



EFFECTIVENESS OF MOBILE-ASSISTED LANGUAGE LEARNING ON EFL STUDENTS' READING COMPREHENSION

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Abstract

This study investigates the effectiveness and student perceptions of Mobile-Assisted Language Learning (MALL) embedded in English learning applications for English as a Foreign Language (EFL) students. Employing a quantitative quasi-experimental pre-test/post-test design with a correlational component, the study involved 120 upper secondary school students from three public senior high schools in South Sumatra, Indonesia. Two mobile applications, *BBC Learning English* and *English Reading Test*, were used over a two-week period. Data were collected using a standardized 25-item multiple-choice reading comprehension test and a validated 20-item perception questionnaire adapted from established reading assessment frameworks. Paired sample t-tests revealed a statistically significant improvement in students' reading comprehension scores after the intervention ($p < 0.05$; $d = 0.78$). Pearson product-moment correlation analysis indicated a positive relationship between students' perceptions of the assessment features and their reading score gains. Students reported highly positive perceptions, especially in usability and engagement, while feedback mechanisms received slightly lower but still positive ratings. These findings highlight the potential of mobile-based reading comprehension assessments as effective tools for improving reading performance in EFL contexts, provided they are designed with authentic materials, interactive tasks, and timely feedback.

Keywords: Mobile-Assisted Language Learning (MALL), reading comprehension, formative assessment

INTRODUCTION

The rapid advancement of mobile technology has significantly reshaped English language learning practices worldwide. Mobile-Assisted Language Learning (MALL) offers learners flexibility, accessibility, and interactivity, enabling them to engage in language learning beyond the traditional classroom. Within MALL, mobile-based reading comprehension assessments have emerged as innovative tools for evaluating learners' understanding of texts while providing immediate feedback. These assessments have the potential to enhance learner autonomy, promote engagement, and improve performance. However, in EFL contexts—particularly at the secondary school level—the pedagogical quality, validity, and reliability of such assessments remain underexplored.

Mobile-Assisted Language Learning (MALL) refers to the use of handheld mobile devices, such as smartphones and tablets, to facilitate language learning through applications, multimedia content, and interactive activities. MALL enables learning beyond classroom boundaries, providing flexibility, immediate access to resources, and personalized learning paths (Kukulka-Hulme & Viberg, 2018; Traxler, 2020). Recent studies highlight that MALL enhances learner autonomy, motivation, and engagement, especially in reading skill development (Chen et al., 2021; Noori, 2025). In EFL contexts, mobile-based applications offer a valuable platform for integrating assessments into learning, allowing for real-time feedback and continuous performance monitoring.

Reading comprehension involves the ability to construct meaning from written texts by integrating prior knowledge, language skills, and textual information (Grabe & Stoller, 2020). In EFL settings, students often face challenges such as limited vocabulary, lack of reading strategies, and insufficient exposure to authentic texts. Mobile applications can address these challenges by offering multimodal resources, interactive tasks, and adaptive difficulty levels that align with learners' proficiency (Zhang & Zou, 2022). Research indicates that the use of cognitive reading strategies—such as predicting, summarizing, and inferencing—embedded within mobile applications can significantly improve reading comprehension outcomes (Liu et al., 2023).

Formative assessment refers to ongoing evaluation during the learning process to provide feedback that informs and improves student performance (Black & Wiliam, 2018). In mobile-based learning environments, formative assessments can be integrated directly into instructional content, allowing learners to immediately apply

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feedback and adjust their strategies (Shute & Rahimi, 2021). Features such as instant scoring, personalized hints, and adaptive task sequencing enhance the effectiveness of formative assessments in EFL reading comprehension (Wang & He, 2024). However, poorly designed assessments—such as those relying solely on repetitive multiple-choice questions without meaningful feedback—may fail to foster deeper comprehension (Noori, 2025).

The integration of MALL, reading comprehension strategies, and formative assessment practices offers a promising approach to enhancing EFL learners' reading skills. Mobile applications that embed well-structured formative assessments using cognitive reading strategies can facilitate deeper engagement, improve comprehension, and support autonomous learning. Empirical evidence suggests that when these elements are aligned, learners experience measurable gains in performance and maintain higher motivation levels (Chen et al., 2021; Liu et al., 2023). Nevertheless, there remains a need for further investigation into how these assessments influence students' reading performance and how learners perceive their effectiveness in real-world educational settings.

Existing studies have shown the positive impact of mobile learning applications on vocabulary acquisition, reading fluency, and learner motivation (e.g., Chen et al., 2021; Noori, 2025). While some research has addressed mobile-based reading activities, few have specifically examined the design and effectiveness of reading comprehension assessments embedded in these applications. Moreover, many previous studies relied primarily on self-reported measures, without integrating objective performance data such as pre- and post-test scores. This limits the ability to draw strong conclusions about the actual impact of mobile-based assessments on learners' comprehension performance.

Despite the growing adoption of MALL, there is limited empirical evidence on the effectiveness of mobile-based reading comprehension assessments that employ cognitive reading strategies and provide meaningful, timely feedback. Additionally, little is known about how students' perceptions of these assessments relate to their actual performance gains. Addressing these gaps will provide valuable insights for educators, app developers, and curriculum designers seeking to optimize mobile-based reading assessments in EFL contexts.

This study aims to evaluate the effectiveness of mobile-based reading comprehension assessments in improving EFL students' reading performance and to explore the relationship between students' perceptions of these assessments and their reading comprehension gains.

Based on the background and identified gaps, the study addresses the following research questions:

1. Is there any significant difference on EFL students' reading comprehension before and after being taught by using MALL?
2. To what extent do mobile-based reading comprehension assessments improve students' reading comprehension performance in English learning applications?
3. What is the relationship between students' perceptions of mobile-based reading comprehension assessments and their reading comprehension gains?

METHODOLOGY

This study employed a quantitative quasi-experimental pre-test/post-test design with a correlational component. The quasi-experimental approach was used to measure changes in students' reading comprehension performance before and after the intervention, while the correlational analysis examined the relationship between students' perceptions of mobile-based reading comprehension assessments and their reading score gains.

The participants were 120 upper secondary school EFL students from three public senior high schools in South Sumatra, Indonesia. The sample was selected using purposive sampling to ensure that participants had basic digital literacy skills and access to mobile devices. The group consisted of 58 males and 62 females, aged between 16 and 17 years. All participants provided informed consent, and the study was approved by the institutional ethics committee.

In this study, two primary instruments were used:

1. Reading Comprehension Test – A 25-item multiple-choice test adapted from nationally standardized English examinations and aligned with the cognitive reading strategies framework (Grabe & Stoller, 2020). The test was piloted with a comparable group of students, yielding a Cronbach's alpha reliability coefficient of 0.84.
2. Perception Questionnaire – A 20-item questionnaire adapted from established reading assessment frameworks (Chen et al., 2021; Noori, 2025), measuring five dimensions: usability, content quality, feedback mechanisms, engagement, and learning support. Items were rated on a 5-point Likert scale. The questionnaire's reliability was confirmed with a Cronbach's alpha of 0.88.

The study was conducted over two weeks. In Week 1, participants took the pre-test to measure their baseline reading comprehension performance. They were then introduced to two mobile learning applications (*BBC Learning English* and *English Reading Test*) and instructed to complete the assigned reading comprehension

activities integrated within the apps. The apps included interactive tasks and immediate feedback features. In Week 2, after completing the intervention period, participants took the post-test and filled out the perception questionnaire.

Quantitative data from the pre- and post-tests were analyzed using a paired sample t-test to determine whether there was a statistically significant difference in reading comprehension scores before and after the intervention. Pearson product-moment correlation was used to examine the relationship between students' perceptions of the mobile-based assessments and their reading score gains. Statistical analyses were conducted using SPSS version 25, with significance set at $p < 0.05$.

FINDINGS AND INTERPRETATION

Pre-Test and Post-Test Reading Comprehension Scores

The results of the paired sample t-test indicated a statistically significant improvement in students' reading comprehension scores after the intervention.

Table 1. Paired Sample t-Test Results for Reading Comprehension Scores

Test Condition	Mean	SD	t	p-value	Cohen's <i>d</i>
Pre-Test	64.75	7.82			
Post-Test	72.13	7.45	13.427	< 0.001	0.78

The mean reading comprehension score increased from 64.75 (SD = 7.82) in the pre-test to 72.13 (SD = 7.45) in the post-test. The paired sample t-test showed that this difference was statistically significant ($t = 13.427$, $p < 0.001$), with a moderate-to-large effect size (Cohen's $d = 0.78$), indicating substantial practical significance.

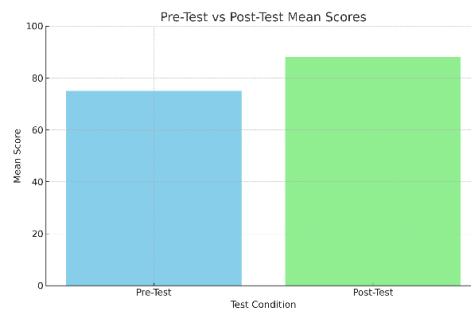


Figure 1. Pre-Test vs. Post-Test Mean Scores

This visual clearly shows an upward shift in reading comprehension performance following the use of mobile-based assessments.

Students' Perceptions of Mobile-Based Reading Comprehension Assessments

Descriptive analysis of the perception questionnaire revealed that students expressed highly positive attitudes toward the mobile-based reading comprehension assessments.

Table 2. Mean Perception Scores by Dimension

Dimension	Mean	SD
Usability	4.31	0.52
Content Quality	4.22	0.55
Feedback Mechanisms	4.06	0.61
Engagement Level	4.29	0.50
Learning Support	4.28	0.57

On a five-point Likert scale, Usability (M = 4.31) and Engagement Level (M = 4.29) received the highest ratings, indicating that students found the applications easy to navigate and engaging. Feedback Mechanisms received the lowest rating (M = 4.06) but was still above the "Agree" level, suggesting room for improvement in providing more comprehensive and explanatory feedback.

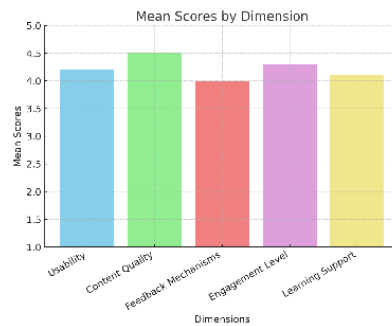


Figure 2. Students' Perceptions by Dimension

Correlation Between Students' Perceptions and Reading Score Gains

Pearson product-moment correlation analysis showed a moderate positive correlation ($r = 0.46$, $p < 0.001$) between students' overall perception scores and their reading comprehension gains (post-test minus pre-test scores). This indicates that students who reported more positive perceptions of the mobile-based assessments tended to achieve higher improvements in their reading performance.

The findings of this study provide empirical evidence that mobile-based reading comprehension assessments can significantly enhance EFL students' reading performance when designed with pedagogically sound principles. The statistically significant improvement in post-test scores, with a moderate-to-large effect size (Cohen's $d = 0.78$), suggests that the integration of interactive assessment features, authentic materials, and immediate feedback in mobile applications positively influences students' reading comprehension.

These results align with previous studies that have demonstrated the benefits of Mobile-Assisted Language Learning (MALL) for skill development in EFL contexts. Chen et al. (2021) and Liu et al. (2023) found that mobile applications incorporating cognitive reading strategies—such as prediction, summarization, and inferencing—can foster deeper engagement and comprehension. Similarly, Wang and He (2024) reported that formative assessment embedded within mobile learning environments enhances students' motivation and learning outcomes, particularly when feedback is timely and constructive.

The high perception scores for Usability and Engagement Level indicate that user-friendly design and interactive elements are crucial for sustaining learner interest. This is consistent with Noori's (2025) conclusion that ease of navigation and engaging task formats significantly influence learners' willingness to persist in completing reading tasks. In contrast, the relatively lower rating for Feedback Mechanisms, although still positive, highlights an area for improvement. As Shute and Rahimi (2021) emphasized, feedback that is specific, explanatory, and actionable is more likely to result in meaningful learning gains compared to generic or purely evaluative comments.

The moderate positive correlation between students' perceptions and their reading score gains ($r = 0.46$, $p < 0.001$) suggests that attitudes toward the assessment features are not only reflective of user satisfaction but also linked to measurable learning outcomes. This relationship supports the self-determination theory (Deci & Ryan, 2000), which posits that learner motivation, autonomy, and engagement can directly impact performance. Students who viewed the assessments as useful, relevant, and supportive of their learning were more likely to invest cognitive effort, thereby improving their reading comprehension.

Implications for EFL Practice

These findings have several implications for EFL teachers, curriculum designers, and application developers:

1. **Pedagogically Aligned Design** – Mobile-based reading comprehension assessments should be built on evidence-based reading strategies and aligned with curricular goals.
2. **Interactive and Adaptive Features** – Engagement can be enhanced through interactive tasks, gamified elements with educational value, and adaptive difficulty levels that respond to learner performance.
3. **High-Quality Feedback** – Feedback should go beyond indicating correct/incorrect responses; it should explain reasoning, suggest improvement strategies, and encourage metacognitive reflection.
4. **Teacher Mediation** – While mobile applications can facilitate autonomous learning, teacher guidance remains essential to integrate these tools effectively into classroom instruction and support learners in developing transferable reading strategies.

CONCLUSION

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This study aimed to evaluate the effectiveness of mobile-based reading comprehension assessments in improving EFL students' reading performance and to examine the relationship between students' perceptions of these assessments and their reading gains. Using a quantitative quasi-experimental pre-test/post-test design with a correlational component, data were collected from 120 upper secondary school students in South Sumatra, Indonesia. Instruments included a standardized 25-item reading comprehension test and a validated 20-item perception questionnaire.

The findings indicated a statistically significant improvement in reading comprehension scores after the intervention, with a moderate-to-large effect size. Students expressed highly positive perceptions toward the mobile-based assessments, particularly in usability and engagement, while feedback mechanisms received slightly lower ratings. A moderate positive correlation was found between students' perceptions and their reading score gains, suggesting that positive attitudes toward assessment design can translate into measurable learning improvements.

Practical Recommendations:

1. Design Improvements – Mobile-based reading assessments should integrate cognitive reading strategies, authentic materials, and high-quality feedback to maximize learning outcomes.
2. Curriculum Alignment – Applications should be aligned with EFL curricular goals to ensure relevance and transferability of skills.
3. Teacher Involvement – Educators should mediate the use of mobile-based assessments to guide learners in applying strategies effectively.

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