eISSN 2721-5016 | pISSN 2721-5024
Journal of Research on English and Language Learning (J-REaLL)
http://riset.unisma.ac.id/index.php/JREALL/user
https://doi.org/10.33474/j-reall.v7i1.24221
Volume 7 | Number 1 | p. 1-18
Published on November 25th, 2025

Exploring MALL and AI integration in EFL: Impacts on speaking skills and learners' motivation

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ABSTRACT

While mobile-assisted language learning (MALL) and artificial intelligence (AI) are known to enhance EFL learning, there exists a deficiency in comprehending their exact influence on discrete speaking sub-skills. This study addresses this gap by providing a granular analysis of how the AI-powered application ELSA Speak affects specific aspects of speaking proficiency and motivation. Employing a quasi-experimental, pretest-posttest design over six weeks, 20 Indonesian EFL learners were divided into an experimental group (n=10) using ELSA Speak and a control group (n=10) receiving conventional instruction. The results showed a notable enhancement in the speaking abilities of the experimental group, with statistical significance ($t(9) = 6.025$, $p < .001$), whereas the control group showed no significant improvement. The mean score for the experimental group increased from 58.6 to 68.7, with fluency showing the most substantial gain (+18.3 points), followed by intonation (+16.8) and pronunciation (+8.1). Furthermore, questionnaire data indicated very high motivation (M=4.49/5.00). A significant limitation of this study is its limited sample size, which impacts the generalizability of the results. The primary practical implication is that AI tools like ELSA Speak are highly effective as supplementary resources for building learner fluency and confidence. More extensive studies with broader demographics and longer time frames are required to validate the results.

Keywords: AI integration; ELSA Speak; learner motivation; MALL; speaking performance

First Received:	Revised:	Accepted:	Published:
September 10th, 2025	November 10th, 2025	November 17th, 2025	November 25th, 2025

How to cite (in APA style):
Mappewali, A., Omolu, F. A., Mulyadi, E., Manangkari, I., & Pratama, R. D. (2025). Exploring MALL and AI integration in EFL: Impacts on speaking skills and learners' motivation. *Journal of Research on English and Language Learning (J-REaLL)*, *7*(1), 1–18. https://doi.org/10.33474/j-reall.v7i1.24221

INTRODUCTION

A new paradigm in language acquisition has emerged thanks to the proliferation of mobile devices: mobile-assisted language learning (MALL). In EFL context, students can use mobile technology to practice speaking more fluently and gain more independence in their studies (Aliakbari & Mardani, 2022; Hwang et al., 2024). Because mobile applications enable learners to engage in oral tasks anytime and anywhere —for example, recording their own voice, receiving instant feedback, or conversing

with peers through the app —they support autonomy and flexible access outside the constraints of the traditional classroom (Benlaghrissi & Ouahidi, 2024; Jeon, 2022). These tools often incorporate gamified elements (progress levels, experience scores, achievement badges, leaderboards, and unlocking new tasks), which can boost motivation and engagement (Hellín et al., 2023). Studies suggest that learners who use mobile technologies exhibit greater confidence in oral communication (Dong et al., 2022; Zhang & Zou, 2020) and are more likely to practice outside traditional classroom settings. Building on this increased confidence and motivation, learners can further benefit from the self-paced nature of mobile learning, which allows them to progress at their own speed and revisit challenging topics with ease. This flexibility aligns with the principles of individualized learning and has been linked to improved public speaking skills.

Pronunciation is one area where EFL students often struggle (Rad & Roohani, 2024). Mastering English pronunciation can be challenging for several reasons, including the impact of one's native language, a lack of drive, insufficient opportunity to practice, and environmental limitations (Antaris & Omolu, 2019; Bai & Yuan, 2019; Du et al., 2025). Given the substantial differences between English and languages like Bahasa Indonesia, learners often struggle to achieve accurate pronunciation. To address this, technological tools have shown great promise. For instance, accent reduction software has been found effective in reducing the impact of native dialects on English pronunciation (Sun, 2023). Moreover, applications such as JOOX, by incorporating English-language music and lyrics, provide supplementary advantages for college students aiming to refine their pronunciation, thereby emphasizing the significance of technology in augmenting speaking proficiency and learner motivation (Huang & Chen, 2024). Consequently, the integration of mobile applications designed for pronunciation practice, such as Google Translate, has proven valuable in providing remote learners with access to accurate native-speaker English pronunciation models (Wongsuriya, 2020).

Despite early exposure to English and familiarity with its sounds, many learners still face pronunciation difficulties at both the junior high and tertiary levels (Nursyahida et al., 2024). For instance, at Universitas Muhammadiyah Palu, Indonesia, students in the English Language Education Program face similar challenges. The first four semesters focus on helping students become better public speakers, starting from the first semester. However, many students continue to struggle. According to preliminary results, potential reasons for these difficulties include insufficient practice, limited exposure to native speakers, and inadequate feedback on errors (Almusharraf, 2024).

Several key barriers compound these issues. Insufficient practice is a significant obstacle, as many students do not engage in regular speaking practice outside of class, limiting their opportunities to improve pronunciation and fluency. The absence of regular practice hinders learners from achieving significant advancement. Limited exposure to native speakers further hinders learners, as they have fewer opportunities to hear and imitate natural pronunciation, intonation, and rhythm. Without this exposure, learners struggle to replicate native-like speech patterns. Finally, inadequate feedback on errors prevents learners from recognizing and correcting their pronunciation mistakes. Without timely, specific feedback, they cannot adjust their speech, which delays improvement.

Given these challenges, there is a significant shortage of technological resources to help learners practice pronunciation. Programs that utilize artificial intelligence (AI), such as the ELSA Speak application, offer a potential solution. This smartphone application offers specialized workouts and customized feedback, assisting learners in enhancing their pronunciation with features including interactive practice modules, speech recognition technology, and immediate feedback on pronunciation precision. Moreover, ELSA Speak provides personalized learning trajectories tailored to the distinct requirements and objectives of learners, rendering it an invaluable resource for overcoming obstacles to pronunciation enhancement (Dakakni & Safa, 2023; Xu & Ismail, 2024).

The excellent reception of ELSA Speak among learners and its overall usefulness in improving pronunciation have been supported by multiple studies. For instance, research by Kholis (2021) and Rinaepi et al. (2022) demonstrated that it improves learners' pronunciation, while Indari (2023) highlighted its utility for identifying common pronunciation errors. Khalizah and Damanik (2024) examined how middle school learners use it to improve their pronunciation and found that it can hold

their attention. However, there is still a large void in the literature. While these studies affirm the tool's overall benefit, they often treat speaking proficiency as a single skill, failing to analyze its distinct components. There is a lack of granular analysis into which specific sub-skills, namely intonation, segmental pronunciation, and fluency, are most impacted by its use. Understanding this is crucial for educators seeking to implement AI tools in a targeted and pedagogically sound manner. Without this detailed insight, it is challenging to determine whether applications like ELSA Speak serve as comprehensive speaking development tools or are more specialized in phonology.

Thus, by analyzing the effects of ELSA Speak on distinct speaking ability components among Indonesian EFL learners, this study sought to close this gap. Additionally, it aimed to link these performance outcomes to the motivational reactions of students to technology. The following research questions served as the basis for the study:

1. How does ELSA Speak influence the speaking skills of Indonesian EFL learners?
2. Which specific aspect of speaking (intonation, pronunciation, or fluency) shows the most significant improvement after integrating ELSA Speak in EFL learning?
3. How does ELSA Speak influence learners' motivation to develop their speaking skills?

LITERATURE REVIEW

The growing dependence on mobile technologies has had a substantial impact on language learning, particularly through the framework of mobile-assisted language learning (Liu et al., 2023). As part of this broader digital transformation, AI has become as a crucial tool for facilitating language learning (Liu, 2023), providing learners with personalized learning opportunities previously unattainable in traditional classroom settings. This review examined the intersection of MALL and AI, specifically focusing on how AI-powered applications, such as ELSA Speak, enhance speaking skills and promote autonomy.

Mobile-assisted language learning (MALL)

"Mobile-assisted language learning" refers to the process of learning a new language through mobile devices. One significant benefit of MALL is that it allows learners to practice their language skills whenever and wherever they choose (Metruk, 2024). This flexibility aligns with the demands of contemporary learners, who often require personalized, on-demand learning. Research has demonstrated that mobile apps offer opportunities for repeated practice, a critical factor in the retention and development of language skills (Zakian et al., 2022). Moreover, MALL is credited with promoting learner autonomy, as mobile devices enable learners to take greater control of their learning processes and adjust their study schedules to meet personal needs (Van & Thanh, 2022).

One key area where MALL has proven particularly effective is enhancing learners' speaking skills, including pronunciation (Hwang et al., 2024; Mingyan et al., 2025). Mobile applications offer many features, such as speech recognition, audio playback, and immediate feedback, facilitating more interactive and engaging learning experiences (Alzieni, 2021). These features are particularly valuable in pronunciation training, allowing learners to practice speaking and receive instant feedback on their pronunciation accuracy. Learners interact with MALL applications by repeating words or phrases, recording their voices, and comparing them to those of native speakers. Speech recognition features offer immediate feedback, assisting learners in recognizing and rectifying pronunciation inaccuracies. Numerous applications enable learners to refine particular elements, such as intonation and stress, while monitoring their advancement over time. Through consistent practice and adaptation of their learning in response to feedback, learners can enhance their speaking abilities at their own speed and convenience.

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Language learning with artificial intelligence

Artificial intelligence (AI) has opened new ways for personalized language teaching by providing adaptive learning experiences tailored to individual learners' needs. AI-powered applications are becoming increasingly sophisticated, offering immediate feedback, error correction, and speech

analysis -critical components for improving pronunciation (Xi, 2023). The implementation of AI in MALL has led to the creation of tools that assess learners' pronunciation, provide targeted corrections, and track progress over time, thereby promoting more effective learning outcomes (Ngo et al., 2024).

Many research investigations have underscored the benefits of incorporating AI in learning languages, especially with regard to pronunciation (Abdelhalim & Alsehibany, 2025; Chen et al., 2025; Rad & Roohani, 2024). AI-driven tools such as speech recognition software may look at how students talk and provide them with comprehensive feedback. This helps them fix their mistakes better than in a regular classroom, where they might not get as much feedback (Luan et al., 2024). Furthermore, AIs can generate personalized learning pathways that adapt to a student's strengths and weaknesses, enabling more targeted pronunciation practice (Liu et al., 2023).

The role of feedback in SLA

This study examines how feedback provision aligns with the interaction hypothesis in second language acquisition (SLA) theory. The interaction theory posited by Long (1996) asserts that language acquisition is augmented by interaction, particularly through the negotiation of meaning. Feedback plays a central role in this process, whether explicit (correction) or implicit (recasts). When learners receive feedback, they are prompted to notice the gap between their own language use and the target form, a process referred to as "noticing". This noticing is essential for advancing language acquisition, as it motivates learners to modify their output toward the target language.

In the context of MALL and AI, applications like ELSA Speak function as tireless non-human interlocutors. The AI's ability to provide immediate, individualized, and consistent corrective feedback on phonological errors aligns directly with the core tenets of the interaction hypothesis. The real-time analysis of a learner's speech, pinpointing errors in pronunciation, intonation, and rhythm, automates the feedback process, forcing learners to "notice the gap" without the communicative pressure or potential embarrassment. This study, therefore, investigated how this form of AI-driven, instantaneous feedback impacts the development of specific speaking sub-skills, serving as a technological application of interaction-based learning principles.

The role of AI-powered speaking tools in language learning

AI-powered speaking, such as ELSA Speak, has transformed how language learners approach pronunciation practice. ELSA Speak, a tool designed to enhance English pronunciation, offers learners customized feedback and exercises tailored to their needs. This leverages advanced speech recognition technology to analyze learner's pronunciation in real-time, providing corrective feedback on aspects such as stress, intonation, and articulation (Kholis, 2021). Additionally, ELSA Speak allows learners to practice with immediate responses, which not only improves their accuracy but boosts self-assurance when communicating in English (Ngoc et al., 2023). These figures illustrate how ELSA Speak's interface provides detailed feedback, showing learners their pronunciation errors and offering corrective exercises.

Figure 1

ELSA Speak showing feedback provision for intonation

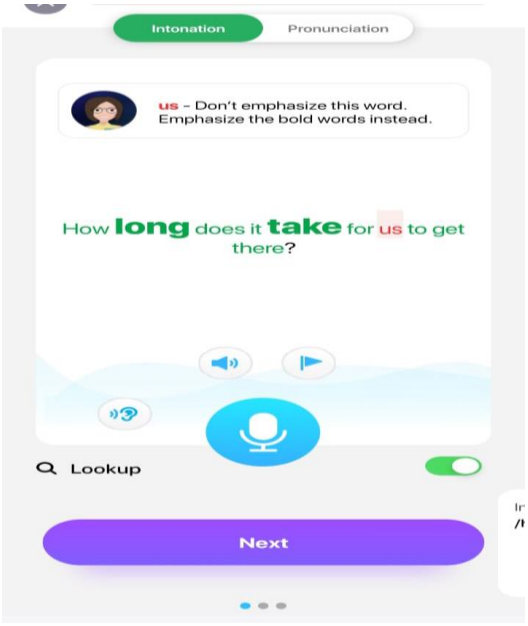
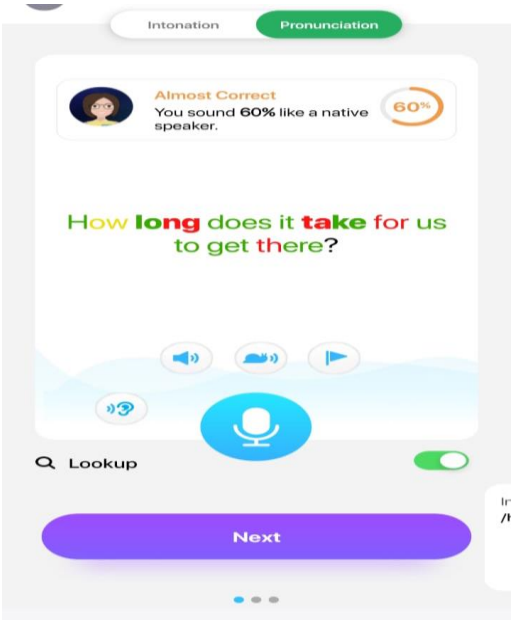


Figure 2

ELSA Speak shows feedback provision for pronunciation



A rising number of research have evidenced the effectiveness of AI tools in improving speaking skills. Studies such as those by Rahmania and Mandasari (2021) found that AI-powered tools, including apps like JOOX and ELSA Speak, significantly enhance learners' speaking skills by providing continuous, detailed feedback. This feedback helps learners identify and correct their pronunciation errors, which is often difficult to achieve in a classroom setting where teachers' feedback may not be as immediate or frequent. Moreover, these tools encourage more consistent practice, as learners can access them at their convenience, leading to greater engagement with the learning material (Indari, 2023).

Learner autonomy and motivation in MALL and AI contexts

One of the most significant pedagogical advantages of MALL and AI is the capacity to foster learner autonomy, which is critical for sustained language development. Learner autonomy denotes a learner's ability to take responsibility for their own education, is not merely about flexibility; it is about empowering learners to become active agents in their skill acquisition (Yu, 2020). AI-driven applications like ELSA Speak facilitate this by providing a structured yet personalized environment, which aligns with self-determination theory (SDT) as proposed by Deci & Ryan (1985). Features such as adaptive learning paths and detailed progress dashboards allow learners to set their own pronunciation goals, monitor their performance on specific phonemes or intonation patterns, and evaluate their outcomes. According to SDT, this sense of autonomy supports intrinsic motivation, as learners feel more in control of their learning process. Moreover, the focus on competence, where learners actively track and improve their skills, cultivates metacognition, helping them identify their weaknesses and select appropriate exercises to address them. The direct learning outcome of this enhanced autonomy is an increase in the quality and quantity of deliberate practice, transforming learning into a self-directed project rather than a passive activity.

The mechanism of immediate, granular feedback powerfully fuels this autonomous learning cycle. In traditional settings, feedback can be delayed and general. In contrast, AI provides instantaneous, specific corrections as soon as an error is made. This immediacy is critical because it enables learners to "notice the gap" between their own production and the target form, a cornerstone of second language acquisition. Rather than being told their pronunciation is "good" or "needs work", learners receive precise data on which syllable was stressed incorrectly, or which vowel was mispronounced. This type of feedback does more than just correct errors; it transforms practice into a diagnostic and formative experience. This, in turn, boosts intrinsic motivation, as learners can see a direct correlation between their effort and measurable improvement, fostering a sense of achievement and encouraging the consistency required for the automatization of speaking skills (Liu et al., 2022). Therefore, autonomy and immediate feedback work in synergy: autonomy provides the learner with the control to practice, while immediate feedback provides the precise information and motivation needed to make that practice effective.

METHODOLOGY

Research design

Research design in educational studies aims to establish a robust framework for examining interventions and their effects on learner outcomes. In the context of language learning, especially when evaluating AI-driven tools, a quasi-experimental design offers an effective method for comparing pre- and post-intervention data, allowing researchers to assess the impact of specific treatments while acknowledging the inherent limitations of non-randomized control groups. This research, involving Indonesian EFL learners, utilized a design to assess the efficacy of the ELSA Speak application in enhancing learners' speaking abilities, encompassing intonation, pronunciation, and fluency. The setting involved six 100-minute sessions over six weeks, where the experimental group received intervention via ELSA Speak, while the control group continued with regular lessons focusing on minimal pairs. The experimental group fully utilized ELSA Speak as part of their in- and out-of-classroom instruction, while still receiving traditional instructional elements, such as minimal pair practice and phonetic drills. The design offers significant insights; however, a primary weakness is the absence of random assignment, potentially impacting the potential for generalization of the results. However, considering the practical limitations of carrying out research in actual classroom settings, this quasi-experimental approach was judged appropriate. Future research could address this limitation by exploring randomized controlled trials and examining other dimensions of language learning, such as writing or listening skills.

Research instrument

The instrument used for the intervention was the AI-based mobile application, ELSA Speak. The

selection of this application was based on several key criteria that directly aligned with the research objectives. First, ELSA Speak is specifically designed to improve speaking proficiency through its advanced artificial intelligence-based speech recognition technology, which provides granular feedback on three core sub-skills central to this study: segmental pronunciation, intonation, and fluency. Second, the application's ability to provide instantaneous, corrective feedback creates a powerful learning environment consistent with the principles of the Interaction Hypothesis, enabling learners to notice and correct errors in real time. Third, ELSA Speak has been employed as a valid tool in previous empirical studies in the EFL field, establishing its credibility as a research instrument (Pham & Pham, 2025). Finally, its user-friendly interface and widespread accessibility made it a practical and motivating tool for implementation within the study context. For the experimental group, the premium version of the application was utilized to ensure full access to all learning features.

Participants

The subjects of this study were selected from an undergraduate cohort in the English Language Education program at Universitas Muhammadiyah Palu. A multi-stage sampling approach was employed. First, purposive sampling was used to identify a target population. An initial screening process, involving a review of semester assessment scores and instructor observations, identified a pool of 48 students characterized by lower-level speaking proficiency. Second, Volunteer sampling was employed to solicit participation from 48 students, and 23 consented. To ensure objectivity in group allocation, these 23 volunteers were then assigned to one of the two study conditions using a simple random assignment procedure. Each volunteer was assigned a unique number from 1 to 23, and 10 students were selected randomly to form the experimental group (n=10), while the remaining 13 students were assigned to the control group (n=13). During the six-week intervention phase, three participants from the control group left due to schedule issues, yielding a final sample of 20 participants: 10 in the treatment group and 10 in the control group.

It is crucial to understand that the relatively small sample size, particularly the control group (n=10), limits the ability to draw broad conclusions from this study. This research is exploratory, and although it offers insights regarding the utilization of AI-driven tool for language learning, the results cannot be generalized to larger populations. More investigation with bigger sample numbers is necessary to validate these findings and furnish more substantial proof of the effectiveness of these interventions.

Data collection and data analysis

Data for this study were obtained using pretest and post-test assessments, along with a 15-item Likert-scale questionnaire. The pretest was administered using the ELSA Speak to assess learners' speaking skills, with specific emphasis on intonation, pronunciation, and fluency. This test was used to assess the learners' prior speaking abilities. The post-test, also conducted using ELSA Speak, was used to evaluate the learners' performance after the intervention. Both the experimental and control groups completed these assessments, with the test results providing insights into improvements in speaking skills. In addition, a Google Form questionnaire was provided to the experimental group after the post-tests to collect data on their perceptions of the ELSA Speak application and motivation. The questionnaire responses were evaluated on a 5-point Likert scale, where 1 represented "Strongly Disagree" and 5 represented "Strongly Agree".

Quantitative data were processed using IBM SPSS Statistics, version 22. To examine the first research question, a paired-samples t-test was performed to evaluate the impact of the intervention. This test was used for comparing the average scores of the identical set of participants (both experimental and control groups) at two different times (pretest and post-test). The main assumptions for conducting the t-test, such as the normal distribution of the difference scores, were verified and satisfied. An alpha level of $p < .05$ was set for all analyses. In addition, 95% confidence intervals for the mean differences were calculated, and Cohen's d was computed as a measure of effect size to evaluate the practical significance of the intervention.

RESULTS

Learners' speaking skills

The test was administered to the sample using the ELSA Speak application, which assesses intonation, pronunciation, and fluency. It facilitates researchers' assessment of student progress. The data obtained are presented along with the values for the three measurement aspects. Each value obtained is summed and averaged. The following tables and figures present the descriptive pretest and post-test data from both groups.

Table 1

Experimental group test results

No	Code	Pretest	Post-test	Deviation	Score Detail					
					Intonation		Pronunciation		Fluency	
					Pre	Post	Pre	Post	Pre	Post
1	X1	60	66	6	62	78	61	63	49	63
2	X2	46	69	23	37	75	50	66	33	70
3	X3	62	73	11	62	68	61	75	53	75
4	X4	58	70	12	45	60	65	76	47	63
5	X5	66	76	10	64	69	68	82	60	69
6	X6	55	66	11	50	62	61	69	39	58
7	X7	59	70	11	51	68	63	70	49	72
8	X8	51	57	6	44	57	57	59	35	43
9	X9	60	67	7	62	95	61	67	49	61
10	X10	69	73	4	68	81	68	69	54	77
	Average	**58.6**	**68.7**	**10.1**	**54.5**	**71.3**	**61.5**	**69.6**	**46.8**	**65.1**

Table 1 shows an overall increase in speaking skills, as assessed by intonation, pronunciation, and fluency. With a mean deviation of 10.1 points, the average post-test score was 68.7, up from an average pretest score of 58.6. From an average of 54.5 on the pretest to 71.3 on the post-test, there was a statistically significant improvement in intonation scores. Pretest scores averaged 61.5, and post-test scores increased to 69.6, indicating a significant improvement in pronunciation as well. Additionally, there was an improvement in fluency, with average scores rising from 46.8 to 65.1. These results demonstrate that the experimental group's speaking abilities were improved in all three areas by the intervention, with the most significant improvements shown in intonation and fluency.

Table 2

Control group test results

No	Code	Pretest	Post-test	Deviation	Score Detail					
					Intonation		Pronunciation		Fluency	
					Pre	Post	Pre	Post	Pre	Post
1	C1	66	71	5	64	73	68	70	60	76
2	C2	57	56	-1	56	57	58	58	48	43
3	C3	66	69	3	68	69	66	68	60	74
4	C4	73	80	7	73	77	73	80	77	88
5	C5	58	58	0	58	62	59	57	48	54
6	C6	69	78	9	70	81	71	79	60	70
7	C7	47	51	4	37	44	53	55	33	38
8	C8	57	59	2	53	63	61	58	47	62
9	C9	68	70	2	81	69	66	73	58	60
10	C10	66	57	-9	81	55	67	59	63	54
	Average	**62.7**	**64.9**	**2.2**	**64.1**	**65.0**	**64.2**	**65.7**	**55.4**	**61.9**

Table 2 reveals that the control group exhibited only a marginal increase in speaking competency over the six weeks. The group's mean score rose from 62.7 to 64.9, a modest mean deviation of just 2.2 points. This pattern of minimal change was consistent across the three assessed sub-skills. Intonation scores slightly increased from 64.1 to 65.0, and pronunciation scores improved similarly

from 64.2 to 65.7. While fluency showed the most notable gain, rising from 55.4 to 61.9, the groups overall performance remained relatively stable. These results indicate that the conventional instruction received by the control group did not significantly enhance speaking proficiency, thereby providing a stable baseline for comparison and strengthening the inference that the intervention was the primary driver of the experimental group's development.

Effectiveness of ELSA Speak on speaking skills

A rigorous study of the test data was conducted to analyze the efficiency of the ELSA Speak application. Before proceeding with this analysis, providing a detailed description of the data at hand is essential. In this study, descriptive statistics were calculated using SPSS software, and the results are meticulously presented in Table 3, assuring you of the thoroughness of our analysis.

Table 3

Descriptive statistic

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Experiment	10	46	69	58.60	6.736
Post-test Experiment	10	57	76	68.70	5.250
Pretest Control	10	47	73	62.70	7.747
Post-test Control	10	51	80	64.90	9.983
Valid N (listwise)	10				

As illustrated in Table 3, the number of test participants in each class, both during the pretest (a test administered before the experiment to establish a baseline) and post-test (a test administered after the experiment to measure change), was 10 individuals. In the preliminary assessment of the experimental class, the lowest observed score was 46, while the highest score was 69. In the final test of the experimental class, the lowest score was 57, while the highest score was 76.

Furthermore, the data were carefully chosen for normality and homogeneity testing to ensure their suitability for parametric or non-parametric statistical analysis. The Shapiro-Wilk test, a recommended tool for normality assessment in data sets with less than 50 observations, was selected.

Table 4

Normality test

	Class/Group	Shapiro-Wilk		
		Statistic	df	Sig.
Learning Result	Pretest Experiment	.971	10	.902
	Postest Experiment	.921	10	.361
	Pretest Control	.913	10	.301
	Post-test Control	.922	10	.370

As illustrated in Table 4 the notable value observed in each data set for the experimental and control groups is above 0.05, suggesting that the perceived difference lacks statistical significance ($p>0.05$). Thus, the pretest and post-test data of the experimental and control classes do not deviate from the Gaussian distribution, indicating no significant difference between the data distribution and the Gaussian distribution. Accordingly, the data from the student test results are deemed to be normally distributed. After the normality test, a homogeneity test was performed to ascertain the homogeneity of the test data. This test also employs SPSS; the following table presents the result.

Table 5
Homogeneity test

Postest Result	Sig.
Based on Mean	0.008
Based on Median	0.009
Based on median and with adjusted df	0.009
Based on the trimmed mean	0.008

The results of the statistical analysis conducted on the test data from the experimental and control classes yielded a significance value of 0.008 (based on the mean), 0.009 (based on the median), 0.009 (based on the median with adjusted degrees of freedom), and 0.008 (based on the trimmed mean). The obtained p-value is less than 0.05, indicating that the test data of the experimental and control class students are homogeneous. Once it has been established that the data are typically distributed and homogeneous, a t-test was conducted. This test was designed to ascertain the significance of the difference between two data groups. The first data group is that of the pretest results and the post-test of the experimental class, while the second group comprises the pretest and post-test data for the control class. The t-test for the two paired groups, as calculated using SPSS, is presented in Table 6.

Table 6
Paired sample descriptive statistics

	Data Group	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Experiment Class Pretest	58.60	10	6.736	2.130
	Experiment Class Post-test	68.70	10	5.250	1.660
Pair 2	Pretest Control Class	62.70	10	7.747	2.450
	Post-test Control Class	64.90	10	9.983	3.157

Table 6 presents descriptive data from both the experimental and control classes. The average value of the experimental class in the pre- and post-tests has increased. A similar trend is evident in the control class, where the average value of the pretest and post-test has also increased. The subsequent table is presented to ascertain whether this increase is statistically significant.

Table 7
T-test of pre and post tests results of experimental and control classes

	Test Groups	t-Counted value	df	Sig. (2-tailed)
Pair 1	Experimental Class Pretest Experimental Class Posttest	-6.025	9	0.000
Pair 2	Control Class Pretest Control Class Post-test	-1.402	9	0.194

Table 7 shows the t-values calculated for both the experimental and control groups. The SPSS software also calculates a two-tailed significance value. The t-test can be performed either by analyzing the significance value or by comparing the computed t-value with the critical values from the t-distribution table. Using the first method, a p-value below 0.05 indicates a statistically significant effect of the treatment on students' speaking skills. If the p-value is above 0.05, it suggests that the impact is not statistically significant. In this case, the null hypothesis is not rejected, meaning the treatment does not significantly affect students' speaking skills. In the experimental group, the two-tailed significance value is 0.000, which is below 0.05, suggesting a significant effect of the ELSA Speak application on students' speaking skills. This indicates a notable improvement in students' performance following the intervention. In contrast, the control group shows a significance value of

0.194, greater than 0.05, implying that conventional teaching methods do not have a statistically significant impact on students' speaking abilities.

An alternative approach to evaluating the significance of the t-value is to compare it with the critical value from the t-table. If the calculated t-value is higher than the critical t-value, it indicates a significant effect of the treatment. On the other hand, if the t-value is lower, it suggests no significant impact. The critical t-value at df 9 with an alpha of 0.025 is 2.262. For the experimental class, the t-value is 6.025, which exceeds the critical value of 2.262, confirming a significant improvement in students' speaking abilities due to the ELSA Speak application. Conversely, the control class has a t-value of 1.402, which is less than the critical value of 2.262, indicating that traditional teaching methods are less effective in enhancing students' speaking skills, particularly in terms of pronunciation, intonation, and fluency.

After analyzing the skill improvement within each group, this section compares the post-test results of the experimental and control groups.

Table 8

Relationship between post-test scores of experimental and control classes

Class	N	Mean	P-value (Sig.)
Experimental Class	10	68.70	0,305
Control Class	10	64.90	
Total	20		

Table 8 presents the number of participants, the mean score for each class, and the associated significance value. The mean scores for the two classes exhibit a notable discrepancy, with the experimental class displaying a higher mean score than the control class. The calculated t-value for these two classes is 0.305, which is higher than the 0.05 threshold when using the same decision-making basis. Consequently, there is no statistically significant difference in the speaking ability of students in the experimental and control classes after the treatment period.

Improvement across aspects

Figure 3

Experimental group pretest and post-test performance across aspects

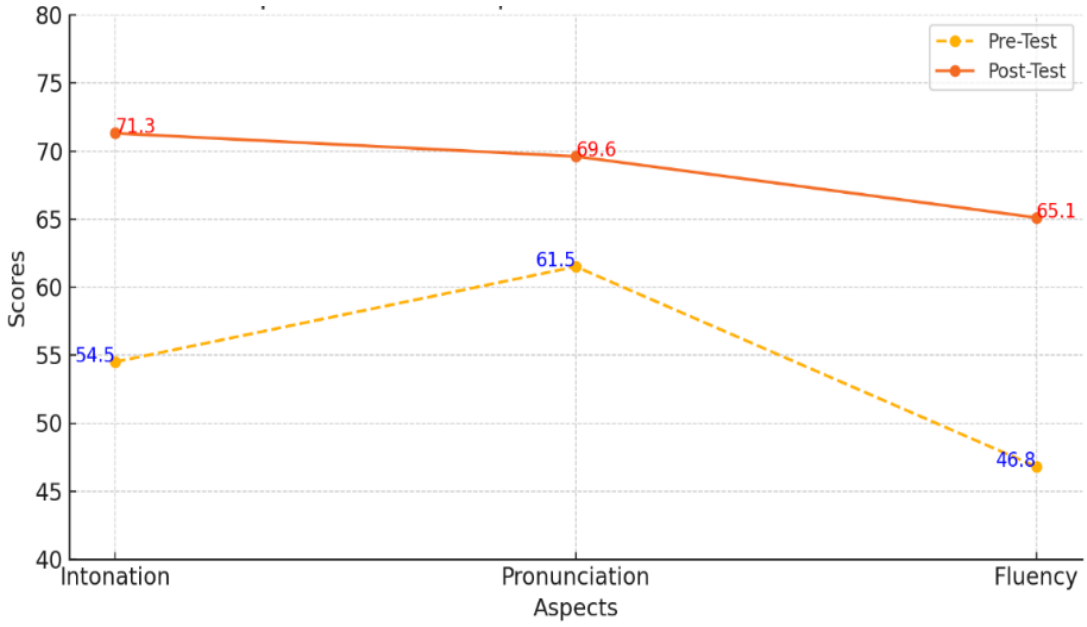


Figure 3 shows the difference between the experimental group's pre- and post-test results on three aspects of fluency, intonation, and pronunciation. All three sectors demonstrated a notable improvement in the outcomes. With an average score increase from 54.5 on the pretest to 71.3 on the post-test, intonation showed the most significant improvement. There was a considerable improvement in pronunciation as well, with scores going up from 61.5 to 69.6. Although fluency was the lowest-scoring element at the beginning, it showed significant improvement, going from 46.8 on the pretest to 65.1 on the post-test. The intervention was successful in helping the experimental group improve their intonation and fluency, as seen by the overall upward trend.

Figure 4

Control group pretest and post-test performance across aspects

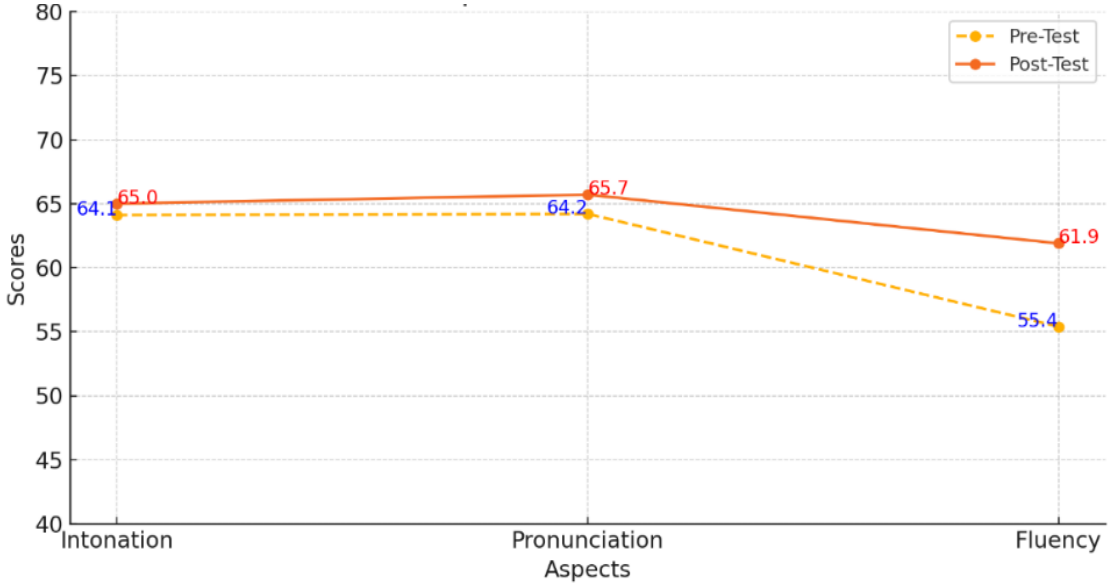


Figure 4 depicts the pretest and post-test performance of the control group in three aspects: intonation, pronunciation, and fluency. The pretest results indicated relatively uniform proficiency across these domains, with intonation at 64.1, pronunciation at 64.2, and fluency at 55.4. After the intervention, the post-test results showed improvements in all areas. Intonation rose slightly to 65.0, pronunciation increased to 65.7, and fluency saw the most substantial improvement, rising to 61.9. Although there was an increase in the control group's scores, it was not significant, suggesting that the conventional teaching methods had a limited impact on improving their speaking skills.

The impact of the ELSA Speak on learner motivation

The data gathered from the questionnaire indicate that ELSA Speak substantially enhances learners' motivation to advance their speaking proficiency. The learners' responses revealed an average score of 4.49 (89.87%), suggesting that most participants found the application to be highly motivating. A closer examination of the app's features showed that gamification, personalized feedback, engaging exercises, and daily reminders were the most influential elements contributing to learners' motivation.

One of the strongest motivators was the gamification elements, such as levels and rewards. These features, which received a Pearson correlation of 0.883, significantly increased learners' engagement with the app. The high score indicates that the gamification elements of ELSA Speak enhanced the learning experience and fostered a sense of accomplishment., which encouraged learners to keep practicing and progressing through the levels. By offering tangible rewards and a clear sense of advancement, the app effectively tapped into learners' intrinsic motivation to reach new milestones and complete tasks, making it a key driver of sustained engagement.

In addition to gamification, personalized feedback was a critical feature that helped foster motivation by addressing the individual needs of each learner. With a mean score of 4.50 (90%) and a Pearson correlation of 0.756, learners reported that receiving tailored feedback on their pronunciation and speaking performance significantly boosted their confidence and determination to continue practicing. Personalized feedback, as provided by ELSA Speak, enabled learners to recognize their strengths and areas for improvement, which in turn enhanced their sense of competence, a key component of Self-Determination Theory (SDT). By making learners feel more capable and aware of their progress, this feature played a vital role in encouraging learners to persist with their speaking practice.

Another major contributor to motivation was the interactive exercises within the app, which received a mean score of 4.70 (94%) and a Pearson correlation of 0.837. These exercises were designed to be both fun and educational, allowing learners to practice their pronunciation in a dynamic, interactive environment. The high rating for these exercises reflects how learners valued the opportunity to engage with the app in a way that was both enjoyable and productive. Since the exercises were aligned with learners' language goals, they provided not only practice but also the challenge necessary to maintain interest and motivation. This approach to task-based learning helped learners stay motivated by offering them clear, manageable goals while fostering a sense of accomplishment as they completed exercises.

Furthermore, the daily reminders and notifications feature played a significant role in keeping learners consistently engaged with the app. With a mean score of 4.40 (88%) and a Pearson correlation of 0.898, the notifications ensured that learners maintained a steady practice routine. These reminders served as a nudge to engage with the app daily, reinforcing the importance of regular practice for long-term improvement in speaking proficiency. By promoting consistency, the reminders helped learners form learning habits that are essential for mastering any language skill, particularly speaking, which requires continual practice to achieve fluency.

In conclusion, the findings suggest that ELSA Speak has a strong positive effect on learners' motivation to improve their speaking proficiency, largely due to its incorporation of gamification, personalized feedback, engaging exercises, and daily reminders. The Pearson correlations provide strong evidence that these features are closely linked to increased motivation and engagement. Through its interactive and personalized approach, ELSA Speak effectively motivated learners to engage in regular practice, thus fostering long-term improvement in their speaking skills. These results emphasize the significance of incorporating AI-driven applications into language learning environments, as they provide a highly motivating and personalized experience that traditional methods often lack.

DISCUSSION

This study employed the ELSA Speak application, which was administered to a sample of 10 EFL learners. It aimed to investigate whether there was a notable improvement in their classroom skills, particularly concerning intonation, pronunciation, and fluency. The study also explored the impact of using this application on boosting students' motivation towards language learning.

The first research question asked whether using ELSA Speak significantly affects EFL learners' speaking skills. The findings indicate that the treatment caused a statistically significant effect on the experimental group. The group's mean score increased by 10.1 points, from a pretest mean of 58.6 to a post-test mean of 68.7. This improvement was shown to be statistically significant according to a paired-samples t-test, $t(9) = 6.025$, $p < .001$. The null hypothesis was rejected because the p-value is less than the alpha level of .05. This result suggests that integrating mobile-assisted language learning applications like ELSA Speak is an effective strategy for enhancing the speaking proficiency of EFL learners.

In line with the findings, Husnu (2017) and Ramos and Valderruten (2017) concluded that mobile-assisted language learning can enhance linguistic competencies, including vocabulary, grammar, and listening skills. The frequent use of mobile applications specifically designed for

language practice can positively impact the development of both listening and linguistic proficiencies. Moreover, the mobile applications use can also be beneficial for improving speaking skills (Ramos & Valderruten, 2017).

In addressing the second RQ, which investigated the most improved aspect of speaking, the data show that fluency demonstrated the most substantial progress. It registered a mean gain of 18.3 points between the pretest and post-test. Intonation showed the second-largest improvement, with a mean gain of 16.8 points. Pronunciation, while still improving, recorded the most modest gain at 8.1 points. This finding implies that the consistent, spontaneous speech practice facilitated by the ELSA Speak application was particularly effective at enhancing learners' fluency and prosodic control. These enhancements align with the concept that AI-driven tools, through features like real-time feedback and gamification, can foster significant advancements in specific language competencies (Chen et al., 2023).

Regarding the third RQ, which investigated how the ELSA Speak application influences learners' motivation to improve their speaking proficiency, the results demonstrated that the students' motivation rate was 89.87, categorized as "very good" according to the established criteria. This result can be interpreted as a high level of agreement from the students that the treatment was motivating. The continued use of conventional methods over an extended period has decreased students' motivation (Wardani et al., 2020; Xue, 2020). Consequently, the enhancement of their abilities is also gradual. The introduction of the ELSA Speak represents a novel and engaging addition to the learning environment, allowing learners to engage with exercises independently. This is evidenced by the exemplary responses provided by the learners on items 7 (the exercises offered by the application are very fun), 8 (the application makes learning English in a more fun way), and 15 (overall, I am satisfied with how the application affected my motivation to improve my English speaking skills). The statements on these items relate to the exercises in the ELSA Speak, which foster interest and motivation, enhancing the appeal of learning to speak. Moreover, the overwhelming majority of participants in the experimental group indicated that using ELSA Speak had a beneficial effect on their overall English skills. Furthermore, the ELSA Speak program, designed to facilitate speaking improvement through its interactive features, may require a more extended engagement period to produce significant results. The efficacy of this can be enhanced by a more extended subscription, which allows learners to utilize its resources more comprehensively and consistently. The premium accounts offered by ELSA Speak (ranging from one month to one year) suggest that more extended usage may be required to realize its full potential. This is in line with existing studies that points out the importance of duration in skill acquisition, particularly within the context of learning languages.

CONCLUSION

The findings confirmed that the application was a highly effective intervention, producing a statistically notable enhancement in the experimental group's overall speaking proficiency ($p < .001$), an effect not observed in the control group. This study fundamental contribution resides in its granular analysis, which revealed that fluency and intonation were the aspects most enhanced, suggesting that the tool's greatest strength is in building automaticity and prosodic control. The practical implication for educators is that such AI tools should be integrated not as replacements for instruction, but as powerful supplementary resources to provide the low-stakes, high-repetition practice necessary for building learner confidence and speaking automaticity. Therefore, it is recommended that future research replicates this study with larger, more diverse populations and over a more extended period to validate these findings. Longitudinal research would yield a more comprehensive understanding of the effects of these technologies on long-term language acquisition and could explore their integration into blended learning curricula more deeply.

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CONFLICT OF INTEREST STATEMENT:

The authors report no competing interests associated with the research presented in this manuscript

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