools provide opportunities for individualized and self-paced learning (Pérez-Garcías et al., 2024), the practical effects of voice-assistant technologies, specifically, Google Assistant, on EFL learners' speaking fluency, pronunciation, and conversational competence have not yet been thoroughly studied. Given the significance of speaking in communicative competence and the growing integration of digital tools in second-language instruction across the world, this difference is crucial. As highlighted in Section 1.1, tools like Google Assistant may offer unique benefits that deserve systematic investigation.

1.3 Purpose of the study

In response to this gap, the main purpose of this study is to systematically review existing literature to investigate how EFL students can enhance their speaking skills by employing Google Assistant, a popular AI-powered voice assistant. The potential for interactive speech technology like Google Assistant to aid in language acquisition is significant, as technological tools become more and more integrated into education. Nevertheless, existing research tends to focus more on abilities such as vocabulary acquisition, listening comprehension, reading comprehension, and grammar development. Research has largely focused on mobile-assisted language learning (MALL) (Alqarni, 2024; Arafat, 2024; Maharani et al., 2024; Sabiri & Shah, 2023; Lăpădat, 2023; Li, 2023; Sepyanda et al., 2023; Gutiérrez-Colón et al., 2023; Pyo & Lee, 2024; Dehghani & Zamorano, 2023; Surdyanto, 2023). Therefore, by reviewing the existing literature on the use of Google Assistant in enhancing speaking proficiency – an essential skill for real-time communication in EFL learning environments – this study addresses the gap in current research. Language proficiency, pronunciation, involvement, and spontaneity are just a few of the many aspects of speaking skills (Ghafar & Raheem, 2023). Importantly, with its ability to simulate conversations, give immediate pronunciation feedback, and perform a variety of language activities, Google Assistant offers opportunities for independent speaking practice that can be quite similar to language use in real life. Accordingly, this systematic review aims to examine the effect of frequent use of Google Assistant on EFL students' speaking skills and see if students understand that this technology is a valuable tool for language practice. In addition, this review will also consider the advantages and difficulties of using Google Assistant compared with traditional speaking exercises in delivering more personalized and flexible, as well as inclusive practice opportunities (Tai, 2024a; Butler & Starkey, 2024). Ultimately, this study synthesizes important research findings and, ideally, advances the field by offering novel viewpoints on the expanding corpus of studies that explore AI technologies in language acquisition. Furthermore, the analysis will provide useful recommendations for

educators who take on the challenge of integrating technology advancements into their speaking instruction.

1.4 Research questions

1. To what extent does the use of Google Assistant enhance EFL students' overall speaking proficiency?
2. Which specific aspects of speaking skills, such as pronunciation, fluency, spontaneity, and language use, are most significantly improved through interaction with Google Assistant?
3. What are the specific pedagogical advantages and limitations of using Google Assistant compared to traditional EFL speaking exercises?

2. Literature review

2.1 Voice-activated technologies in language learning

The advent and rapid development of voice-activated technologies have brought transformative modifications to both daily life and educational settings. This has dramatically changed the way people engage with technology (Jones, 2018). These voice assistants, which were first made to perform basic functions including setting reminders and responding to questions, have evolved to include advanced AI and natural language processing (NLP) features that enable their use in educational settings (Alqahtani et al., 2023). Siri's debut in 2011 revolutionized interaction with mobile devices, and further development by Alexa and Google Assistant expanded the range and intelligence of these voice-controlled technologies. In recent years, voice assistants have been included in classrooms and libraries so that pupils may use them to enhance their language skills, access instructional materials, and engage in interactive activities. For instance, language learners can gain from Google Assistant's adaptable tool, which supports over 30 languages and enables individualized interaction that simulates conversational practice (Kumar & Sheshadri, 2024). This capability supports not only inclusivity but also practical learning efficiency, as these tools offer hands-free information access and a more inclusive learning environment, which is highly beneficial for students with impairments. Besides helping with language acquisition, voice assistants are employed in libraries to automate administrative activities such as catalog searches and recommendation systems, which enhances productivity for both teachers and students. As AI technology continues to evolve, voice assistants are becoming more refined, able to comprehend complex questions, context, and accents, and thus offer more personalized learning assistance (Hoy, 2018). These developments indicate that voice assistants will be at the core of individualized, interactive learning environments, evolving from their current supporting role.

2.2 EFL Speaking skills

To communicate effectively in English as a foreign language, learners must enhance a range of interrelated crucial speaking subskills, which include fluency, accuracy, pronunciation, and interaction. Fluency entails speaking naturally and smoothly to enable students to express their ideas cohesively. Goh and Burns (2012) state that speaking fluently involves not just speaking at a fast pace but also maintaining coherence and flow so that the listener can easily follow the conversation. Fluency gives students more self-confidence and makes it easier for them to communicate in everyday situations. The correct application of linguistic structures, such as grammar and vocabulary, is the central concern regarding accuracy. According to Skehan (2018), accuracy ensures that students communicate their ideas with few errors, making their speech easier to comprehend, even though fluency is essential for communication. Thus, an accurate plus fluent EFL speaking is a compromise. Accurate production of sounds, stress patterns, and intonation is required for proper pronunciation. Since incorrect pronunciation might result in misconceptions, articulation is crucial to comprehension. Research by Derwing and Munro (2015) demonstrates, a speaker's overall efficacy in communication and comprehensibility is significantly improved by proper pronunciation of words. The ability to take part in significant conversations, including controlling turn-taking, interpreting meaning, and reacting properly to others, is the primary focus of interaction (Ellis et al., 2020). Therefore, to engage in arguments, discussions, and social interactions – all essential components of language usage in authentic situations – learners must possess interactive skills (Shawaqfeh et al., 2024).

2.3 Previous research on AI tools in language learning

The incorporation of AI tools, such as virtual assistants, into language learning has shown promising results across multiple dimensions of second language acquisition by offering individualized, interactive experiences. Moreover, the motivational and engagement-related benefits of AI – especially via features like voice recognition and dialogue-based simulations – have been highlighted (Neji et al., 2023; Wang et al., 2024; Yuan & Liu, 2025). This study's results, however, are conflicting when it comes to the effects of teaching presence; certain research investigations even point to possible harm to learning results. AI solutions, such as ChatGPT, ELSA Speak, and Perplexity, have revolutionized English language learning by providing individualized, efficient, and engaging experiences. Through conversational contact, personalized teaching, and real-time feedback, these technologies help students improve their speaking and understanding abilities. Research by Arbi (2024) indicates that AI can be used to create personalized learning materials, generate speech, and instruct students using illustrations, all of which improve pupil involvement and responsiveness in the classroom. However, concerns such as ethical implications, equal access, and the seamless blending of AI with traditional techniques still warrant further exploration to ensure sustainability.

According to Barrot's descriptive paper (2024), ChatGPT and other AI

technologies can be quite helpful while learning a language. It demonstrates that modern AI, through its flexible design and prompt interaction, can significantly enhance conventional instruction. Yet, they are not meant to completely replace human instruction, even though they work best as an addition to it. Other risks and challenges of integration identified by Barrot include algorithmic bias and inaccurate answers. The study by Fathi et al. (2024) gives substantial evidence of the usefulness of AI tools in enhancing the speaking abilities of EFL learners, particularly in the form of AI-mediated interactive speaking exercises. According to their research, AI may successfully enhance a person's vocabulary, pronunciation, grammatical accuracy, coherence, fluency, and confidence. These findings align with broader research focusing on AI's role in simulating authentic communication, providing tailored feedback, and nurturing independence. Yet, the study calls for more review into the sustainability of AI-based methods and concerns around data protection and ethical usage.

Tai's (2024a) study provides insightful information on how well intelligent personal assistants (IPAs) work to support English language acquisition. In contrast to interactions with human interlocutors, the study indicates that learners' speech ability can be significantly enhanced through consistent engagement with IPAs. Moreover, the results demonstrate the advantages of IPAs in offering chances for real-world contact, prompt feedback, and an encouraging learning environment. These findings align with broader research highlighting the potential of AI technologies to improve language acquisition, especially in domains like pronunciation and speaking practice. Still, Tai highlights the significance of reflecting on lasting implications and ethical considerations, including data handling, in AI-integrated education.

2.4 Gaps in literature

Despite extensive scholarly work on AI in language learning, specific gaps persist concerning the use of Google Assistant in enhancing EFL speaking skills. Recent scholarly research on AI-supported tools in language teaching has mostly focused on more general MALL applications, such as vocabulary building, reading comprehension, and grammatical knowledge (Yamshynska & Kutsenok, 2024; Baleghizadeh & Oladrostam, 2010). However, there hasn't been much focus on those unique features – conversational interaction and real-time feedback – important for enhancing speaking fluency and pronunciation in Google Assistant. Although voice-activated systems, such as Alexa and Siri, have attracted a fair share of scholarly interest (Hoy, 2018), the potential of Google Assistant as a self-contained tool for independent speaking practice has been subject to scant scrutiny. A good deal of previous literature has demonstrated the general role of virtual assistants in facilitating interactive conversation and enabling speech recognition (Golonka et al., 2014); however, there remains a significant gap in our knowledge of how Google Assistant uniquely supports authentic, spontaneous communication in EFL learners.

Moreover, while research into AI-based chatbots and L2 learning has engaged with broader educational implications – like Khreisat et al. (2024),

Ayeni et al. (2024), Obidovna (2024), Senthilkumar et al. (2024), Ali et al. (2024), Stolpe and Hallström (2024), Fazil et al. (2024b), Balloccu et al. (2024), Shwede et al. (2024), and Łodzikowski et al. (2024) – the challenges and opportunities presented by Google Assistant are very much underrepresented in this regard. To the best of our knowledge, no published systematic review studies have specifically examined the use of Google Assistant in the context of second language (L2) learning. This systematic review has the distinguishing feature of having an exclusive focus on the role of Google Assistant in EFL speaking skills development, with a nuanced synthesis of both its possibilities and limitations. Unlike many existing reviews that broadly discuss AI-based chatbots, this review specifically highlights the pedagogical implications of using Google Assistant, particularly its ability to provide learners with immediate feedback on their fluency, pronunciation, and accuracy during conversational interactions. In doing so, this review aims to address this gap by providing researchers and educators with practical insights into integrating Google Assistant into EFL courses, thereby fostering a deeper understanding of its potential as a language learning resource.

3. Methodology

3.1 Design

To answer the research questions, a systematic literature review (SLR) was conducted for the current study. According to Kitchenham et al. (2009), Schulenkorf et al. (2024), and Tranfield et al. (2003), this approach was chosen with the following goals in mind: first, to fairly, rigorously, and transparently identify and select research studies that are pertinent to the topic of this review; second, to summarize these studies in a way that identifies potential directions for future research and highlights the limitations of current knowledge regarding the use of Google Assistant in EFL learning. Moreover, SLR is appropriate for the current investigation as it presents a fresh viewpoint on prior research (Chaudhary et al. 2021). As the name implies, systematic reviews often entail extensive preparation and a prior search approach aimed to minimize bias (Nightingale, 2009; Chaudhary et al., 2021). This is achieved by finding, evaluating, and summarizing all pertinent research on a given subject (Uman, 2011).

3.2 Data collection

Initially, 250 studies were identified in the current study in databases corresponding to the type of references sought, with a focus on peer-reviewed articles and studies about IPAs in language learning. The chosen databases are Scopus because it covers a large number of multidisciplinary academic journals; Web of Science, since it indexes high-impact journals with strong citation tracking; and ERIC, which focuses specifically on educational research. Also, the current study utilized Science Direct when researching topics relating to AI and applied linguistics, while Google Scholar helped include gray literature

and open-access resources. The following screening criteria were used, and 31 pertinent studies were found and will be examined further. The inclusion criteria (Figure 1) include full-text availability, studies focusing on EFL learners and speaking skills, articles published after 2017 (taking into account the increasing use of Google Assistant in L2 learning), and empirical research with findings on the use of Google Assistant for speaking skills development. In contrast, the exclusion criteria eliminated studies without a clear description of Google Assistant implementation (33), publications not focusing on developing speaking skills (30), studies with inaccessible complete text (20), and articles missing empirical findings on Google Assistant and speaking abilities (60) are some examples of the exclusion criteria (Figure 2).

3.3 Data analysis

A deductive content analysis technique involves the systematic study of data through the use of preset categories or codes that are derived from research questions (Hall et al., 2023). For the current study, three key codes matched the research questions for the study on how Google Assistant helps EFL learners' speaking abilities. Code one is 'assistance in speaking practice,' (n = 12). encompasses the methods by which Google Assistant aids EFL students in improving their speaking skills. Features like voice-activated learning activities, question-and-answer sessions, and conversation practice could be included. To illustrate to what extent Google Assistant enhances EFL students' overall speaking proficiency, data points can be grouped under the code " Assistance in Speaking Practice." This code reflects how AI technologies like Google Assistant enable students to practice speaking autonomously (Tai & Chen, 2023; Dizon, 2023). Code two is specific skill enhancement (fluency, pronunciation, n = 10). This code focuses on the precise speaking skills that Google Assistant affects, such as vocabulary, accuracy, pronunciation, and fluency. Data was sorted by the analysis according to how using the program has improved speaking skills in specific areas. Google Assistant can be especially helpful for enhancing fluency and pronunciation because it provides real-time feedback and replies that seem natural (Hadi & Junor, 2022). Code three is the benefits and drawbacks of adoption (n = 9). Usability, availability of customized feedback, increased autonomy and involvement of language acquisition are some of the notable pros, whereas cultural and technological incompatibilities, increased technological dependence and a notable lack of human connection are the cons (Chen et al., 2020). These codes directly address the study's research questions, presenting a structured lens through which to interpret the findings.

3.4 Inter-rater reliability

The researcher independently coded seven preliminary studies to ensure the validity of the coding technique. The other studies were classified following a comparison of these initial classifications and a sufficient level of agreement

(Pearson’s $r = 0.90$). Where discrepancies arose, in-depth cross-checking was used to resolve any coding inconsistencies.

3.5 Data synthesis

To give a complete picture of how Google Assistant may be used to improve EFL learners’ speaking abilities, the results of the analysis of these experiments were combined. The researcher took a close look at the selected Google Assistant’s features and learning exercises, emphasizing how they could help with particular areas of speech development. To determine if Google Assistant is a useful tool for advancing spoken language competency, a critical assessment of the recorded results of these programs will also be conducted.

4. Results and Discussion

4.1 Results

Table 1. Identified studies

SI. No.	Author(s)	Year	Study design	Sample size	Participants	Country/ context
1	Budiman	2017	Quasi-experimental	52	Eighth-grade students	Indonesia
2	Anggara	2019	Quasi-experimental	40	Tenth-grade students	Indonesia
3	Istrate	2019	Literature review	Not specified	N/A	N/A
4	Bickmore et al.	2018	Experimental	54	Participants (age not specified)	N/A
5	Tai & Chen	2023	Experimental	112	Eighth-grade EFL learners	Taiwan
6	Chen et al.	2020	Experimental	29	EFL college students	Taiwan
7	Terzopoulos, & Satratzemi	2020	Literature review	Not specified	N/A	N/A
8	Bajaj & Pramod	2020	Literature review	Not specified	N/A	N/A
9	Gonulal	2023	Experimental	42	English language learners	N/A
10	Kent	2021	Exploratory qualitative study	12	MA(TESOL) instructors	Korea
11	Hadi & Junor	2022	Pre-experimental	31	Eleventh-grade students	Indonesia
12	Song et al.	2022	Experimental	20	L2 learners and native English speakers	N/A
13	Yang et al.	2024	Experimental	34	College EFL learners	China
14	Tai & Chen	2024	Experimental	88	Ninth-grade EFL learners	Taiwan

SI. No.	Author(s)	Year	Study design	Sample size	Participants	Country/ context
15	Aldayel	2022	One-group quasi-experimental	48	Saudi university students	Saudi Arabia
16	Riska	2023	Quasi-experimental	Not specified	N/A	N/A
17	Rahman & Tomy	2023	Experimental	40	Students (grade not specified)	India
18	Moulieswaran & Prasantha Kumar	2023a	Qualitative research	N/A	N/A	N/A
19	Marfina	2023	Pedagogical experiment	12	First-year Japanese language students	Russia
20	Dizon	2023	Literature review	Not specified	N/A	N/A
21	Van Wingerden et al.	2023	Mixed-methods multiple case studies	7	Individuals with visual impairments and/or intellectual disabilities	N/A
22	Aturrohmaniah	2023	Quasi-experimental	69	Tenth-grade students	Indonesia
23	Tai	2024a	Experimental	89	College freshmen	Taiwan
24	Novanti & Saputri	2024	Pre-experimental	11	Second-semester English Education students	Indonesia
25	Zhang	2024	Mixed-methods	54	University-level EFL learners	China
26	Yulia & Sharizan	2024	Systematic review	Not specified	N/A	N/A
27	Mahartana	2024	Explanatory sequential mixed methods	44	Tenth-grade students	Indonesia
28	Tai	2024b	Experimental	30	Taiwanese BE teachers	Taiwan
29	Alharthi	2024	Experimental	40	EFL learners	N/A
30	Darmawan	2024	Explanatory sequential mixed methods	75	Tenth-grade EFL students	Indonesia
31	Moulieswaran & Prasanth Kumar	2023b	Survey research	141	Engineering stream undergraduates	India

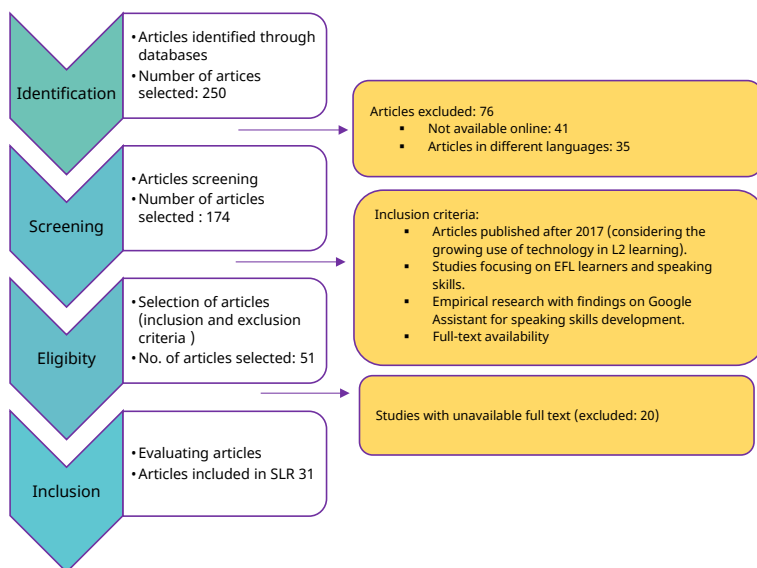


Figure 1. Inclusion criteria of studies

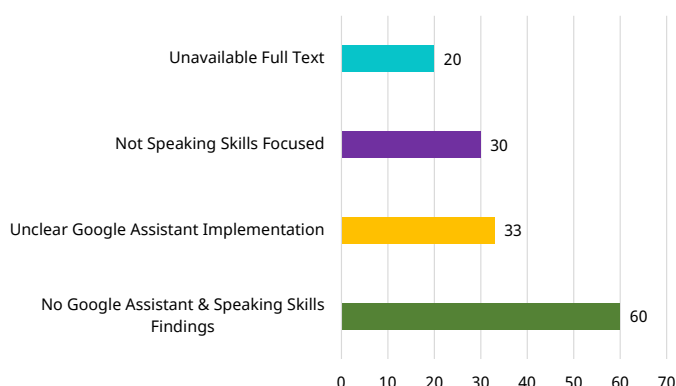


Figure 2. Exclusion of studies

4.1.1 Assistance in speaking practice. This section focuses on the theme of “Assistance in Speaking Practice,” as it explores the extent to which Google Assistant supports EFL learners in enhancing their speaking skills. Most remarkably, research has demonstrated that Google Assistant enhances autonomous learning by providing students with real-time feedback on pronunciation, fluency, and interactive communication through tailored, streaming services and conversational practice (Hadi & Junor, 2022; Fathi et al., 2024; Tai, 2024b; Zhang, 2024). The incorporation of its voice-activated features provides learners with dynamic practice opportunities that reflect authentic communication scenarios. This is particularly significant for lowering anxiety and raising willingness to communicate (WTC), both of which are vital elements of language learning (Tai & Chen, 2023).

Through repeated conversational practice with native-like speech, learners can improve their fluency and pronunciation accuracy by engaging with Google Assistant (Chen et al., 2020; Song et al., 2022; Rahman & Tomy, 2023; Novanti & Saputri, 2024; Yulia & Sharizan, 2024). Qualitative interview data

also shows that sources like Google Assistant's ability to simulate authentic communication, since it increases their self-assurance and participation in speaking assignments (Tai & Chen, 2023; Tai, 2024a; Zhang, 2024). Furthermore, Google Assistant supports self-directed learning by adapting to learners' pace and providing immediate feedback (Istrate, 2019; Zhang, 2024). This is especially important when taking into account how students use Google Assistant for extra practice beyond the classroom to improve their language skills overall (Tai & Chen, 2024; Tai, 2024a). However, there is still room for progress when it comes to issues like technology restrictions and the requirement for an improved understanding of non-native accents (Dizon, 2023). Despite these difficulties, Google Assistant significantly improves the speaking abilities of EFL students by offering relevant and interesting learning opportunities (Moulieswaran & Prashanth Kumar, 2023a; 2023b).

4.1.2 Specific skill enhancement (fluency, accuracy, pronunciation, interaction). This subsection categorizes the results based on four vivid areas of speaking competence: fluency, accuracy, pronunciation, and interaction, representing how Google Assistant contributes to each speaking skill. Numerous studies show that one of the main skills enhanced by using Google Assistant is pronunciation (Budiman, 2017; Anggara, 2019; Aturrohmaniah, 2023; Riska, 2023; Alharthi, 2024). The AI's natural-sounding voice provides students with a realistic imitation model. For instance, tenth graders' pronunciation abilities significantly improved in Anggara's (2019) research, with students gaining the ability to hear and repeat proper pronunciations. Riska (2023) further supports that students who were exposed to Google Assistant's interactive story elements performed better on pronunciation tests than students who received traditional training. Google Assistant also helps improve fluency by offering regular conversation practice. A study by Hadi and Junor (2022) supports this, indicating that learners' fluency increased as they had continuous discussions with the AI. Because of the interactive features of the program, students can practice speaking in real time, which helps them become more fluent communicators by reducing pauses and hesitations.

In terms of accuracy, students gain from Google Assistant's instant response, as it enables them to swiftly rectify lexical and grammatical errors. According to Chen et al. (2020), learners improved their sentence construction and overall speaking accuracy when they interacted with Google Assistant and became more understanding of their grammatical errors. Finally, simulating real-world discussions helps students improve their interactional skills by encouraging them to practice taking turns and coming up with impromptu answers. According to Tai and Chen (2024), students were able to have more casual conversations, which enhanced their capacity to deal with situations in the real world with confidence. Thus, the studies collectively suggest that Google Assistant is extremely successful in improving a variety of speaking skills, most notably pronunciation (Budiman, 2017; Anggara, 2019; Alharthi, 2024; Aturrohmaniah, 2023; Riska, 2023), fluency (Rahman & Tomy, 2023; Yulia & Sharizan, 2024), accuracy, (Zhang, 2024), and interaction (Song et al., 2022;

Gonulal, 2023), by providing users with personalized and adaptive practice that is accessible and readily available, coupled with instantaneous and automated feedback.

4.1.3 Advantages and disadvantages of Google Assistant adoption. In exploring learners' experiences, this section evaluates the practical benefits and potential limitations of using Google Assistant in EFL speaking instruction. From the 31 studies examined, there are pros and cons of using Google Assistant in EFL speaking practice. One of its key benefits is offering opportunities for independent language learning, enabling students to practice speaking on their own without requiring a teacher's continuous supervision. According to Tai and Chen (2024), learners' confidence and involvement were greatly increased when they were given the freedom to practice pronunciation and fluency at their own speed. Google Assistant provides learners with real-time pronunciation and fluency feedback, allowing them to make corrections as they go. This was particularly evident in Chen et al.'s (2020) research, where students said that the Google Assistant's timely responses helped them monitor and adjust their speech, improving their speaking skills. Additionally, it has been demonstrated that students who use Google Assistant experience less anxiety when speaking. Compared to training with human interlocutors, learners experience less pressure when they engage with a nonjudgmental AI-powered voice assistant. According to Tai and Chen (2023), this resulted in an increased desire to talk and improved motivation for speaking practice. Through imitation, learners can enhance their pronunciation by using Google Assistant's native-like speech models. According to Anggara (2019), learners noticed that their speech was improved by Google Assistant's voice suggestions, which had a native-like quality.

Even with its benefits, Google Assistant might not be able to provide meaningful conversational interaction. Though useful in brief conversations, Istrate (2019) and Dizon (2023) discovered that Google Assistant is unable to participate in longer, more complex conversations. When attempting to participate in open-ended discussions, which are essential for fostering the development of higher-order speaking abilities, learners frequently run into challenges. Google Assistant's inability to comprehend accents that are not native, especially those of learners with lower levels of language competence, is another disadvantage. According to Song et al. (2022), students with heavier accents found it frustrating when their speech was misinterpreted, which affected their ability to learn. This may be demoralizing and have a detrimental effect on pupils' motivation because it undermines their confidence and creates a barrier to effective communication and language acquisition. Additionally, learners risk becoming too dependent on technology, which might result in less frequent interaction with live educators. Although Google Assistant is helpful for practice, Hadi and Junor (2022) warn that it cannot completely follow the dynamic and unexpected character of real-life conversations, which are essential for the advancement of comprehensive speaking skills. Technical problems, such as the requirement of reliable internet connectivity and appropriate devices, are

also mentioned in studies like Mahartana (2024) and Darmawan (2024). These problems may restrict technology's accessibility, especially in environments with restricted resources.

4.2 Discussion

In this discussion, the findings from the three preceding subsections are synthesized to address the research questions, drawing on theoretical and empirical evidence to explain Google Assistant's overall contribution to EFL speaking proficiency. The use of Google Assistant enhances EFL students' overall speaking proficiency is the first research question comprehensively addressed through the triangulation of evidence from the 31 studies examined, which focus on the tool's advantages while contrasting it with more conventional language learning approaches. Google Assistant helps EFL learners enhance their speaking skills through autonomous learning by providing real-time conversational practice and immediate feedback on pronunciation and fluency. Research by Hadi and Junor (2022) highlights how Google Assistant can help students become more fluent by allowing them to take part in unstructured, natural discussions that resemble real-world interactions. Fluency can be improved by reducing hesitation, which is a major benefit of regular interaction with AI assistants like Google Assistant.

Another significant field where Google Assistant excels is pronunciation. With its natural-sounding voice models, students can recreate proper pronunciations and intonation patterns. Significant improvements in learners' pronunciation skills were seen by Anggara (2019) and Riska (2023), indicating that repeated exposure to Google Assistant's voice models can result in accurate speech reproduction. In contrast, conventional approaches – which frequently depend on textbook examples or teacher-led pronunciation drills – might not be able to provide native-like speech with the same accessibility or immediate feedback that an AI assistant can. Google Assistant fosters autonomy and customization in a way that is incomparable to traditional language practice approaches like teacher-led teaching or classroom conversations. Due to the time restrictions teachers have, traditional approaches frequently involve group-based interactions, which may reduce the amount of customized feedback a student receives (Kim et al., 2020). On the other hand, Google Assistant gives users the freedom to practice whenever they want and at the pace they prefer. According to Chen et al. (2020), students receive benefits from immediate, nonjudgmental feedback, which is more difficult to provide in conventional classroom settings where students might feel stressed for time or uncomfortable. There is a perceived reduction in anxiety in AI-learning settings because the students are subject to less pressure from the social and evaluative characteristics of traditional classrooms; they are less concerned about disapproval from teachers or classmates when they commit errors, and this provides them with greater freedom to experiment with the language and consequently learn from their errors without fear (Zhang, 2024).

However, a balanced perspective reveals that conventional methods still

hold value, particularly in fostering nuanced communication skills. While Google Assistant works well in shorter, more organized interactions, Istrate (2019) and Dizon (2023) note that this technology is not well-suited for longer, more nuanced conversations – a skill that is enhanced in human-to-human contacts. The cognitive complexity and unpredictability required for higher-order conversational skills are provided by traditional practice techniques such as teacher-guided conversations and peer discussions.

Google Assistant's efficacy in EFL instruction is consistent with theories of Communicative Language Teaching (CLT), which emphasize interaction as the key mechanism for language learning (Ellis et al., 2020). With its conversational principles, Google Assistant promotes the type of meaningful contact that CLT emphasizes. The AI tool helps EFL students in developing communicative competence, which is essential in EFL learning, by providing opportunities for them to practice speaking in context. These theoretical insights emphasize why the observed outcomes, specifically enhancements in fluency, are not incidental but pedagogically grounded.

The Social Development Theory of Vygotsky, which supports the notion that interaction – whether with a human or an AI – drives language development through scaffolded learning, also supports the potential advantages of Google Assistant (Vygotsky, 1978). In this situation, Google Assistant offers students a linguistic framework and real-time guidance while they produce a conversation. The controlled interactions with Google Assistant, however, may not precisely recreate the cognitive complexity of human interactions, which traditional techniques provide, according to the Cognitive Load Theory (Sweller, 2011). This idea highlights the need to expose students to spontaneous, unstructured communication, an area where human-computer interaction, particularly with intelligent personal assistants (IPAs) like Google Assistant, may offer advantages over purely AI-driven interactions due to the opportunity for learners to initiate and guide conversations, thereby fostering a greater sense of agency and control in their learning (Tai & Chen, 2023; Tai, 2024a).

In response to research question two, Google Assistant significantly helps EFL students in developing fluency, accuracy, pronunciation, interaction, and other critical speaking skills. These skills are essential parts of one's overall communicative competence, and including Google Assistant in EFL instruction might support students' language development significantly. Because Google Assistant lets users practice impromptu conversations, it is very useful for improving fluency. Continuous engagement helps students acquire the skill of speaking without extended pauses or hesitations, which is essential for smooth communication. Hadi and Junor (2022) stated that learners' fluency was enhanced by communicating with the AI in real-time, decreasing their reliance on cognitive interpretations – the mental effort and processing that language learners exert when they are not fluent – and encouraged a more spontaneous flow of language. Google Assistant provides limitless chances for conversation practice, in contrast to traditional classroom environments where fluency development may be restricted by time and peer interactions. This supports Swain's (1995) Output Hypothesis, which states that creating language

in significant circumstances is a means of developing fluency. This kind of practice environment is precisely what Google Assistant offers, highlighting its significance in improving fluency.

Another ability that gains a lot from using Google Assistant is pronunciation. Learners may practice precise intonation, stress patterns, and articulation employing the AI's native-like voice models. Students' pronunciation significantly improved in the studies conducted by Budiman (2017), Anggara (2019), Chen et al. (2020), Hadi (2022), Aturrohmaniah (2023), Riska (2023), Tai and Chen (2023), Darmawan (2024), Mahartana (2024), Novanti and Saputri (2024), Tai (2024a), Yulia and Sharizan (2024) and Zhang (2024) when they reproduced the AI's voice cues using Google Assistant. Figure 3 contributes to various sub-skills of speaking, including fluency, pronunciation, and interactional competence, each supported by both empirical findings and theoretical models. This element of enhancing pronunciation through imitation is consistent with the Speech Learning Model proposed by Flege (2005), which claims that exposure to native sounds regularly improves pronunciation learning. Because Google Assistant exposes users to it frequently, it is an efficient tool for practicing pronunciation. Furthermore, Google Assistant's instantaneous feedback enables learners to promptly identify and correct pronunciation mistakes, which is not always feasible within conventional language learning environments where instructor comments could take some time to be provided.

Accuracy is also improved by Google Assistant, especially when it comes to lexical and grammatical usage. Chen et al. (2020) found that learners who interacted with the AI were often able to enhance their vocabulary usage and correct sentence structures since the AI provided real-time grammatical corrections. By preventing mistakes from being reinforced, the instant correction function enables students to produce language more accurately. This aligns well with the Interaction Hypothesis of Long (1996), which highlights the integral part that corrective feedback plays in promoting language development. Due to time constraints and instructors' limited availability in conventional educational institutions, students have fewer opportunities to refine their linguistic accuracy compared to working with Google Assistant, which provides continuous correction of grammatical errors (Zhang, 2024).



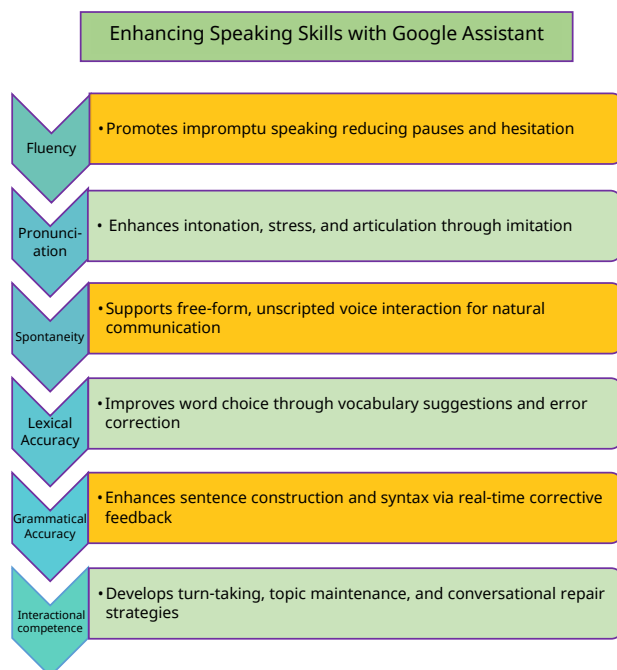


Figure 3. Enhancing speaking sub-skills with Google Assistant

Google Assistant simulates real-world discussions to improve students' interactional competency. In research by Tai and Chen (2024), students who practiced taking turns and coming up with spontaneous answers employing Google Assistant reported that they felt more comfortable with their conversational skills. This supports Vygotsky's (1978) Sociocultural Theory, which claims that learning is a social process that happens via interaction with more knowledgeable people, whether those people be Google Assistant or other human interlocutors. This is particularly significant since interaction is a fundamental component of task-based language teaching (TBLT), in which students improve communicative competence by interacting with real-life tasks (Long, 2015).

Overall, Google Assistant integration offers a promising way to improve language acquisition for EFL speakers, but its effectiveness depends on carefully weighing its benefits and limitations (RQ3). Self-directed language learning is one of the most significant advantages of utilizing Google Assistant. Without a teacher's constant supervision, students may practice speaking, which allows more schedule freedom and tailored learning opportunities. According to Tai and Chen (2024), the ability to practice pronunciation and fluency at their own pace increased the confidence and involvement of EFL students and improved learner motivation. This aligns well with theories of self-regulated learning that highlight the significance of autonomy in language learning (Zimmerman, 2008). Besides fostering autonomy, Google Assistant helps learners in correcting speaking errors in real time by giving them instantaneous input on accuracy, fluency, and pronunciation. As indicated in studies by Budiman, (2017), Anggara (2019), Chen et al. (2020), Hadi and Junor (2022), Aturrohmaniah (2023), Riska (2023), Tai and Chen (2023), Darmawan (2024),

Mahartana (2024), Novanti and Saputri (2024), Tai (2024a), Yulia and Sharizan (2024) and Zhang (2024), where learners greatly improved their pronunciation by reproducing Google Assistant's native-like voice models, this is highly beneficial for enhancing pronunciation. In contrast to conventional schools, where input is frequently delayed, this real-time feedback method is quite effective in strengthening accurate speech patterns and reducing mistakes. Another key advantage is the creation of a low-stress atmosphere where students have less pressure to meet expectations (Dizon & Tang, 2020; Dizon, 2023; Tai & Chen, 2023; Tai, 2024; Zhang, 2024). According to Tai and Chen (2023), pupils who spoke with a nonjudgmental AI assistant showed less speaking anxiety than those who interacted with human interlocutors. This is significant because the development of speaking skills is strongly predicted by learners' willingness to communicate (WTC), which can only be enhanced by reducing nervousness.

However, despite these advantages, Google Assistant does have limitations when it comes to managing sophisticated, open-ended conversations. Such interactions are best handled in more conventional face-to-face encounters with classmates or educators (Dizon, 2023). This shortcoming is in contrast to human-centered learning settings, where students engage in a wider variety of contextualized interactions that encourage them to think critically and adjust how they use language in current circumstances. Higher-order speaking abilities like cultural pragmatics and meaning negotiation are limited by this constraint. Moreover, Google Assistant's inability to comprehend accents that are not native, especially those of learners with a lower level of language competence, is another drawback. According to Song et al. (2022), students with stronger accents found it annoying when their speech was misunderstood, which might have a detrimental effect on their confidence and motivation. This problem could be solved most effectively through conventional approaches, where teachers are sensitive to learners' accents and can offer customized feedback. In addition to linguistic limitations, technology dependence has drawbacks, particularly regarding technical accessibility. The usage of Google Assistant in locations with limited resources may be restricted by challenges like the requirement for dependable internet connectivity and the availability of compatible devices. These worries are emphasized by studies by Mahartana (2024) and Darmawan (2024), which note that technological problems could disrupt learning and prevent certain students from using the instrument effectively. By contrast, conventional face-to-face language practice, on the other hand, is not constrained by technology issues and offers a more reliable and widely available learning environment.

It is also crucial to note the key distinctions between Google Assistant-based learning and conventional language practice techniques. Because of clashing schedules and teacher availability, conventional educational environments may not always be able to offer uninterrupted practice and individualized, real-time feedback. This is precisely where Google Assistant proves particularly advantageous. Nonetheless, traditional approaches – characterized by direct human interaction in classrooms, on the other hand, provide deeper, more dynamic contact that promotes the growth of interactional skills, critical

thinking, and cultural awareness (Bickmore et al., 2018; Tai & Chen, 2023; Istrate, 2019; Blyznyuk & Kachak, 2024). Teachers can customize their input to meet the requirements of each student and establish more contextually rich conversations – a feature that Google Assistant is yet unable to fully follow. Taken together, the results of the analysis of Google Assistant’s benefits and drawbacks align with ideas related to SLA, specifically Krashen’s (1982) Input Hypothesis, which highlights the significance of understandable input in language acquisition. With native-like speech modeling and real-time feedback, Google Assistant offers a wealth of understandable information, particularly for pronunciation and fluency. However, Long’s (1996) Interaction Hypothesis emphasizes the value of negotiated contact in language development, pointing out areas in which Google Assistant is inadequate. The negotiation of meaning that is necessary for developing language proficiency is still best facilitated by human interaction (Chen et al., 2020; Hadi & Junor, 2022; Song et al., 2022; Tai & Chen, 2023; 2024; Gonulal, 2023; Tai, 2024a; Yang et al., 2024).

4.3 Implications

Integrating Google Assistant into EFL instruction brings several pedagogical advantages, mainly in enhancing learners’ speaking skills. Using voice-based assignments to have students enhance pronunciation, fluency, and interactivity through interactive speaking practice with the AI is one successful strategy. According to Chen et al. (2020), giving students activities like vocabulary drills, everyday conversations, or role-plays employing Google Assistant enables them to practice beyond the classroom. This out-of-classroom engagement aids in minimizing nervousness and encourages more regular speaking practice by fostering a low-stakes learning environment. Additionally, teachers may utilize Google Assistant to offer students tailored feedback, which will motivate them to independently practice pronouncing words, particularly those that are challenging. According to Hadi and Junor (2022), the AI’s real-time correcting capability provides instantaneous insights, bolstering accurate patterns and improving language retention. To promote collaborative learning, instructors can also incorporate peer-assisted learning, in which students contrast their experiences using Google Assistant. Moreover, Google Assistant may also be used in conjunction with more conventional techniques, such as dialogue-based instruction, to support students in practicing dialogues that they will discuss in class. By combining traditional instruction with the use of Google Assistant, students can enhance both their human communication skills and their AI-assisted language learning abilities (Tai & Chen, 2023).

4.4 Recommendations

To maximize classroom impact, the study offers the following targeted recommendations. To fully realize the potential of Google Assistant in EFL speaking classes, institutions and instructors should include Google Assistant-based role-plays as weekly out-of-class assignments, paired with student reflections

and enhance accent-specific feedback prompts within Google Assistant to aid learners with heavy first language interference with conventional classroom teaching. Such an approach enables students to expand learning beyond the classroom and reinforce speaking abilities in interactive, real-life situations. Educators are advised to enhance focused speaking practice modules for the development of particular sub-skills like pronunciation, fluency, and interactional competence (Chen et al., 2020). These modules may be coded through directed activities, such as role-play contexts, vocabulary-based elicitations, and time-limited fluency practice, with assistance being rendered through Google Assistant's interactive interface. Such structuring and competence-based activities have the potential to enhance student engagement and provide for frequent, one-to-one speaking practice, particularly in large class sizes where one-to-one support is not feasible (Kinshuk et al., 2016).

Furthermore, incorporating daily AI-supported speaking practice into home study routines gives learners instant feedback and the chance to retry the tricky bits independently. Most critical among these, however, is the fact that Google Assistant does not identify and respond accordingly to a variety of non-native accents, thus often irritating users. To address this, the speech recognition algorithms of the system need to be improved by incorporating more variations in English accents into the training data, a higher sensitivity to phonetics, and adaptive learning enabled for more user personalization (Song et al., 2022; Dizon, 2023). In this way, the technology will be made more inclusive and effective for EFL learners representing varied linguistic backgrounds. Additionally, to ensure a more immersive experience, augmenting the speaking experience through the utilization of multimedia functionality, for instance, visual cues, transcripts, and audiovisual reinforcement, can provide a more holistic and enjoyable language learning experience. Such multimodal inputs not only facilitate retention and understanding but also allow learners to connect language with context, thus enhancing practical communication competencies (Song et al., 2022; Dizon, 2023). By adopting these particular strategies, instructors and institutions can turn Google Assistant from a mere voice tool into an effective, learner-centered tool that supplements and augments conventional approaches to teaching speaking skills in EFL environments.

4.5 Limitations

There are several limitations to take into account, even if the SLR technique is valuable in providing a thorough review of the usage of Google Assistant for enhancing EFL speaking abilities. First of all, the selection criteria place restrictions on the sample size and data collection. After exclusion criteria were implemented, only 31 studies were evaluated, which, as a result, may restrict the findings' generalizability (Kitchenham et al., 2010). Furthermore, selection bias can arise since the review concentrated on empirical studies that were available in full text, thereby excluding other pertinent but unavailable research (Tranfield et al., 2003). The research's scope is an additional limitation. The majority of the evaluated research focuses on speaking skills such as

accuracy, pronunciation, interaction and fluency, but they do not thoroughly examine other critical language skills like listening or reading. Consequently, this reduces the range of research on Google Assistant's whole language learning capabilities. Additionally, as deductive content analysis uses predetermined codes for data analysis, it may overlook additional spontaneous insights that do not fit neatly within the coding system (Elo & Kyngäs, 2008). Furthermore, contextual elements such as the learners' sociocultural background and the technology infrastructure were not given sufficient consideration. This oversight is critical, as technology dependence may make learning environments with limited resources less accessible for students (Chen et al., 2020).

5. Conclusion

This study offers a balanced assessment of Google Assistant's role in enhancing EFL learners' speaking skills, addressing both its pedagogical advantages and existing limitations. In addition to outlining its benefits and drawbacks, the study looked at how Google Assistant can assist EFL learners in improving their speaking skills by emphasizing fluency, accuracy, pronunciation, and interactivity through real-time feedback, and reducing speaking anxiety. According to the main findings, Google Assistant supports self-directed learning by assisting students in honing their fluency and pronunciation via repeated, conversational practice with native-like speech models (Anggara, 2019; Chen et al., 2020). Furthermore, its ability to lessen anxiety promotes an enjoyable learning atmosphere, enhancing students' WTC (Tai & Chen, 2023). However, the downsides include reliance on technology and challenges in managing dynamic, complicated interactions with non-native accents (Song et al., 2022; Dizon, 2023). According to the research's conclusions, Google Assistant may be added to typical EFL teaching techniques to enhance pronunciation and provide accessible language practice beyond the classroom. The study also emphasizes AI's role in enhancing autonomy and engagement, while emphasizing the significance of better management of accent variability and managing complex conversations. To overcome these barriers and expand the use of AI in language learning, future studies should investigate advancements in the field, such as improved conversational complexity and accent identification. Ultimately, Google Assistant proves to be a significant supplementary tool for EFL speaking practice; however, it yields the best results when strategically integrated with direct human interaction to achieve a more holistic approach to language learning.

Competing interests

The author declares no competing interests. This research was conducted independently, and there are no financial or other relationships that could potentially bias the interpretation or presentation of the findings.

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