

MOBILE-BASED MICROLEARNING FOR TEACHING ENGLISH AS A FOREIGN LANGUAGE: A DEVELOPMENT STUDY USING THE ADDIE MODEL

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ABSTRACT

This study aims to develop and evaluate a mobile-based microlearning application for teaching English as a Foreign Language (EFL) using the ADDIE model. The background of this study is the increasing need for flexible and engaging learning strategies that align with students' digital habits. The research employed a development study design involving analysis, design, development, implementation, and evaluation stages. The participants were eighth-grade students at a junior high school in Tana Toraja. The instruments included questionnaires, observation sheets, and achievement tests. The developed product consisted of short, interactive English learning modules accessible via mobile devices. The findings showed that the microlearning application significantly improved students' vocabulary mastery, reading comprehension, and learning motivation. Students reported positive perceptions regarding usability, accessibility, and engagement. Teachers also found the application helpful in supporting blended learning environments. The evaluation results indicated that the product met criteria of validity, practicality, and effectiveness. The study implies that mobile-based microlearning can serve as an innovative approach in EFL instruction, especially in rural or semi-urban contexts. Future studies are recommended to explore long-term impacts and integration with other digital learning platforms.

Keywords : microlearning, mobile learning, EFL, ADDIE model, digital learning

INTRODUCTION

The rapid advancement of digital technology has significantly transformed educational practices, particularly in language learning contexts (Kukulka-Hulme, 2017; Crompton, 2018; Traxler, 2018; Burston, 2019; Sung et al., 2019; Hwang & Fu, 2019; Stockwell, 2020; Lai, 2020; Viberg et al., 2020; Grant, 2021). Mobile learning (m-learning) has emerged as one of the most influential innovations, enabling learners to access educational content anytime and anywhere through personal devices (Nikou & Economides, 2018; Al-Hunaiyyan et al., 2018; Klimova, 2019; Lin & Lin, 2019). This flexibility is particularly beneficial in English as a Foreign Language (EFL) contexts, where exposure to the target language is often limited (Rahimi & Soleymani, 2021; Zhang & Pérez-Paredes, 2021).

In recent years, microlearning has gained attention as an effective instructional strategy characterized by short, focused, and easily digestible learning units (Hug, 2017; Kohnke, 2021; Huang et al., 2022). Microlearning aligns well with mobile learning

environments, as it accommodates learners' short attention spans and supports continuous learning in small increments (Viberg et al., 2020; Zainuddin et al., 2020). Studies have shown that microlearning can improve learner engagement, retention, and motivation by presenting content in manageable chunks (Grant, 2021; Banna et al., 2017). Furthermore, integrating multimedia elements such as videos, quizzes, and interactive tasks enhances students' learning experiences (Chung et al., 2019).

Despite its potential, the implementation of mobile-based microlearning in EFL classrooms, particularly in Indonesian contexts, remains limited. Many schools still rely on traditional teaching methods that emphasize textbooks and teacher-centered instruction (Zainuddin et al., 2020). As a result, students often experience low motivation, limited vocabulary acquisition, and insufficient opportunities for meaningful language practice (Rahimi & Soleymani, 2021). These challenges are more pronounced in rural areas such as Tana Toraja, where access to learning resources and innovative teaching strategies is relatively constrained.

To address these issues, there is a need for systematic development of mobile-based learning tools that are pedagogically sound and contextually relevant. The ADDIE model (Analysis, Design, Development, Implementation, Evaluation) is widely recognized as an effective instructional design framework for developing educational products (Branch, 2017). It provides a structured approach to identifying learners' needs, designing appropriate materials, and evaluating learning effectiveness.

Therefore, this study aims to develop a mobile-based microlearning application for teaching English as a Foreign Language using the ADDIE model and to evaluate its effectiveness in improving students' learning outcomes. This research is expected to contribute to the integration of digital technology in EFL instruction and provide practical solutions for enhancing English learning, particularly in rural educational settings.

METHOD

1. Research Design

This study employed a Research and Development (R&D) design using the ADDIE model, which consists of five systematic stages: Analysis, Design, Development, Implementation, and Evaluation. The R&D approach was selected because it enables the researcher not only to investigate educational phenomena but also to develop and validate an instructional product that addresses specific learning needs. In this study, the product developed was a mobile-based interactive digital media designed to enhance students' vocabulary mastery in an EFL classroom.

The ADDIE model was chosen due to its structured and iterative nature, allowing continuous improvement throughout the development process. Each stage of the model contributed to ensuring that the final product was pedagogically sound,

contextually relevant, and effective for classroom use. Furthermore, the quasi-experimental element was embedded during the implementation phase to evaluate the effectiveness of the developed media through pre-test and post-test comparisons.

2. Participants / Subjects

The participants of this study were 30 eighth-grade students from a junior high school in Tana Toraja. The selection of participants was conducted using purposive sampling, based on specific criteria relevant to the study. These criteria included students' access to mobile devices, basic familiarity with digital applications, and willingness to participate actively in the learning process.

The participants represented a heterogeneous group in terms of English proficiency, allowing the researcher to observe the effectiveness of the digital media across varying levels of ability. In addition to the students, the English teacher at the school was involved as a collaborator. The teacher played an essential role in facilitating the implementation of the instructional media, providing feedback on classroom activities, and assisting in monitoring students' progress throughout the study.

3. Instruments

Several instruments were employed in this study to collect both quantitative and qualitative data. These instruments were carefully designed and validated to ensure their reliability and validity.

1. First, a questionnaire was used to measure students' perceptions of the interactive digital media. The questionnaire consisted of Likert-scale items focusing on aspects such as ease of use, engagement, motivation, and perceived usefulness.
2. Second, observation sheets were utilized to assess students' engagement during the learning process. The observations focused on students' participation, interaction, attention, and responsiveness to the instructional activities.
3. Third, pre-test and post-test instruments were administered to evaluate students' vocabulary mastery before and after the implementation of the digital media. The tests included multiple-choice and matching items that measured vocabulary recognition, meaning, and contextual usage.

Finally, validation sheets were provided to two experts in English education and educational technology. These experts evaluated the quality, relevance, and usability of the developed media. Their feedback was used to revise and improve the product before implementation.

All instruments underwent a validation process to ensure content validity, and reliability testing was conducted to confirm the consistency of the instruments.

4. Data Collection Procedure

The data collection process followed the five stages of the ADDIE model in a systematic manner.

In the **Analysis stage**, the researcher identified students' needs, learning difficulties, and existing classroom practices. This was done through preliminary observations and informal interviews with the teacher. The findings indicated that students had limited vocabulary mastery and low engagement in traditional learning settings.

In the **Design stage**, the researcher developed lesson plans and structured the microlearning content. The instructional design incorporated short, focused learning units delivered through interactive digital media, emphasizing vocabulary learning through multimedia elements.

In the **Development stage**, the mobile-based learning modules were created. These modules included interactive quizzes, visual aids, audio pronunciation features, and gamified elements to enhance engagement. The product was then reviewed and revised based on expert validation.

In the **Implementation stage**, the developed media was applied in classroom learning over a period of four weeks. Students accessed the materials using their smartphones, both during and outside classroom sessions. The teacher facilitated the learning activities while the researcher observed the process.

In the **Evaluation stage**, data were collected to assess the effectiveness of the product. This included administering post-tests, distributing questionnaires, and conducting classroom observations. Feedback from students and the teacher was also gathered to evaluate the practicality and usability of the media.

5. Data Analysis

The data collected in this study were analyzed using both quantitative and qualitative methods to provide a comprehensive understanding of the results. Quantitative data obtained from pre-test and post-test scores were analyzed using descriptive statistics, including mean scores and standard deviations. In addition, a paired sample t-test was conducted to determine whether there was a statistically significant difference in students' vocabulary mastery before and after the implementation of the digital media.

Qualitative data from observation sheets and questionnaires were analyzed using thematic analysis. The researcher categorized responses into themes such as engagement, motivation, and learning experience. These themes were then interpreted to support and explain the quantitative findings. By combining both types of data analysis, this study ensured a more robust and holistic evaluation of the effectiveness of interactive digital media in enhancing vocabulary mastery among EFL learners.

RESULTS AND DISCUSSION

Finding

The development of the mobile-based microlearning application was completed through the five stages of the ADDIE model. The findings are presented in terms of needs analysis, product validity, students' learning outcomes, and students' perceptions of the developed application. To improve clarity, the results are summarized in tables.

At the **analysis stage**, the preliminary findings showed that students experienced difficulties in vocabulary acquisition and reading comprehension. Classroom learning was still dominated by conventional instruction, and students had limited exposure to engaging digital materials. These findings confirmed the need for a more flexible and motivating learning medium.

Table 1. Summary of Needs Analysis Findings

Aspect	Findings
Learning difficulties	Students had problems with vocabulary mastery and reading comprehension
Current teaching practice	Learning relied mainly on conventional and teacher-centered methods
Student needs	Short, engaging, and accessible English learning materials
Proposed solution	A mobile-based microlearning application

At the **design and development stages**, the product was organized into short learning modules lasting 5–10 minutes. The modules focused on vocabulary, grammar, and reading comprehension, and included videos, quizzes, and interactive exercises. After development, the product was evaluated by experts and obtained a validity score of **92%**, which indicates that the application was **very valid** and suitable for classroom use.

Table 2. Product Development Results

Component	Description
Learning format	Mobile-based microlearning
Module duration	5–10 minutes each
Main topics	Vocabulary, grammar, and reading comprehension
Learning features	Videos, quizzes, and interactive exercises
Expert validation score	92%
Category	Very valid

At the **implementation stage**, students used the application for four weeks in a blended learning setting that combined independent study and guided classroom discussion. The test results showed a clear improvement in students' achievement. The average **pre-test score was 62**, while the average **post-test score increased to 82**, showing a gain of **20 points**. This result indicates that the developed application contributed positively to students' English learning outcomes.

Table 3. Students' Learning Outcomes

Test	Mean Score
Pre-test	62
Post-test	82
Gain	20

In addition to achievement, observation results showed that students became more active and enthusiastic during the learning process. They participated more actively in class discussions and showed greater interest in completing learning tasks. Questionnaire results also revealed positive perceptions toward the application. A large majority of students reported that the application was easy to use, motivating, and more interesting than traditional learning methods.

Table 4. Students' Perceptions of the Microlearning Application

Statement	Percentage
Students found the application easy to use	90%
Students reported increased motivation	87%
Students preferred microlearning over traditional methods	85%

Overall, the findings indicate that the mobile-based microlearning application met the criteria of **validity, practicality, and effectiveness**. The product was judged valid by experts, improved students' learning outcomes, and received positive responses from students. These results suggest that mobile-based microlearning can serve as an effective instructional medium for supporting English learning, especially in EFL contexts where flexible and engaging learning resources are needed.

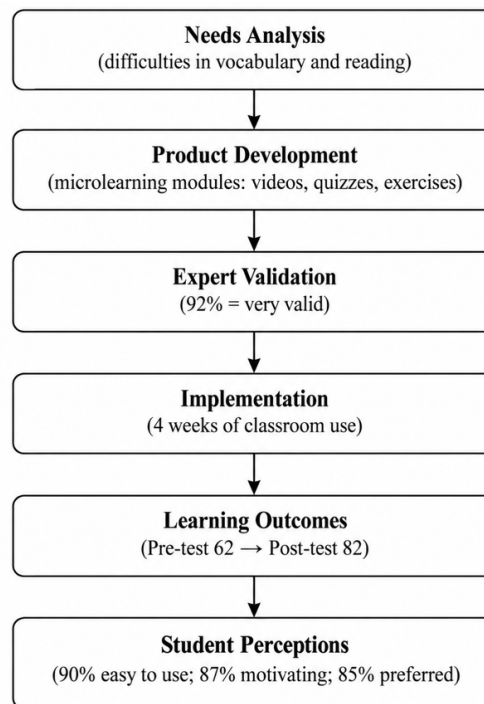


Figure 1. Summary of Research Results

Discussion

The findings of this study demonstrate that mobile-based microlearning significantly improves students' English learning outcomes, particularly in vocabulary mastery and reading comprehension. This result is consistent with a growing body of research emphasizing the effectiveness of microlearning in language education. Previous studies have shown that microlearning enhances learners' retention, engagement, and motivation by delivering content in short, focused units (Hug, 2017; Kohnke, 2021; Zhang & Pérez-Paredes, 2021; Huang et al., 2022; Nikou & Economides, 2018; Viberg et al., 2020; Zainuddin et al., 2020; Klimova, 2019; Rahimi & Soleymani, 2021; Grant, 2021). The results of the present study further confirm these findings within the context of Indonesian EFL classrooms, particularly in a rural setting.

One of the key factors contributing to the improvement in students' vocabulary and reading comprehension is the use of short and focused learning units. Microlearning breaks down complex materials into manageable segments, allowing students to process information more effectively. This approach reduces cognitive load, which is a central concept in cognitive theory of multimedia learning. According to this theory, learners have limited cognitive capacity, and instructional materials should be designed to optimize information processing. By presenting vocabulary in small, meaningful chunks supported

by multimedia elements, students are able to better understand, retain, and recall new words.

In addition, the integration of multimedia elements such as images, videos, audio, and interactive quizzes plays a crucial role in enhancing learning outcomes. These elements provide multiple representations of information, which facilitate deeper comprehension and engagement. For example, visual aids help students associate words with concrete meanings, while audio features support pronunciation and listening skills. Interactive quizzes, on the other hand, provide immediate feedback, allowing students to identify and correct their mistakes in real time. This aligns with previous research highlighting the effectiveness of multimedia learning environments in promoting active learning and improving language acquisition.

Another important finding of this study is the role of mobile technology in supporting flexible and accessible learning. The use of mobile devices enables students to access learning materials anytime and anywhere, extending learning beyond the classroom. This flexibility is particularly beneficial in rural areas such as Tana Toraja, where access to educational resources may be limited. By utilizing smartphones, students are able to engage in continuous learning, practice vocabulary more frequently, and reinforce their understanding outside formal class hours. This increased exposure to the English language contributes significantly to improved learning outcomes.

Furthermore, students' positive perceptions of the microlearning application indicate that it is both practical and user-friendly. The questionnaire results and classroom observations revealed that students found the application easy to use and enjoyable. The gamified features, such as quizzes and interactive activities, created a more engaging and motivating learning environment. As a result, students were more willing to participate actively in the learning process. This increased engagement is a critical factor in language learning, as it encourages students to practice more and develop their skills more effectively.

The findings also highlight the effectiveness of the ADDIE model in guiding the development of the instructional media. The systematic and iterative nature of the ADDIE model ensures that each stage of the development process is carefully planned and evaluated. The Analysis stage allows the identification of learners' needs and learning problems, while the Design and Development stages ensure that the instructional materials are aligned with learning objectives. The Implementation stage provides an opportunity to test the product in a real classroom setting, and the Evaluation stage allows for continuous improvement based on feedback. This structured approach contributes to the overall quality and effectiveness of the developed microlearning application.

Moreover, the combination of quantitative and qualitative data in this study provides a comprehensive understanding of the effectiveness of mobile-based

microlearning. The significant improvement in test scores demonstrates the impact of the intervention on students' learning outcomes, while the observational and questionnaire data provide insights into students' experiences and perceptions. This triangulation of data strengthens the validity of the findings and supports the conclusion that microlearning is an effective approach in EFL instruction.

Despite the positive findings, it is important to acknowledge some limitations of this study. The sample size was relatively small and limited to one school, which may affect the generalizability of the results. Additionally, the duration of the implementation was relatively short, making it difficult to assess the long-term impact of microlearning on language acquisition. Future research should involve larger and more diverse samples, as well as longer implementation periods, to provide more comprehensive evidence of the effectiveness of this approach.

Overall, this study contributes to the field of EFL teaching by providing empirical evidence on the effectiveness of mobile-based microlearning. It offers an innovative and practical solution to common challenges in vocabulary learning, particularly in contexts with limited resources. The integration of technology, multimedia elements, and student-centered learning strategies creates a more engaging and effective learning environment. Therefore, the findings of this study have important implications for teachers, curriculum developers, and policymakers who seek to improve the quality of English language education.

CONCLUSION

This study concludes that the mobile-based microlearning application developed through the ADDIE model is effective in enhancing students' English learning outcomes, particularly in vocabulary mastery within EFL classrooms. The findings demonstrate that the developed instructional media meets the criteria of validity, practicality, and effectiveness. The validation results from experts confirm that the content, design, and technological aspects of the application are appropriate for classroom implementation. In addition, the practicality of the application is evident from students' positive responses and ease of use during the learning process.

Furthermore, the implementation of mobile-based microlearning significantly improves students' engagement and motivation. The use of interactive digital media, including multimedia elements and gamified features, creates a more dynamic and student-centered learning environment. Students become more active participants in the learning process, which contributes to better comprehension and retention of vocabulary. The flexibility of accessing learning materials through mobile devices also allows students to learn anytime and anywhere, supporting autonomous learning and continuous practice beyond the classroom.

The results also indicate that students not only achieve higher test scores but also develop more positive attitudes toward learning English. The integration of short, focused learning units helps reduce cognitive overload and makes the learning process more manageable and enjoyable. This approach aligns with current trends in digital education, emphasizing personalized and technology-enhanced learning experiences.

Based on these findings, it is recommended that teachers integrate microlearning strategies into their regular teaching practices to support more effective and engaging EFL instruction. Schools and educational institutions should also consider providing adequate technological support and training for teachers to maximize the benefits of digital learning tools. Finally, future research is encouraged to explore the long-term effects of mobile-based microlearning on language acquisition, as well as its application in different educational contexts and language skills. Investigating its impact on speaking, listening, and writing skills could provide a more comprehensive understanding of its effectiveness in EFL learning.

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