Enhancing Oral Language Skills with Pi AI: A Study on Speaking and Pronunciation Gains

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Abstract
Learners often struggle with speaking and pronunciation due to insufficient practice and feedback opportunities in real situations, which classroom instruction cannot provide adequately. This paper examined the effectiveness of Pi AI, an AI-powered chatbot, in improving speaking and pronunciation among Omani EFL learners. In this investigation, 60 students were randomly divided into experimental (n = 30) and control groups (n = 30). Speaking pretests were conducted to ensure all participants had similar speaking skills. While both groups received regular classroom instruction, the experimental group received additional practice through Pi AI for a month of treatment period. Speaking posttests were conducted to compare the results with the pretests. Findings showed that the experimental group performed better than their peers in the control group on both speaking and pronunciation posttests. The findings are helpful for students, teachers, and educational institutions.

Keywords: AI-driven learning tool; Pi AI; speaking skills; pronunciation

Introduction

Speaking skills are significant in communication, mainly when the mother tongue is not used, and the communication medium is a foreign language. English is extensively used globally for communication. Particular attention should be paid to improving EFL learners' speaking skills (Akhter et al., 2020). EFL learners must acquire proficiency in spoken English since it reflects their understanding of the English language (Nazara, 2011). The efficacy of English speaking is assessed by the precision and fluency with which a speaker employs spoken language in conversation (Brown & Lee, 2015; Dao, 2017; Manurung, 2015).

According to Huy et al. (2024), speaking is essential in acquiring and instructing foreign languages. Using a foreign language enables pupils to articulate their concepts verbally. He also thinks that students should practice speaking within quotidian contexts to get proficiency. Consequently, the instructor should give students supplementary speaking opportunities, including activities or examples that engage them in genuine communication scenarios (Aldosari, 2024).

Speaking is an essential ability for students of second languages to engage with both native and non-native speakers and to navigate daily life (Jabber & Mahmood, 2020; Kohn & Hoffstaedter, 2017; Li & Chan, 2024; Wan & Moorhouse, 2024), significantly influencing their entire growth in language (Fathi et al., 2024). Individuals possessing significant speaking proficiency might excel in other language competencies and enhance their speaking abilities through collaborative practice (Rahimi & Fathi, 2022). Students with fluency in English will encounter improved prospects for future educational advancement; nonetheless, mastery must occur both in academic settings and real-world contexts (Alsalihi, 2020). Engagement in speaking enhances pronunciation abilities and overall language proficiency in EFL (English as a Foreign Language) students. Language proficiency is linked to students' academic success and is integral to national and individual economic advancement; specifically, a nation's progress is directly associated with its English language competencies (Muslimah et al., 2021). Acquiring proficiency in English necessitates engagement with several elements of English-speaking cultures. This exposure cultivates cross-cultural understanding, empathy, and appreciation, facilitating the dismantling of cultural boundaries and advancing global harmony. Proficient English-speaking abilities promote an individual's personal and professional development. It enhances self-assurance and broadens networking opportunities (Paudel, 2024).

Speaking is the most arduous skill for several EFL learners, necessitating linguistic and cultural competence. Shumin (1997) asserts that proficiency in the grammar and vocabulary of a foreign language is insufficient for achieving fluency. Students must collaborate to acquire the skill. Nonetheless, their restricted use of language in real-world contexts complicates EFL learners' ability to articulate appropriate English in the classroom. As Thornbury and Slade (2006) stated, speaking challenges may originate from the instructor, the curriculum, the resources, or the students themselves. Shumin (2002) says that speaking English presents the most significant challenge for learners. EFL students often exhibit stuttering when conversing in English. This arises from pupils' lack of exposure to authentic circumstances where they may speak and express themselves in English. Furthermore, pupils lack exposure to the cultural backgrounds of native English speakers (Aldosari, 2024).

Unfortunately, speaking proficiency is underappreciated in schools. Educators primarily emphasize conventional techniques that foster rote memorization, making students passive recipients of information. They have little inclination to acquire proficiency in English. The acquisition of English becomes a daunting challenge for them, prompting some to abandon their studies. In EFL courses, emphasis is placed on reading and writing. This crucial ability is entirely overlooked. Consequently, learners struggle to articulate even a single statement. Recently, speaking skills have been emphasized to achieve desired objectives. Moreover, English is a conduit for career prospects and effective navigation within this global community (Akhter et al., 2020). Bueno et al. (2006) assert that EFL learners encounter difficulties with speaking skills. For them, conversing in English is a formidable challenge. This problem involves several aspects. An inadequate teaching style is one of them. Educators neglect the development of speaking skills. They emphasize reading and writing. The absence of practice is another contributing element. Students are rarely allowed to develop their speaking skills. Shyness and a deficiency of confidence are other contributing factors. Speaking is considered a crucial ability. Baek and Lee (2018) and Chen and Hwang (2019) identified outdated instructional methods in EFL English classes that lacked renewal or enhancement, resulting in inadequate practice and restricted exposure to English speaking.

Innovative technology has provided L2 language learners the chance to improve speaking skills through significant interactions (Bower & Kawaguchi, 2011). Recent decades have witnessed substantial technological advancements that have revolutionized schooling. Technology in education can enhance motivation and comprehension, resulting in superior learning outcomes and increased instructional efficacy (Afendi et al., 2022). Specifically, artificial intelligence (AI) technologies can enhance student learning and augment the function of educators in the short to medium term (Reiss, 2021). AI technologies are expected to offer a more flexible approach to education. This will offer a learning environment customized to the specific demands of each learner (Arbi, 2024). This parallels the assertion of Yahya et al. (2023) that artificial intelligence can facilitate the creation of adaptive learning systems capable of tailoring educational resources and methodologies to align with students' unique competencies and preferences. AI technology is an interactive educational partner and a supportive resource throughout the learning process. AI can identify each student's strengths and weaknesses by providing adaptive learning solutions (Ronsumbre et al., 2023). This leads to more individualized education. This phenomenon creates a complete learning environment and ecosystem that improves education quality through efficient cooperation between teachers and artificial intelligence technologies. AI technology can evaluate students' speaking, listening, writing, and reading skills in English language acquisition. The AI learning system can create a tailored educational program depending on every student's ability level and needs. A student with more speaking ability might be given challenging tasks or materials to improve their skills (Arbi, 2024).

According to El Shazly (2021), AI technologies are good learning tools because of their flexibility, interaction, and learner-centered approach, which are vital for enhancing speaking skills. Furthermore, artificial intelligence has shown its ability to inspire student enthusiasm and improve interactive language learning strategies, which is particularly important in a new academic context (Wekke et al., 2017). Among AI technologies, chatbots are mostly used in education (Colace et al., 2018). AI voice chatbots benefit educational environments since they can converse

with the same speed and clarity as people using speech recognition and natural language processing algorithms (Kaplan, 2016; Duong & Suppasetseree, 2024).

The domain of EFL has experienced the beneficial impact of AI recently (Hamuddin, 2018; Junaidi, 2020). AI systems using automated speech recognition technology demonstrate a capacity comparable to human understanding by identifying and interpreting learners' speech. This ability is especially beneficial when native English speakers are not easily accessible, significantly enhancing learners' speaking proficiency (Junaidi, 2020; Zou et al., 2020; Soleimani et al., 2022).

According to Kim (2017), the AI voice chatbot might engage consumers in meaningful negotiations. It might also reiterate or recontextualize a comment to improve the negotiation process. Colace et al. (2018) noted that using the AI voice chatbot was a novel approach linking technological tools with educational settings, improving students' communicative and customized learning experiences and promoting their speaking skills. Adamopoulou and Moussiades (2020) found the AI voice chatbot quite effective by conversing with several users simultaneously on a messaging network. Kim (2018) also discovered that the AI voice chatbot provided the students with fluent and human-like English communication, producing practical input.

Hill et al. (2015) looked at human-human communication concerning AI-human interactions and found that students had a more extended involvement with AI than their relationships with peers. Kang (2022) looked into how students interacted with artificial intelligence instead of natural speakers and found that AI significantly improved their speaking abilities. AI-assisted learning also helps the students' general speaking ability, including fluency, grammatical correctness, vocabulary, and pronunciation (Junaidi (2020).

Literature Review

Artificial Intelligence in Learning Context

Fryer and Carpenter (2006) found that AI voice chatbots might facilitate discussions among students on identical topics using text and speech interactions. Ahmad et al. (2018) demonstrated that AI voice chatbots can consistently comprehend and reply to user questions while managing a significant number of participants. Çakmak (2022) observed that AI speech chatbots may interact with learners like native speakers, enhancing their interest in speaking (Duong & Suppasetseree, 2024).

Kim et al. (2021) examined how an AI voice chatbot affected EFL students' speaking ability. The study covered 49 undergraduate EFL students with two separate degrees of English competence. The people participated in a 14-week research comprising verbal interactions with one of three AI speech chatbots: Replika, Andy, and Google Assistant. Methodological tools for the study included surveys, pre-speaking and post-speaking assessments, and interviews. The study results showed that the participants enhanced their word stress, intonation, and pronunciation following the intervention. Still, while intermediate-level students showed notable progress, low-level pupils did not become more fluent. The study found that pupils had more opportunities for speaking practice as they were unconcerned about losing face from errors. Unrestricted time for

contact with the AI voice chatbot improved their pronunciation, confidence, involvement, and speaking preferences. Still, the research showed that inadequate speech recognition capabilities made students uneasy during verbal encounters with the AI voice chatbot.

Çakmak (2022) investigated the interactive impact of an AI voice chatbot on students' speaking performance, involving 90 EFL students from a Turkish institution who engaged in English-speaking practice with Replika over 12 weeks. The study used a questionnaire to examine students' impressions about using Replika for English-speaking practice. The investigation disclosed both beneficial and detrimental outcomes. Using Replika for English practice markedly enhanced the students' speaking proficiency relative to in-person practice. The study revealed that students' anxiety persisted unabated, owing to apprehensions over Replika's understanding of specific situations. Çakmak (2022) said interaction with an AI voice chatbot significantly improved pupils' English-speaking proficiency.

Duong and Suppasetseree (2024) examined how an AI voice chatbot affected Vietnamese students' English communication abilities and assessed their opinions on its use. Thirty undergraduate students participated in an eight-week quasi-experiment run across eight weeks. They participated in English-speaking exercises monthly, using an artificial intelligence voice chatbot. The pupils' English-speaking abilities improved with the AI chatbot ($p < 0.05$). All the students said that using suitable hedging phrases, grammatical structures, and vocabulary had improved their speaking skills. The results show that adding artificial intelligence avatars could be beneficial, but technological issues and sample size limitations also existed.

Zou et al. (2023) examined the efficacy of AI speech evaluation programs with automated feedback in aiding EFL learners to enhance their speaking skills. Forty Chinese EFL students participated in speaking exercises with AI tools like Liulishuo and EAP Talk. The findings revealed that most participants saw improvements in their speaking skills, encompassing fluency, pronunciation, and vocabulary, due to the use of the AI applications. The authentic enhancement was validated by the significantly elevated average results in posttests compared to pretests. The participants favored intuitive feedback, including scores and highlighted colors, along with practice suggestions from the computers. The research concluded that AI speech assessment tools with good feedback can enhance speaking proficiency in EFL learners.

Makhlouf (2021) examined the effect of the AI-based smartphone software ELSA Speak on improving the accuracy and fluency of oral communication abilities among 20 Saudi engineering students. Participants were required to use the ELSA Speak tool to enhance their English-speaking skills. Fluency, exact pronunciation, vocabulary, and grammar were the key goals. The main findings showed that the AI-based application caused statistically significant improvement in the learners' fluency, accuracy, and speaking ability from the pretest to the posttest.

Maknun (2020) studied how Orai, an artificial intelligence-driven tool, helped students in a foreign language enhance their public speaking abilities. The treatment and control groups consisted of sixty students from the English Department. Six treatment sessions were held for the experimental group, during which Orai provided comments on speech metrics, including confidence, conciseness, tempo, unnecessary words, gestures, and pauses. The control group did not use Orai. Apart from pretests and posttests, Orai's assessment features were used to collect

data. With the Orai group demonstrating a faster development in speaking skills following the treatments, the treatment and control groups showed a significant difference in speaking competency.

Examining the use of artificial intelligence technologies in the pragmatic context of English language learning is vital. It would show how artificial intelligence could help to provide interesting instructional materials and improve the learning of English language competence (Arbi, 2024). Though earlier research has looked at the influence of artificial intelligence in a language learning environment, much more knowledge is still needed on how it affects the speaking abilities of EFL students. Thus, further study is required to define AI's role in enhancing the speaking skills of EFL students (Qiao & Zhao, 2023). Moreover, it is unclear how well artificial intelligence speaking assessment tools help language students improve their speaking abilities (Heil et al., 2016; Loewen et al., 2019, 2020); thus, more empirical evidence is needed (Burston, 2015; Zhang & Zou, 2022). Moreover, spoken comments have to help EFL students (Shute, 2008).

Studying spelling techniques, Al Balushi and Al Seyabi (2016) found that Omani EFL students mostly use spelling techniques, including sounding out, syllabification, and visual checking, suggesting that the learners attempt to link spelling with pronunciation. El Shorbagi et al. (2017) did another study on the first-grade basic education program in Omani pupils, revealing the disparity and necessity for efficient phonemic and phonological awareness initiatives. Limited to specific plosive and affricate sounds, Al Yaqoobi et al. (2016) investigated Omani EFL students' mistakes in particular consonant sounds. Focusing on Omani students' views on low English competence in Oman, Al Mahrooqi (2012) found some reflections on phonological characteristics. While discussing the improvement of speaking and pronunciation, it was considered one of the most difficult tasks for Omani EFL learners, and many people blame the few opportunities for actual language practice and individual feedback. Traditional classroom teaching plays an important role; however, sometimes, it cannot give learners customized and interactive support to achieve fluency and pronunciation. AI tools, like Pi AI, propose the opposite by creating an immersive, interactive, and self-dictated learning environment. The present study attempts to fill in the gap existing in the pedagogical approach so far, considering the effectiveness of Pi AI in improving speaking and pronunciation among Omani EFL learners. Pi AI was chosen for this research because of its unique focus on emotionally intelligent and conversational interactions, distinguishing it from other task-oriented or fact-based artificial intelligence technologies. Unlike traditional AI chatbots that primarily provide information or corrections, Pi AI is meant to maintain natural conversation, provide sympathetic replies, and establish rapport with users. These qualities fit the educational goals of encouraging continuous speaking practice and lowering anxiety among EFL students. Its simple mobile interface helps to provide access and ongoing engagement outside the classroom. This research is relevant because it might revolutionize language learning by incorporating and using AI technology in delivering immediate and tailored feedback apart from accurate language exchange. Thus, the research proceeds to answer the following questions:
1. Does Pi AI affect the speaking performance of Omani EFL learners?
2. Does Pi AI affect the pronunciation of Omani EFL learners?

Methodology

Participants

The study's sample comprised 60 Omani EFL learners, randomly allocated to control and experimental groups; 30 students were in the control group and 30 in the experimental one. This number of students was used as the sample population based on their availability within the research timeframe. The students were native Arabic speakers aged 19 to 21 years, except one of the candidates in the experimental group, an external student called a working student, at 40. The institution's assessments revealed that these students have intermediate proficiency in the English language. The Preparatory Studies Center within the college does not focus on the age and gender of participants.

The national curriculum of Oman requires participants to fulfill one to two academic years in the General Foundation Program (GFP). The GFP program is compulsory and a requirement for higher education in Oman. Consequently, to gain admission to specialized departments, the GFP program offers students a variety of disciplines, including English, Mathematics, and Information Technology, using English as the language of teaching.

Instrumentation

A few instruments were employed in this study to collect the required information regarding the students' speaking.

Speaking Package

One of the instruments used in this study was the speaking package for the assessment. The speaking exam has three sections. In section 1, there are 31 situations with 3 to 4 questions in each situation on familiar topics such as hometown, living with the family, like and dislikes, etc., 5 minutes specified to this section. In the second section, with 30 situations and approximately 5 to 6 minutes, some answers will be given to the students, and they must make questions for the responses; this section aims to measure students' grammatical knowledge in using tenses. The last part of the exam contains 17 picture stories and maps. Students can select picture stories or maps to make their own stories. In the former case, students are given 1 minute, a pen and paper, to write down some prompts and utterances for their speaking; in the latter one, students are given 1 minute to read the map and familiarize themselves with the places within the map. Students have 1 to 2 minutes for this section. The speaking exam is out of 20 for the intermediate students; their marking criteria are task achievement, lexical resources, grammar, and pronunciation, and each criterion carries 5 marks. Two examiners listen to the students, and their voices are recorded accordingly. The discrepancy between the markers must not be more than 3 scores.

Pi Application

The second and most important data-gathering source was the Pi Application, which could be freely downloaded from the App Store or Google Play. This tool was used to give extra practice to experimental group students. Toolify.ai (2023) stated that Pi represents Personal Intelligence and is a sophisticated chatbot particularly developed for language learners. In contrast to conventional chatbots, Pi is designed to deliver tailored replies and facilitate substantive dialogues.

It transcends mere question-answering and emphasizes aiding users in enhancing their language proficiency through interactive dialogue. Pi presents three distinctive attributes that differentiate it from other chatbots:

(a) Dialogue Format, in which Pi employs a conversational approach, enabling users to participate in seamless and fluid dialogues. Whether you pose a question, wish to make a declaration, or engage in dialogue, Pi is there to answer and interact with you as though you were conversing with a native speaker.

(b) Accessibility of the Platform. In contrast to several chatbots restricted to a singular platform, Pi is operable across various platforms to enhance language abilities at any time and location.

(c) Customization. The most notable characteristic of Pi, analyzes the preferences, objectives, and dialogue history. Pi customizes its replies to address your particular requirements. Increased interaction with Pi enhances its comprehension and adaptation to your conversational style, rendering it a customized language-learning assistant.

Like ChatGPT, Pi lets you input your message into the chat interface. Unlike other chatbots, Pi enhances customization with its speech function. Activating the audio feature allows Pi to vocalize its responses, improving the conversational experience via immersion and engagement. Pi has several advantages for language learners, including Engaging in a dialogic approach, availability of the platform on Instagram, WhatsApp, and Facebook Messenger, and tailored replies informed by your choices and dialogue history. Pi offers two methods for engaging in conversations: text-based and voice-based. To communicate with Pi via the text-based approach, just input your message into the chat interface. You may pose inquiries, convey assertions, or initiate a dialogue. Pi will answer appropriately, facilitating a tailored dialogue. Although Pi lacks an integrated speech-to-text functionality, it is nevertheless possible to engage in voice-based dialogues. Windows users can employ voice-to-text functionality on their devices. This enables real-time communication with Pi, akin to conversing with a native English speaker. A significant advantage of Pi is its superior speech quality. The voices used in Pi's audio function are crafted to sound authentic and captivating, eschewing any artificial or unnatural tones. In addition, it guarantees that your engagements with Pi are seamless and pleasurable. Pi is an exceptional resource for enhancing English fluency and language assessment preparation (Toolify.ai, 2023).

Pi can be your virtual language tutor to improve your English proficiency. It can enhance your fluency, augment your lexicon, and hone your linguistic abilities. Engaging in tailored dialogues may provide significant practice and strengthen your confidence. Pi can be your evaluator when preparing for language assessments such as the IELTS speaking test. Through the simulation of examination circumstances, Pi aids in acclimating to the exam style and enhancing your speaking abilities. Eliminate the inconvenience of locating discussion partners or participating in costly speaking courses. Even without intensive language study, Pi may be an enjoyable talking companion. Whether you want light-hearted talks or profound conversations, Pi's customization guarantees an authentic and entertaining conversational experience. Pi's primary power is in its capacity to acquire knowledge about you and tailor its replies accordingly. Providing Pi with background information on your personal history and objectives enables it to

offer customized advice, recommendations, and discussion topics. It adjusts to your learning preferences, guaranteeing that each connection is individualized and significant (Toolify.ai, 2023).

The first theory based on which Pi was employed in this study was the Technology Acceptance Model (TAM). The TAM, established by Davis (1986), elucidates the determinants affecting humans' choices to embrace or dismiss new technology. The concept asserts that perceived utility and ease of use are the primary factors influencing an individual's desire to use a technology, which ultimately affects the practical use of the technology. The TAM defines perceived utility as the degree to which a technology is believed to enhance work performance and perceived ease of use as the extent to which the technology is considered user-friendly. In conjunction with additional external variables like social impact, the characteristics above shape an individual's attitude towards technology usage, affecting their desire to use it. The TAM has been extensively used and evaluated across several contexts, including higher education. Using the core principles of TAM, it serves as a practical framework for examining the integration of artificial intelligence in educational environments. Artificial intelligence, including chatbots (e.g., ChatGPT, ChatSonic), necessitates evaluation in higher education; hence, the TAM offers a framework for analyzing the findings. Chatbots are computer programs engineered to replicate human communication, serving various functions such as delivering student assistance, responding to inquiries, and facilitating individualized learning experiences. The TAM may be used in higher education to help students understand the adoption of chatbots as an emerging technology. Students may regard chatbots as beneficial if they deliver prompt and precise information, assist with academic work, and provide tailored advice. Conversely, students may find chatbots challenging to use if they necessitate advanced technological proficiency or lack user-friendliness. Besides perceived utility and simplicity of use, social influence may also affect students' adoption of chatbots. Students who observe their friends or professors using chatbots may be more inclined to embrace them. The TAM offers a valuable framework for comprehending and forecasting students' adoption of chatbots in higher education. Educators may formulate more effective interventions to foster their adoption and improve students' learning experiences by discerning the aspects that affect students' attitudes and intentions toward chatbot usage (Tarisayi, 2024).

Sociocultural Theory was the second theory evaluated in the study's design and instrumentation. Sociocultural Theory, formulated by Russian psychologist Lev Vygotsky, is crucial in second language learning. From a sociocultural standpoint, learning is regarded as fundamentally social before becoming an individual. Consciousness and conceptual development are seen mostly as inter-mental phenomena. Phenomena are shared amongst individuals; subsequently, individuals develop their awareness, evolving into an intra-mental phenomenon. Language is the principal symbolic tool for enhancing awareness (Mitchell & Myles, 2004).

AI may identify gaps in teaching and learning by assessing student performance data, determining their individual Zone of Proximal Development (ZPD), and equipping educators with insights into their students' existing abilities and pathways for improvement. AI implements a dual-teacher model that optimizes administrative tasks and enhances efficiency by alleviating teachers from repetitive duties, such as distributing assignments and addressing frequently asked

questions, allowing them to concentrate on student mentorship and individualized communication that machines cannot replicate. Educators have begun collaboration with AI helpers to optimize student achievements. Consequently, they possess more significant control over the scope and quantity of scaffolding, allowing pupils to operate fully autonomously. In the era of AI, teachers are tasked with providing targeted feedback to pupils and guiding them until they achieve mastery of the activity independently. The teacher offers targeted support for skills outside the pupils' capabilities, allowing them to accomplish tasks independently to the greatest extent feasible. In the era of AI, teachers are tasked with providing targeted feedback to pupils and guiding them until they achieve mastery of the activity independently (Zhou, 2020).

Procedures

This study was conducted in January 2025 in one of the universities in Oman's North Al Batinah region. Before the main round of the study, the study's approval and the ethical consideration form were received from the Research Department and students. It was thoroughly explained to the students that their participation in this study was voluntary and their performance would not affect their regular studies and assessments. The study was conducted in one month. In the first three days of the study, pretests of speaking were undertaken to ensure students' speaking skills homogeneity. Later, the control group continued their regular and daily training in the speaking classes with their teacher face-to-face. The class teacher used the in-house training materials, slides, and practice materials for the students. Various speaking techniques were also used, such as group work, pair work, and individual activities.

On days four and five of week one, the researcher conducted a 60-minute orientation session for the experimental group to familiarize students with the Pi application's features, including voice recognition capabilities, conversation simulation functions, and vocabulary-building tools. Technical support was available throughout the study to assist with any application-related issues. The researcher created a Microsoft Teams group for the experimental group and requested that the students send any problems or questions they might have through Microsoft Teams.

The students studied English for 4 hours per day, covering different skills (reading, writing, listening, and speaking), and the teacher allocated 1 hour from these 4 hours to conduct speaking sessions with both groups in the three weeks. This ensured that the time allocated to speaking practice was consistent across both the control and experimental groups. Each 60-minute session followed a structured format: a 10-minute introduction, 10-minute individual preparation with Pi, a 20-minute paired conversation, a 10-minute reflection period, and a final 10-minute whole-class summary discussion. To collect qualitative data about student experiences with the Pi application, participants completed a short feedback form after each session, rating their comfort level, perceived usefulness, and engagement.

In week 2, the control and experimental groups started regular and daily training in the speaking classes with their teacher face-to-face. The class teacher used the in-house training materials, slides, and practice materials for the students. In the control group, the speaking techniques included structured role-plays where students enacted real-life scenarios, information-gap activities requiring students to exchange missing details, debate sessions on curriculum topics,

and timed presentations with peer feedback. These activities were carefully designed to parallel the communication practice in the experimental group while using traditional face-to-face methods instead of AI assistance. Various speaking techniques were also used, such as group work, pair work, and individual activities. These sessions were conducted in a traditional classroom with standard audiovisual equipment. Each week followed a structured syllabus covering topics including week 2: describing places and giving directions; week 3: expressing opinions on current events; week 4: problem-solving scenarios in workplace contexts.

Although the experimental group experienced similar training sessions, activities, and materials, the application of Pi was used as the facilitator in their learning practice. Students were told to install the application on their mobile phones initially. Learners were divided into pairs to start the procedure, ensuring that each group included various students. Because of this diversity, there was an engaging discussion of viewpoints and ideas, which led to a deeper comprehension of different concepts. Students worked in couples, taking turns using the Pi program to ask various questions on a particular subject assigned by the teacher each session. Pairs then answered Pi's inquiries. Through this cooperative conversation, students could share personal stories, learn from their friends, and develop their speaking abilities. Learners switched partners and worked through a new set of questions after debating each one. By exposing students to various perspectives, this rotation made sure they interacted with several peers, which improved their communication skills and deepened their comprehension. The partners kept switching places until every student spoke with another student about every question.

Students' confidence in voicing their opinions was strengthened, and their prolonged exposure to various viewpoints created a dynamic learning atmosphere. Depending on numerous contextual and cognitive elements, users of artificial intelligence in the experimental group encountered both facilitation and interference. From a convenience standpoint, artificial intelligence usually offers quick access to data, tailored feedback, and automation of mundane activities. These qualities could improve student autonomy and drive and help to lower the cognitive load linked with task complexity. However, it interferes when the technology causes distraction, misunderstanding, or conflict with the user's goals. Users started to doubt or lose interest in AI results that were too general or contextually unsuitable. Moreover, poor digital literacy, insufficient training, or a lack of openness in artificial intelligence systems could allow users to misuse technologies or become overly dependent on them, promoting superficial involvement and lowering critical thinking. The students were told to contact their teachers immediately in these problematic situations. Pi provided a supportive environment where the students could prepare and practice the valuable words, phrases, and utterances individually before a pair or group discussion. Students practiced these techniques of using Pi 180 minutes weekly in two sessions with 90 minutes of practice. In the last three days of the treatment, speaking posttests were conducted to determine the results of implementing Pi in the speaking class and compare the experimental group's performance with their counterpart in the control group.

Data Analysis

This section analyzes the data collected to measure the impact of Pi as the learning facilitator on the speaking and pronunciation of EFL learners. In the beginning, a normality test was run to

select suitable parametric or nonparametric tests for the data analysis, and the results can be seen in Table 1.

Table 1
The Results of the Shapiro-Wilk Test of Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
pretest	.899	60	.000
posttest	.917	60	.001

Table 1 shows that the datasets for both pretest and posttest scores are significantly different from a normal distribution. Specifically, the Shapiro-Wilk test conducted on the pretest resulted in a statistic of 0.899 with df = 60 and a p-value of 0.000, and the posttest resulted in a statistic of 0.917 with df = 60 and a p-value of 0.001. The fact that all p-values are below the critical level of 0.05 leads to rejecting the null hypothesis of normality; hence, it implies that the pretest and posttest data do not follow a normal distribution. Based on the findings from the normality test, a nonparametric test will be performed to gain further information. Before conducting the main nonparametric test, a randomness test was performed to ensure the data grouping was not accidentally occurring. Table 2 below shows the results of the Wald-Wolfowits randomness test.

Table 2
The Wald-Wolfowitz Run Test

		Number of Runs	Z	Asymp. Sig. (1-tailed)
pretest	Minimum Possible	8	-5.990	.000
	Maximum Possible	44	3.385	1.000
posttest	Minimum Possible	6	-6.510	.000
	Maximum Possible	20	-2.865	.002

Table 2 shows the randomness of data groupings, which showed a violation in both pretest and posttest. For instance, where there is the least number of runs in the pretest, it yielded $Z = -5.990$ with $p < 0.001$, whereas the highest number of runs yielded $Z = 3.385$ with $p = 1.000$. In the posttest, the least number of runs yielded $Z = -6.510$ with $p < 0.001$, while the highest number yielded $Z = -2.865$ with $p = 0.002$. This means that both pretest and posttest data do not meet the

requirement of randomization or observation independence in data grouping. To gain detailed information on participants' performance in the pretest and posttest, a Man-Whitney U Test was run, and the results can be observed in Tables 3 and 4 below.

Table 3

The Descriptive Analysis of Both Groups in Pretest and Posttest

	groups	N	Mean Rank	Sum of Ranks
pretest	control	30	27.98	839.50
	experiment	30	33.02	990.50
	Total	60		
posttest	control	30	18.73	562.00
	experiment	30	42.27	1268.00
	Total	60		

Table 4

The Results of the Man-Whitney U Test in the Pretest and Posttest of Both Groups

	pretest	posttest
Mann-Whitney U	374.500	97.000
Wilcoxon W	839.500	562.000
Z	-1.143	-5.307
Asymp. Sig. (2-tailed)	.253	.000

Tables 3 and 4 include comprehensive descriptive and inferential assessments of the pretest and posttest results for the control and experimental groups. In the pretest, the experimental group had a marginally superior mean rank (33.02) relative to the control group (27.98), with sum rankings of 990.50 and 839.50, respectively. The Mann-Whitney U test findings for the pretest ($U = 374.500$, $Z = -1.143$, $p = 0.253$) demonstrate no statistically significant difference between the two groups. In the posttest, the experimental group exhibited a notably higher mean rank (42.27) than the control group (18.73), with sum rankings of 1268.00 and 562.00, respectively. The Mann-Whitney U test for the posttest ($U = 97.000$, $Z = -5.307$, $p < 0.001$) indicates a statistically significant difference between the groups. The data indicate that although there was no notable difference in performance between the groups during the pretest, the experimental group dramatically surpassed the control group in the posttest, presumably due to the intervention.

A comparison test was run between the groups to measure the effect of Pi AI on students' pronunciation. Tables 5 and 6 below show the statistical analysis for this variable.

Table 5

The Descriptive Analysis of Pronunciation in Pretest and Posttest

	groups	N	Mean Rank	Sum of Ranks
pretest	control	30	30.50	915.00
	experiment	30	30.50	915.00
	Total	60		
posttest	control	30	18.00	540.00
	experiment	30	43.00	1290.00
	Total	60		

Table 6

The Man-Whitney U Test for the Pronunciation in Pretest and Posttest

	pretest	posttest
Mann-Whitney U	450.000	75.000
Wilcoxon W	915.000	540.000
Z	.000	-5.926
Asymp. Sig. (2-tailed)	1.000	.000

Tables 5 and 6 comprehensively examine the pretest and posttest outcomes for the control and experimental groups. In the pretest, both groups exhibited equal mean rankings (30.50) and sum ranks (915.00 each), signifying no disparity in performance. The Mann-Whitney U test findings for the pretest (U = 450.000, Z = 0.000, p = 1.000) indicate no statistically significant difference between the control and experimental groups prior to the intervention. In the posttest, the experimental group exhibited a significantly higher mean rank (43.00) and sum rank (1290.00) than the control group, which recorded a mean rank of 18.00 and sum rank of 540.00. The Mann-Whitney U test for the posttest (U = 75.000, Z = −5.926, p < 0.001) reveals a highly significant difference between the two groups. The results indicate that although the groups were similar initially, the intervention administered to the experimental group resulted in substantial enhancements in their posttest performance, underscoring the treatment's efficacy.

Discussion

The primary objectives of the present paper were to measure the impact of using Pi AI as a learning facilitator within the language learning context, focusing on the speaking skills of EFL learners and pronunciation improvements. To achieve this goal, 60 Omani EFL learners with an intermediate English proficiency level participated in this study. They were randomly divided into two equal experimental and control groups, with 30 students in each group. During one month of treatment, both groups received regular in-class training and feedback from their teachers; however, the Pi AI was used within the experimental group as an extra tool for practicing speaking individually and in groups. The comprehensive data analysis of this study revealed that the experimental group outperformed the control group in the speaking posttest. In addition, the analysis of the pronunciation criterion showed similar results with significant progress of students in the experimental group from pretest to posttest and their outperformance compared to the control group.

The special benefits of Pi AI can explain the enhanced performance in the experimental group as a complementary pedagogical tool: Pi AI-enabled both individual and group speaking practices, allowing students to engage in language-related activities outside the scheduled class time. This is important for developing speaking skills, as students get many chances to practice, make mistakes, and receive immediate corrective feedback. All these characteristics are not seen in the traditional settings on which the control group relied exclusively.

The personalized feedback and adaptive exercise programs by Pi AI went a long way in bringing about notable improvements in pronunciation. Unlike traditional classroom feedback, Pi AI could focus on the specific phonetic difficulties encountered by each learner, thus allowing for targeted interventions that motivated steady and measurable progress, a notion in line with second language acquisition theories emphasizing the importance of constant and focused practice to achieve fluency and accuracy.

Moreover, the appealing and challenging features of Pi AI may have also raised the experimental group's motivation and confidence in verbal communication. As Pi AI likely reduced social anxieties related to presenting before a group of peers by offering a safe, low-anxiety environment for practice, it probably helped to overcome psychological barriers to performance, such as speaking apprehension. This individualized and assuring language practice gave the experimental group an advantage over the control group, resulting in better performance in the speaking posttest and improved pronunciation.

Several natural constraints of conventional language training settings explain the control group's lack of obvious improvement in speaking and pronunciation despite consistent classroom instruction. First, such environments usually provide little chances for ongoing and personalized speaking practice as classroom time is generally split among several students, depriving each student of the opportunity to participate in meaningful spoken contact. Face-to-face teaching also tends to deliver broad rather than specific comments, which might allow students to make the same pronunciation or fluency mistakes without knowing it. These tendencies might become fossilized over time without prompt remedial action. Moreover, conventional teaching often does not go outside the classroom, limiting the active language generation, which learners perform

independently. This limitation impedes the intensity and frequency of exposure required for significant progress. Students, especially those with speaking anxiety, may feel embarrassed in front of classmates, which might lower their desire to engage and practice freely in class. Students could lose interest or lack the drive to strive toward betterment if conventional classroom activities' often boring or monotonous character is considered. The control group, thus, while exposed to educational material, lacked the interactive, adaptive, and emotionally supportive setting needed for real improvements in spoken language and pronunciation accuracy.

The study results are consistent with several studies that have shown the positive effects of AI support tools on students' speaking (Qiao & Zhao, 2023; Safadi et al., 2022; El Shazly, 2021; Maknun, 2020; Makhlouf, 2021). Qiao and Zhao's (2023) research examined how well artificial intelligence-based teaching may enhance second language (L2) speaking abilities and communication self-regulation in a real environment. These results imply that AI-based teaching improves L2 speaking skills and encourages language students to self-regulate. Another study that supports the beneficial effects of AI on speaking skills was carried out by El Shazly (2021) to examine how AI affected EFL students' speaking ability and anxiety. The findings showed that AI considerably enhanced the students' speaking abilities. Safadi et al. (2022) examined the impact of AI-based training on the speaking skills of female English students. The results showed that the experimental students outperformed the control students in speaking, indicating the significant benefits of AI-based training in improving the speaking abilities of female English language learners. In a similar vein, Maknun (2020) looked at how an AI program affected the speaking skills of ELL learners. The results showed that after the treatment, the experimental learners performed better while speaking than the control group, highlighting the important contribution of AI-based training to improving the speaking skills of EFL learners. These findings align with the research done by Makhlouf (2021), who looked at how well AI training affected EFL learners' speaking abilities overall and accuracy, as well as fluency and speaking capacity subcomponents.

Multiple studies have obtained comparable outcomes to those found in the second study goal (Mohammadkarimi, 2024; Abimanto and Sumarsono, 2024; Al-Shallakh, 2024; Dennis, 2024; Zou et al., 2023), demonstrating that AI support tools improved learner pronunciation. Mohammadkarimi (2024) investigated the role of artificial intelligence (AI) in improving learners' English speech abilities. The research found that the experimental group improved significantly in their pronunciation accuracy. Abimanto and Sumarsono (2024) investigated the utilization of artificial intelligence in the Google Read Along app to improve English pronunciation, especially among learners who struggle with it. The research discovered that AI technology may assist students in enhancing their English pronunciation. Similarly, Al-Shallakh (2024) studied the use of Elsa Speak, an artificial intelligence tool, in higher education to improve the pronunciation abilities of EFL students at a Jordanian institution. The results add to the greater discussion of AI in education by emphasizing the practical effect of these kinds of apps on language acquisition, particularly pronunciation enhancement in higher education. These findings are congruent with Dennis' (2024) examination of the influence of AI-powered Speech Recognition Technology (AI-SRT) on enhancing English pronunciation and speaking abilities among EFL students. The outcomes of this research add to our knowledge of the influence of AI-powered voice recognition technologies on EFL learners' pronunciation and communication skills. The findings demonstrate the efficacy of this technology and provide useful insights into learners' perspectives and experiences. Zou et al. (2023) studied whether the varied automated feedback provided by AI

speech assessment tools may assist English as a foreign language (EFL) learners improve their speaking abilities. The findings revealed that almost all participants thought the AI speaking assessment program's input helped enhance their speaking abilities. The results also showed that their mean speaking ability ratings improved significantly.

Conclusion

The present paper focused on implementing AI tools, Pi, to monitor the students' speaking skills and pronunciation improvements in this study. After analyzing the 60 Omani EFL learners' performance in pre and post-treatment tests, it was revealed that the experimental group that employed Pi AI as the speaking facilitator performed significantly better than the control group in both variables. The results could be associated with using technological instruments, Pi AI.

The findings could be useful for students, teachers, and higher education institutions. The results confirm that AI technologies, especially Pi, greatly improve EFL learners' speaking and pronunciation. The customized approach, which enables students to work on their deficits to develop those skills at their pace, gives them immediate feedback and ample opportunity to practice, thus assuring better language ability and removing the fear of speaking, the most important ability for academic and professional success. Results show that AI technologies should be used in supporting language classes. Teachers can use pi AI to complement their teaching methodologies to ensure that learners receive additional support beyond the limits of school confinement. Its ability to monitor improvement and provide instant feedback will give teachers more time to fit their lesson plans more adequately to the needs of each learner and save precious time inside the classroom. Therefore, applying AI-driven tools like Pi in academic institutions comes with increasing emphasis on digital transformation across higher education. Institutions can help increase the quality of language programs by offering new tools to attract new students and further build the institution's reputation as a leader in adopting the latest state-of-the-art educational technology.

This study had some shortcomings, which are worth pointing out. First, the small sample size of 60 participants limits the generalization of results to larger populations, though this size is appropriate for an exploratory study. The experiment is conducted within a specific framework, targeting only Omani EFL learners from one place, hence narrowing to culturally or educationally different contexts. Whereas the Pi application does provide real opportunities for practicing languages, the outcome may be further influenced by several external factors relating to students' differing levels of technological expertise or their willingness to use the tool. Finally, the intervention length is rather short, lasting for a month, which is not enough to properly investigate the long-term effects on the development of speaking skills or to maintain the gain that has been reported.

Future studies can examine the longitudinal effect of AI-driven technologies like Pi on speaking proficiency and long-term retention of the acquired language. Such a treatment model will allow researchers to study how long the benefits are maintained and how learners eventually

accommodate the AI technologies. An investigation into the effectiveness of AI-supported language learning in different cultural and linguistic contexts can indicate the function of cultural variables in engagement and learning outcomes, thus allowing for a wider generalization of these tools. A more general design that incorporates the investigation of a range of different age groups, educational backgrounds, and technical abilities would have helped establish how learner profiles interact with the process of language acquisition driven by AI. Further research might be directed towards hybrid approaches that meld AI technology with more traditional face-to-face teaching to identify what works best for effective instruction. Looking at unique AI tool characteristics, such as voice synthesis, customizability, and accessibility, may define their specific effects on capabilities like fluency, pronunciation, and vocabulary building. The research into AI tools' effects on learner motivation and engagement, particularly because of such elements as gamification and interactive dialogues, will go a long way toward improving the understanding of how AI learning tools affect the learning process.

No Conflict of Study

We certify that there is no actual or potential conflict of interest or unfair advantage in providing the offer submission or performing the required services.

References

Abimanto, D., & Sumarsono, W. (2024). Improving English pronunciation with AI speech-recognition technology. *Acitya: Journal of Teaching and Education, 6*(1), 146–156. https://doi.org/10.30650/ajte.v6i1.3810

Adamopoulou, E., & Moussiades, L. (2020). Chatbots: History, technology, and applications. *Machine Learning with Applications*, *2*, 100006. https://doi.org/10.1016/j.mlwa.2020.100006

Afendi, A., Sholihah, N., Mutmainah, F., Ishak, K., & Lubis, A. (2022). Penggunaan Microsoft Office untuk meningkatkan motivasi dan hasil belajar siswa sekolah dasar *[The use of Microsoft Office to improve motivation and learning outcomes of elementary school students]. Jurnal PGSD, 8*(1), 28–32. https://doi.org/10.32534/jps.v8i1.2949

Ahmad, N. A., Che, M. H., & Zainal, A. (2018). Review of chatbots design techniques. *International Journal of Computer Applications*, *18*(8), 7–10.

https://doi.org/10.5120/ijca2018917606

Akhter, S., Haidov, R., Rana, A. M., & Qureshi, A. H. (2020). Exploring the significance of speaking skill for EFL learners. *PalArch's Journal of Archaeology of Egypt/Egyptology, 17*(9), 6019–6030.

Al Balushi, M., & Al Siyabi, F. (2016). Spelling strategies of Omani EFL students. *English Linguistics Research, 5*(3), 1–14. https://doi.org/10.5430/elr.v5n3p1

Aldosari, M. S. (2024). Another world with artificial intelligence in speaking classes: To delve into the influences on willingness to communicate, personal best goals, and academic enjoyment. *Computer Assisted Language Learning Electronic Journal (CALL-EJ)*, *25*(4), 439–463.

Al Mahrooqi, R. (2012). A student perspective on low English proficiency in Oman. *International Education Studies, 5*(6), 263–271. https://doi.org/10.5539/ies.v5n6p263

Alsalihi, H. D. (2020). Main difficulties faced by EFL students in language learning. *Journal of College of Education for Women, 31*(2), 19–34. https://doi.org/10.36231/coedw.v31i2.1359

Al-Shallakh, M. A. I. (2024). Embedding artificial intelligent applications in higher educational institutions to improve students' pronunciation performance. *Theory and Practice in Language Studies*, *14*(6), 1897–1906. https://doi.org/10.17507/tpls.1406.31

Al Yaqoobi, Z., Ali, F., & Sulan, N. (2016). An analysis of errors caused by Omani EFL learners in pronouncing certain consonant sounds. *International Journal of Languages, Education and Applied Linguistics, 5*, 59–71.

Arbi, A. P. (2024). Optimizing the use of artificial intelligence in English language learning: A literature review. *Global Journal of Management and Innovation*, *2*(2), 25–30. https://doi.org/10.59435/gjmi.v2i2.278

Baek, J., & Lee, C. H. (2018). University students' perceptions and engagement in mobile-assisted blended learning in English speaking classes. *Multimedia-Assisted Language Learning*, *21*(4). https://doi.org/10.15702/mall.2018.21.4.11

Bower, J., & Kawaguchi, S. (2011). Negotiation of meaning and corrective feedback in Japanese/English eTandem. *Language, Learning and Technology*, *15*(1), 41–71. http://dx.doi.org/10125/44237

Brown, H. D., & Lee, H. (2015). *Teaching by principles: An interactive approach to language pedagogy* (4th ed.). Pearson Education.

Bueno, A., Madrid, D., & McLaren, N. (2006). *TEFL in secondary education*. Editorial Universidad de Granada.

Burston, J. (2015). Twenty years of MALL project implementation: A meta-analysis of learning outcomes. *ReCALL*, *27*(1), 4–20. https://doi.org/10.1017/S0958344014000159

Çakmak, F. (2022). Chatbot-human interaction and its effects on EFL students' L2 speaking performance and anxiety. *Novitas-ROYAL (Research on Youth and Language)*, *16*(2), 113–131.

Chen, M. R. A., & Hwang, G. J. (2019). Effects of a concept mapping–based flipped learning approach on EFL students' English-speaking performance, critical thinking awareness, and speaking anxiety. *British Journal of Educational Technology*, *51*(3), 817–834. https://doi.org/10.1111/bjet.12887

Colace, F., Santo, M. D., Lombardi, M., Pascale, F., Pietrosanto, A., & Lemma, S. (2018). Chatbot for e-learning: A case of study. *International Journal of Mechanical Engineering and Robotics Research*, *7*(5), 528–533. https://doi.org/10.18178/ijmerr.7.5.528-533

Dao, H. (2017). Identify factors that negatively influence non-English major students' speaking skills. *Higher Education Research*, *2*(2), 35–43. https://doi.org/10.11648/j.her.20170202.12

Davis, F. D. (1986). *A technology acceptance model for empirically testing new end-user information systems: Theory and results* [Doctoral dissertation, MIT Sloan School of Management].

Dennis, N. K. (2024). Using AI-powered speech recognition technology to improve English pronunciation and speaking skills. *IAFOR Journal of Education*, *12*(2), 107–126.

Duong, T., & Suppasetseree, S. (2024). The effects of an artificial intelligence voice chatbot on improving Vietnamese undergraduate students' English-speaking skills. *International Journal of Learning, Teaching and Educational Research*, *23*(3), 293–321.

https://doi.org/10.26803/ijlter.23.3.15

El Shazly, R. (2021). Effects of artificial intelligence on English speaking anxiety and speaking performance: A case study. *Expert Systems*, *38*(e12667). https://doi.org/10.1111/exsy.12667

El Shorbagi, A., Al Kharusi, H., Al Kindi, F., Al Siyabi, A., & Al Abri, A. (2017). The effectiveness of phonemic and phonological awareness program to improve reading

performance of first grade basic education students in Oman. *Journal of Educational and Psychological Studies, 11*(3), 666–676. https://doi.org/10.24200/jeps.vol11iss3pp666-676

Fathi, J., Rahimi, M., & Derakhshan, A. (2024). Improving EFL learners' speaking skills and willingness to communicate via artificial intelligence-mediated interactions. *System, 121,* 103254. https://doi.org/10.1016/j.system.2024.103254

Fryer, L., & Carpenter, R. (2006). Bots as language learning tools. *Language Learning & Technology*, *10*(3), 8–14. http://dx.doi.org/10.125/44068

Hamuddin, B. (2018). Blogs as powerful learning tools: The perception from EFL students in Riau main island, Indonesia. *IOP Conference Series: Earth and Environmental Science*, *156*, 012060. https://doi.org/10.1088/1755-1315/156/1/012060

Jabber, K. W., & Mahmood, A. A. (2020). Non-verbal communication between two non-native English speakers: Iraqi and Chinese. *Theory and Practice in Language Studies, 10*(2), 189–196. https://doi.org/10.17507/tpls.1002.06

Heil, C. R., Wu, J. S., Lee, J. J., & Schmidt, T. (2016). A review of mobile language learning applications: Trends, challenges, and opportunities. *The EuroCALL Review*, *24*(2), 32–50. https://doi.org/10.4995/eurocall.2016.6402

Hill, J., Ford, W. R., & Farreras, I. G. (2015). Real conversations with artificial intelligence: A comparison between human–human online conversations and human–chatbot conversations. *Computers in Human Behavior*, *49*, 245–250. https://doi.org/10.1016/j.chb.2015.02.026

Huy, V., Nam, T., & Bon, N. (2024). The importance of speaking in English as a foreign language between skillful and thoughtful competencies: Studying sociolinguistics perspectives. *International Journal of English Language Studies*, *6*(2), 153–159.

https://doi.org/10.32996/ijels.2024.6.2.22

Junaidi, J. (2020). Artificial intelligence in EFL context: Rising students' speaking performance with Lyra virtual assistance. *International Journal of Advanced Science and Technology Rehabilitations*, *29*, 6735–6741.

Kang, H. (2022). Effects of artificial intelligence and native speaker interlocutors on ESL learners' speaking ability and affective aspects. *Multimedia-Assisted Language Learning*, *25*, 9–43. https://doi.org/10.15702/mall.2022.25.2.09

Kaplan, J. (2016). *Artificial intelligence: What everyone needs to know*. Oxford University Press. https://doi.org/10.1093/wentk/9780190602383.001.0001

Kim, N.-Y. (2017). Effects of types of voice-based chat on EFL students' negotiation of meaning according to proficiency levels. *English Teaching, 72*(1), 159–181.

https://doi.org/10.15858/engtea.72.1.201703.159

Kim, N.-Y. (2018). A study on chatbots for developing Korean college students' English listening and reading skills. *Journal of Digital Convergence*, *16*(8), 19–26.

https://doi.org/10.14400/JDC.2018.16.8.019

Kim, H.-S., Cha, Y., & Kim, N. Y. (2021). Effects of AI voice chatbots on EFL students' communication skills. *Korean Journal of English Language and Linguistics*, *21*, 712–734. https://doi.org/10.15738/kjell.21..202108.712

Kohn, K., & Hoffstaedter, P. (2017). Learner agency and non-native speaker identity in pedagogical lingua franca conversations: Insights from intercultural telecollaboration in foreign language education. *Computer Assisted Language Learning, 30*(5), 351–367. https://doi.org/10.1080/09588221.2017.1304966

Li, Q., & Chan, K. K. (2024). Test takers' attitudes of using exam-oriented mobile application as a tool to adapt in a high-stakes speaking test. *Education and Information Technologies, 29*(1), 219–237. https://doi.org/10.1007/s10639-023-12297-0

Loewen, S., Crowther, D., Isbell, D. R., Kim, K. M., Maloney, J., Miller, Z. F., & Rawal, H. (2019). Mobile-assisted language learning: A Duolingo case study. *ReCALL*, *31*(3), 293–311. https://doi.org/10.1017/S0958344019000065

Loewen, S., Isbell, D. R., & Sporn, Z. (2020). The effectiveness of app-based language instruction for developing receptive linguistic knowledge and oral communicative ability. *Foreign Language Annals*, *53*(2), 209–233. https://doi.org/10.1111/flan.12454

Makhlouf, M. K. I. (2021). Effect of artificial intelligence-based application on Saudi preparatory-year students' EFL speaking skills at Albaha University. *International Journal of English Language Education*, *9*(2), 36. https://doi.org/10.5296/ijele.v9i2.18782

Maknun, L. L. (2020). The implementation of Orai as artificial intelligence for digital native students in English speaking learning. *Indonesian Technology Enhanced Language Learning*, *1*, 131–138.

Manurung, K. (2015). Improving the speaking skill using reading contextual internet-based instructional materials in an EFL class in Indonesia. *Procedia - Social and Behavioral Sciences*, *176*, 44–51. https://doi.org/10.1016/j.sbspro.2015.01.442

Mitchell, R., & Myles, F. (2004). *Second language learning theories* (2nd ed.). Hodder Arnold.

Mohammadkarimi, E. (2024). Exploring the use of artificial intelligence in promoting English language pronunciation skills. *LLT Journal: A Journal on Language and Language Teaching*, *27*(1), 98–115. https://doi.org/10.24071/llt.v27i1.8151

Muslimah, M., Usman, B., & Iskandar, A. S. (2021). Teaching speaking report text through documentary video. *Research in English and Education, 6*(1), 42–48.

Nazara, S. (2011). Students' perception on EFL speaking skill development. *JET (Journal of English Teaching)*, *1*(1), 28–43.

Paudel, P. (2024). Navigating linguistic diversity: Implementing English medium instruction in Nepal's community schools. *Issues in Educational Research*, *34*(4), 1526–1547.

Qiao, H., & Zhao, A. (2023). Artificial intelligence-based language learning: Illuminating the impact on speaking skills and self-regulation in Chinese EFL context. *Frontiers in Psychology*, *14*, 1255594. https://doi.org/10.3389/fpsyg.2023.1255594

Qiao, H., & Zhao, A. (2023). Artificial intelligence-based language learning: illuminating the impact on speaking skills and self-regulation in Chinese EFL context. *Frontiers in Psychology*, *14*, 1255594. https://doi.org/10.3389/fpsyg.2023.1255594

Rahimi, M., & Fathi, J. (2022). Employing e-tandem language learning method to enhance speaking skills and willingness to communicate: The case of EFL learners. *Computer Assisted Language Learning*, 1–37. https://doi.org/10.1080/09588221.2022.2064512

Reiss, M. J. (2021). The use of AI in education: Practicalities and ethical considerations. *London Review of Education, 19*(1), 1–14. https://doi.org/10.14324/LRE.19.1.05

Ronsumbre, S., Rukmawati, T., Sumarsono, A., & Waremra, R. S. (2023). Pembelajaran digital dengan kecerdasan buatan (AI): Korelasi AI terhadap motivasi belajar *[Digital learning with artificial intelligence (AI): The correlation of AI with learning motivation]. Educatio: Jurnal Pendidikan, 9*(3), 1464–1474. https://doi.org/10.31949/educatio.v9i3.5761

Safadi, H. A., Shgair, M. S. A., & Qatawnih, K. S. (2022). The effectiveness of designing an e-learning environment based on mastery learning and artificial intelligence on developing English speaking skills among tenth graders in Palestine. *Journal of Educational and Psychological Sciences, 31*, 475–507. https://doi.org/10.33976/IUGJEPS.31.1/2023/22

Shumin, K. (1997). Factors to consider: Developing adult EFL pupils' speaking abilities. *English Teaching Forum, 35*(3), 8–13. Retrieved January 5, 2025, from http://dosfan.lib.uic.edu/usia/E-USIA/forum/vols/vol35/no3/p8.htm

Shumin, K. (2002). Factors to consider: Developing adult EFL student speaking abilities. In J. C. Richards & W. A. Renandya (Eds.), *Methodology in language teaching: An anthology of current practice* (pp. 204–211). Cambridge University Press.

https://doi.org/10.1017/CBO9780511667190.028

Shute, V. J. (2008). Focus on formative feedback. *Review of Educational Research, 78*(1), 153–189. https://doi.org/10.3102/0034654307313795

Soleimani, H., Mohammaddokht, F., & Fathi, J. (2022). Exploring the effect of assisted repeated reading on incidental vocabulary learning and vocabulary learning self-efficacy in an EFL context. *Frontiers in Psychology*, *13*, 851812. https://doi.org/10.3389/fpsyg.2022.851812

Tarisayi, K. S. (2024). A theoretical framework for interrogating the integration of artificial intelligence in education. *Research on Education and Media*, *16*(1), 37–44. https://doi.org/10.2478/rem-2024-0006

Thornbury, S., & Slade, D. (2006). *Conversation: From description to pedagogy*. Cambridge University Press.

Toolify.ai. (2023, December 26). *Meet Pi, your personal AI companion.* https://www.toolify.ai/ai-news/meet-pi-your-personal-ai-companion-25320

Wan, Y., & Moorhouse, B. L. (2024). Using Call Annie as a generative artificial intelligence speaking partner for language learners. *RELC Journal.* Advance Online Publication. https://doi.org/10.1177/00336882231224813

Wekke, I. S., Yandra, A., & Hamuddin, B. (2017). Learning strategy in class management: A reflection from Manado case. *IOP Conference Series: Earth and Environmental Science*, *97*(1), 012053. https://doi.org/10.1088/1755-1315/97/1/012053

Yahya, M., Hidayat, & Wahyudi. (2023). Implementasi artificial intelligence (AI) di bidang pendidikan kejuruan pada era revolusi industri 4.0 *[Implementation of artificial intelligence (AI) in vocational education in the era of the industrial revolution 4.0]*. *Prosiding Seminar Nasional Dies Natalis ke-62*, 190–199. Retrieved from https://journal.unm.ac.id/index.php/Semnasdies62/index

Zhang, R., & Zou, D. (2020). Types, purposes, and effectiveness of state-of-the-art technologies for second and foreign language learning. *Computer Assisted Language Learning, 35*(2), 1–47. https://doi.org/10.1080/09588221.2020.1744666

Zhou, W. (2021). Sociocultural theory and its implications in college English teaching and learning in the age of artificial intelligence. *Journal of Physics: Conference Series*, *1646*(1), 012142. https://doi.org/10.1088/1742-6596/1646/1/012142

Zou, B., Du, Y., Wang, Z., Chen, J., & Zhang, W. (2023). An investigation into artificial intelligence speech evaluation programs with automatic feedback for developing EFL learners' speaking skills. *SAGE Open*, *13*. https://doi.org/10.1177/21582440231193818

Zou, B., Liviero, S., Hao, M., & Wei, C. (2020). Artificial intelligence technology for EAP speaking skills: Student perceptions of opportunities and challenges. In M. R. Freiermuth & N. Zarrinabadi (Eds.), *Technology and the psychology of second language learners and users* (pp. 433–463). https://doi.org/10.1007/978-3-030-34212-8_17