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# Evaluating the effectiveness of mobile-assisted language learning in enhancing English speaking proficiency : A case study in Indonesian high school

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A B S T R A C T

This study examines the efficacy of Mobile-Assisted Language Learning (MALL) in improving English speaking skills among Indonesian senior high school students. Employing a mixed-methods approach, the research utilized a quasi-experimental design involving 70 students divided into experimental and control groups. The experimental group utilized mobile applications like ELSA Speak and HelloTalk, whilst the control group implemented conventional ESL methods. Speaking performance was measured through pre-test and post-test scores, complemented by questionnaires and interviews to explore learners' perceptions. Quantitative findings reveal that although both groups demonstrated statistically significant improvement, the experimental group showed substantially greater gains. The control group recorded a modest mean increase of 1.63 points with a moderate effect size (Cohen's d = 0.58), whereas the experimental group achieved a remarkable mean gain of 13.23 points, accompanied by a very large effect size (Cohen's d = 3.36). These results indicate that MALL is considerably more effective than traditional instruction in improving English speaking proficiency. The reduced score variability in the experimental group further suggests more consistent learner achievement following the intervention. Qualitative findings indicate that MALL increased learners' motivation, reduced speaking anxiety, and enhanced learner autonomy through flexible practice and immediate feedback. Despite its effectiveness, the study identified challenges related to technological constraints and initial instructor readiness. Issues such as unstable internet connectivity occasionally disrupted learning, and limited early guidance affected initial application use. However, these challenges did not significantly hinder learning outcomes when adequate teacher support was provided. Overall, the findings demonstrate that MALL offers a pedagogically effective approach to enhancing English speaking skills in the Indonesian high school context. When integrated thoughtfully with conventional instruction and supported by appropriate technological and instructional preparation, MALL has strong potential to transform speaking instruction and promote more engaging, autonomous, and effective language learning.

## 1. INTRODUCTION

Mobile-Assisted Language Learning (MALL) has developed as a transformative approach in language education, leveraging the ubiquitous accessibility and adaptability of mobile devices

to address conventional challenges in English as a Second Language (ESL) instruction. MALL has demonstrated efficacy in addressing challenges such as inadequate speaking practice and low student motivation by enabling learners to access content in a flexible and engaging way. Pebiana and Febria (2023) examine the capacity of mobile applications to sustain student engagement and stimulate interest in language learning activities, while Benlaghrissi and Ouahidi (2024) highlight their significance in enhancing vocabulary acquisition and pronunciation—essential elements of speaking proficiency. This integration of technology and education promotes autonomy and facilitates prompt feedback, essential for enhancing language skills (Assauri et al., 2022; Ekoç, 2021).

The theoretical foundations of MALL are established on constructivist and sociocultural frameworks that emphasize active involvement and social interaction. Constructivist principles are evident in mobile applications that enable learners to acquire information through genuine difficulties and real-world simulations (Yakar et al., 2020). Sociocultural theory underscores the significance of mediated learning experiences that enhance peer communication and connections with native speakers, consistent with Vygotsky's notion of social mediation (Kukulska-Hulme & Viberg, 2018). These theoretical frameworks converge in personalized learning environments, where information is customized to meet individual needs, promoting autonomy and contextualized learning (Jeong, 2022; Morchid, 2020).

MALL's significant breakthrough lies in its ability to enhance speaking skills via accessibility and adaptability. Mobile applications facilitate students' speaking practice at their convenience, promoting regular involvement often lacking in conventional classroom environments. Rojas et al. (2020) and Rinanda et al. (2019) demonstrate that consistent engagement with mobile devices correlates with enhanced language proficiency. Applications like ELSA Speak provide specialized exercises that concentrate on pronunciation and fluency, enabling students to practice speaking in a regulated setting while building confidence (Aqilah, 2024). This adaptability enables learners to integrate language practice into their regular activities, as evidenced by Alzieni (2024) study on the immersive characteristics of mobile-assisted environments.

Furthermore, mobile applications offer prompt feedback and gamified elements, which are significant benefits for the development of speaking skills. These applications employ sophisticated speech recognition technologies to provide immediate corrective feedback on pronunciation, grammar, and fluency, enabling learners to identify problems promptly (Shaheen et al., 2024). Such feedback fosters a supportive atmosphere for students with speaking anxiety by promoting active participation without the apprehension of judgment (Rojas et al., 2020; Ngoc et al., 2023). Simultaneously, gamification elements—such as points, badges, and challenges—render language practice more engaging, enhancing intrinsic motivation and fostering a sense of accomplishment (Puspitasari & Arifin, 2023; Dirgantoro et al., 2022; Almelhes, 2024).

Mobile applications also provide genuine communication opportunities and customized learning experiences that distinguish MALL from conventional methods. Numerous systems employ voice or video chat functionalities to replicate real-life interactions, linking learners with native speakers or AI-driven conversational partners (Zainal, 2023; Chan, 2022). This immersion enhances pronunciation and grammar while providing context-specific feedback. Moreover, applications personalize information based on individual advancement, featuring customized workouts that target certain deficiencies such as pronunciation or vocabulary utilization (Elsani et al., 2023). This customization fosters enhanced involvement and accountability, as students can monitor their progress while concentrating on areas requiring improvement (Yang et al., 2024).

However, despite these extensive advantages, several critical gaps persist in the current research. The integration of mobile devices into ESL training presents several challenges that require meticulous attention. Unreliable internet connectivity or app functionality issues can disrupt the learning experience (Lee et al., 2021). Moreover, not all students possess the necessary digital competencies or motivation to effectively utilize these tools (Iter & Salhab, 2024).

Furthermore, teacher preparation is a crucial factor. Educators must be adequately trained to integrate mobile devices into their pedagogical methods while maintaining a balance between conventional instruction and technological advancement (Han, 2019). Excessive dependence on technology presents risks, such as neglecting essential in-person interactions for spontaneous conversation (Alghazi et al., 2020). While educators generally possess a favorable disposition towards MALL, they underscore the necessity of a hybrid strategy that integrates traditional methods with technological improvements (Kassim & Said, 2020; Undi & Hashim, 2021).

While current studies elucidate the general benefits of MALL for language acquisition, many focus on overall language skills rather than providing a concentrated analysis on the enhancement of speaking skills, an essential domain that necessitates further exploration (Benlaghrissi & Ouahidi, 2023). Context-specific research is also notably limited; as noted by Pebiana and Febria (2023), targeted investigations in specific educational settings, such as senior high schools, are required to understand how problems like unreliable internet connectivity or varying digital competencies impact MALL's effectiveness (Lee et al., 2021; Iter & Salhab, 2024). Furthermore, while teachers generally possess a favorable disposition towards MALL, they underscore the necessity of balancing technological use with direct teacher-student interactions to avoid excessive dependence on technology (Kassim & Said, 2020; Alghazi et al., 2020). There is a pressing need for longitudinal studies and mixed-methods research that can capture both the quantitative progress in speaking proficiency and the qualitative experiences of students and educators (Undi & Hashim, 2021; Han, 2019).

This study intends to bridge these empirical and contextual gaps by investigating the how mobile applications promote speaking skills specifically within the Indonesian senior high school context. Using a mixed-methods approach, the research integrates quantitative evaluations through pre-test/post-test assessments with qualitative insights from questionnaires and interviews. The objective is to offer a comprehensive understanding of how MALL addresses speaking anxiety and fosters learner autonomy while tackling the practical issues associated with its incorporation into formal education (Iter & Salhab, 2024; Han, 2019). By doing so, this study provides a strategic framework for optimizing mobile-assisted environments to transform EFL instruction and maximize language learning outcomes.

## 2. METHOD

### 2.1 Design

This study employed an explanatory sequential mixed-methods design (Creswell & Clack, 2017). The research began with a quasi-experimental phase using a pretest-posttest control group to compare the efficacy of MALL-based training against conventional ESL methods. This was followed by a qualitative phase to gather deeper insights from students and teachers, allowing the qualitative data to explain and expand upon the initial quantitative findings. This design ensures a comprehensive evaluation of both causal relationships and the practical experiences of the participants.

**Participants and Sampling**

Seventy senior high school students from a private institution in Surabaya, Indonesia, participated in the study. Purposive sampling was employed based on three specific criteria: (1) enrollment in the same grade level to ensure homogeneity, (2) comparable baseline English proficiency demonstrated by prior academic records, and (3) consistent access to smartphones or tablets compatible with the selected mobile applications.

A power analysis conducted with G*Power software determined the ideal sample size, utilizing parameters of α = 0.05, statistical power (1-β) = 0.85, and anticipated effect size (Cohen's d) = 0.7, informed by previous research on technology-enhanced language acquisition. Participants were equally allocated into two groups: an experimental group (n=35) utilizing mobile applications alongside conventional classroom training, and a control group (n=35) receiving standard ESL education devoid of mobile application integration.

**Data Collecting Technique**

The research employed methodological triangulation by integrating speaking proficiency evaluations and written interviews via Google Forms. To mitigate bias, speaking proficiency was assessed for both experimental and control groups during the pre- and post-intervention phases by independent, qualified assessors. All sessions were audio-recorded to ensure scoring precision and consistency. Furthermore, qualitative data were gathered through online written interviews with instructors and 36 student volunteers via Google Forms, a method chosen for its scalability, anonymity, and efficiency in data organization. Prior to data collection, informed written consent was obtained from all participants. In accordance with ethical standards, the Google Form included a mandatory consent section at the beginning, ensuring that participants were fully aware of the study's purpose and voluntarily agreed to participate before proceeding to the interview questions.

**Data Analysis Technique**

Quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics were initially employed to summarize patterns and evaluate variability, while the Shapiro-Wilk test was used to assess data normality. For inferential analysis, paired-sample t-tests were utilized to evaluate within-group progress, and independent-sample t-tests were applied to compare post-test findings between the experimental and control groups. The independent-sample t-test was calculated using the formula.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{s_p^2 \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Where X represents the group means, n the sample sizes,s2p the pooled variance. To determine the practical importance of the findings, effect sizes were calculated using Cohen’s d.

$$d = \frac{\bar{X}_1 - \bar{X}_2}{s_{pooled}}$$

Qualitative data were analyzed following the six-step thematic analysis framework by Braun and Clarke (2006). This process involved familiarizing with the transcripts, developing fundamental codes, and identifying emerging trends. These themes were continuously compared with the original dataset to guarantee coherence and explicitly delineated in accordance with the research objectives. Finally, the findings were integrated into a narrative report that corresponds with the theoretical frameworks, providing a detailed evaluation of learners' responses to the MALL intervention to complement the quantitative results.

**Ethical Considerations**

To ensure ethical integrity, all participants were provided with a clear brief regarding the study's objectives and their right to voluntary withdrawal without penalty. Operational consent was secured via a mandatory digital agreement in the Google Form, which also guaranteed anonymity through the use of pseudonyms and secure data encryption during analysis. Furthermore, the study established rigorous validity and reliability through methodological triangulation, cross-referencing quantitative pre-test/post-test results with qualitative interview data. This dual-layered approach minimized individual bias and ensured that the assessment of MALL's effectiveness on speaking proficiency was both statistically sound and contextually accurate.

## 3. RESULTS AND DISCUSSION

This study investigated the effectiveness of Mobile-Assisted Language Learning (MALL) in improving English speaking proficiency among Indonesian high school students, with particular attention to pronunciation, fluency, and interactive communication. The findings demonstrate that MALL produces substantially greater improvements in speaking performance than conventional instruction, confirming its pedagogical value in EFL contexts.

### 3.1 The Impact of MALL on Speaking Proficiency

The results provide clear evidence that Mobile-Assisted Language Learning (MALL) effectively improves English speaking skills among Indonesian high school students. The quantitative findings show clear differences between traditional teaching methods and mobile-assisted learning, indicating strong advantages of technology-based learning environments.

| Group | Test | Mean | SD | Mean Gain | t-value | p-value | Effect Size (Cohen's d) |
|---|---|---|---|---|---|---|---|
| **Control (Traditional Instruction)** | Pre-test | 81.03 | 2.82 | | | | |
| | Post-test | 82.66 | 2.85 | 1.63 | −4.81 | < 0.0001 | 0.58 |
| **Experimental (MALL)** | Pre-test | 81.03 | 3.93 | | | | |
| | Post-test | 94.26 | 2.15 | 13.23 | −19.18 | < 0.0001 | 3.36 |

The comparative analysis presented in Table 1 shows clear differences between traditional instruction and Mobile-Assisted Language Learning (MALL) in improving students' English speaking proficiency. Both groups demonstrated statistically significant improvement from pre-test to post-test; however, the magnitude of improvement differed substantially.

Students in the control group who received traditional instruction showed a modest increase in speaking scores, with a mean gain of 1.63 points (from M = 81.03, SD = 2.82 to M = 82.66, SD = 2.85). Although this improvement was statistically significant ($t = -4.81$, $p < 0.0001$), the effect size was moderate (Cohen's $d = 0.58$), indicating limited practical impact. This suggests that conventional instruction can support speaking development, but its effectiveness remains constrained.

In contrast, the experimental group using MALL demonstrated a substantial improvement in speaking proficiency. The mean score increased by 13.23 points, from 81.03 (SD = 3.93) in the pre-test to 94.26 (SD = 2.15) in the post-test. This gain was highly significant ($t = -19.18$, $p < 0.0001$) and accompanied by a very large effect size (Cohen's $d = 3.36$), indicating strong practical significance. The reduction in standard deviation from pre-test to post-test also suggests more consistent achievement among learners after the intervention.

Overall, the results indicate that MALL is considerably more effective than traditional instruction in enhancing English speaking proficiency. The large difference in mean gain and effect size between groups highlights the strong contribution of mobile-based learning environments, which provide frequent practice, immediate feedback, and greater learner engagement. These findings support the view that technology-integrated instruction can play a transformative role in developing speaking skills in the Indonesian high school context.

### 3.2 Advantages of MALL Implementation

**1. Increased Learning Motivation**

The qualitative data revealed that MALL users experienced a noticeable increase in learning motivation. Questionnaire results indicated that students felt more enthusiastic about practicing speaking because mobile applications offered interactive and varied activities. Learners also reported that the flexibility of mobile learning encouraged them to practice outside scheduled classroom sessions.

*"I practice speaking more often because the app is easy to use and feels fun."* (Questionnaire Respondent Q4)

*"Before using the app, I rarely practiced speaking at home, but now I practice almost every day."* (Interview Participant I7)

These excerpts demonstrate that MALL increased students' intrinsic motivation by making speaking practice more accessible and enjoyable. The opportunity to practice independently and repeatedly appeared to foster sustained engagement, which is often difficult to achieve through conventional classroom instruction alone.

**2. Reduced Speaking Anxiety**

Another significant qualitative finding was a reduction in speaking anxiety among students using MALL. Many participants reported feeling less pressure when practicing speaking through mobile applications compared to speaking in front of classmates. This low-anxiety environment enabled learners to focus on improving their performance rather than worrying about making mistakes.

*"I am not afraid of making mistakes when using the app because no one laughs at me."* (Interview Participant I3)

*"When I practice speaking in class, I feel nervous, but with the app I feel more relaxed."* (Questionnaire Respondent Q10)

These statements indicate that MALL provided a psychologically safe space for speaking practice. By reducing fear of negative evaluation, the applications helped learners build confidence gradually before engaging in real classroom communication.

**3. Enhanced Learner Autonomy**

The qualitative findings also showed that MALL promoted learner autonomy. Students reported being able to decide when, how long, and how often they practiced speaking. Questionnaire data indicated that learners frequently repeated pronunciation and fluency exercises based on personal needs.

*"I can repeat the pronunciation practice many times until I get it right."* (Questionnaire Respondent Q2)

*"If I feel my fluency is still weak, I practice again using the app without waiting for class."* (Interview Participant I9)

These excerpts illustrate that MALL encouraged students to take responsibility for their own learning. Learners became more aware of their strengths and weaknesses and actively managed their speaking practice, indicating the development of self-directed learning behaviors.

### 3.3 Challenges in MALL Implementation

**1. Technological Constraints**

Despite the positive outcomes, technological constraints were reported by several participants. Students mentioned unstable internet connections and occasional technical issues with the applications. These problems sometimes interrupted practice sessions and caused frustration.

*"Sometimes the app stops working because the internet connection is not stable."* (Interview Participant I1)

*"I want to practice, but when the signal is bad, I cannot use the app properly."* (Questionnaire Respondent Q6)

These excerpts suggest that technical limitations affected the consistency of learning for some students. However, most participants indicated that they attempted to adapt by practicing at different times or locations, suggesting that technological constraints did not completely prevent engagement with MALL.

**2. Instructor Readiness**

Instructor readiness also emerged as a challenge in the early stage of implementation. Some students reported limited initial guidance on how to maximize the use of mobile applications for speaking practice. Questionnaire responses indicated that clearer explanations from teachers were needed at the beginning.

*"At first, I was confused about how to use the app for speaking practice."* (Questionnaire Respondent Q12)

*"After the teacher explained how to use the app, it became easier to practice."* (Interview Participant I6)

These findings indicate that teacher support played a crucial role in the effective use of MALL. While initial instructor readiness was limited, appropriate guidance helped students overcome difficulties and use the applications more effectively.

Overall this study seeks for the effectiveness of Mobile-Assisted Language Learning (MALL) in enhancing English speaking proficiency among Indonesian high school students. In line with previous studies, the results indicate that MALL offers significant pedagogical advantages through increased accessibility and flexibility, enabling learners to engage in speaking practice beyond the constraints of traditional classroom instruction. Consistent with Rojas et al. (2020), mobile applications facilitated continuous exposure to speaking activities, which is essential for the development of oral proficiency.

The study also confirms the critical role of immediate feedback in supporting speaking development. As highlighted by Ali (2023), prompt corrective feedback enables learners to recognize and address linguistic inaccuracies more efficiently. The findings suggest that real-time feedback mechanisms embedded in mobile applications supported learners in refining pronunciation and fluency through repeated practice. This aligns with Ngoc et al. (2023), who emphasize that mobile-based speaking platforms provide a low-anxiety environment that fosters learner confidence and sustained engagement.

Motivational factors further contributed to the effectiveness of MALL. Although motivation was primarily explored through qualitative data, the findings suggest that interactive and gamified features promoted active learner involvement. This supports Puspitasari and Arifin's (2023) assertion that gamification enhances learner engagement in language learning contexts. Similarly, Almelhes (2024) argues that positive learner attitudes toward technology-mediated instruction can lead to improved learning outcomes, a claim substantiated by the consistent engagement observed in this study.

Another key advantage of MALL identified in this research is the provision of authentic communication opportunities. In accordance with Zainal (2023), mobile applications enabled learners to practice speaking in simulated real-world contexts, thereby bridging the gap between theoretical knowledge and practical language use. This finding supports Chan's (2022) view that authentic interaction plays a central role in developing communicative competence, particularly in speaking. The findings further highlight the effectiveness of MALL in facilitating personalized learning. In line with Elsani et al. (2023), mobile learning environments allowed learners to focus on individual areas of difficulty, promoting more self-directed learning behaviors. This supports Yang et al.'s (2024) assertion that personalization in mobile learning enhances learner autonomy and engagement, which are crucial for sustained language development.

Despite these advantages, the study also acknowledges challenges related to MALL implementation. Technological constraints, such as internet connectivity issues and application performance, remain consistent with concerns raised by Helwa (2017) and Hilao and Wichadee (2017). However, the findings suggest that these challenges did not substantially impede learning outcomes, indicating that appropriate planning and infrastructure support can mitigate technical

limitations. Concerns regarding learner readiness, as noted by Iter and Salhab (2024), were not strongly reflected in the findings. Students demonstrated the ability to adapt to mobile learning environments and engage actively with the applications. This suggests that learner preparedness can be effectively developed through guided implementation. Similarly, while instructor readiness has been identified as a challenge in previous studies (Han, 2019), the successful integration of MALL in this study indicates that adequate teacher support can facilitate effective implementation. Finally, the findings address concerns related to unbalanced skill development reported in earlier research (Han, 2019; Helga, 2017). The results suggest that MALL can support balanced improvement across multiple speaking components when integrated thoughtfully into instructional practice. Overall, this study demonstrates that MALL represents a pedagogically sound and effective approach to enhancing English speaking proficiency, particularly when technological and instructional challenges are systematically addressed.

## 4. CONCLUSION

This study concludes that Mobile-Assisted Language Learning (MALL) is a highly effective instructional approach for improving English speaking proficiency among Indonesian high school students. The findings demonstrate that learners engaged in mobile-assisted environments experienced significantly greater development in speaking skills compared to those receiving traditional instruction, primarily due to expanded practice opportunities and immediate feedback mechanisms. Qualitatively, MALL was found to positively influence student motivation, reduce speaking anxiety, and promote learner autonomy by providing a flexible, low-anxiety, and personalized setting that allows students to regulate their own learning pace. Despite identified challenges concerning technological constraints and instructor readiness, the study proves that these limitations do not significantly undermine the effectiveness of MALL when implemented with appropriate planning and infrastructure support. Ultimately, the advantages of systematic mobile integration outweigh the practical challenges in secondary-level English instruction. By extending the literature on speaking skills within the Indonesian context, this study reinforces constructivist and sociocultural perspectives on the essential roles of interaction and authentic practice. Future research should focus on the long-term impacts of MALL across diverse educational settings and broader learner populations.

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