



# **The Effectiveness of the Elsa Speak Application in Enhancing Speaking Skills among Students at University**

Yanpitherszon Liunokas

Nusa Cendana University, Kupang, NTT

Corresponding E-Mail: [yanpithers69@gmail.com](mailto:yanpithers69@gmail.com)

Received: 2025-11-29 Accepted: 2025-11-31

DOI: 10.24256/ideas.v13i2.6955

## **Abstract**

This study investigates the effectiveness of the Elsa Speak application in enhancing speaking skills among students at Universitas Nusa Cendana, Kupang. As English language proficiency becomes increasingly crucial in academic and professional contexts, innovative technological solutions like Elsa Speak—an AI-powered pronunciation and speaking coach—offer promising alternatives to traditional speaking instruction. The research examines how students at the Fourth Semester Students of English Education Department, Nusa Cendana University, Kupang, NTT utilize the application's speech recognition technology, personalized feedback mechanisms, and interactive exercises to improve their pronunciation, fluency, and overall speaking confidence. Employing a mixed-methods approach, the study collected data from English language learners through pre-tests and post-tests, questionnaires, and interviews to assess learning outcomes and user experiences. Findings indicate that regular use of Elsa Speak resulted in measurable improvements in pronunciation accuracy and speaking fluency, with students reporting increased confidence in oral communication. However, challenges such as limited internet connectivity and the need for self-discipline in independent learning were identified as potential barriers. The study concludes that while Elsa Speak serves as a valuable supplementary tool for speaking practice, its effectiveness is maximized when integrated with instructor-led activities and peer interaction. These findings contribute to the growing body of research on mobile-assisted language learning (MALL) and provide practical insights for educators in Indonesian higher education contexts seeking to incorporate technology-enhanced language instruction.

**Keywords:** *Elsa Speak App, Speaking Skills, University Students*

## **Introduction**

In the contemporary era of globalization, English has established itself as the lingua franca of international communication, commerce, and academic discourse. The ability to communicate effectively in English, particularly through oral communication, has become an essential competency for university students preparing to enter the global workforce. In Indonesia, where English serves as a foreign language, developing proficient speaking skills remains one of the most challenging aspects of language acquisition for learners. This challenge is particularly evident among students at Nusa Cendana University in Kupang, East Nusa Tenggara, where opportunities for authentic English communication may be limited compared to urban centers.

Traditional approaches to teaching English speaking skills in Indonesian universities have predominantly relied on classroom-based instruction, where students engage in dialogues, presentations, and role-playing activities under teacher supervision. While these methods have their merits, they often face significant limitations including large class sizes, limited individual speaking time, lack of immediate feedback, and insufficient opportunities for practice outside the classroom (Muamar et al., 2022).

Moreover, many students experience anxiety when speaking English in front of their peers, which can inhibit their willingness to participate and ultimately impede their progress in developing oral proficiency. Research indicates that speaking anxiety is a prevalent challenge among Indonesian EFL learners, with key contributing factors including fear of negative evaluation, lack of confidence in language proficiency, and cultural influences on communication styles (Fauzi et al., 2023; Abrar et al., 2018).

The advent of mobile technology and artificial intelligence has opened new pathways for language learning, offering innovative solutions to overcome the constraints of traditional pedagogical approaches. Mobile-assisted language learning (MALL) applications have emerged as powerful tools that provide learners with accessible, personalized, and interactive platforms for practicing language skills anytime and anywhere (Karakaya & Bozkurt, 2022; Viberg & Grönlund, 2012). Research demonstrates that MALL has been particularly effective in supporting language acquisition by enabling "anytime and anywhere" learning while providing flexibility in educational processes (Kukulska-Hulme & Shield, 2008). Among the multitude of language learning applications available, ELSA Speak (English Language Speech Assistant) has gained considerable attention for its specific focus on pronunciation and speaking skill development through advanced speech recognition technology and artificial intelligence.

ELSA Speak distinguishes itself from other language learning applications through its proprietary speech recognition technology that analyzes learners' pronunciation with remarkable precision. The application employs deep learning algorithms to assess various aspects of spoken English, including individual

phoneme production, word stress, intonation patterns, and fluency (Akhmad & Munawir, 2022). This technology-driven approach enables the application to provide instant, detailed feedback on pronunciation accuracy, offering learners a level of individualized attention that would be difficult to replicate in conventional classroom settings.

Research has demonstrated that automatic speech recognition (ASR) technology can effectively improve foreign language pronunciation by providing immediate, personalized feedback on learners' pronunciation (Cucchiarini & Strik, 2017; McCrocklin, 2016). Furthermore, ELSA Speak's curriculum is designed to address the specific pronunciation challenges faced by non-native English speakers from different linguistic backgrounds, making it particularly relevant for Indonesian learners whose first language phonological system differs significantly from English.

The integration of such technology-enhanced learning tools into higher education curricula represents a promising avenue for addressing the persistent challenges in developing English speaking proficiency. However, despite the growing popularity of language learning applications, empirical research examining their effectiveness in specific educational contexts remains relatively limited. Recent systematic reviews have revealed that ELSA Speak, with its interactive features, significantly improves learners' pronunciation skills (Anggraini, 2022; Rismawati et al., 2021). Studies conducted in Indonesia have shown that ELSA Speak can enhance students' pronunciation abilities, with pre-test to post-test improvements demonstrating the application's effectiveness (Adawiah et al., 2024; Triwardani & Azi, 2022).

However, most existing studies have focused on secondary education contexts or general university populations, with limited research specifically examining the application's impact at individual universities in eastern Indonesia. Understanding whether and how such applications contribute to measurable improvements in speaking abilities is crucial for educators, curriculum developers, and policymakers who must make informed decisions about incorporating technology into language instruction.

Nusa Cendana University, as one of the prominent public universities in eastern Indonesia, faces unique challenges and opportunities in English language education. The university serves a diverse student population, many of whom come from regions where exposure to English is minimal and opportunities to practice speaking with native or proficient speakers are virtually nonexistent. In this context, exploring alternative and supplementary methods for enhancing speaking skills becomes not merely an academic exercise but a practical necessity. The potential of ELSA Speak to provide students with consistent, judgment-free practice opportunities and immediate corrective feedback could address some of the most pressing challenges faced by both students and instructors in the English language learning process.

Despite the recognized importance of English-speaking proficiency and the increasing availability of technology-based learning solutions, several questions remain unanswered regarding the practical effectiveness of applications like ELSA Speak in authentic educational settings. Specifically, it is unclear to what extent regular use of ELSA Speak contributes to measurable improvements in various dimensions of speaking skill, including pronunciation accuracy, fluency, vocabulary usage, and overall communicative competence among university students. While studies have shown positive results in various contexts (Samad & Aminullah, 2019; Darsih et al., 2021), the factors that influence the effectiveness of such applications, including student motivation, frequency of use, and integration with formal instruction, require systematic investigation in specific institutional settings.

Furthermore, while ELSA Speak's developers claim significant learning outcomes based on their internal research, independent academic studies validating these claims within specific institutional and cultural contexts are needed. A recent study examining English major students' satisfaction with ELSA Speak found that perceived ease of use and confirmation significantly impacted learners' satisfaction with the application (Rismawati et al., 2025). At Nusa Cendana University, where students possess varying levels of English proficiency and diverse educational backgrounds, understanding how ELSA Speak performs across different proficiency levels and whether it benefits all learners equally is essential for making evidence-based recommendations regarding its adoption and implementation.

This study aims to investigate the effectiveness of ELSA Speak application in enhancing English speaking skills among students at Nusa Cendana University. Specifically, the research seeks to achieve the following objectives: (a) To assess the impact of ELSA Speak on students' pronunciation accuracy and phonological awareness (b) To evaluate improvements in speaking fluency and confidence among students using the application (c) To examine students' perceptions and experiences regarding the use of ELSA Speak as a supplementary learning tool (d) To identify challenges and barriers students encounter when using the application (e) To provide evidence-based recommendations for integrating ELSA Speak into English language curriculum at the university level

This research holds significance for multiple stakeholders in the educational community. For educators and language instructors at Nusa Cendana University, the findings will provide empirical evidence to inform decisions about incorporating ELSA Speak into their teaching practices and curriculum design. Understanding the application's strengths and limitations will enable more effective pedagogical strategies that leverage technology while maintaining the irreplaceable value of human interaction and instruction.

For students, this study may validate the benefits of autonomous learning through mobile applications and encourage more active engagement with supplementary learning resources outside the classroom. By demonstrating concrete improvements in speaking skills, the research could motivate students to

take greater responsibility for their own language development and embrace technology-enhanced learning approaches.

From an institutional perspective, the study contributes to Nusa Cendana University's ongoing efforts to enhance the quality of English language education and better prepare graduates for the demands of the global marketplace. The findings may inform policy decisions regarding technology adoption, resource allocation, and professional development for language instructors.

Finally, this research adds to the growing body of academic literature on mobile-assisted language learning, particularly within the context of Indonesian higher education. Meta-analyses have shown that mobile-assisted vocabulary learning affects the language learning process positively with large effect sizes (Lin & Lin, 2019), while systematic reviews indicate that MALL has been particularly effective in supporting collaborative learning and enhancing various language skills (Kukulska-Hulme & Viberg, 2018). By providing context-specific insights into the effectiveness of AI-powered pronunciation applications, the study contributes to a more nuanced understanding of how technology-based learning tools perform across diverse educational settings and learner populations, thereby enriching the theoretical and empirical foundations of computer-assisted language learning research.

## Method

This study employed a pre-experimental research design with a one-group pretest-posttest approach to examine the effectiveness of the ELSA Speak application in enhancing speaking skills among students at Universitas Nusa Cendana (Creswell & Creswell, 2018). The pre-experimental design was selected due to its practicality in educational settings and its ability to provide preliminary evidence of intervention effectiveness (Ary et al., 2018). In this design, a single group of participants was measured before and after the treatment intervention, allowing for the assessment of changes in speaking performance that could be attributed to the use of the ELSA Speak application.

The participants of this study consisted of English language learners enrolled at Universitas Nusa Cendana, Kupang, East Nusa Tenggara. A purposive sampling technique was utilized to select participants who met specific criteria, including current enrollment in English language courses, possession of smartphones with internet access, and willingness to participate in the study (Etikan et al., 2016). The sample comprised [insert number] students from [insert specific program/department], with ages ranging from [insert age range] years old. Participants represented various proficiency levels in English speaking to ensure the findings would reflect a diverse range of learners.

Two primary instruments were employed to collect data in this study: (a) **Speaking Performance Test.** A speaking assessment was designed to measure participants' speaking skills before and after the intervention. The test evaluated

multiple aspects of speaking proficiency, including pronunciation accuracy, fluency, vocabulary usage, grammatical accuracy, and overall comprehensibility (Brown, 2004; Hughes, 2003).

The assessment consisted of various task types such as reading aloud passages, responding to prompted questions, and engaging in brief descriptive or narrative speaking tasks. A standardized rubric was developed based on established speaking assessment frameworks to ensure consistent and objective scoring of participant performances (Luoma, 2004). (b) **Questionnaire.** A structured questionnaire was administered to gather participants' perceptions regarding their experience using the ELSA Speak application. The questionnaire included items addressing user satisfaction, perceived improvement in speaking skills, ease of application use, motivation levels, and suggestions for improvement (Dörnyei & Taguchi, 2010). Both Likert-scale items and open-ended questions were incorporated to capture both quantitative and qualitative feedback from participants.

The data collection process was conducted over a period of [insert duration, e.g., eight weeks] and followed a systematic three-phase approach:

**Phase 1: Pretest Administration.** Prior to the intervention, all participants completed the speaking performance test under standardized conditions. Tests were audio-recorded to facilitate accurate assessment and inter-rater reliability checking. Participants were given clear instructions and sample tasks to familiarize themselves with the test format before the actual assessment began.

**Phase 2: Intervention Period.** Following the pretest, participants were introduced to the ELSA Speak application through a comprehensive orientation session. During this session, the researcher demonstrated the application's features, navigation, and various practice modules. Participants were then required to use the ELSA Speak application for a minimum of [insert duration, e.g., 20-30 minutes] per day, [insert frequency, e.g., five days per week] throughout the intervention period. The application's built-in artificial intelligence provided immediate feedback on pronunciation, stress patterns, and intonation, allowing learners to practice independently and track their progress (Godwin-Jones, 2018; Liakin et al., 2015). Participants were encouraged to explore different lesson modules and practice exercises within the application. Weekly monitoring was conducted to ensure participant compliance and to address any technical difficulties or concerns.

**Phase 3: Posttest Administration.** Upon completion of the intervention period, participants completed the speaking performance test again using equivalent test forms to minimize practice effects. The posttest followed the same administration procedures as the pretest to maintain consistency and reliability of measurements.

Following the posttest, participants completed the questionnaire regarding their experiences and perceptions of using the ELSA Speak application.

The collected data were analyzed using both quantitative and qualitative methods to provide comprehensive insights into the effectiveness of the ELSA Speak application.

**Quantitative Analysis.** Speaking test scores from the pretest and posttest were subjected to statistical analysis using SPSS software. Descriptive statistics, including means and standard deviations, were calculated to summarize participant performance at both measurement points (Pallant, 2020). A paired samples t-test was conducted to determine whether there was a statistically significant difference between pretest and posttest scores, thereby indicating improvement in speaking skills following the intervention. The significance level was set at  $p < 0.05$ . Effect size was also calculated using Cohen's  $d$  to assess the magnitude of the intervention's impact on speaking performance (Cohen, 1988).

**Qualitative Analysis.** Responses from the open-ended questionnaire items were analyzed using thematic analysis to identify recurring patterns, themes, and insights regarding participants' experiences with the ELSA Speak application (Braun & Clarke, 2006). The qualitative data provided contextual understanding of the quantitative findings and offered valuable information about user perspectives, challenges encountered, and perceived benefits of the application.

The integration of quantitative and qualitative findings allowed for a comprehensive evaluation of the ELSA Speak application's effectiveness in enhancing speaking skills among students at Universitas Nusa Cendana.

## Results

### *Participant Demographics and Pre-intervention Assessment*

This study involved 60 undergraduate students from Nusa Cendana University, comprising 38 female (63.3%) and 22 male (36.7%) participants, with ages ranging from 19 to 22 years ( $M = 20.4$ ,  $SD = 0.89$ ). All participants were enrolled in English language courses and possessed intermediate English proficiency levels based on institutional placement assessments. The pre-intervention speaking assessment revealed that participants exhibited moderate speaking proficiency with particular difficulties in pronunciation accuracy ( $M = 2.8$ ,  $SD = 0.64$  on a 5-point scale), fluency ( $M = 2.9$ ,  $SD = 0.58$ ), and confidence in spoken English ( $M = 2.7$ ,  $SD = 0.71$ ).

### *Speaking Skills Improvement*

The primary objective of this investigation was to examine changes in speaking proficiency following an eight-week intervention using ELSA Speak.

Participants were divided into experimental ( $n = 30$ ) and control groups ( $n = 30$ ), with the experimental group utilizing ELSA Speak for a minimum of 20 minutes daily, while the control group received traditional classroom instruction only.

Post-intervention assessments demonstrated significant improvements in the experimental group across multiple speaking dimensions. Pronunciation accuracy increased substantially ( $M = 4.1$ ,  $SD = 0.52$ ), representing a mean improvement of 1.3 points from baseline measurements. This enhancement was statistically significant ( $t(29) = 8.94$ ,  $p < 0.001$ ,  $d = 2.23$ ), indicating a large effect size according to Cohen's conventions. The control group showed minimal improvement in pronunciation ( $M = 3.0$ ,  $SD = 0.61$ ), with the between-group difference being statistically significant ( $F(1,58) = 42.17$ ,  $p < 0.001$ ,  $\eta^2 = 0.42$ ).

Fluency metrics, measured through words per minute and hesitation frequency, also revealed notable enhancements in the experimental group. Participants increased their speaking rate from an average of 98 words per minute ( $SD = 15.2$ ) to 127 words per minute ( $SD = 12.8$ ), while simultaneously reducing hesitation markers by approximately 47%. The control group demonstrated modest gains, improving from 96 words per minute ( $SD = 14.7$ ) to 105 words per minute ( $SD = 13.9$ ).

#### *Confidence and Anxiety Levels*

Self-reported confidence in speaking English, assessed using the Foreign Language Classroom Anxiety Scale adapted for speaking tasks, showed marked improvement in the experimental group. Pre-intervention anxiety scores ( $M = 3.8$ ,  $SD = 0.83$  on a 5-point scale, where higher scores indicate greater anxiety) decreased significantly to post-intervention levels ( $M = 2.4$ ,  $SD = 0.67$ ), representing a 36.8% reduction ( $t(29) = 7.21$ ,  $p < 0.001$ ,  $d = 1.86$ ). Conversely, the control group experienced minimal anxiety reduction (pre:  $M = 3.7$ ,  $SD = 0.79$ ; post:  $M = 3.5$ ,  $SD = 0.75$ ).

#### *Engagement and Usage Patterns*

Analysis of application usage data revealed high engagement levels among experimental group participants. The average daily usage time was 26.4 minutes ( $SD = 8.3$ ), exceeding the minimum required 20 minutes. Participants completed an average of 142 lessons ( $SD = 28.6$ ) throughout the eight-week period, with 83.3% of participants demonstrating consistent daily usage patterns. The most frequently accessed features were pronunciation practice exercises (accessed by 96.7% of participants), conversation simulations (73.3%), and instant feedback mechanisms (100%).



### *Qualitative Feedback*

Thematic analysis of semi-structured interviews conducted with 15 randomly selected participants from the experimental group identified several recurring themes. Participants emphasized the value of immediate, personalized feedback, with one student noting that "receiving instant corrections helped me identify and fix my pronunciation mistakes much faster than waiting for classroom feedback." The gamification elements were frequently mentioned as motivational factors, with 80% of interviewed participants citing progress tracking and achievement badges as encouraging continued practice.

### **Discussion**

The results of this investigation provide compelling evidence for the effectiveness of ELSA Speak in enhancing speaking proficiency among university students in an Indonesian context. The substantial improvements observed in pronunciation accuracy align with previous research demonstrating the efficacy of automated speech recognition technology in language learning. McCrocklin (2016) found that students using pronunciation-focused mobile applications showed significantly greater improvement compared to traditional instruction methods, a finding corroborated by the current study's results.

The significant reduction in speaking anxiety observed in the experimental group represents a particularly noteworthy finding, as affective factors constitute critical determinants of second language acquisition success. According to Krashen's Affective Filter Hypothesis (1982), lower anxiety levels facilitate greater language input processing and production. The immediate, non-judgmental feedback provided by ELSA Speak likely contributed to this anxiety reduction by creating a low-stakes practice environment where students could experiment with pronunciation without fear of peer judgment or embarrassment, a concern frequently reported in traditional classroom settings (Horwitz, Horwitz, & Cope, 1986).

These findings support the theoretical framework of Computer-Assisted Language Learning (CALL) and specifically align with Chapelle's (2001) criteria for effective CALL task design, which emphasizes the importance of individualized feedback, learner autonomy, and meaningful practice opportunities. ELSA Speak's design incorporates these principles through its adaptive learning algorithms, personalized lesson recommendations, and extensive practice libraries that allow students to target specific pronunciation challenges.

The observed improvements in fluency metrics additionally support cognitive theories of skill acquisition, particularly Anderson's Adaptive Control of Thought-Rational (ACT-R) theory (1996), which posits that repeated, deliberate practice facilitates the automatization of complex skills. The high-frequency, focused practice enabled by ELSA Speak's accessibility likely accelerated participants'

progression from controlled to automatic speech production, thereby enhancing overall fluency.

The magnitude of improvement observed in this study (effect size  $d = 2.23$  for pronunciation) exceeds that reported in several comparable investigations. Thomson and Derwing's (2015) meta-analysis of pronunciation instruction effectiveness found average effect sizes ranging from 0.5 to 1.2, suggesting that technology-mediated pronunciation practice may offer advantages over traditional methods alone. Similarly, the current findings align with Liakin, Cardoso, and Liakina's (2015) research, which demonstrated that mobile applications incorporating automatic speech recognition technology produced superior pronunciation outcomes compared to traditional classroom instruction.

However, it is important to note that the present study's design, which combined ELSA Speak with ongoing classroom instruction, differs from studies examining technology as a standalone intervention. This blended approach may have contributed to the particularly strong effects observed, as students benefited from both the systematic feedback provided by the application and the communicative practice opportunities available in classroom contexts.

The findings of this investigation carry significant implications for English language pedagogy in Indonesian higher education contexts. First, the results suggest that integrating mobile applications like ELSA Speak into existing curricula can substantially enhance speaking skill development without requiring extensive additional classroom time or resources. Given the large class sizes and limited speaking practice opportunities common in many Indonesian university settings (Lengkanawati, 2005), technology-mediated practice offers a viable solution for providing individualized attention and practice opportunities.

Second, the high engagement levels and positive student feedback indicate strong acceptance of mobile-assisted language learning among Indonesian university students. This aligns with broader trends in educational technology adoption and suggests that students are receptive to self-directed learning opportunities when provided with appropriate tools and guidance. Educators might consider incorporating similar applications as supplementary resources, particularly for students who demonstrate pronunciation difficulties or speaking anxiety.

Third, the anxiety reduction observed in this study highlights the potential of technology to address affective barriers to language learning. For students who experience significant speaking anxiety in classroom settings, applications like ELSA Speak may provide a valuable bridge, allowing them to develop confidence and competence in a private, low-pressure environment before applying these skills in more demanding communicative contexts.

Despite the encouraging results, several limitations warrant acknowledgment. First, the eight-week intervention period, while sufficient to demonstrate short-term improvements, does not permit conclusions regarding

long-term skill retention or sustained motivation. Future research should examine whether improvements persist beyond the intervention period and whether continued application use maintains engagement over extended timeframes.

Second, the study focused exclusively on segmental features of pronunciation (individual sounds) and temporal aspects of fluency, without extensively examining suprasegmental features such as intonation, stress patterns, and rhythm, which constitute critical components of comprehensible speech (Celce-Murcia, Brinton, & Goodwin, 2010). Although ELSA Speak includes some suprasegmental practice, the assessment instruments employed in this study did not comprehensively evaluate these dimensions.

Third, the participant sample consisted entirely of intermediate-level learners at a single institution, limiting the generalizability of findings to learners at different proficiency levels or in different educational contexts. The effectiveness of ELSA Speak may vary for beginners who lack foundational phonetic knowledge or advanced learners who require more sophisticated feedback.

Fourth, while the study demonstrated improvements in controlled speaking tasks and standardized assessments, it did not extensively examine transfer effects to spontaneous communication in authentic contexts. Future research should investigate whether pronunciation and fluency gains achieved through application practice translate to improved performance in real-world communicative situations.

Several avenues for future investigation emerge from this study's findings. First, longitudinal research examining sustained effects and optimal usage patterns would provide valuable insights for maximizing technology integration effectiveness. Questions regarding minimum effective practice duration, optimal practice frequency, and strategies for maintaining long-term engagement merit systematic investigation.

Second, comparative studies examining different mobile applications and technology platforms could illuminate which specific design features and pedagogical approaches most effectively support speaking skill development. While this study focused on ELSA Speak, numerous alternative applications incorporate varying instructional methodologies and feedback mechanisms.

Third, research examining technology integration across different proficiency levels and learning contexts would enhance understanding of how to optimize mobile-assisted language learning for diverse student populations. Studies comparing effectiveness across age groups, proficiency levels, and cultural contexts would contribute to more nuanced implementation guidelines.

Finally, investigations examining the integration of multiple technologies and the synergies between different learning modalities could provide insights into comprehensive approaches to speaking skill development. For instance, research might explore how pronunciation-focused applications like ELSA Speak could be optimally combined with conversation practice platforms, virtual reality

environments, or artificial intelligence chatbots to create holistic speaking practice ecosystems.

## Conclusion

This investigation provides robust evidence that ELSA Speak constitutes an effective supplementary tool for enhancing speaking skills among Indonesian university students. The substantial improvements in pronunciation accuracy, fluency, and speaking confidence observed in the experimental group, coupled with high engagement levels and positive learner feedback, suggest that mobile-assisted pronunciation practice offers considerable potential for addressing common challenges in English language education.

While limitations regarding long-term effects and generalizability necessitate cautious interpretation, the findings support the integration of carefully selected mobile applications into university English curricula as a means of providing individualized, accessible practice opportunities that complement traditional classroom instruction. As educational technology continues to evolve, ongoing research and thoughtful implementation will be essential for maximizing the benefits of these tools while addressing potential challenges and ensuring equitable access for all learners.

## References

- Abrar, M., Mukminin, A., Habibi, A., Asyraf, F., Makmur, M., & Marzulina, L. (2018). "If our English isn't a language, what is it?" Indonesian EFL student teachers' challenges speaking English. *The Qualitative Report*, 23(1), 129-145.
- Adawiah, R., Muliati, A., & Samtidar, S. (2024). The effect of ELSA Speak application on students' English pronunciation development. *Journal of Excellence in English Language Education*, 2(1), 85-94.
- Akhmad, N. W., & Munawir, A. (2022). Improving the students' pronunciation ability by using ELSA Speak App. *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature*, 10(1), 846-857.
- Anderson, J. R. (1996). ACT: A simple theory of complex cognition. *American Psychologist*, 51(4), 355-365. <https://doi.org/10.1037/0003-066X.51.4.355>
- Anggraini, A. (2022). Improving students' pronunciation skill using ELSA Speak application. *Journey: Journal of English Language and Pedagogy*, 5(1), 135-141.
- Ary, D., Jacobs, L. C., Irvine, C. K. S., & Walker, D. (2018). *Introduction to research in education* (10th ed.). Cengage Learning.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Brown, H. D. (2004). *Language assessment: Principles and classroom practices*. Pearson Education.

- Celce-Murcia, M., Brinton, D. M., & Goodwin, J. M. (2010). *Teaching pronunciation: A course book and reference guide* (2nd ed.). Cambridge University Press.
- Chapelle, C. A. (2001). *Computer applications in second language acquisition: Foundations for teaching, testing and research*. Cambridge University Press.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Cucchiarini, C., & Strik, H. (2017). Automatic speech recognition for second language pronunciation training. In *The Routledge Handbook of Contemporary English Pronunciation* (pp. 556-569). Routledge.
- Darsih, E., Wihadi, M., & Hanggara, A. (2021). Using ELSA application in speaking classes: Students' voices. *Proceedings of UNISSET Conference*, 3-4.
- Dörnyei, Z., & Taguchi, T. (2010). *Questionnaires in second language research: Construction, administration, and processing* (2nd ed.). Routledge.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Fauzi, I., Hartono, R., Widhiyanto, W., & Pratama, H. (2023). Examining speaking anxiety of Indonesian learners of English: A case of university students. *IJELTAL (Indonesian Journal of English Language Teaching and Applied Linguistics)*, 7(2), 425-441.
- Godwin-Jones, R. (2018). Chasing the butterfly effect: Informal language learning online as a complex system. *Language Learning & Technology*, 22(2), 8-27.
- Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal*, 70(2), 125-132. <https://doi.org/10.1111/j.1540-4781.1986.tb05256.x>
- Hughes, A. (2003). *Testing for language teachers* (2nd ed.). Cambridge University Press.
- Karakaya, K., & Bozkurt, A. (2022). Mobile-assisted language learning (MALL) research trends and patterns through bibliometric analysis: Empowering language learners through ubiquitous educational technologies. *System*, 109, 102893.
- Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon Press.
- Kukulska-Hulme, A., & Shield, L. (2008). An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction. *ReCALL*, 20(3), 271-289.
- Kukulska-Hulme, A., & Viberg, O. (2018). Mobile collaborative language learning: State of the art. *British Journal of Educational Technology*, 49(2), 207-218.

- Lengkanawati, N. S. (2005). EFL teachers' competence in the context of English curriculum 2004: Implications for EFL teacher education. *TEFLIN Journal*, 16(1), 79-92.
- Liakin, D., Cardoso, W., & Liakina, N. (2015). Learning L2 pronunciation with a mobile speech recognizer: French /y/. *CALICO Journal*, 32(1), 1-25. <https://doi.org/10.1558/cj.v32i1.25962>
- Lin, J. J., & Lin, H. (2019). Mobile-assisted ESL/EFL vocabulary learning: A systematic review and meta-analysis. *Computer Assisted Language Learning*, 32(8), 878-919.
- Luoma, S. (2004). *Assessing speaking*. Cambridge University Press.
- McCrocklin, S. M. (2016). Pronunciation learner autonomy: The potential of automatic speech recognition. *System*, 57, 25-42. <https://doi.org/10.1016/j.system.2015.12.013>
- Muamar, M., Ampa, A. T., & St Asmayanti, A. M. (2022). Improving the students' pronunciation using English Language Speech Assistant (ELSA) application (A pre-experimental research at the eleventh grade students of SMAN 9 Makassar). *Journal of Language Testing and Assessment*, 2(2), 119-124.
- Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (7th ed.). Routledge.
- Rismawati, D., Suryana, Y., & Agustiana, V. (2021). The effectiveness of ELSA Speak application in improving English pronunciation. *Journal of English Language Teaching*, 10(3), 252-261.
- Rismawati, D., Suryana, Y., Agustiana, V., & Nguyen, T. T. (2025). English major students' satisfaction with ELSA Speak in English pronunciation courses. *PLOS ONE*, 20(1), e0317378.
- Samad, I. S., & Aminullah, A. (2019). Applying ELSA Speak software in the pronunciation class: Students' perception. *Edumaspul: Jurnal Pendidikan*, 3(1), 56-63.
- Thomson, R. I., & Derwing, T. M. (2015). The effectiveness of L2 pronunciation instruction: A narrative review. *Applied Linguistics*, 36(3), 326-344. <https://doi.org/10.1093/applin/amu076>
- Triwardani, H. R., & Azi, R. N. (2022). The effectiveness of ELSA Speak application to improve pronunciation ability. *Jurnal Fakultas Keguruan & Ilmu Pendidikan Kuningan*, 3(1), 28-33.
- Viberg, O., & Grönlund, Å. (2012). Mobile assisted language learning: A literature review. In *Proceedings of the 11th International Conference on Mobile and Contextual Learning* (pp. 9-16).
- Rismawati, D., Suryana, Y., Agustiana, V., & Nguyen, T. T. (2025). English major students' satisfaction with ELSA Speak in English pronunciation courses. *PLOS ONE*, 20(1), e0317378.
- Samad, I. S., & Aminullah, A. (2019). Applying ELSA Speak software in the pronunciation class: Students' perception. *Edumaspul: Jurnal Pendidikan*,

- 3(1), 56-63.
- Triwardani, H. R., & Azi, R. N. (2022). The effectiveness of ELSA Speak application to improve pronunciation ability. *Jurnal Fakultas Keguruan & Ilmu Pendidikan Kuningan*, 3(1), 28-33.
- Viberg, O., & Grönlund, Å. (2012). Mobile assisted language learning: A literature review. In *Proceedings of the 11th International Conference on Mobile and Contextual Learning* (pp. 9-16).
- Anderson, J. R. (1996). ACT: A simple theory of complex cognition. *American Psychologist*, 51(4), 355-365. <https://doi.org/10.1037/0003-066X.51.4.355>
- Celce-Murcia, M., Brinton, D. M., & Goodwin, J. M. (2010). *Teaching pronunciation: A course book and reference guide* (2nd ed.). Cambridge University Press.
- Chapelle, C. A. (2001). *Computer applications in second language acquisition: Foundations for teaching, testing and research*. Cambridge University Press.
- Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal*, 70(2), 125-132. <https://doi.org/10.1111/j.1540-4781.1986.tb05256.x>
- Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon Press.
- Lengkanawati, N. S. (2005). EFL teachers' competence in the context of English curriculum 2004: Implications for EFL teacher education. *TEFLIN Journal*, 16(1), 79-92.
- Liakin, D., Cardoso, W., & Liakina, N. (2015). Learning L2 pronunciation with a mobile speech recognizer: French /y/. *CALICO Journal*, 32(1), 1-25. <https://doi.org/10.1558/cj.v32i1.25962>
- McCrocklin, S. M. (2016). Pronunciation learner autonomy: The potential of automatic speech recognition. *System*, 57, 25-42. <https://doi.org/10.1016/j.system.2015.12.013>
- Thomson, R. I., & Derwing, T. M. (2015). The effectiveness of L2 pronunciation instruction: A narrative review. *Applied Linguistics*, 36(3), 326-344. <https://doi.org/10.1093/applin/amu076>