International Journal of Computer and Information System (IJCIS)
Peer Reviewed – International Journal
Vol : Vol. 06, Issue 04, December 2025
e-ISSN : 2745-9659
https://ijcis.net/index.php/ijcis/index

Game Application as A Tool for Enhancing English Learning: A Development Study

1st Nursyah Handayani, 2nd Lahmudin Sipahutar
[1] Faculty of Social Science and Education [2]Faculty of Engineering and Computer Science
[1,2]Universitas Potensi Utama Medan, Indonesia
[1]nursyahhandayani972@gmail.com[2]mudinsipa@gmail.com,

Abstract *- The rapid advancement of digital technology has encouraged educators to explore innovative tools that enhance language learning outcomes. This study reports the development of a mobile-based English learning game application designed to improve vocabulary acquisition, reading comprehension, and learner motivation. Using a design-based research framework, the application was developed through three stages: needs analysis, prototype development, and expert evaluation. English language learning media in Indonesia are experiencing significant growth, particularly as English instruction is being introduced at an increasingly early age, including for children as young as four. In response to this development, an Android-based English learning game was developed to serve as an effective learning medium for students. In current educational practices, learning activities still largely depend on conventional face-to-face methods, which often result in students having difficulty mastering English vocabulary and showing low motivation to learn the language. The proposed Android-based educational game is designed with an engaging and interactive interface, allowing it to be used efficiently and effectively as a modern learning tool in both educational settings and everyday life.*

Keywords: Game, English Teacher, Android, Interactive

I. INTRODUCTION

The rapid development of digital technology has fundamentally transformed the landscape of English language education. According to Gee (2007), digital environments create meaningful learning experiences because they provide problem-based, interactive, and immersive contexts in which learners actively construct knowledge. This shift reflects broader 21st-century educational demands, where digital literacy, critical thinking, and learner autonomy are essential competencies for students growing up in technology-rich societies.

English, as emphasized by Nation (2013), plays a central role in academic advancement, global communication, and participation in international communities. However, despite its importance, many English as a Foreign Language (EFL) learners continue to struggle with core skills such as vocabulary retention, reading comprehension, and sustained engagement. Krashen (1982) explains that these challenges often stem from limited comprehensible input and environments that lack authentic, meaningful language use. Similarly, Prensky (2001) argues that traditional classroom methods are increasingly mismatched with the learning preferences of "digital native" students who are accustomed to interactive digital experiences.

Game-based learning (GBL) has emerged as a promising response to these challenges. According to Kapp (2012), game-based elements—such as challenges, rewards, feedback, and story-driven tasks—promote intrinsic motivation and support higher levels of learner engagement. This aligns with Csikszentmihalyi's (1990) concept of flow, which suggests that well-designed games maintain learners' attention by balancing difficulty and skill level. Moreover, researchers such as Shute and Ventura (2013) highlight that games provide low-stress learning environments where students can experiment, make mistakes, and receive immediate feedback—conditions that are highly conducive to language acquisition.

In the domain of EFL specifically, digital games have shown measurable benefits. Hung et al. (2018) found that vocabulary acquisition is significantly enhanced when learners engage with repeated, meaningful input through interactive activities. Likewise, Romero, Usart, and Ott (2015) report that game-based tasks encourage active participation and reduce anxiety—two key factors influencing language performance. These findings reinforce the idea that games can serve not only as recreational tools but as pedagogically meaningful systems capable of supporting structured language development.

Despite these advantages, the integration of game-based tools in EFL classrooms remains limited. According to Kim (2015), many educational institutions struggle to adopt digital game applications due to insufficient technological infrastructure, teacher training gaps, and the lack of curriculum-aligned

applications designed specifically for language learning. Teachers often report that commercial games provide entertainment but do not correspond with learning outcomes or assessment standards. This creates a practical gap between emerging digital learning theories and real classroom implementation.

Mobile-assisted language learning (MALL) further expands the potential for game-based approaches. Traxler (2009) notes that mobile devices offer accessibility, immediacy, and personalization—features that can transform informal moments into meaningful learning opportunities. However, as Anderson and Shattuck (2012) emphasize, effective educational technology must be grounded in systematic, research-based design processes to ensure pedagogical relevance and usability.

Given these considerations, there is a need for a curriculum-aligned, pedagogically structured, and empirically validated English learning game that supports junior-high learners. Developing such a tool through a rigorous design framework—such as Design-Based Research (DBR)—can ensure alignment between theory, classroom practice, and technological innovation. Therefore, this study aims to design, develop, and evaluate a mobile-based English learning game that enhances vocabulary learning, reading comprehension, and learner engagement.

This research contributes to the growing body of literature on educational technology by offering a model for designing game-based language learning applications. The results may guide teachers, developers, and educational institutions seeking to integrate game elements into English learning.

Despite the documented benefits, the practical implementation of game-based English learning tools in formal education remains limited. Kim (2015) notes that many schools face challenges related to technological readiness, teacher preparedness, and the lack of curriculum-aligned digital games. Moreover, many existing studies primarily report learning outcomes or user perceptions without sufficiently explaining how specific game features contribute to those outcomes. Other studies focus heavily on interface descriptions rather than on systematic evaluation of learning effectiveness and user experience. As a result, there is a lack of empirical evidence connecting game design elements, learner interaction, and measurable language learning outcomes within authentic classroom contexts.

Furthermore, although mobile-assisted language learning (MALL) offers flexibility and accessibility (Traxler, 2009), many mobile-based English learning games are not developed through iterative, research-driven design frameworks. Anderson and Shattuck (2012) emphasize that without systematic design and evaluation processes, educational applications risk prioritizing usability and visual appeal over pedagogical effectiveness. This highlights a research gap in the development and evaluation of mobile-based English learning games that are curriculum-aligned, grounded in learning theory, and empirically validated through learner performance and feedback.

Addressing these gaps, this study employs a Design-Based Research (DBR) approach to design, develop, and evaluate a mobile-based English learning game for junior-high EFL learners. The study focuses on examining how specific game features support vocabulary learning, reading comprehension, and learner engagement, and how iterative design revisions informed by user feedback enhance the effectiveness of the application.

Based on the identified research gaps, this study is guided by the following research to build a mobile-based English learning game designed and developed using a Design-Based Research framework to align game features with curriculum-based learning objectives

II. RESEARCH METHODS

This study employed Design-Based Research (DBR)**,** which integrates iterative development with empirical investigation. The DBR model was chosen because it allows researchers to collaboratively design, refine, and evaluate digital learning tools in authentic educational settings.

At this stage, it is carried out by studying the basic theory that supports research, searching and collecting the required data. To collect the required data, the author used several techniques. (1) Direct Observation, namely the researcher makes direct observations at the school to obtain data related to the research, (2) Interview, namely the researcher directly meets face to face with the school principal to obtain more complete data regarding Algorithm Implementation, (3) Sampling, namely the researcher selects data that is available and in accordance with the research, namely the application of previous research and previous research theses to be used as samples in this research.

This research will go through several stages. The stages in this research can be modeled on a Waterfall diagram. There are several stages used in this research:

This study employed a Design-Based Research (DBR) approach, which combines iterative development with empirical investigation. DBR was chosen because it allows researchers to collaboratively design, develop, and evaluate an English learning game application in

authentic educational contexts. This approach emphasizes repeated cycles of design, implementation, observation, and reflection, ensuring that the resulting product is aligned with the needs of both students and teachers (Design-Based Research Collective, 2003).

The participants in this study consisted of thirty five tenth- and eleventh-grade students who represented the end users of the game application, two English teachers who guided its use in the classroom, and two educational technology experts who assisted in validating the content and design of the application. The study began with a needs and theoretical analysis through a literature review on game-based English learning and interactive learning theories (Gee, 2007; Prensky, 2001). Initial observations were conducted in the school to understand the learning environment, teachers' needs, and students' preferences, ensuring that the application design would fit the real educational context.

Based on the analysis, the researchers designed a game prototype that included storyboards, game mechanics, learning levels, and interactive features. The prototype was then validated by experts using a validation sheet assessing content accuracy, interface design, and usability. Feedback from this validation was used to revise and improve the application before classroom implementation (Reeves, 2006).

During implementation, data were collected through direct observation of students' interactions with the application, semi-structured interviews with teachers and students to gain in-depth insights into their experiences, and documentation such as field notes, student responses, and supporting materials. Previous studies, including related research and theses, were also used as references in developing the application design.

Data analysis was conducted qualitatively through data reduction, categorization, and interpretation to identify the main themes related to the effectiveness of the application in English learning. Data validity was ensured through triangulation of sources, including observations, interviews, and documentation, as well as peer review by academic advisors (Creswell & Creswell, 2018). The results of the analysis were then used to revise and refine the application prototype, and this cycle was repeated until the application met the criteria of learning effectiveness, usability, and content relevance. This approach ensured that the study produced not only a functional learning game application but also empirically grounded findings that are relevant to the objectives of English language education.

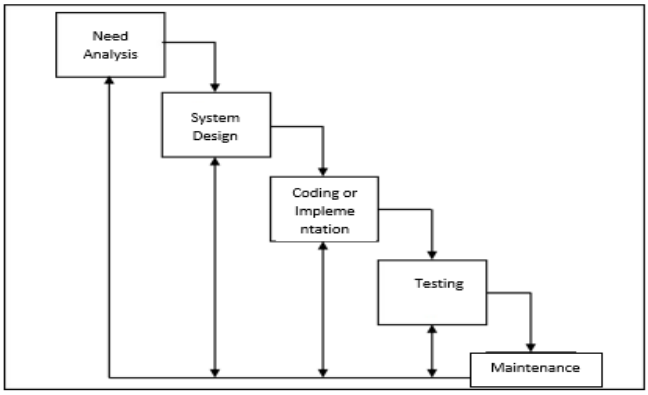

Figure 1. Diagram of Water

III. RESULT AND ANALYSIS

In this part, we will explain the display of the results of the application that has been created, which is used to clarify the existing displays in the Design of the Student Grade Data Security Application at school in Medan using the Android So that the results of implementation can be seen in accordance with the results of the program that has been created. Below we will explain each display in the program.

This section presents the results of the implementation and evaluation of the Android-based English learning game. The analysis is conducted based on system implementation results and user testing involving students as research participants. The discussion focuses on usability, learning effectiveness, and user engagement in relation to the research objectives.

The main menu interface is the first screen displayed when the application is launched, as shown in Figure 3.1. This interface provides access to the main features of the English learning game. The design emphasizes simplicity and clarity to ensure that students can easily navigate the application without additional instructions.

Based on user testing results, most students stated that the main menu was easy to understand and visually attractive. This finding indicates that the interface design successfully supports usability, which is essential for maintaining student engagement during the learning process. An intuitive main menu allows students to focus more on learning English content rather than on understanding how to operate the application.

The login interface, shown in Figure 3.2, functions as a user authentication feature that allows students to access personalized learning content. Through this

feature, the system can store user data such as learning progress and game scores.

The results of the user questionnaire show that students did not experience significant difficulties during the login process. This indicates that the login feature is practical and does not hinder the learning experience. From a research perspective, this feature supports data collection on student performance, which is important for evaluating learning outcomes in English learning activities.

The application was tested by students through direct usage in a learning session. After using the application, students were asked to complete a questionnaire to evaluate usability, attractiveness, and learning benefits. The results indicate that the majority of students felt more motivated to learn English using the game-based application compared to conventional learning methods.

Students reported that interactive elements, such as quizzes and game challenges, helped them understand English vocabulary more easily. This suggests that the game-based learning approach implemented in the application is effective in supporting English learning objectives. These findings are consistent with the research goal of developing an engaging and effective English learning game using Android technology.

Overall, the results show that the developed application meets the research objectives in terms of functionality, usability, and learning effectiveness. The integration of game elements into English learning activities increases student motivation and supports active learning. Therefore, the application can be considered suitable as an alternative learning media for English subjects at the school level.

3.1 Main menu View

The main menu display is the first display that appears when the program is run. It functions as an input form for the admin username and password.

program. The registration display image can be shown in Figure 2.

Figure 2. Main Menu Display

3.2 Login Menu View

The login display is the first display that appears when the program is run. It functions as an input form for the program admin username and password. The login display image can be shown in Figure 3.

Figure 3. Login Menu View

3.3 Main Form View

FormThe main is the overall cryptographic program interface, where to use this cryptographic application can be done through the main form interface. In the main form there are several menus, namely, the file menu and the program menu. For more details, the main form display can be seen in Figure 4.

Figure 4. Login Menu View

3.4 Subject Data Form View

FormThis subject is used to display subject data at School The following is a display of the subject data form which can be seen in Figure 5.

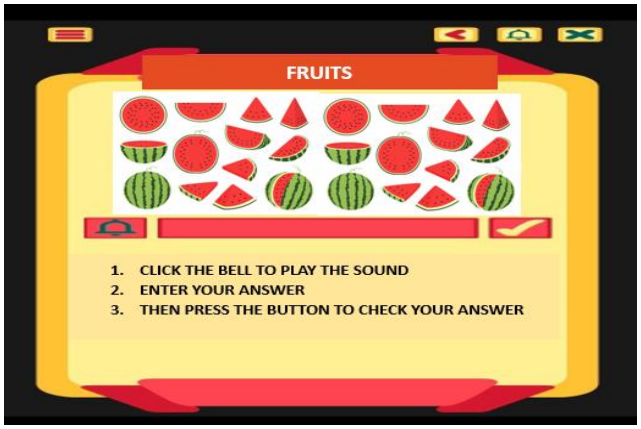

Figure 5. Subject Data Font View

3.5 Class Data Form View

FormThis class functions to display class data at School . The following is a display of the class data form which can be seen in Figure III.5 below:

3.6 Student Data Form View

FormThis student is used to display student data at School

VI. CONCLUSION

Based on the results of the discussion and trials that have been carried out, namely the Design of Student Grade Data Security Applications at School in Medan using the Android-Based RC4 Method, it can be concluded:

Firstly, the Android-based educational game application used in English language learning was developed using Adobe Animate CC software. This application was designed to integrate interactive game features with English learning materials, enabling students to participate more actively in the learning process through the use of mobile technology.

Secondly, the interface presented in this application is designed to be attractive, simple, and easy to understand. The layout, navigation system, and visual elements are carefully arranged to ensure user-friendliness, particularly for elementary school students, so that they can operate the application independently without experiencing difficulty or confusion.

Lastly, the implementation of this Android-based English educational game allows students to understand English vocabulary more easily, practically, and effectively. Compared to previous learning methods that relied solely on face-to-face instruction and textbooks, this game-based learning approach provides a more engaging and interactive learning experience, which helps improve students' motivation, comprehension, and vocabulary retention.

THANK-YOU NOTE

Titles for thanks and references are not numbered. Thank you to the IJCIS Team for taking the time to create this template.

REFERENCES

[1] Anderson, T., & Shattuck, J. (2012). Design-based research: A decade of progress in education research? *Educational Researcher, 41*(1), 16–25. https://doi.org/10.3102/0013189X11428813

[2] Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

[3] Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. Harper & Row.

[4] Gee, J. P. (2007). *What video games have to teach us about learning and literacy* (2nd ed.). Palgrave Macmillan

[5] Hung, H. T., Yang, J. C., Hwang, G. J., Chu, H. C., & Wang, C. C. (2018). A scoping review of research on digital game-based language learning. *Computers & Education, 126*, 89–104. https://doi.org/10.1016/j.compedu.2018.07.001

[6] Kapp, K. M. (2012). *The gamification of learning and instruction: Game-based methods and strategies for training and education*. Pfeiffer.

[7] Kim, B. (2015). Understanding gamification. *Library Technology Reports, 51*(2), 29–35.

[8] Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Pergamon Press.

[9] Nation, I. S. P. (2013). *Learning vocabulary in another language* (2nd ed.). Cambridge University Press.

[10] Prensky, M. (2001). *Digital game-based learning*. McGraw-Hill.

[11] Reeves, T. C. (2006). Design research from a technology perspective. In J. van den Akker, K. Gravemeijer, S. McKenney, & N. Nieveen (Eds.), *Educational design research* (pp. 52–66). Routledge.

[12] Romero, M., Usart, M., & Ott, M. (2015). Can serious games contribute to developing and sustaining 21st century skills? *Games and Culture, 10*(2), 148–177. https://doi.org/10.1177/1555412014548919

[13] Shute, V. J., & Ventura, M. (2013). *Stealth assessment: Measuring and supporting learning in video games*. MIT Press.

[14] Traxler, J. (2009). Learning in a mobile age. *International Journal of Mobile and Blended Learning, 1*(1), 1–12. https://doi.org/10.4018/jmbl.2009010101