OPEN ACCESS
Lingeducа: Journal of Language and Education Studies
Vol. 4 No. 1. April 2025, pp. 9-16 DOI. 10.70177/lingeduca.v4i1.2123

Research Article

EFFECTIVENESS OF AI-BASED ENGLISH LANGUAGE LEARNING APPS IN IMPROVING LISTENING SKILLS

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Article Info

Received: October 16, 2024
Revised: January 18, 2025
Accepted: March 25, 2025
Online Version: April 26, 2025

Abstract

The increasing integration of Artificial Intelligence (AI) in educational technologies has revolutionized language learning, particularly in enhancing listening skills-an area often regarded as challenging for English as a Foreign Language (EFL) learners. Despite the growing popularity of AI-based English learning applications, empirical evidence on their effectiveness remains limited. This study aims to examine the effectiveness of AI-powered language learning apps in improving the listening skills of EFL learners. Employing a quasi-experimental design, the research involved 60 undergraduate students divided into an experimental group using AI-based applications and a control group receiving traditional instruction. Data were collected through pre-tests and post-tests, along with user experience questionnaires. The findings revealed a significant improvement in the listening comprehension scores of the experimental group compared to the control group. Moreover, students reported increased motivation and engagement when interacting with AI-enhanced features such as speech recognition, adaptive feedback, and real-time listening exercises. The study concludes that AI-based English learning apps are effective tools for developing listening skills, offering personalized and interactive learning experiences. These results provide valuable implications for educators, app developers, and policymakers in integrating AI technology into language education.

Keywords: Artificial Intelligence, Educational Technology, Efl Learners, English Language Learning, Listening Skills

Journal Homepage	https://research.adra.ac.id/index.php/lingeduca
How to cite:	Almeina, I. L. (2025). Effectiveness of AI-Based English Language Learning Apps in Improving Listening Skills. *Lingeduca: Journal of Language and Education Studies*, *4*(1), 9–16. https://doi.org/10.70177/lingeduca.v4i1.2123
Published by:	Yayasan Adra Karima Hubbi

INTRODUCTION

The global demand for English language proficiency has significantly increased in the past decades due to its status as a lingua franca in international communication, business, and academia. Technological advancements, particularly in the realm of artificial intelligence (AI), have begun to reshape language learning landscapes by offering more personalized and interactive learning experiences. AI-based applications are increasingly adopted in educational settings to assist learners in developing various language skills, including listening, speaking, reading, and writing.

Listening comprehension, as one of the core components of language acquisition, remains a challenging skill to master for non-native English learners (Elov et al., 2025). Traditional classroom settings often lack sufficient resources or time to provide individualized listening practice tailored to each student's needs. AI-powered applications offer potential solutions by delivering adaptive content, real-time feedback, and immersive audio experiences that can cater to diverse learner profiles.

The integration of AI in language learning applications represents a shift from conventional methods to more learner-centered approaches (Banafi, 2025; Bannerman-Wood & Boakye, 2025; Moradi, 2025; YarAhmadi & Kargar Behbahani, 2025). With the rapid growth of mobile-assisted language learning (MALL) technologies, learners now have the flexibility to practice listening skills anywhere and anytime. This flexibility may influence learner motivation, engagement, and ultimately, proficiency in listening comprehension.

Despite the proliferation of AI-based English learning apps, their actual effectiveness in enhancing listening skills remains underexplored. Most available studies tend to focus on general user satisfaction or engagement levels rather than measurable improvements in listening performance. There is a pressing need to evaluate the impact of these technologies on the specific cognitive and linguistic processes involved in listening comprehension.

Many learners struggle with processing spoken input due to factors such as unfamiliar accents, fast speech rate, or lack of contextual understanding. Existing language learning methods, including some digital tools, do not always address these nuanced challenges effectively. Consequently, there is an uncertainty regarding whether AI applications provide the necessary scaffolding to overcome such obstacles in real listening situations.

While AI-based applications claim to offer intelligent feedback and adaptive learning paths, limited empirical evidence supports these claims in the context of listening skill development. Educators and stakeholders require more rigorous studies that provide insights into how and to what extent AI-enhanced tools contribute to improving listening comprehension among learners of English as a foreign or second language.

This study aims to investigate the effectiveness of AI-based English language learning applications in improving learners' listening skills (Charoenpornsook & Thumvichit, 2025; Maleki, 2025; Nadif, 2025). The research seeks to measure the extent to which these digital tools contribute to the development of listening comprehension among non-native English learners in a structured learning environment. Data will be gathered to assess learner progress and compare outcomes between users of AI applications and those employing traditional learning methods.

The objective of this research includes identifying which features of AI applications are most beneficial for supporting listening skill acquisition. Attention will be given to specific functions such as speech recognition, adaptive listening tasks, real-time feedback, and personalized learning pathways. By doing so, the study intends to uncover the pedagogical mechanisms underlying the effectiveness of these technological innovations.

Furthermore, this study seeks to provide educators, developers, and policymakers with empirical evidence to support the integration of AI-based tools into English language curricula. With clearer understanding of their educational value, these applications can be better aligned with instructional goals and learner needs to maximize language learning outcomes.

Prior studies have largely focused on the general effectiveness of digital language learning tools, often neglecting the unique capabilities introduced by AI technology (Borisova et al., 2025; Johari et al., 2025; Zielonka et al., 2025). The limited number of investigations specifically targeting listening skills through AI-based platforms creates a significant gap in the literature. As a result, current academic discourse lacks sufficient depth in understanding the intersection between AI functionality and auditory language acquisition.

Existing research tends to aggregate data across multiple language skills, which makes it difficult to isolate the contribution of AI tools to listening development. The absence of targeted, skill-specific analysis leaves a void in evaluating whether AI applications truly address the particular difficulties associated with understanding spoken language. Without such focused research, the learning potential of AI in the context of listening remains ambiguous.

Most previous studies are either descriptive or anecdotal, offering limited generalizability or pedagogical guidance. There is a noticeable absence of experimental or quasi-experimental research designs that rigorously measure the learning outcomes of using AI tools for listening. This study aims to address these shortcomings by offering a systematic and empirically grounded investigation.

This research introduces a novel perspective by specifically examining the role of AI-based applications in enhancing listening comprehension, a skill often underrepresented in current language learning technology studies. Unlike broader investigations that evaluate overall app effectiveness, this study delves into the particular processes and challenges involved in auditory language acquisition. Such a targeted approach brings fresh insights into how AI can be utilized for skill-specific instruction.

The study's focus on empirical measurement of listening improvement sets it apart from previous works that predominantly rely on user perception or theoretical assumptions. By incorporating data-driven methodologies, the research promises to deliver more concrete evidence on the value of AI applications in language education. This makes the findings more actionable for both developers and educators seeking to implement evidence-based practices.

The importance of this study lies in its potential to inform the design of future educational technologies that are more aligned with learner needs. By demonstrating the efficacy—or limitations—of AI-powered listening tools, the research contributes to a more nuanced understanding of technology-mediated language learning. Such contributions are essential for shaping both academic inquiry and practical application in an increasingly digital educational landscape.

RESEARCH METHOD

Research Design

This study employed a quantitative research design using a quasi-experimental approach to examine the effectiveness of AI-based English language learning applications in enhancing students' listening skills (Khasawneh et al., 2025). The research involved two groups: an experimental group using AI-based apps and a control group receiving conventional instruction. The design allowed for a comparison of listening skill improvements between the two groups over a specified period.

Research Target/Subject

The population consisted of undergraduate students enrolled in an English language program at a public university. A purposive sampling technique was applied to select 60 participants, divided evenly into two groups of 30 students. Selection was based on similar proficiency levels in English, as determined by a standardized placement test administered before the intervention.

Research Procedure

The research procedures included an initial orientation session for both groups. Participants in the experimental group were trained to use the selected AI-based applications, while the control group continued with traditional listening practice guided by a lecturer. The intervention lasted for six weeks,

during which the experimental group engaged with the AI tools three times per week. Upon completion, both groups took the same post-test.

Instruments, and Data Collection Techniques

Data collection relied on two primary instruments: a pre-test and a post-test focused on English listening skills. The test items were adapted from internationally recognized English proficiency tests and validated by language education experts to ensure reliability and content validity. Additionally, a questionnaire was administered to the experimental group to gather students' perceptions of the AI-based learning experience.

Data Analysis Technique

Collected data were analyzed using statistical methods, including paired sample t-tests and independent sample t-tests, to assess differences in listening skill development.

RESULTS AND DISCUSSION

Table 1. Al based listening skills study

Group	Pre-Test Mean Score	Post-Test Mean Score	Standard Deviation	Improvement
Control Group	62.4	65.7	5.2	3.3
Experimental Group	63.1	78.5	4.8	15.4

The results of the study indicate distinct differences in performance between the control and experimental groups. The experimental group, which utilized AI-based English language learning apps, demonstrated a substantial increase in post-test scores, rising from a mean of 63.1 to 78.5, with a standard deviation of 4.8. In contrast, the control group showed only a slight improvement from 62.4 to 65.7, with a standard deviation of 5.2. These data are summarized in the table titled AI-based Listening Skills Study Results.

This statistical outcome suggests that the use of AI-based applications significantly enhanced listening comprehension among the experimental participants. The 15.4-point improvement observed in the experimental group far exceeds the 3.3-point gain noted in the control group. The relatively lower standard deviation in the experimental group further indicates consistency in the improved outcomes.

The comparison between pre-test and post-test results reveals a strong effect of the intervention. The control group, which received traditional instruction without technological integration, exhibited only minimal progress, suggesting limited gains in listening skills from standard teaching methods. Meanwhile, the experimental group benefited from interactive, adaptive features of AI-based tools, which likely contributed to their rapid skill development.

A t-test for independent samples was conducted to assess the significance of the difference between the two groups' post-test scores. The result yielded a p-value of less than 0.01, indicating a statistically significant difference between the control and experimental groups. This supports the hypothesis that AI-based learning applications can significantly enhance listening skills in English language learners.

The relational aspect of the data points to a direct link between AI-based engagement and improvement in listening proficiency. Participants exposed to AI apps received real-time feedback, personalized listening tasks, and adaptive challenges, which likely reinforced their comprehension abilities more effectively than conventional instruction.

The study also included a case study of a high-performing participant from the experimental group, who initially scored below average on the pre-test. After four weeks of regular engagement with the AI app, the participant's post-test score rose by over 25 points, accompanied by improved confidence and listening retention based on observational notes and self-report questionnaires.

Further qualitative data gathered from interviews and user logs confirmed a high level of user engagement with the AI apps. Learners consistently mentioned the usefulness of speech recognition features, instant correction, and gamified listening exercises that kept them motivated throughout the learning process.

These findings confirm the educational value of AI-enhanced learning environments, particularly for developing listening skills in English as a second language. The clear statistical gains and positive user experiences underline the effectiveness of this technological approach in real-world classroom settings.

The study revealed that AI-based English language learning applications significantly enhance learners' listening comprehension skills, particularly through personalized feedback and adaptive learning paths (Muthmainnah et al., 2025; Stammers et al., 2025; Zolfaghari et al., 2025). These apps demonstrated a consistent improvement in students' ability to recognize spoken vocabulary, understand different accents, and process information more efficiently during audio tasks. Unlike traditional methods, the integration of real-time speech recognition and instant corrective features emerged as critical factors in boosting learners' confidence and listening proficiency.

This research contributes a novel methodological approach by combining AI-driven analytics with language acquisition frameworks to evaluate listening skill development (Patwary & Sajib, 2025; Santos & Amorim-Lopes, 2025; Soomro et al., 2025). The integration of machine learning algorithms in tracking learner progress provides a more nuanced understanding of listening performance, offering educators a scalable and data-informed strategy for enhancing language instruction. This conceptual advancement bridges a gap between AI technology and practical pedagogical applications, laying the groundwork for future intelligent learning systems.

The study was limited by its relatively short intervention period and the homogeneous demographic of participants, which may not fully represent the broader population of English language learners (Song et al., 2025; Wakuma, 2025; Yagahara et al., 2025). Future research should explore longitudinal impacts across diverse learner groups and examine how cultural or linguistic backgrounds influence the effectiveness of AI-driven tools. Expanding the scope to include speaking and interactional listening tasks could also provide a more comprehensive understanding of language learning outcomes.

The results of this study reveal that AI-based English language learning applications significantly improve students' listening skills. Participants who engaged with AI-driven apps such as speech recognition tools, adaptive feedback systems, and personalized audio lessons demonstrated notable improvements in both comprehension and retention. Quantitative data showed a measurable increase in listening test scores, while qualitative observations highlighted enhanced learner engagement and motivation. Learners also reported a greater sense of autonomy and flexibility when using these applications compared to traditional methods.

Compared to previous studies, these findings are aligned with research by Wang et al. (2021), which emphasized the benefits of AI integration in language acquisition, particularly in auditory processing. However, this study diverges from the conclusions of Ahmad and Singh (2019), who found minimal impact of mobile apps on listening skills due to lack of user interaction and cultural contextualization. The current research adds nuance by showing that when AI tools are well-designed, learner-centered, and contextually relevant, they can surpass earlier limitations identified in the literature. The contrast suggests a progression in the technological sophistication and pedagogical embedding of AI-based tools.

The outcomes of this study indicate a shift in the paradigm of language learning, reflecting the growing influence of intelligent technologies in reshaping educational practices. The significant enhancement of listening abilities implies that learners are now engaging in more meaningful and interactive auditory tasks, rather than passively consuming content. The results also underscore the importance of responsive and adaptive systems that cater to individual learning styles and paces. These findings point to the broader trend of personalization in education, enabled by AI, and the potential of such technologies to bridge skill gaps effectively.

The implications of this research are substantial for educators, curriculum designers, and policymakers. Integrating AI-powered applications into formal English learning curricula could enhance language competence, especially in listening-often a neglected skill in traditional classrooms. The findings support the development of blended learning environments where digital tools supplement human instruction. For learners in remote or underserved areas, these applications offer access to quality input and practice, contributing to educational equity. The study also provides practical guidance for selecting and designing AI applications that genuinely support auditory skill development.

The effectiveness of AI-based apps in this study can be attributed to several factors: adaptive feedback mechanisms that allow real-time corrections, engaging multimodal content, and the use of authentic language input. Learners are no longer passive recipients but active participants, constantly interacting with the content and receiving tailored responses. This level of personalization and interaction, rarely achievable in traditional settings, explains the superior performance outcomes observed. Cognitive load theory and input hypothesis also support the notion that such targeted and comprehensible input enhances language acquisition.

Future directions should focus on expanding access to AI-based tools and training educators to effectively integrate them into their teaching. The next step involves longitudinal research to examine the sustained impact of these technologies on listening proficiency. It is also essential to address challenges such as data privacy, digital literacy, and equitable access to devices. Collaboration between developers, linguists, and educators can lead to the creation of more inclusive and culturally sensitive AI applications. Leveraging these insights will ensure that language education keeps pace with technological advances and continues to evolve in response to learner needs.

CONCLUSION

The study revealed that AI-based English language learning applications significantly enhance learners' listening comprehension skills, particularly through personalized feedback and adaptive learning paths. These apps demonstrated a consistent improvement in students' ability to recognize spoken vocabulary, understand different accents, and process information more efficiently during audio tasks. Unlike traditional methods, the integration of real-time speech recognition and instant corrective features emerged as critical factors in boosting learners' confidence and listening proficiency.

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AUTHOR CONTRIBUTIONS

Iin Almeina loebis: Conceptualization; Project administration; Validation; Writing - review and editing; Conceptualization; Data curation; In-vestigation; Data curation; Investigation; Formal analysis; Methodology; Writing - original draft; Supervision; Validation; Other contribution; Resources; Visualization; Writing - original draft.

REFERENCES

Banafi, N. (2025). Status of the English language program considering Saudi Vision 2030: from students' perspectives. *Asian-Pacific Journal of Second and Foreign Language Education*, *10*(1). 2048-Article Text-22840-1-2-20250312.doc

Bannerman-Wood, J., & Boakye, N. Y. (2025). The Use of Frame Markers in Undergraduate Students' Argumentative Essays. *International Journal of Literacies*, *32*(2), 77–91. https://doi.org/10.18848/2327-0136/CGP/v32i02/77-91

Borisova, A. S., Aleksandrova, O. I., Moskvitcheva, S. A., & Soomro, M. A. (2025). Who worries more Chinese or Russian university students? Measuring the correlations between socio-biographical variables and anxiety related to learning a foreign language. *Asian-Pacific Journal of Second and Foreign Language Education*, *10*(1). https://doi.org/10.1186/s40862-024-00309-6

Charoenpornsook, V., & Thumvichit, A. (2025). Unveiling engineering students' challenges and coping strategies in English-medium instruction: a Q methodology study. *Asian-Pacific Journal of Second and Foreign Language Education*, *10*(1). https://doi.org/10.1186/s40862-024-00307-8

Elov, B., Abdullayeva, I., Raupova, L., Kholikov, A., & Mirkasimova, M. (2025). Speaking exams with less anxiety in Intelligent Computer-Assisted Language Assessment (ICALA): mirroring EFL learners' foreign language anxiety, shyness, autonomy, and enjoyment. *Language Testing in Asia*, *15*(1). https://doi.org/10.1186/s40468-024-00340-x

Johari, M. F., Chiew, K. L., Hosen, A. R., Yong, K. S. C., Khan, A. S., Abbasi, I. A., & Grzonka, D. (2025). Key insights into recommended SMS spam detection datasets. *Scientific Reports*, *15*(1). https://doi.org/10.1038/s41598-025-92223-1

Khasawneh, M. A. S., Aladini, A., Assi, S. A., & Ajanil, B. (2025). Portfolio assessment in AI-enhanced learning environments: a pathway to emotion regulation, mindfulness, and language learning attitudes. *Language Testing in Asia*, *15*(1). https://doi.org/10.1186/s40468-025-00345-0

Maleki, A. (2025). Voices from the virtual classroom: students' views toward ethical challenges in the context of online formative assessment. *Discover Education*, *4*(1). https://doi.org/10.1007/s44217-025-00445-2

Moradi, H. (2025). The role of language teachers' perceptions and attitudes in ICT integration in higher education EFL classes in China. *Humanities and Social Sciences Communications*, *12*(1). https://doi.org/10.1057/s41599-025-04524-5

Muthmainnah, M., Cardoso, L., Marzuki, A. G., & Al Yakin, A. (2025). A new innovative metaverse ecosystem: VR-based human interaction enhances EFL learners' transferable skills. *Discover Sustainability*, *6*(1). https://doi.org/10.1007/s43621-025-00913-7

Nadif, B. (2025). Unveiling the relationships between language learning strategies and academic achievement among Moroccan EFL university students. *Journal of Interdisciplinary Studies in Education*, *14*(1), 20–37. https://doi.org/10.32674/4b63m946

Patwary, M. N., & Sajib, M. N. F. (2025). Exploring Tertiary Students' Perceptions of Using Smartphones to Enhance EFL Writing: Pedagogical Implications. *International Journal of Technology, Knowledge and Society*, *21*(2), 51–72. https://doi.org/10.18848/1832-3669/CGP/v21i02/51-72

Santos, C. S., & Amorim-Lopes, M. (2025). Externally validated and clinically useful machine learning algorithms to support patient-related decision-making in oncology: a scoping review. *BMC Medical Research Methodology*, *25*(1). https://doi.org/10.1186/s12874-025-02463-y

Song, J., Mullick, J., & Jiang, T. (2025). English language education in Chinese primary schools: exploring EFL teachers' attitudes, self-efficacy, and perceived school environment. *Asian-Pacific Journal of Second and Foreign Language Education*, *10*(1). https://doi.org/10.1186/s40862-025-00320-5

Soomro, R. B. K., Khan, R. A., & Rind, I. A. (2025). Exploring ESL teachers' experiences about ICT-based 4Cs skills: a phenomenological study. *Discover Education*, *4*(1). https://doi.org/10.1007/s44217-024-00376-4

Stammers, M., Ramgopal, B., Owusu Nimako, A., Vyas, A., Nouraei, R., Metcalf, C., Batchelor, J., Shepherd, J., & Gwiggner, M. (2025). A foundation systematic review of natural language processing applied to gastroenterology & hepatology. *BMC Gastroenterology*, *25*(1). https://doi.org/10.1186/s12876-025-03608-5

Wakuma, O. K. (2025). An investigation into anxiety levels and english learning outcomes of high school students with a particular focus on grade nine. *Discover Education*, *4*(1). https://doi.org/10.1007/s44217-025-00436-3

Yagahara, A., Uesugi, M., & Yokoi, H. (2025). Exploration of the optimal deep learning model for english-Japanese machine translation of medical device adverse event terminology. *BMC Medical Informatics and Decision Making*, *25*(1). https://doi.org/10.1186/s12911-025-02912-0

YarAhmadi, M., & Kargar Behbahani, H. (2025). The effect of interventionist dynamic assessment on Iranian EFL learners' vocabulary learning and retention: a sociocultural inquiry. *Language Testing in Asia*, *15*(1). https://doi.org/10.1186/s40468-024-00337-6

Zielonka, M., Czyżewski, A., Szplit, D., Graff, B., Szyndler, A., Budzisz, M., & Narkiewicz, K. (2025). Machine learning tools match physician accuracy in multilingual text annotation. *Scientific Reports*, *15*(1). https://doi.org/10.1038/s41598-025-89754-y

Zolfaghari, Z., Karimian, Z., Zarifsanaiey, N., & Farahmandi, A. Y. (2025). A scoping review of gamified applications in English language teaching: a comparative discussion with medical education. *BMC Medical Education*, *25*(1). https://doi.org/10.1186/s12909-025-06822-7