

CLASSROOM DYNAMICS AND SPEAKING MASTERY IN AI-INTEGRATED MOBILE-ASSISTED LANGUAGE LEARNING: A STUDY IN INDONESIAN EFL CONTEXT

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis secara empiris pengaruh penerapan *Mobile-Assisted Language Learning* (MALL) terintegrasi kecerdasan buatan (AI) terhadap dinamika kelas dan penguasaan berbicara siswa dalam konteks EFL di Indonesia. Latar belakang penelitian ini didasarkan pada rendahnya partisipasi lisan dan tingginya kecemasan berbicara siswa dalam pembelajaran konvensional. Studi ini menggunakan desain *mixed-method* eksplanatori berurutan dengan melibatkan 96 siswa kelas XI Program Kelas Explore di SMA NU 1 Gresik. Data kuantitatif diperoleh melalui tes berbicara sebelum dan sesudah perlakuan yang dinilai menggunakan rubrik analitik mencakup kefasihan, ketepatan, pengucapan, dan kosakata, sedangkan data kualitatif dikumpulkan melalui wawancara semi terstruktur dan observasi kelas. Kelompok eksperimen mengikuti pembelajaran berbicara berbasis AI selama delapan minggu, sementara kelompok kontrol menjalani pembelajaran konvensional dengan pemanfaatan AI yang terbatas. Hasil analisis menunjukkan bahwa kelompok eksperimen mengalami peningkatan skor berbicara yang lebih tinggi dibandingkan kelompok kontrol, terutama pada aspek pengucapan dan pengayaan kosakata. Temuan kualitatif memperlihatkan adanya peningkatan keterlibatan siswa, perubahan pola interaksi kelas yang lebih partisipatif, pergeseran peran guru sebagai fasilitator, serta penurunan kecemasan berbicara yang dikaitkan dengan umpan balik AI yang bersifat individual. Dengan demikian, penerapan MALL terintegrasi AI memberikan kontribusi positif terhadap dinamika kelas dan peningkatan penguasaan berbicara siswa dalam konteks intervensi delapan minggu, tanpa menggeneralisasi dampak jangka panjang di luar periode penelitian.

Kata Kunci: *Dinamika Kelas, Penguasaan Berbicara, MALL Terintegrasi AI*

ABSTRACT

This study aims to empirically examine the effect of the implementation of Artificial Intelligence (AI)-integrated Mobile-Assisted Language Learning (MALL) on classroom dynamics and students' speaking proficiency in the Indonesian EFL context. The study is grounded in the persistent issues of low oral participation and high speaking anxiety in conventional classroom instruction. Addressing these challenges requires instructional approaches that promote interactive engagement while providing individualized learning support. An explanatory sequential mixed-method design was employed, involving 96 eleventh-grade students from the Explore Program at SMA NU 1 Gresik. Quantitative data were collected through pre- and post-speaking tests assessed using an analytic rubric covering fluency, accuracy, pronunciation, and vocabulary, while qualitative data were gathered through semi-structured interviews and classroom observations. The experimental group participated in AI-supported speaking activities for eight weeks, whereas the control group received conventional instruction with limited AI integration. The findings indicate that the experimental

group demonstrated greater improvement in speaking scores compared to the control group, particularly in pronunciation and vocabulary development. Qualitative results reveal increased student engagement, more participatory classroom interaction patterns, a shift in the teacher's role toward facilitation, and reduced speaking anxiety associated with individualized AI-generated feedback. These findings suggest that AI-supported learning environments may foster more responsive and interactive speaking instruction within classroom settings. Thus, the implementation of AI-integrated MALL contributed positively to classroom dynamics and students' speaking proficiency within the eight-week intervention period, without extending claims beyond the duration of the study.

Keywords: *Classroom Dynamics, Speaking Proficiency, AI-Integrated MALL*

INTRODUCTION

Mobile-Assisted Language Learning (MALL) has gained increasing attention in English as a Foreign Language (EFL) education due to its potential to extend learning opportunities beyond the physical classroom. The portability and accessibility of mobile devices allow learners to engage with language input and speaking practice more flexibly and autonomously. Large-scale reviews and meta-analyses indicate that MALL positively contributes to language learning outcomes, particularly in speaking-related skills, by enabling frequent practice and learner-centered engagement (Burston & Giannakou, 2022; Shaqila et al., 2024). These advantages position MALL as a viable response to the limited instructional time typically allocated for speaking practice in formal EFL settings.

The integration of artificial intelligence (AI) into MALL environments has further strengthened its pedagogical relevance. AI-powered features such as automatic speech recognition, pronunciation assessment, adaptive feedback, and conversational chatbots provide learners with immediate and personalized input during speaking activities. Empirical studies report that AI-enhanced mobile applications significantly improve learners' pronunciation accuracy, fluency, and overall speaking confidence (Sun, 2023; Mingyan et al., 2025; Alenezi & Alenezi, 2025). Recent findings also indicate that the use of AI-based voice interaction tools, such as ChatGPT Voice, positively influences learners' self-efficacy in speaking by fostering confidence and reducing hesitation during oral performance (Muhtadi et al., 2025). Such findings suggest that AI-integrated MALL can partially address the lack of authentic English exposure commonly experienced by EFL learners.

Ideally, AI-integrated MALL is expected to foster communicative competence by offering interactive and responsive speaking environments. However, speaking proficiency is a multifaceted construct involving real-time processing, intelligibility, linguistic accuracy, and pragmatic appropriateness. These components develop most effectively through sustained interaction and meaningful participation rather than through isolated technological practice. Therefore, the effectiveness of AI-integrated MALL depends not only on technological features but also on how they are embedded within classroom interaction.

In practice, many EFL classrooms continue to encounter persistent challenges in developing students' speaking skills. Research in the Indonesian context highlights issues such as limited opportunities for oral interaction, unequal participation, and high levels of speaking anxiety among learners (Tambunan et al., 2025; Haidir et al., 2025). As a result, a clear gap emerges between the ideal pedagogical potential of AI-integrated MALL and the realities of classroom-based speaking instruction. This discrepancy underscores the need to examine classroom processes rather than focusing solely on learning outcomes.

From an interactional perspective, classroom dynamics play a central role in shaping learning opportunities. Classroom Interactional Competence theory emphasizes that learning is co-constructed through teacher–student interaction, peer collaboration, turn-taking management, and interactional scaffolding. In addition, learner engagement and agency have been identified as key factors mediating successful language learning experiences in technology-enhanced environments (Zhang, 2022; Roe & Perkins, 2024). Recent empirical evidence further indicates that AI-empowered applications can enhance EFL learners’ cognitive, behavioral, and affective engagement, thereby sustaining participation and reducing disengagement in classroom contexts (Ma & Chen, 2024). These perspectives suggest that the introduction of AI-integrated MALL may significantly alter interactional patterns and participation structures in the classroom.

Although previous studies on MALL and AI-based language learning have consistently reported improvements in learners’ speaking performance, most of these studies primarily focus on individual learning outcomes and the effectiveness of technological features. As a result, existing research tends to conceptualize learning gains in isolation from the interactional contexts in which speaking activities actually occur. Consequently, limited scholarly attention has been given to how AI-integrated MALL reshapes classroom interaction, participation structures, and teacher roles within formal EFL settings (Mubarok et al., 2025). This tendency creates a theoretical and empirical gap between what is known about technological effectiveness and how such technologies function within real classroom interactional processes.

Therefore, this study addresses the identified research gap by examining speaking mastery through the lens of classroom dynamics in an AI-integrated MALL environment. Unlike prior research that treats AI primarily as a standalone learning tool or a supplementary technological feature, this study conceptualizes AI as an embedded instructional mediator that actively shapes interactional patterns, learner participation, and pedagogical decision-making in the classroom. By adopting an interaction-oriented analytical perspective, the study foregrounds classroom processes as central mechanisms through which speaking development is facilitated. In doing so, this study offers a novel contribution by integrating technological, interactional, and pedagogical dimensions to explain how sustained speaking development is jointly constructed in Indonesian EFL classrooms.

RESEARCH METHOD

This study adopted an explanatory sequential mixed-methods design to investigate the effects of AI-integrated Mobile-Assisted Language Learning (MALL) on students’ speaking mastery and to explore its influence on classroom dynamics from both teacher and student perspectives. The quantitative phase employed a pre-test–post-test design involving an experimental group and an active control group, which differed in the extent of AI integration during speaking activities. The study was conducted at SMA NU 1 Gresik, East Java, Indonesia, involving 96 eleventh-grade students enrolled in a speaking-focused English program selected through purposive total sampling, as all participants had access to mobile devices and prior exposure to AI-supported learning.

Both groups received the same instructional content, learning objectives, instructional duration, and assessment procedures to control for instructional variability. Quantitative data were collected using speaking performance tests administered before and after the intervention, requiring students to produce spontaneous oral responses to contextual prompts. Speaking performances were evaluated using an analytic rubric assessing fluency, accuracy, pronunciation, and vocabulary, adapted from established assessment frameworks. Two trained

raters independently scored all performances, and inter-rater reliability was established to ensure scoring consistency. Quantitative data were analyzed using descriptive statistics (mean and standard deviation) and inferential statistics. Paired-sample t-tests were conducted to examine within-group differences between pre- and post-test scores, while independent-sample t-tests were employed to compare post-test gains between the experimental and control groups. Statistical significance was determined at the 0.05 level using SPSS software.

The qualitative phase focused on capturing classroom dynamics and participants' perceptions of the AI-integrated MALL implementation. Data were obtained through semi-structured interviews with English teachers and selected students, as well as systematic classroom observations conducted throughout the intervention. Observations examined interactional features such as turn-taking, teacher mediation, peer collaboration, and student–AI interaction. All qualitative data were transcribed and analyzed thematically. The thematic analysis followed a systematic procedure consisting of data familiarization, initial coding, categorization of codes into potential themes, theme review and refinement, and final theme definition. Coding was conducted manually by the researchers, and credibility was strengthened through member checking and peer debriefing to ensure the trustworthiness of interpretations. The integration of quantitative and qualitative findings occurred at the interpretation stage to explain how changes in classroom interaction were associated with improvements in students' speaking mastery.

RESULT AND DISCUSSION

Result

To ensure the validity of the comparison between learning outcomes, an initial analysis was conducted to examine students' speaking proficiency prior to the implementation of the instructional intervention. This preliminary stage aimed to determine whether any substantial differences existed between the experimental and control groups at the outset of the study. Establishing baseline equivalence is essential so that subsequent changes in speaking performance can be more confidently attributed to the AI-integrated MALL intervention. The descriptive statistics of students' pre-test speaking scores for both groups are presented in Table 1.

Table 1. Descriptive and Inferential Statistics of Pre-Test Speaking Scores

Group	N	Mean	SD	t	p	Cohen's d
Experimental Group	68	9.66	2.24	0.34	0.734	0.07
Control Group	28	9.50	2.10	—	—	—

As summarized in Table 2, the experimental and control groups exhibited relatively comparable levels of speaking proficiency at the pre-test stage. The similarity in score distribution and central tendency suggests that no marked differences existed between the two groups before the intervention. This finding supports the assumption of baseline equivalence and indicates that both groups started from similar levels of speaking ability. Consequently, any differences observed in post-test performance can be reasonably interpreted as resulting from the differing levels of AI integration in the MALL-based instruction.

Following the completion of the instructional intervention, further analysis was conducted to examine students' speaking mastery in greater detail. This analysis focused on

four core speaking indicators fluency, accuracy, pronunciation, and vocabulary in order to capture a more nuanced picture of students' speaking development. An indicator-based approach allows for the identification of specific aspects of speaking that were most influenced by the instructional treatment. The mean post-test scores for each speaking indicator in both groups are presented in Table 2.

Table 2. Mean Post-Test Speaking Scores by Speaking Indicators

Speaking Indicator	Experimental Group	Control Group
Fluency	4.10	3.20
Accuracy	3.90	3.10
Pronunciation	4.00	2.60
Vocabulary	3.80	2.80

As shown in Table 3, the experimental group consistently outperformed the control group across all speaking indicators. The most notable gains were observed in pronunciation and vocabulary, which had previously been identified as the weakest components of students' speaking performance. Fluency and accuracy also demonstrated more stable development among students who participated in AI-integrated MALL activities. These results indicate that AI-integrated MALL not only enhances overall speaking proficiency but also effectively supports the improvement of specific linguistic components that are critical for oral communication.

To provide a clear visual representation of changes in students' speaking mastery, the quantitative results of the pre-test and post-test are presented in graphical form. This visual presentation is intended to facilitate comparison of improvement patterns between the experimental and control groups. In addition, the use of a graph helps illustrate the extent to which different levels of AI integration within MALL influenced students' speaking development. The comparison of mean speaking scores before and after the instructional intervention is displayed in Figure 1.

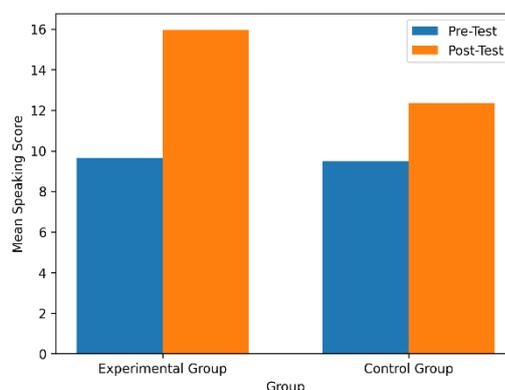


Figure 1. Comparison of Pre-Test and Post-Test Mean Speaking Scores between Experimental and Control Groups

As illustrated in Figure 1, the two groups demonstrated different trajectories of speaking development following the intervention. The experimental group showed a substantially greater increase in mean speaking scores than the control group, indicating the stronger impact of AI-integrated MALL on speaking mastery. Although the control group also experienced improvement, the magnitude of change was comparatively more limited. These visual patterns reinforce the statistical findings and suggest that higher levels of AI integration contribute more effectively to students' speaking development.

Discussion

The findings of this study demonstrate that improvements in students' speaking mastery (RQ1) are closely connected to changes in classroom interaction patterns during the implementation of AI-integrated Mobile-Assisted Language Learning (MALL) (RQ2). The marked increase in speaking performance observed in the experimental group reflects not only linguistic gains but also enhanced confidence and willingness to engage in oral communication. This pattern is consistent with prior research indicating that AI-supported mobile learning environments promote learner autonomy and reduce psychological barriers to speaking in EFL contexts (Putra et al., 2024; Mappewali et al., 2025). Similar gains in speaking proficiency facilitated by AI-powered applications have also been reported in higher education contexts, where adaptive feedback and interactive features contributed to measurable improvements in fluency and accuracy (Qassrawi et al., 2024). These results suggest that speaking development should be understood as a multidimensional process shaped by both technological affordances and evolving interactional practices within the classroom.

Pronunciation emerged as one of the most responsive components of speaking development, particularly given its initially weak baseline across both groups. This finding aligns with previous studies showing that AI-powered pronunciation tools provide learners with continuous access to accurate phonological models and immediate corrective feedback, which facilitates gradual improvement in intelligibility and articulatory control (Abdelhalim & Alsehibany, 2025). In the present study, pronunciation development occurred within meaningful communicative tasks rather than isolated mechanical drills, indicating that AI-supported feedback was effectively embedded in authentic speaking activities. Similar interactional processes have been documented in AI-mediated pronunciation learning, where learners iteratively compare their spoken output with AI-generated models and refine their production over time (Li et al., 2024; Fanania & Priyatmojo, 2025).

Vocabulary development was likewise enhanced through AI-supported speaking practice, as evidenced by richer lexical choices and improved contextual appropriacy in students' oral production. Repeated exposure to vocabulary items through personalized AI feedback and task-based speaking activities appeared to facilitate deeper lexical processing and retention. This finding supports earlier research demonstrating that mobile-assisted language learning environments foster vocabulary growth by enabling flexible, repeated, and contextualized language use (Rosalia & Thohir, 2024). Furthermore, affective support for self-regulation in MALL has been shown to increase learner engagement and lexical uptake, reinforcing the interconnectedness of cognitive and motivational factors in speaking development (Viberg et al., 2023). The present findings extend this line of research by illustrating how AI feedback simultaneously supports lexical and phonological development within spoken discourse.

Beyond linguistic outcomes, the qualitative findings highlight a notable shift in teachers' instructional roles following the integration of AI into classroom practice. Teachers

increasingly adopted facilitative roles that emphasized task orchestration, monitoring, and selective scaffolding rather than direct control of speaking activities. This pedagogical transformation is consistent with research in Indonesian EFL contexts, which suggests that technology integration often prompts teachers to renegotiate their roles while balancing curricular demands and technological readiness (Rahmiati et al., 2024). Students' expectations for guidance, emotional support, and interactive facilitation further underscore the importance of this role shift in creating supportive conditions for sustained speaking practice (JN et al., 2025).

Changes in participation patterns and turn-taking dynamics also help explain the differential gains between the experimental and control groups. Students in the AI-integrated MALL environment demonstrated more balanced participation and increased oral contributions, suggesting that AI-supported rehearsal reduced anxiety and lowered barriers to classroom interaction. This finding resonates with mixed-methods evidence showing that AI-powered conversational agents can significantly reduce speaking anxiety while simultaneously enhancing learners' willingness to communicate in L2 contexts (Ding & Yusof, 2025). In contrast, classrooms with limited AI integration exhibited less pronounced interactional change and more modest speaking gains, highlighting the importance of structured and purposeful AI use rather than incidental technological exposure.

Learner engagement, particularly affective engagement, emerged as a critical mediating factor in speaking development. Students perceived AI-generated feedback as neutral and non-judgmental, which contributed to reduced speaking anxiety and increased confidence. This observation aligns with research demonstrating that AI-driven learning environments can foster emotional safety and resilience by minimizing fear of negative evaluation (He et al., 2025). However, the findings also indicate that affective support alone is insufficient to sustain interactive classroom discourse. Teacher mediation remained essential in transitioning students from individual AI-assisted rehearsal to collaborative speaking activities that promote meaningful interaction and communicative competence.

Taken together, these findings carry important theoretical and pedagogical implications. From a theoretical perspective, the study extends interaction-oriented views of EFL learning by conceptualizing AI-integrated MALL as an instructional mediator that reshapes classroom interaction, learner participation, and teacher roles, rather than merely a technological enhancement targeting individual outcomes. This perspective contributes to the growing body of research that emphasizes the co-construction of learning through the dynamic interplay of technology, interaction, and pedagogy. Pedagogically, the findings suggest that the effectiveness of AI-integrated MALL depends on teachers' capacity to strategically embed AI tools within communicative tasks, balance learner autonomy with guided interaction, and foster emotionally supportive learning environments. Accordingly, AI-integrated MALL should be implemented not as a replacement for interactive language teaching, but as a complementary resource that amplifies opportunities for meaningful speaking practice in EFL classrooms.

CONCLUSION

This study concludes that the integration of AI-integrated Mobile-Assisted Language Learning (MALL) significantly reshapes speaking instruction in EFL classrooms by altering interactional structures, participation patterns, and instructional roles. AI-integrated MALL functions not merely as a technological supplement but as an interactional mediator that organizes learning opportunities through stages of private rehearsal, guided practice, and collaborative speaking. This reconfiguration allows learners to engage in speaking tasks with

greater readiness, reduced anxiety, and increased participation. As a result, speaking instruction shifts from performance-centered activities toward developmental and interaction-driven learning processes that support sustained oral language development.

From a theoretical standpoint, this study contributes to interaction-oriented perspectives in EFL pedagogy by positioning AI as an embedded component of classroom interaction rather than an external instructional aid. The findings demonstrate that improvements in speaking development are closely associated with changes in interactional dynamics, including learner agency, turn-taking distribution, and the redistribution of instructional control between teachers, learners, and AI tools. By integrating insights from MALL research and classroom interaction analysis, this study bridges the gap between technology-effectiveness studies and pedagogical process-oriented research. Consequently, it offers a more holistic understanding of how AI-supported environments shape communicative competence in EFL speaking instruction.

Pedagogically, the findings highlight that AI-integrated MALL can enhance learners' confidence and engagement by creating emotionally supportive and low-risk speaking environments. At the same time, teachers' roles evolve toward facilitating interaction, scaffolding communicative tasks, and managing the integration of AI-assisted and collaborative learning activities. These results indicate that effective AI implementation depends on intentional instructional design and sustained teacher mediation rather than on technology use alone. Future research is encouraged to examine AI-integrated MALL across diverse learning contexts, proficiency levels, and longer instructional periods to assess the durability and transferability of interactional and pedagogical outcomes.

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