Vocabulary Introduction for Early Childhood Through Game-Based Learning Media

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Abstract. Vocabulary acquisition in early childhood is a fundamental foundation for the development of language skills. Vocabulary plays a crucial role in children's overall development, as it serves as the foundation for other language abilities, including listening, speaking, reading, and writing. Children with a rich vocabulary tend to express their thoughts more easily, interact socially, and comprehend new information more effectively. Conversely, limited vocabulary development may lead to learning difficulties at subsequent educational levels. Therefore, introducing vocabulary from an early age through the use of appropriate media is essential in early childhood education. This study aims to introduce vocabulary through game-based learning media. The type of research conducted is developmental research, employing the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The methods used to collect data were observation and the use of instruments. The data were analysed using a descriptive quantitative approach, which involved illustrating the results of children's vocabulary acquisition after the implementation of the learning media. The analysis was conducted by comparing the initial condition with the condition after the intervention, thereby highlighting the improvement in vocabulary acquisition among the children.The results of the study show that the pre-test score was 65%, while the post-test score reached 87,4%. Based on these findings, the use of game-based learning media can serve as an effective alternative for teachers in introducing vocabulary to children during the learning process.

Keywords: Vocabulary Introduction, Language, Early Childhood, Game-based Learning.

INTRODUCTION

Vocabulary development in early childhood is a fundamental foundation for language acquisition and overall academic success. Vocabulary plays a central role in supporting the four core language skills—listening, speaking, reading, and writing—and also contributes to children's social interaction and cognitive development. Children with a rich vocabulary are generally more capable of expressing their thoughts, engaging in meaningful communication, and comprehending new information. Conversely, limited vocabulary development during the early years can lead to long-term learning difficulties and negatively impact literacy and school readiness. Thus, strengthening vocabulary acquisition during this stage is crucial for ensuring a strong linguistic and cognitive foundation.

Despite its importance, vocabulary instruction in early childhood often relies on conventional methods, such as rote memorization, picture books, and teacher-led repetition. While these approaches can provide initial exposure to new words, they are often monotonous, lack interactivity, and fail to sustain children's attention (Liu et al., 2021). Moreover, passive and decontextualized vocabulary learning may not allow children to connect words with meaningful experiences, limiting their ability to internalize and apply new vocabulary in daily contexts. This gap highlights the need for innovative instructional media that can foster deeper engagement, enjoyment, and long-term retention in vocabulary learning.

Game-based learning (GBL) has emerged as a promising alternative to traditional instruction. Previous studies demonstrate that digital game-based learning enhances both short-term and long-term vocabulary retention, supports learner motivation, and reduces anxiety during the language learning process (Zou et al., 2019). Mobile-based educational games have also been proven to significantly improve preschool children's vocabulary mastery compared to control groups using conventional methods (Utomo et al., 2017). Furthermore, systematic reviews and meta-analyses confirm that game-based learning not only strengthens linguistic outcomes but also positively impacts cognitive, social, and emotional development in early childhood education (Alotaibi, 2024). These

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findings suggest that game-based media align well with early childhood pedagogical philosophies that emphasize play, discovery, and experiential learning.

Based on these considerations, this study aims to investigate the effectiveness of game-based learning in introducing vocabulary to young children. Specifically, the research seeks to explore how interactive and play-based digital games can support children in recognizing and understanding new words during the early stages of language development. In addition, this study examines the extent to which game-based learning strategies enhance children's motivation and engagement compared to traditional vocabulary introduction methods. By addressing these objectives, this research seeks to contribute to the growing body of evidence on the role of educational games in early childhood language development and to provide practical insights for teachers, curriculum developers, and policymakers in the field of early childhood education.

2. METHODOLOGY

A. Research Design

This study employs a Research and Development (R&D) design, utilising the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) as its methodological framework. The use of R&D is intended to systematically develop and test the effectiveness of game-based learning media for vocabulary recognition. The ADDIE model was chosen because it provides a structured and iterative process that ensures instructional products are pedagogically sound and practically applicable. The study begins with the Analysis stage, which involves identifying learners' needs, followed by the Design stage, where a game design is created for use and assessment instruments are designed. The Development stage involves creating game-based learning media, while the Implementation stage entails applying these media in learning activities. Finally, the Evaluation stage is conducted to measure the effectiveness of the media through pre-test and post-test results.

B. Participant

The participants in this study were 10 students aged between 5 and 6 years, enrolled in Kindergarten 2 (K2) at a private school in the Bogor area. The selection of participants was conducted purposively, based on their suitability in relation to the research objectives, particularly in terms of vocabulary learning at the early childhood education level.

C. Instrument

The instruments used in this study is a test. The test, administered in the form of a pre-test and post-test, was designed to measure the students' vocabulary knowledge before and after the implementation of the game-based learning media. The pre-test served to identify the participants' initial vocabulary recognition, while the post-test was intended to evaluate their progress and the effectiveness of the instructional intervention.

3. RESULT AND ANALYSIS

The intervention lasted 8 weeks, with sessions lasting 30 minutes each, starting in May to July 2025. The results of the pre-test given to participants in the study to identify their initial vocabulary knowledge showed that all participants achieved an average of 65%, and after implementing game-based learning, this figure increased to 87,4%. Therefore, it can be concluded that there is a significant difference between before and after implementing game-based learning in classroom activities.

TABEL 1
Descriptive statistic for pre-test and post-test

	N	Mean	Std. Deviation	Std. Error Mean
Pre-test	10	65.0	2.943920	0.930949
Post-test	10	87.4	1.897367	0.600000

Based on statistical analysis, the students showed a significant improvement in their performance from the pre-test to the post-test. Furthermore, the relatively low standard deviations on both tests indicate that the scores were quite consistent across participants. These findings highlight that the implementation of game-based learning in the learning process is quite effective in introducing new vocabulary to students.

4. DISCUSSION

The significant increase in post-test scores indicates that game-based learning media was effective in enhancing students' vocabulary acquisition. This finding aligns with Vygotsky's theory of learning through interaction and supports previous research showing the positive impact of educational games on language development. In line with this, the use of digital game-based learning (DGBL) has been shown to strengthen children's thinking skills and learning abilities (Behnamnia et al., 2023). Traditional teaching methods often fail to fully capture learners' attention, which decreases their interaction, engagement, and investment in the content. Therefore, innovative approaches are needed to overcome these limitations. Recent studies in cognitive science and educational neuroscience also suggest that play-based learning is a promising approach in early childhood education (Lamrani & Abdelwahed, 2020).

Game-based learning fits well with early childhood education philosophies that emphasize experiential, play-based, and discovery-oriented learning. Young children learn best through active exploration and social interaction, which can be fostered through shared experiences with peers and teachers. The Game Development Life Cycle (GDLC) method, for instance, has been shown to improve children's vocabulary skills and increase their engagement in learning (Mutmainah et al., 2024). Thus, integrating game-based learning into early childhood education holds significant potential to strengthen vocabulary acquisition while also fostering meaningful engagement.

Compared to traditional vocabulary teaching methods—such as static flashcards or picture books—game-based learning provides distinct advantages. Conventional approaches often rely on passive, two-dimensional representations, whereas game-based learning offers interactive and dynamic experiences that stimulate curiosity and motivation. This approach aligns with the principle that early childhood learning should be active and exploratory. Supporting this, the integration of game-based learning into early childhood curricula has been proven to improve learning outcomes (Manditereza, 2024). Therefore, game-based learning stands out as a more effective method of vocabulary instruction, enabling deeper engagement and better language development among young learners.

Previous studies further reinforce these findings. Game-based learning has been shown to produce moderate to large effects on cognitive, social, emotional, motivational, and engagement outcomes (Alotaibi, 2024). Conversely, traditional teaching methods often appear dry and one-dimensional, leading to disengagement and boredom among children (Fotaris et al., 2016). For example, Ludo pedagogy has been found to significantly improve English vocabulary acquisition and retention among fourth-grade students by making learning more engaging and enjoyable (Azizi et al., 2025). Similarly, educational games have proven effective in supporting EFL vocabulary learning for early childhood students with learning disabilities, motivating them and enhancing cooperation between children (Mohamed et al., 2021). Additionally, my recreation educational game encourages young children to carry out educational activities in a fun way. My recreational educational game has a significant effect on the development of children's literacy in early childhood (Widuroyekti et al., 20223).

Moreover, digital game-based language learning, when combined with learner agency, tinkering, intrinsic motivation, and contextualized learning, can create powerful and engaging vocabulary learning experiences for elementary learners (Chowdhury et al., 2024). Research has also shown that preschoolers can autonomously acquire new vocabulary through game-based learning, with two words per day identified as the optimal pace for long-term retention (Tang et al., 2020). Additionally, consistent users of gamified platforms expressed greater enthusiasm for language learning and reported noticeable improvements in their language skills (Hafeez et al., 2025). Furthermore, applying the game-based learning model assisted by Quizwhizzer media on vocabulary skills and there was a better improvement compared to using the Picture and Picture type model. Therefore, the application of the Game-Based Learning model using Quizwhizzer media can be considered as an alternative to improve vocabulary mastery (Wahyuningtyas et al.,2025). In addition, android-based educational games have significantly supported vocabulary learning in early childhood, showing a 43.68% improvement in mastery

compared to control groups (Utomo et al., 2017). Supporting this, evidence suggests that screen media exposure in early childhood has a small but positive effect on vocabulary size, with e-books providing stronger impacts compared to TV, videos, or apps (Jing et al., 2023).

Playful learning experiences in early childhood classrooms are particularly effective because they are active, engaging, meaningful, socially interactive, iterative, and joyful (Masters et al., 2024). For older learners, digital game-based platforms such as Quizziz have also shown strong results, with features like in-game power-ups, competition, and rapid feedback improving students' motivation and engagement (Kazu et al., 2020). Similarly, digital game-based vocabulary learning has been shown to positively influence both short-term and long-term vocabulary acquisition, comprehension, motivation, engagement, anxiety reduction, and learner interaction (Zou et al., 2019). In addition, game-based learning methods have been proven to increase student learning motivation, as well as increase curiosity in learning (Listiani & Utama, 2025). A concrete example of this is "Smart Fun English," an interactive, mobile-based multimedia program designed for early childhood education, which promotes vocabulary retention through interactive materials and educational games (Sumiyati et al., 2020).

Taken together, these findings highlight that game-based learning provides a powerful alternative to traditional methods of vocabulary instruction. By leveraging interaction, engagement, and play, game-based approaches not only improve vocabulary mastery but also foster children's motivation, collaboration, and enjoyment in the learning process.

5. LIMITATION

Although this study provides valuable insights into introducing vocabulary through game-based learning media for early childhood, several limitations should be acknowledged. First, the relatively small sample size of 10 participants may limit the generalizability of the findings to broader early childhood populations. Larger, more diverse samples across different socioeconomic, cultural, and linguistic backgrounds would help validate and extend the results.

Second, the study took place in a controlled school setting with private school students in a specific region, which may not fully reflect real-world variations, such as differences in access to technology, home learning environments, or parental support. As a result, children from under-resourced communities might respond differently to game-based learning media interventions.

Third, the intervention period was relatively short, which means we cannot conclude whether the long-term retention of vocabulary learned through game-based learning media is achieved. Future studies should include follow-up assessments to measure whether children can maintain and apply their vocabulary knowledge over time.

Fourth, the study primarily focused on quantitative outcomes, such as vocabulary score improvements, without deeply exploring qualitative aspects of children's experiences, engagement, or attitudes toward game-based learning media. Incorporating qualitative methods, such as interviews or observations, would enrich our understanding of how game-based learning media shapes motivation, curiosity, and enjoyment in learning.

Finally, technical issues related to game-based learning media such as software glitches or hardware limitations, could have influenced the learning experience and outcomes. However, these were not systematically measured in this study. Future research should consider evaluating the usability and accessibility of game-based learning media technologies to ensure they are practical and sustainable in early education contexts.

Overall, while the study demonstrates promising results for introducing vocabulary through game-based learning media, addressing these limitations in future research will strengthen the evidence base and support broader educational implementation.

6. CONCLUSION

The research demonstrating an improvement in children's ability to recognize new words through game-based learning media provides compelling evidence of this technology's transformative potential in early childhood education. These findings are highly consistent with a burgeoning body of literature highlighting game-based

learning media advantages in creating immersive, interactive, contextualized, and motivating learning experiences. By addressing challenges related to accessibility, content design, and responsible use, game-based learning media can become an invaluable tool in enriching children's learning experiences and preparing them for future literacy success. Further research is warranted to explore the effectiveness of game-based learning media across diverse cultural and socioeconomic contexts, as well as to develop comprehensive pedagogical frameworks for its seamless integration into early childhood curricula.

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