Application of AI in Enhancing Speaking Performance of Students in Hanoi

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Abstract: Teaching English has recently been boosted by the development of artificial intelligence (AI). One of the key sections that benefits most from this is the speaking performance of students. This paper explores a case study in Hanoi where English language teaching is supported by AI. The result shows that the speaking performance of students is significantly enhanced in the experimental group, in both the short term and long term. The motivation and confidence of students is also increased, and this correlates with the application of AI. Time exposure to AI tends to be a big issue with students; it may cause headaches for administration because of several issues such as plagiarism and time consummation; however, it can also improve the learning results. The assistance of AI seems to be effective and needs to be considered in the future pedagogical implementation, especially in the period of maturity of AI tools.

1. Introduction

Foreign language teaching today tends to lean towards a communicative approach with the help of AI, which emphasizes the development of communicative competence through meaningful interaction and authentic language use. Communicative language teaching (CLT) principles prioritize communicative

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activities, such as role-plays, discussions, and problem-solving, to foster fluency, accuracy, and confidence in language learners. AI has emerged as a transformative force in various fields, including education, where its applications are reshaping traditional teaching and learning methodologies. In the context of English language education, the integration of AI offers a multitude of benefits and holds significant importance in facilitating more efficient, personalized, and effective learning experiences for learners around the world. Chatbots, digital tools, "have evolved into digital agents that can interact with human beings as interlocutors in a digital space. In the language learning context, chatbots can provide an opportunity for language learners to personalize their time and language practice through interactions with a virtual interlocutor" (Cakmak, 2022: 114).

Speaking is a fundamental skill in language acquisition, serving as a primary means of communication and interaction. The ability to express oneself orally is essential for social, academic, and professional success, making speaking proficiency a key focus of language education. University students should have a good speaking ability if they want to be successful employees in their future careers. Thus, speaking skills is a fundamental ability that university students should acquire not just for their academic achievement, but also for their prospective professions (Warman, et al., 2023: 4802). Effective speaking instruction involves providing opportunities for students to practice speaking in authentic contexts, receive feedback, and develop strategies for improving fluency and accuracy. AI can make the oral teaching process more effective.

The use of AI in enhancing learning can engage students' motivation since it uses new methods, supports the teacher in teaching the subject more effectively in the classroom (Warman, et al., 2023: 4802). One of the key benefits of AI integration in language education is the provision of personalized learning experiences tailored to individual learners' needs, preferences, and proficiency levels. AI-driven language learning platforms leverage adaptive algorithms to analyze learners' strengths and weaknesses, recommend customized learning paths, and provide targeted feedback on areas for improvement. This personalized approach promotes learner autonomy, engagement, and motivation, ultimately leading to more effective learning outcomes. Applying AI in teaching and learning the English language lies in its ability to tailor educational content and experiences to the unique needs and preferences of individual learners. Through advanced algorithms and machine learning techniques, AI-powered platforms can analyze vast amounts of data regarding learners' proficiency levels, learning styles, strengths, and weaknesses to generate personalized learning pathways. This approach not only fosters greater engagement and motivation among learners, but it

also ensures instructional materials and activities are appropriately challenging, yet achievable, thereby optimizing the learning outcomes.

Furthermore, AI-driven educational tools and platforms offers learners access to an extensive array of interactive and immersive learning experiences, thereby enhancing their language acquisition process. For instance, AI-powered language learning applications often incorporate features such as speech recognition, natural language processing, and virtual tutoring systems, enabling learners to practice listening, speaking, reading, and writing skills in a simulated environment. These interactive exercises not only provide immediate feedback and correction but also create opportunities for authentic language use, thereby promoting communicative competence and fluency.

AI-powered language learning tools offer immediate feedback and assessment, enabling students to receive real-time corrections and guidance on their speaking performance. Speech recognition technologies analyze students' pronunciation, intonation, and fluency, providing instant feedback on errors and suggesting corrective actions. This immediate feedback loop facilitates more efficient skill development and enhances students' awareness of their linguistic strengths and weaknesses.

The development of AI and its application in language learning and teaching is still in its infancy, and the long-term effects need to be carefully checked. "Voice chatbots still struggle with misunderstandings and consequently give off-topic responses. In natural form, depending on the proximity and willingness to communicate between interlocutors, the search for clarification comes through nonverbal as well as verbal communication. Although the nature of human oral interaction involves processing the utterances, it is generally considered that interlocutors communicate most effectively when verbal linguistic input and non-linguistic signaling input are processed simultaneously and contextually" (Cakmak, 2022: 115). This study aims to assess the speaking performance of students in a university in Hanoi to see the impacts of AI on that performance and how it is perceived by the students.

The integration of AI in English language education facilitates continuous assessment and progress monitoring, allowing both learners and educators to track their performance and growth over time. AI algorithms can analyze learners' responses to various language tasks and assessments, identify patterns, and generate insightful reports on their strengths, weaknesses, and areas for improvement. This data-driven

approach enables educators to provide targeted interventions and personalized support to learners, fostering a more effective and efficient learning process.

AI is also able to overcome barriers to access and inclusion, particularly for learners from underprivileged or marginalized communities. AI-powered educational platforms can deliver high-quality language instruction remotely, thereby expanding access to English language learning opportunities for individuals in remote or rural areas, as well as those with physical disabilities or limited access to traditional educational resources. By leveraging technology to democratize access to education, AI has the power to bridge linguistic and socio-economic divides, empowering learners from diverse backgrounds to unlock new opportunities and realize their full potential.

In addition to enhancing individual learning experiences, AI also holds promise in supporting educators and institutions in curriculum design, content development, and instructional decision-making. AI algorithms can analyze educational data and trends to identify effective teaching strategies, recommend relevant learning resources, and generate adaptive learning materials tailored to specific learning objectives and standards. By automating routine tasks such as grading and lesson planning, AI frees up educators' time and energy, allowing them to focus on more personalized interactions with learners and pedagogical innovation.

AI-driven language assessment tools and platforms offer educators valuable insights into learners' progress and proficiency levels, enabling them to make data-informed decisions regarding instructional strategies, interventions, and curriculum adjustments. By providing timely and actionable feedback, AI contributes to a more dynamic and responsive teaching and learning environment, where educators can continuously adapt their practices to meet their students' evolving.

Furthermore, the integration of AI in English language education opens up new avenues for research and innovation, driving advancements in pedagogy, cognitive science, and educational technology. Researchers and developers are exploring novel applications, such as intelligent tutoring systems, virtual reality simulations, and adaptive learning algorithms, to enhance language learning outcomes and transform the way English is taught and learned in the digital age. By fostering collaboration between academia, industry, and educational practitioners, AI catalyzes innovation and promotes the development of cutting-edge tools and methodologies that have the potential to revolutionize language education.

The application of AI in teaching and learning English offers a multitude of benefits and holds significant importance in shaping the future of language

education. From personalized learning experiences and interactive language practice to data-driven assessment and instructional support, AI has the potential to enhance the effectiveness, accessibility, and inclusivity of English language learning for learners worldwide. By harnessing the power of technology to adapt to the diverse needs and preferences of learners, AI empowers educators and learners alike to achieve their educational goals and unlock new opportunities in an increasingly interconnected and multilingual world.

2. Literature review

The theoretical foundation of AI-assisted learning in speaking proficiency stems from a synthesis of language acquisition theories, cognitive psychology principles, and computer-assisted language learning (CALL) methodologies. Krashen's Input Hypothesis, a cornerstone in language acquisition theory, underscores the pivotal role of comprehensible input in the learning process. According to Krashen, exposure to meaningful language input is essential for language acquisition to occur effectively. This theory suggests that learners benefit most when they are immersed in contexts where language input is comprehensible and relevant to their communicative needs. In the realm of AI-assisted learning, this principle guides the development of platforms that provide learners with authentic and engaging language input, tailored to their proficiency level and learning goals (Krashen, S.D., 1981).

People are unable to master a language unless they have numerous chances for substantial repetition. Spoken language and opportunities to generate the language in meaningful activities give critical practice for internalizing the language (Warman, et al., 2023: 4802). Several studies have demonstrated the effectiveness of AI-driven interventions in enhancing speaking performance among language learners. Imran, et al. (2023: 137) state that "the incorporation of artificial intelligence (AI) applications into the domain of language acquisition has been well-received by specific students. The viability of this proposal arises from the capability of AI technology to enable the surveillance and identification of pronunciation difficulties, accelerate the delivery of feedback, and provide additional resources to enhance the development of oral communication abilities among students". For example, Junaidi, H.B., Julita, K., Rahman, F. & Derin, T. (2020) found that students who used an AI-powered speaking practice tool showed significant improvements in pronunciation and fluency compared to those who received traditional instruction. Similarly, Makhlouf, M.K.I. (2021) reported that

students who engaged with a virtual language tutor demonstrated greater gains in speaking proficiency and confidence than those in a control group. Warman et al. (2023) also find that students using AI in learning have better speaking performance. In collaborative learning environments, learners engage in meaningful exchanges that facilitate language learning through negotiation of meaning and peer feedback. AI-based speaking platforms integrate this sociocultural perspective by fostering interactive and collaborative learning experiences. By simulating real-life conversational interactions and providing opportunities for peer interaction and feedback, these platforms create a supportive environment for learners to develop their speaking skills in context.

In addition to improving speaking performance, AI integration has been shown to enhance students' motivation and engagement in language learning. Nassr, R.M., Aldossary, A.A. & Nasir, H. (2021) found that students who used AI-driven language learning platforms reported higher levels of motivation, enjoyment, and satisfaction with their learning experiences compared to those in traditional classrooms. The interactive nature of AI-powered tools encourages active participation, fosters a sense of achievement, and sustains learners' interest over time. "The utilization of artificial intelligence (AI) applications in the context of enhancing speaking skills has been positively received by certain pupils. The feasibility of this proposition stems from the potential of AI technology to facilitate students in monitoring and discerning pronunciation faults, expediting feedback, and furnishing supplementary resources to bolster the acquisition of speaking skills" (Imran, et al., 2023: 141). Insights from cognitive psychology contribute to the design and implementation of AI-based speaking platforms. Cognitive theories emphasize the role of processes such as attention, memory, and problem-solving in learning. AI technologies leverage these insights to enhance speaking instruction by providing personalized feedback, scaffolding learning tasks, and adapting instruction to individual learner needs. By incorporating techniques such as spaced repetition, chunking, and mnemonic strategies, AI-assisted learning systems optimize the efficiency and effectiveness of speaking practice.

Self-regulated learning (SRL) is a foundational concept in the educational landscape and has garnered considerable attention, particularly within the domain of language learning. In the realm of language learning, SRL plays a pivotal role in shaping learners' linguistic proficiency and autonomy. Understanding how learners regulate their language learning processes, establish goals, and employ strategies is paramount for educators striving to design effective language instruction and cultivate autonomous language learners. This explores how AI impacts these critical facets but also offers a deeper insight into the mechanisms

that underpin effective language acquisition to offer invaluable guidance for refining and enhancing pedagogical approaches tailored to the unique needs and preferences of language learners in AI-integrated educational settings. Imran, et al. (2023: 137) point out: "Artificial Intelligence (AI) can be used to provide exercises at different learning paces and different needs in developing their language skills. Language learning apps can adapt exercises and learning materials according to individual student abilities".

Several studies have been conducted addressing the impact of AI on different language learning skills in English as a second and foreign language context. Anas (2019) carried out the research "Behind the Scenes: Student-created video as a meaning-making process to promote student active learning" and see their confidence increased. Lin & Warschauer (2015) assume that online foreign language education may prosper in the future thanks to technology. Han (2020) investigates the effects of voice-based AI chatbots on Korean English as a foreign language (EFL) middle school students' speaking competence and affective domains, and the outcomes are positive. Huang, Hew & Fryer (2022) also see chatbots for language learning are useful. Kim, Cha & Kim (2019) conclude that "chatbots can enrich language inputs and bring opportunities for language learners to raise their communicative competence". Imran, et al. (2023), Loewen et al. (2020), report positive signs from teachers in dealing with the application of AI. Junaidi, et al. (2020) and also came to a similar conclusion. Makhlouf, M.K.I. (2021) finds several effects of AI on speaking performance, while Nassr, et al. (2021) still sees the face-to-face method effective. Qinghua & Satar (2020) try to explore the meaning of negotiation between people and chatbots. Raza et al. (2021), and Ruan et al. (2019) search for the optimal way of implementing digital assistance into the language teaching context. Shumanov & Johnson (2021) attempt to make conversations with chatbots more personalized, while Deusen-Scholl (2015) assess outcomes in online foreign language education to identify the key measures for success. Warman, et al. (2023) believes that AI can help several types of learners. Meanwhile, Cakmak, F. (2022) proposes a negative outlook on AI-assisted systems. Only a few research studies have been done by Vietnamese scientists, or from within Vietnam. Ngo, et al. (2023) review existing literature and consider the effectiveness of automatic speech recognition in ESL/EFL pronunciation. Some features of AI-based instruction, such as the user-friendly program, its availability in different places and at different times, its wide repertoire of topics, and the ability to evaluate learners' language learning, were believed to be the reason behind the learners' successful performance in language learning and speaking.

AI technologies have revolutionized language learning by offering a plethora of methodologies aimed at supporting speaking instruction. These methodologies encompass a wide array of tools, including automated speech recognition (ASR) systems, chatbots, and virtual reality (VR) simulations. Each of these technologies contributes uniquely to enhancing students' speaking proficiency through tailored approaches. "As with most artificial intelligence-based applications, chatbots are recent industrial innovations that afford language learners the opportunity to interact with intelligent mechanical agents in an educational context. The definition of communication has been expanded to include not only human-to-human interaction but also human-to-computer interaction thanks to a volume of research on artificial intelligence and virtual reality" (Cakmak, 2022: 114).

Automated speech recognition (ASR) systems stand out as one of the primary tools for facilitating speaking practice in real-time. This allows students to engage in spoken interactions while receiving immediate feedback on their pronunciation, intonation, and fluency. Through ASR, learners can simulate authentic speaking situations, such as conversations or presentations, in a controlled environment. This real-time feedback fosters self-correction and promotes the development of speaking skills by providing learners with tangible insights into their linguistic performance.

In addition to ASR systems, chatbots represent another innovative application of AI in speaking instruction. Powered by natural language processing (NLP) algorithms, chatbots engage students in conversational exchanges, offering prompts, corrections, and explanations tailored to individual needs. Unlike traditional language practice activities, chatbots provide dynamic and interactive feedback that adapts to learners' responses in real-time. By simulating authentic communication scenarios, chatbots promote active engagement and language production, thereby enhancing learners' speaking proficiency in a supportive and learner-centered environment.

Furthermore, virtual reality (VR) simulations offer a highly immersive approach to speaking instruction by placing learners in virtual environments where they interact with AI characters. These simulations recreate authentic speaking situations, such as job interviews, casual conversations, or public speaking events, allowing learners to practice speaking in contextually rich settings. Through VR, students can develop their speaking skills by engaging in realistic and interactive scenarios that mirror real-life communication experiences. By providing a safe and controlled environment for experimentation and practice, VR simulations help learners overcome speaking anxiety and build confidence in their language abilities.

Each of these AI technologies contributes uniquely to the enhancement of students' speaking proficiency by offering diverse methodologies tailored to individual learning preferences and needs. While ASR systems focus on providing immediate feedback on pronunciation and fluency, chatbots facilitate interactive conversational practice with personalized feedback and support. By leveraging the capabilities of AI technologies, educators can create dynamic and engaging speaking activities empowering learners to develop their speaking skills effectively and confidently.

However, not all studies report positive results. Cakmak, F. (2022) finds there are "negative perceptions and attitudes toward the chatbot interaction. Students reported facing difficulties in being completely understood, which might have contributed to higher anxiety in L2 speaking. Notably, student performance with Replika was significantly better than their face-to-face peer interactions. Overall, the results show that although chatbot interaction is a novel way to provide speaking practice, the actual interaction with a chatbot might not be a reliable way to lessen their anxiety with L2 speaking". Despite the promising outcomes reported in empirical studies, AI-assisted speaking instruction faces several challenges and limitations that warrant careful consideration. One major concern is the lack of personalization and adaptability in AI systems, which may hinder their ability to adequately address individual learner needs and preferences. While AI technologies offer the potential for personalized learning experiences, the current generation of AI systems may struggle to provide tailored feedback and support that align with the diverse needs and learning styles of students. This lack of personalization could potentially limit the effectiveness of AI-assisted speaking instruction, as learners may not receive the targeted support necessary to address their specific areas of difficulty.

Moreover, the reliability and accuracy of AI-generated feedback can vary depending on the quality of algorithms and data input. AI systems rely on machine learning algorithms to analyze learners' spoken language and provide feedback on pronunciation, intonation, and fluency. However, this may not always produce accurate assessments, leading to misleading or incorrect feedback. Additionally, AI systems may struggle to accurately interpret non-standard accents or speech patterns, further limiting their effectiveness for diverse learner populations. A notable gap persists in comprehending the impact of AI on the speaking skills and self-regulation of EFL learners. Consequently, further investigation is imperative to elucidate the role of AI in enhancing speaking performance of EFL learners.

3. Methodology

The implementation of the experiment followed a carefully designed protocol to ensure rigor and validity in assessing the effectiveness of AI integration in enhancing speaking performance among students. The study employed a quasi-experimental design, which involved both a controlled group and an experimental one, allowing traditional teaching methods and AI-driven interventions to be compared.

The process of selecting participants for the study involved several steps to ensure the representativeness and diversity of the sample. The controlled group consisted of 46 students who received conventional instruction without AI integration, while the experimental group comprised 44 students who were exposed to AI-driven language learning interventions. The students all study in the same institution. They were enrolled in English language courses; their proficiency levels ranged from intermediate to advanced. The sample size was determined based on statistical considerations to achieve adequate power for detecting meaningful differences between the controlled and experimental groups. Following ethical guidelines, informed consent was obtained from participating schools, teachers, and students.

The research team identified and selected AI-powered language learning platforms, virtual language tutors, and speech recognition technologies based on their suitability for the target population and curriculum objectives. These platforms offered a range of interactive speaking tasks, pronunciation drills, and conversation simulations to engage students in meaningful language practice.

Before the experiment started, teachers involved with the experimental group received training and professional development sessions to familiarize themselves with the selected AI tools and platforms. Training sessions covered topics such as platform navigation, implementation strategies, and troubleshooting common technical issues. Teachers were encouraged to integrate AI-driven interventions seamlessly into their existing curriculum and instructional practices.

Throughout the implementation phase, the research team provided ongoing support and monitoring to ensure the smooth operation of AI-driven interventions. Technical assistance was available to address any issues or challenges encountered by teachers or students. Additionally, regular check-ins and feedback sessions were conducted to gather insights and identify areas for improvement. In the experiment group, students were encouraged to apply a very famous app (for convenience, this is referred to as app A to avoid any possible conflict of interest) for learning foreign

language with its immersive speaking exercises. These exercises immerse learners in spoken interactions with the application, requiring them to respond to prompts and questions in their target language. This plays a pivotal role in honing speaking fluency as they compel learners to articulate their thoughts and ideas verbally.

An AI-assisted platform usually has a real-time feedback mechanism. As learners respond to prompts, an AI-powered chatbot diligently evaluates various facets of their spoken language, encompassing pronunciation, fluency, vocabulary usage, and grammatical accuracy. This instantaneous feedback mechanism is made possible by the application of machine learning algorithms, it places a strong emphasis on motivation through gamification elements seamlessly integrated into its platform. Learners embark on a journey where they earn points, conquer challenges, and unlock new levels as they progress, nurturing a sense of achievement and fostering consistent practice. The application further empowers them to track their language learning odyssey, offering insights into their overall progress and areas that may warrant additional focus.

In addition to individual speaking exercises, app A offers interactive group activities and discussions that replicate real-world conversational scenarios. These features immerse learners in dynamic and naturalistic contexts, refining their ability to comprehend and respond to spoken language in real time. Engaging in dialogs and discussions enriches their speaking skills. The infusion of AI technology into app A represents a groundbreaking shift in language acquisition. It provides learners with uninterrupted, interactive, and personalized practice opportunities.

Comprehensive training sessions were conducted for both the researchers and the English language teachers responsible for delivering the AI-based speaking instruction, how to effectively facilitate the speaking activities, and provide constructive feedback to learners. Subsequently, an initial evaluation was conducted to assess the teachers' preparedness, knowledge of course materials, and proficiency in using the AI-based platform.

Continuous monitoring of treatment fidelity was done in a series of unannounced observations during the intervention period. These observations were conducted randomly at various points throughout the study at each participating institute. The primary objective was to verify that the speaking activities were being delivered in accordance with the intended design, covered essential aspects such as the duration of the speaking activities, the specific types of activities employed, and the nature of feedback provided to learners. English language teachers responsible for delivering the speaking instruction diligently completed this checklist for each session.

Data collection was conducted using a combination of qualitative and quantitative methods to capture students' speaking performance, motivation, and engagement throughout the experiment. Students' speaking proficiency was assessed using standardized speaking tests administered at the beginning and end of the semester. These assessments included tasks such as oral presentations, role-plays, and spontaneous conversations, which were scored based on predefined benchmarks. The following criteria were used to give scores: grammar and vocabulary, pronunciation, and interactive communication. Pre- and post-study surveys were administered to students to gather information about their attitudes towards speaking English, their perceived confidence levels, and their satisfaction with the instructional methods employed. Surveys included Likert-scale questions, open-ended prompts, and demographic information to provide comprehensive insights.

4. Results

The analysis of speaking performance revealed significant improvements among students in the experimental group compared to those in the controlled group. Pre- and post-assessment scores indicated a notable increase in speaking proficiency among students who were exposed to AI-driven language learning interventions.

Table 1: The Mean of Pre-test of Both Groups out of 100

Groups	Grammar scores	Vocabulary scores	Pronunciation scores	Interactive communication scores
Control group	72	75	73	71
Experimental group	71	74	72	72

The mean scores of speaking assessments for the experimental and control groups show similarities between them. Generally speaking, the mean of the control

group is a little higher than that of the experimental group. What is more, the margin of the two groups is quite narrow.

Table 2: The Mean of Post-test of Both Groups out of 100

Groups	Grammar scores	Vocabulary scores	Pronunciation scores	Interactive communication scores
Control group	74	76	74	73
Experimental group	73	77	76	77

The post-test scores depict a notable improvement in language proficiency across both the control and experimental groups. In comparison to the pre-test results, there is a visible enhancement in all assessed areas: grammar, vocabulary, pronunciation, and interactive communication skills.

In the control group, the mean scores for grammar, vocabulary, pronunciation, and interactive communication increased from 72, 75, 73, and 71 respectively in the pre-test to 74, 76, 74, and 73 respectively in the post-test. This indicates a positive development in language skills among the participants. Similarly, the experimental group exhibited improvement in all aspects of language proficiency. The mean scores for grammar, vocabulary, pronunciation, and interactive communication rose from 71, 74, 72, and 72 respectively in the pre-test to 73, 77, 76, and 77 respectively in the post-test. These results indicate that the experimental intervention has contributed to enhancing language abilities.

Comparing the post-test scores of both groups, it's notable that the experimental group shows a slightly higher mean score across all assessed areas compared to the control group. While the differences are not substantial, they suggest that the experimental intervention might have had a marginally greater impact on language proficiency. Overall, the post-test scores demonstrate significant progress in language skills for both groups, with the experimental group showing slightly higher mean scores, indicating the potential effectiveness of the intervention implemented in that group.

Beside comparing the pre-test and post-test results, the author also aimed to understand how students perceive using AI for teaching and learning English. Following are the questions and responses.

Question 1: How do you see the impact of AI on your speaking performance?

Student 1: AI-powered language learning platforms and applications offer personalized learning experiences tailored to my needs and proficiency levels. These platforms leverage adaptive algorithms to analyze learners' strengths and weaknesses, providing customized lessons, practice activities, and feedback. It fosters a supportive and engaging learning environment conducive to improving speaking skills.

Student 2: AI facilitates immediate feedback and assessment, enabling me to receive real-time corrections and guidance on my speaking performance. Speech recognition technologies analyze pronunciation, intonation, and fluency, providing instant feedback on errors and suggesting corrective actions. This immediate feedback loop allows me to identify and address areas for improvement promptly, accelerating my skill development and enhancing my overall speaking proficiency.

Moreover, AI-driven virtual language tutors emulate human-like interactions, providing conversational practice opportunities and personalized feedback. These virtual tutors engage learners in interactive dialogues, comprehension exercises, and pronunciation drills, offering encouragement and support in real time. By simulating authentic communication scenarios, virtual tutors help learners build confidence, fluency, and accuracy in speaking English.

Student 3: AI enables the creation of immersive and interactive learning experiences that promote active participation and engagement. Virtual reality (VR) and augmented reality (AR) technologies allow me to practice speaking in realistic and dynamic environments. These immersive experiences enhance my motivation, enthusiasm, and sense of ownership over my learning journey, leading to more effective speaking performance.

Student 4: AI algorithms can identify patterns, trends, and areas for improvement, enabling teachers to adapt their instruction and provide targeted support. AI-powered analytics tools offer valuable insights into learners' progress, strengths, and challenges, empowering educators to optimize teaching strategies and enhance learning outcomes.

Question 2: How do you want to see AI engage in your learning course?

Student 5: I want to implement AI-powered speech recognition software so that I can have real-time analysis of my pronunciation, intonation, and fluency. By receiving immediate feedback on my speaking performance, I can identify and correct errors promptly, leading to more effective skill development.

Student 6: I want virtual tutors to interact with me in dialogues, comprehension exercises, and pronunciation drills, offering tailored support and guidance based on my own needs.

Student 7: I prefer immersive learning environments using virtual reality (VR) or augmented reality (AR) technology that enhances speaking sessions by simulating authentic communication scenarios. By learning in this way, I can engage in realistic conversations, cultural simulations, and language exchanges.

Conversely, students in the controlled group exhibited relatively stable levels of motivation, with some expressing boredom and disengagement with the traditional instructional methods employed in their language classes. Their motivation scores remained relatively consistent, with minimal changes observed between pre- and post-assessment.

However, students in the controlled group expressed frustration with the lack of variety in classroom activities and the limited opportunities for authentic communication.

Student 8 responds: "AI can provide immediate feedback and guidance, but it cannot replace the human connection and emotional support offered by teachers and peers. Over-reliance on AI may lead to a loss of empathy, encouragement, and motivational support that human instructors provide, impacting learners' engagement and well-being in speaking sessions. I feel good with the traditional learning method; however, it is a little bit boring".

Some indicated feeling demotivated by the repetitive nature of grammar drills and exercises, highlighting the need for more engaging and interactive teaching methods.

Student 8 states: "Traditional language instruction often relies heavily on rote memorization, grammar drills, and repetitive exercises, which are monotonous and boring. The repetitive nature of these activities fails to capture my interest or stimulate my cognitive engagement, so I lack motivation to participate actively in speaking sessions".

Student 9: "In the speaking lesson, I feel the monotony of grammar drills and exercises from their perceived disconnectedness from real-world communication contexts. I do not see the relevance and practical application of grammar rules and structures in authentic communication situations, leading to my feelings of frustration and disinterest. Moreover, the passive nature of grammar instruction,

where we are often tasked with memorizing rules and completing exercises in isolation, fails to promote active engagement and meaningful interaction in language learning".

The responses suggest that AI integration in language education positively influences students' speaking performance, motivation, and engagement. The experimental group, which received AI-driven interventions, demonstrated superior speaking proficiency and a greater sense of motivation and enthusiasm for learning English compared to the controlled group.

These findings underscore the potential of AI to revolutionize traditional language teaching methods, offering personalized learning experiences, immediate feedback, and opportunities for authentic communication. By leveraging AI technologies, educators can create dynamic and engaging language learning environments that cater to the diverse needs and preferences of students.

However, while the results of this study are promising, it is essential to acknowledge the challenges associated with the novelty of AI facilitation and the impact of other dependent variables on students' responses. Privacy concerns, equity issues, and the risk of overreliance on technology must be carefully considered and addressed to ensure the responsible and effective use of AI in language learning contexts.

5. Discussion

The findings of this study align with and contribute to the growing body of research on the efficacy of AI integration in language education. Several studies have demonstrated the positive impact of AI-driven interventions on various aspects of language learning, including speaking proficiency, motivation, and engagement.

For instance, a study conducted Kim, N.Y. (2018) found that students who used AI-powered language learning platforms showed significant improvements in speaking fluency and accuracy compared to those who received traditional instruction. Similarly, Nassr, R.M., Aldossary, A.A. & Nasir, H. (2021) reported that AI-driven feedback and personalized learning experiences led to higher levels of motivation and satisfaction among language learners.

The results of this study provide compelling evidence of the effectiveness of AI integration in enhancing the speaking performance of students in the experimental group. The significant improvement in speaking proficiency scores, as evidenced by both quantitative assessments and qualitative feedback, underscores the transformative potential of AI-driven language learning interventions.

Learners initially engaged in communicative speaking activities with AI, which likely assisted them in regulating their own speaking performance. Through these communicative activities, students gradually transitioned from other-regulation to self-regulation, demonstrating independent speaking performance. Notably, those who exhibited self-regulation were able to complete their speaking tasks without relying on AI or other students, indicating higher levels of self-regulation among the AI learners. The idea of scaffolding emphasizes the importance of external support in aiding learners' cognitive and linguistic growth. AI systems can serve as valuable scaffolds by offering learners customized prompts, reminders, and feedback that address their specific needs. This personalization enables them to regulate their learning and establish goals.

In the context of interactions supported by AI, learners have the opportunity to observe and engage with AI systems that demonstrate self-regulatory behaviors, such as offering adaptive feedback or guiding learners in goal-setting and planning. By observing these behaviors, learners can internalize and replicate self-regulatory strategies, leading to the development of their own self-regulation skills. Moreover, AI technologies provide certain advantages, such as adaptive learning algorithms and real-time data analysis, which enable learners to receive immediate feedback and monitor their performance. This prompt feedback allows them to evaluate their progress, identify areas of improvement, and adapt their learning strategies accordingly. By engaging in self-reflection, and making adjustments based on feedback received from AI systems, learners can cultivate metacognitive awareness and self-regulatory behaviors.

A key area of improvement observed among students in the experimental group was in pronunciation and fluency. Many students reported feeling more confident in their ability to articulate sounds accurately and speak fluently, attributing these improvements to the real-time feedback provided by AI-powered

platforms. This finding is consistent with previous research that has highlighted the role of AI in helping learners overcome pronunciation challenges and develop natural-sounding speech patterns.

Furthermore, students in the experimental group demonstrated a more extensive vocabulary usage and greater grammatical accuracy in their spoken language. The interactive nature of AI-driven speaking tasks allowed students to practice using new vocabulary in context and receive immediate feedback on grammatical errors. As a result, they were able to express themselves more effectively and with greater precision, leading to overall improvements in speaking proficiency.

Perhaps most importantly, students in the experimental group exhibited enhanced confidence and competence in speaking English. Many expressed a newfound sense of self-assurance when conversing, participating in classroom activities, and presenting their ideas in English. This increased confidence not only contributed to improvements in speaking performance but also had positive implications for students' overall language learning experience and motivation.

The findings of this study have significant implications for language educators, policymakers, and stakeholders involved in language education. By demonstrating the effectiveness of AI integration in enhancing speaking performance, this study highlights the potential of technology to revolutionize traditional language teaching methods and address longstanding challenges in language education.

The observed improvements in students' speaking skills and self-regulation can be attributed to the flexibility of engaging in communicative speaking activities with AI anytime and anywhere. Unlike traditional classroom settings, learners were not limited by time and location, so they could engage in interactive speaking activities at their convenience. Students were more inclined to communicate with AI due to the stress-free environment it provided for collaborative speaking activities. Speaking anxiety often hinders learners from actively participating in interactive speaking activities with instructors and peers. In this context, AI facilitated greater engagement in communicative speaking activities, which, in turn, contributed to the development of students' speaking skills and self-regulation.

AI-driven language learning platforms offer personalized learning experiences tailored to individual learners' needs, preferences, and proficiency

levels. By adapting content and feedback based on learners' performance, these platforms can provide targeted support and scaffolding, thereby maximizing learning outcomes and promoting learner autonomy. The implementation of an AI environment is recommended due to its potential to create a motivating and engaging technological setting, enabling students to interact more effectively with AI and their peers, thereby enhancing their speaking skills and self-regulation. The findings of this study indicate that students of EFL actively participated in collaborative speaking activities with AI and their peers, leading to significant improvements in their speaking skills and self-regulation. The interactive speaking tasks facilitated by AI likely played a role in enhancing their ability to self-regulate their speaking skills.

The immediate feedback provided by AI-powered platforms allows students to identify and correct errors in real-time, facilitating more efficient skill development. Additionally, AI-driven assessment tools enable educators to accurately track students' progress, identify areas of strengths and weaknesses, and tailor instruction accordingly. This formative assessment approach fosters a cycle of continuous improvement and promotes metacognitive awareness among learners.

AI integration in language education creates opportunities for authentic communication and interaction, simulating real-world language use scenarios. Through conversational practice with virtual language tutors, collaborative tasks with peers, and interactive speaking activities, students can develop communicative competence and confidence in using English for meaningful purposes.

While the findings of this study are promising, it is essential to acknowledge several limitations and areas for future research. *Firstly*, the study was conducted over a relatively short timeframe, limiting the ability to assess long-term impacts and sustainability of AI-driven interventions. Future research could explore the durability of improvements in speaking performance over extended periods and investigate the optimal duration and frequency of AI integration in language education.

Secondly, the study focused primarily on speaking proficiency as the outcome measure, overlooking other aspects of language learning such as listening comprehension, writing skills, and cultural competence. "The potential of AI applications to adequately equip students with the necessary skills to effectively navigate diverse speaking circumstances in real-world contexts may be limited" (Imran, et al., 2023: 140). Future research could adopt a more comprehensive

approach to assess the multifaceted nature of language proficiency and examine the holistic impact of AI integration on language learners' communicative competence.

Furthermore, while the results of this study are promising, they may not be generalizable to all contexts and populations. Factors such as language proficiency level, prior exposure to technology, and access to resources may influence the effectiveness of AI-driven interventions. Students who have come to rely on AI applications for language acquisition may experience a diminished ability to engage in speaking exercises without the aid of such technology (Imran, et al., 2023: 140). Future research could explore these factors in more detail and investigate potential individual differences in response to AI facilitation.

Issues related to privacy, data security, and algorithmic bias raise ethical concerns regarding the use of AI in educational settings. AI systems collect and analyze large amounts of data on students' language usage and performance, raising questions about the privacy and security of sensitive information. Moreover, there is a risk of algorithmic bias, where AI systems may inadvertently perpetuate or amplify existing inequalities and biases in educational outcomes. For example, AI systems trained on biased data sets may provide inaccurate feedback or evaluations that disproportionately impact certain groups of learners.

There is also a risk of overreliance on technology in AI-assisted speaking instruction, which may diminish human interaction and interpersonal communication skills. While AI technologies offer valuable opportunities for automated practice and feedback, they should complement rather than replace human instruction and interaction. Overemphasis on technology-driven instruction may result in a reduction of meaningful communication opportunities and interpersonal connections in the classroom, potentially hindering students' development of essential communication skills.

While AI-assisted speaking instruction holds great promise for enhancing speaking proficiency, it is essential to acknowledge and address the challenges and limitations associated with its implementation. Efforts to improve the personalization and adaptability of AI systems, ensure the reliability and accuracy of feedback, address ethical concerns related to privacy and bias, and balance technology-driven instruction with human interaction are crucial for maximizing the potential of AI in supporting students' speaking development. By addressing these challenges thoughtfully, educators can harness the benefits of AI-assisted speaking instruction while mitigating potential risks and drawbacks.

6. Conclusion

In conclusion, the findings of this study provide compelling evidence of the effectiveness of AI integration in enhancing the speaking performance of students in Hanoi. The significant improvements observed in pronunciation, fluency, vocabulary usage, and confidence underscore the transformative potential of AI-driven language learning interventions. The use of the app that incorporates AI technologies such as natural language processing, interactive exercises, personalized feedback, and speech recognition, resulted in significantly greater improvement in second language speaking skills than traditional instruction. This suggests that AI-based instruction has the potential to enhance language learning by providing learners with interactive and personalized learning experiences that target specific language areas for improvement. Also, the participants in the experimental group, who received AI-based instruction, reported higher levels of self-regulation than the control group. This indicates that AI technologies can support learners in regulating their learning processes, setting goals, monitoring their progress, and making necessary adjustments. Having offered personalized feedback and adaptive exercises, AI-based instruction empowers learners to take control of their learning and develop metacognitive strategies that enhance their speaking skills.

By leveraging AI technologies, educators can create dynamic and engaging language learning environments that cater to the diverse needs and preferences of students. These findings have significant implications for language education, highlighting the importance of embracing innovative pedagogical approaches and leveraging technology to enhance learning outcomes. EFL students can benefit greatly from an AI-infused course specifically designed for communicative speaking activities. By participating in such a course, students can receive feedback from both peers and AI, leading to improvements in their communication abilities and self-regulation in speaking. Additionally, the engaging nature of the AI environment's communicative speaking activities is likely to enhance EFL students' speaking proficiency and foster their enthusiasm for further language learning endeavors.

However, while the results of this study are promising, further research is needed to explore the long-term impacts, generalizability, and optimal implementation strategies of AI integration in language education. By continuing to investigate the potential of AI-driven interventions and addressing existing

challenges, educators can unlock new possibilities for language learning and empower students to become confident and proficient speakers of English. Another limitation pertains to the duration of the AI-based instruction and the length of exposure to the intervention, as the impact on speaking skills and self-regulation could vary depending on the intervention's duration. Longer intervention periods may yield different outcomes and provide a more comprehensive understanding of the effects. Additionally, the control group in this study received traditional instruction, which introduces the possibility of confounding factors influencing the observed differences between the experimental and control groups. It is in line with the conclusion of Imran: "the development of Artificial Intelligences (AI) in lectures offers new opportunities to improve student learning experiences and outcomes, especially in speaking class" (Imran, et al., 2023: 141).

To better isolate the effects of AI-based instruction, future research could incorporate an active control group that receives an alternative instructional approach. It is important to acknowledge that while this study did not find a significant change in speaking anxiety as a result of the AI-based intervention, the negative impact of such anxiety on fluency and pronunciation highlights the importance of addressing learners' anxiety levels in language learning contexts. Understanding its impact and exploring effective strategies to alleviate it can further enhance the language learning experience for students. Additionally, the potential differences in anxiety levels between practicing with an AI tool and a human instructor in real conversations present an intriguing avenue for further research. Future studies could explore the comparative effectiveness of practicing with AI tools and human instructors in reducing anxiety and enhancing conversational proficiency. This research could shed light on the unique benefits and challenges associated with each approach, ultimately providing valuable insights for language learners and educators.

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