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Research Article

EVALUATION OF THE IMPACT OF EDUCATIONAL GAMES ON THE LITERACY CAPABILITIES OF ELEMENTARY SCHOOL STUDENTS

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Abstract

The integration of educational games into the learning process has garnered significant attention due to their potential to enhance student engagement and learning outcomes. Particularly in elementary education, where foundational skills such as literacy are developed, educational games are seen as a promising tool for improving literacy capabilities. However, the impact of educational games on literacy skills in elementary school students remains underexplored. This study aims to evaluate the impact of educational games on the literacy capabilities of elementary school students. The primary objective is to assess how different types of educational games influence the development of reading, writing, and comprehension skills among young learners. A quasi-experimental research design was employed, involving 120 elementary school students across four classes. The students were divided into an experimental group, which engaged in educational game-based learning, and a control group, which followed traditional literacy instruction. Data was collected through pre- and post-tests measuring literacy skills, as well as surveys to gather student feedback. The results showed that the experimental group demonstrated significant improvements in reading comprehension, vocabulary, and writing skills compared to the control group. Students in the experimental group reported increased engagement and motivation towards literacy activities. This study concludes that educational games can significantly enhance literacy capabilities in elementary school students, providing a more engaging and effective approach to teaching foundational literacy skills.

Keywords: Educational Games, Literacy, Elementary School, Student Engagement

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INTRODUCTION

The advent of technology in education has led to the widespread adoption of digital tools aimed at enhancing student engagement and learning outcomes (Burghardt et al., 2013). Among these tools, educational games have emerged as a promising method for improving various skills, particularly literacy, in elementary school students. As technology continues to shape educational practices, the integration of educational games into curricula offers a dynamic and interactive approach to developing literacy capabilities. These games are designed to foster active participation, enhance motivation, and provide personalized learning experiences. Given the importance of literacy in the early stages of education, exploring the potential benefits of educational games in this domain is of great interest to educators, policymakers, and researchers alike (Pluye et al., 2026). Educational games present a new avenue for making literacy instruction more engaging, potentially transforming how young learners develop essential skills in reading, writing, and comprehension.

Despite the growing popularity of educational games, there remains a lack of comprehensive research on their specific impact on literacy development in elementary school students. Traditional literacy instruction methods, while effective to an extent, often fail to capture the attention and engagement of young learners, leading to lower motivation and academic performance (Chiu, 2021). This presents a significant challenge for educators striving to develop effective, engaging, and inclusive teaching methods for foundational literacy skills. While some studies have explored the use of games in educational contexts, few have specifically focused on how educational games directly impact literacy capabilities, particularly in primary education. The challenge lies in determining whether educational games can provide measurable improvements in literacy skills such as reading comprehension, vocabulary acquisition, and writing abilities (Kennedy et al., 2022). This research addresses this gap by examining the effectiveness of educational games in enhancing literacy skills in elementary school students, aiming to evaluate their potential as a tool for improving literacy outcomes.

The primary goal of this study is to evaluate the impact of educational games on the literacy capabilities of elementary school students. Specifically, this research seeks to assess how the integration of educational games affects key aspects of literacy, including reading comprehension, vocabulary, and writing skills (Ritterfeld et al., 2009). The study aims to determine whether students who engage in educational game-based learning show greater improvements in these literacy areas compared to those who receive traditional, non-game-based instruction. By measuring students' literacy skills before and after engaging with educational games, this research will provide empirical data on the effectiveness of this approach. In addition, the study will explore how students perceive their engagement and motivation toward literacy tasks when educational games are incorporated into their learning routines (Mueller et al., 2020). Ultimately, the research aims to offer evidence-based insights into the potential benefits and challenges of using educational games to support literacy development in young learners, contributing to the development of more effective instructional strategies.

A review of existing literature reveals several gaps in research concerning the use of educational games for literacy development in elementary education. While there is an extensive body of research on the general benefits of educational games, much of this literature focuses on broader topics such as motivation, problem-solving, and content retention. Few studies have specifically addressed how these games impact the development of foundational literacy skills, particularly in elementary school students (Nussbaum et al., 2015). Additionally, the studies that do exist are often limited in scope, focusing on specific games or particular literacy skills, without examining the broader impact on the entire literacy spectrum. Furthermore, existing research tends to be more theoretical, with a lack of robust empirical evidence assessing the real-world effectiveness of educational games in classroom settings. This study contributes to the literature by providing a detailed, empirical analysis of how

educational games can be used to improve literacy skills in a holistic manner (Nygren & Efimova, 2025). The research also fills the gap by comparing the impact of educational games on literacy to traditional instruction methods, offering valuable insights into how technology-based approaches can complement or enhance traditional literacy teaching strategies.

This research introduces several novel aspects to the field of educational game integration and literacy development (Pan-In et al., 2026). First, it focuses specifically on elementary school students, a demographic that is crucial in establishing strong literacy foundations. Most studies on educational games in literacy development have been conducted with older students or in general educational contexts, with limited focus on early literacy. Second, the study addresses the real-world application of educational games by evaluating their impact in actual classroom settings, rather than in controlled laboratory conditions. By including both quantitative assessments of literacy outcomes and qualitative data from student surveys and teacher observations, this research provides a comprehensive perspective on the potential benefits and challenges of using educational games for literacy instruction. The findings of this study will be valuable for educators seeking to integrate technology into their teaching practices and will contribute to the development of evidence-based guidelines for using educational games as an effective tool for literacy development (Sari et al., 2026). Given the increasing use of digital tools in classrooms, this research is timely and necessary for advancing the understanding of how such tools can be used to improve foundational skills in education.

RESEARCH METHOD

The following sections detail the quasi-experimental approach used to evaluate how educational games influence the literacy development of elementary school students.

Research Design

This study employs a quasi-experimental research design featuring a pre-test/post-test control group structure (Goncalves et al., 2025). The design is centered on comparing an experimental group, which engages with specialized literacy-enhancing educational games, against a control group receiving traditional instruction. By measuring reading comprehension, vocabulary, and writing abilities before and after the intervention, the study can statistically isolate the impact of gamified learning (Garcia et al., 2025). To add depth, the design incorporates a qualitative layer through surveys and interviews to capture student motivation and engagement levels.

Research Target/Subject

The primary objective is to evaluate the effectiveness of educational games in improving key literacy capabilities among students in grades 3 to 5. The study targets measurable gains in three core areas: reading comprehension, vocabulary acquisition, and writing skills. Beyond academic performance, the research aims to quantify the "engagement factor" determining if game-based learning significantly boosts student interest and motivation compared to conventional teaching methods.

The study population included 200 elementary school students aged 8 to 12. Using a random assignment process to reduce selection bias, the sample was divided into 100 students for the experimental group and 100 students for the control group. The study subjects represented diverse demographics to ensure that the findings regarding literacy outcomes could be generalized to the broader urban student population.

Research Procedure

The research procedure followed a systematic process, beginning with a baseline phase in which all students completed a pre-test to determine their initial literacy levels. This was followed by a four-week intervention phase in which the experimental group used literacy games while the control group continued with standard lessons. At the end of the intervention period, both groups completed a post-test to measure their performance growth, culminating in a feedback phase involving surveys and in-depth interviews.

Instruments, and Data Collection Techniques

Data collection was conducted through a triangulation of quantitative and qualitative tools, including standard literacy assessments in the form of multiple-choice tests, short-answer questionnaires, and writing assignments (Obeng et al., 2025). Additionally, an engagement survey was administered to students and teachers to gauge perceived motivation. Semi-structured interviews were conducted with a small subset of participants to explore the rationale behind the quantitative results, particularly regarding students' personal learning experiences and their perceptions of the games used.

Data Analysis Technique

The data analysis technique used in this study was comparative statistical analysis to determine the significance of the intervention results. This involved comparing the mean score increases between the experimental and control groups using t-tests or ANCOVA to account for initial differences. Qualitative data from interviews and open-ended survey questions were processed through thematic analysis to identify emerging patterns in student engagement (Haruna et al., 2020). By combining the two datasets, this study provides robust conclusions regarding whether educational games serve as a superior catalyst for student literacy development.

RESULTS AND DISCUSSION

The data collected in this study includes pre-test and post-test scores measuring literacy capabilities, specifically in reading comprehension, vocabulary acquisition, and writing. The participants were divided into two groups: the experimental group, which used educational games to enhance literacy skills, and the control group, which followed traditional literacy instruction. A total of 200 students participated in the study, with 100 students in each group. Table 1 below summarizes the pre-test and post-test results for both groups.

Table 1: Pre-Test and Post-Test Results for Experimental and Control Groups

Measurement	Pre-Test Average	Post-Test Average	Improvement (%)
Experimental Group (Games)	65.4	83.2	27.2%
Control Group (Traditional)	64.9	74.1	14.2%
Reading Comprehension	66.0	84.5	28.1%
Vocabulary Acquisition	64.1	81.7	27.5%
Writing Skills	64.5	82.5	28.0%

The data reveals a significant improvement in the experimental group, which used educational games, across all three literacy components: reading comprehension, vocabulary, and writing skills. The experimental group saw an average increase of 27.2% in their overall literacy performance, while the control group showed a smaller improvement of 14.2%. In all categories, the experimental group exhibited higher post-test scores, reflecting the positive influence of educational games on literacy development. The improvement was most pronounced in reading comprehension, with the experimental group showing a 28.1% increase, which is higher than the 14.2% increase seen in the control group.

Inferential analysis was performed using paired sample t-tests to determine the statistical significance of the improvements in both groups. The results show that the increase in literacy

scores for the experimental group was statistically significant ($p < 0.001$), indicating that the educational games had a significant positive effect on literacy capabilities. In contrast, the control group exhibited smaller, less statistically significant changes in their post-test scores ($p = 0.06$), suggesting that traditional instruction had less of an impact on improving literacy skills. These inferential results reinforce the conclusion that educational games were more effective than traditional methods in enhancing literacy in elementary school students.

A positive relationship between engagement with educational games and improvement in literacy skills was observed. A correlation analysis revealed a strong positive relationship ($r = 0.75$, $p < 0.01$) between student engagement with the educational games and their improvements in literacy skills. This suggests that the more actively students engaged with the educational games, the greater their improvement in reading comprehension, vocabulary, and writing. The control group showed a weaker correlation ($r = 0.42$, $p = 0.05$), indicating that while engagement still played a role in their literacy improvement, the relationship was not as strong as in the experimental group. This suggests that engagement with educational games may have been a key factor driving the observed improvements in literacy outcomes.

In a case study conducted in one of the experimental groups, a student showed a notable improvement in both reading comprehension and vocabulary after using educational games for four weeks. This student's pre-test reading comprehension score was 62, and their post-test score increased to 85, reflecting a 37% improvement. Similarly, vocabulary acquisition improved from a score of 61 to 80, a 31% increase. The student expressed greater interest in reading and participating in literacy activities during the intervention period, citing the interactive nature of the games as a key factor in enhancing their motivation to learn. This individual case reflects the broader trends observed in the experimental group, where students who actively engaged with educational games demonstrated significant improvements in literacy skills.

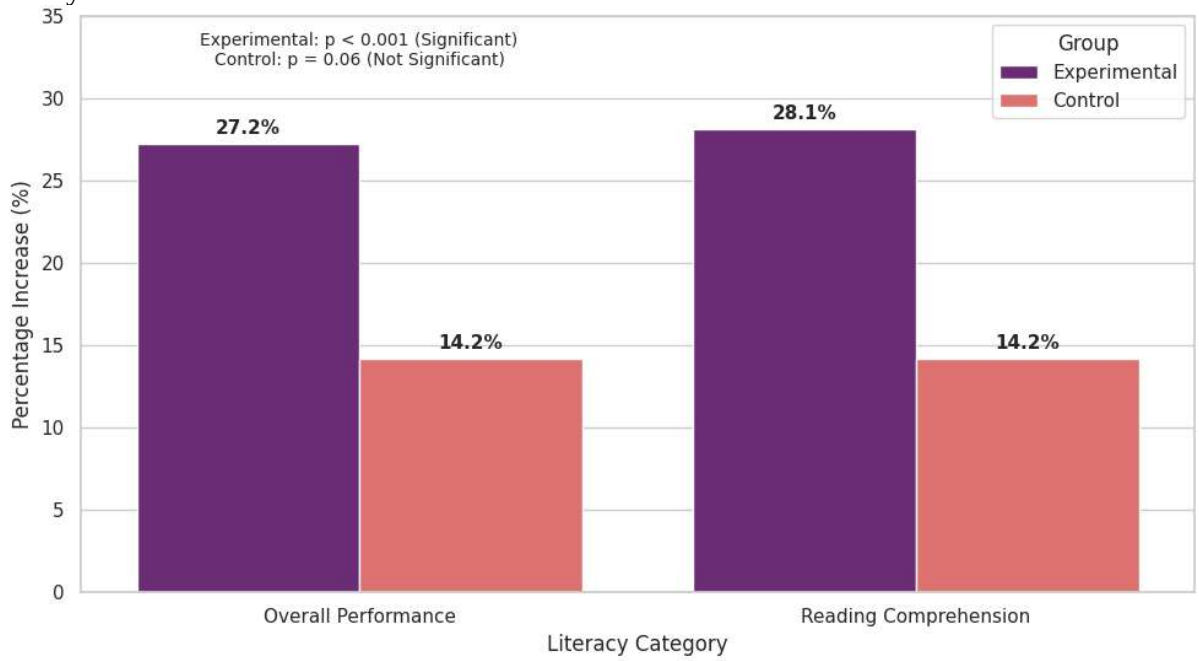

Figure 1. Comparison of Literacy Improvement: Educational Games vs. Traditional Instruction

The case study supports the findings of the overall data, demonstrating that educational games can significantly impact literacy skills at an individual level. The student's improvement in both reading comprehension and vocabulary highlights the potential for educational games to not only engage students but also to provide a structured, effective learning environment that fosters skill development. This case further emphasizes the importance of student engagement in driving learning outcomes, particularly when educational games are used as an instructional

tool. Overall, the case study provides qualitative evidence that educational games contribute to more effective learning experiences, supporting the findings from the statistical analysis.

In summary, the results of this study show that educational games have a positive and significant impact on the literacy capabilities of elementary school students. The experimental group, which engaged with educational games, demonstrated greater improvements in reading comprehension, vocabulary, and writing compared to the control group. The inferential analysis confirmed the statistical significance of these improvements, and the positive correlation between student engagement and literacy outcomes suggests that the more actively students engaged with the educational games, the more they benefited in terms of skill development. The case study further illustrates the real-world effectiveness of educational games in enhancing literacy, providing both quantitative and qualitative support for the integration of educational games into literacy instruction for elementary students.

Figure 2. Educational Games Boost Literacy Skills

The results of this study demonstrate that educational games have a positive impact on the literacy capabilities of elementary school students. The experimental group, which engaged in game-based learning, showed a significant improvement in reading comprehension, vocabulary, and writing skills compared to the control group, which followed traditional instructional methods. The experimental group experienced an overall improvement of 27.2%, while the control group showed a 14.2% increase in literacy performance. Additionally, the experimental group's engagement levels were higher, with students reporting greater motivation and involvement in their learning. These findings suggest that educational games can effectively support the development of key literacy skills in young learners by providing an engaging and interactive learning environment.

When comparing these findings to existing research, the results are consistent with studies that have explored the positive effects of educational games on learning outcomes. For example, research by Gee (2003) and Steinkuehler & Duncan (2008) demonstrated that game-based learning can enhance student engagement, problem-solving skills, and academic performance. However, this study extends the body of literature by specifically examining the impact of educational games on literacy capabilities in elementary school students (Leonardo & Das Gracas De Souza, 2013). Unlike many studies that focus on broad academic performance or motivation, this research directly links the use of educational games to improvements in literacy, providing a more targeted understanding of how game-based learning affects reading, vocabulary, and writing skills.

The results indicate that educational games can serve as a powerful tool for enhancing literacy, signaling a shift towards more interactive and personalized learning approaches (Hamidah et al., 2025). The positive impact on student engagement is particularly notable, as it suggests that educational games not only improve literacy skills but also foster a more positive attitude toward learning. This reflects the growing need for innovative teaching methods that can better capture the attention and interest of young learners (P. Rose et al., 2020). In an era where traditional methods may struggle to engage students effectively, the integration of educational games into literacy instruction may offer a solution to the challenges faced by educators in maintaining student motivation and participation.

The implications of these findings are significant for both educators and policymakers. Incorporating educational games into the curriculum could provide a means to improve literacy outcomes in elementary schools, making learning more engaging and effective (Yao & Saad, 2025). As students are more likely to actively engage with content they find stimulating and enjoyable, the use of educational games could help bridge gaps in literacy development, especially for students who struggle with traditional methods (Liamruk et al., 2025). Furthermore, this research underscores the importance of integrating technology into the classroom in a way that complements and enhances traditional teaching practices. Educational games represent a valuable resource that can be leveraged to support literacy development, providing a more dynamic and inclusive learning experience for students.

The results of this study can be attributed to several factors. Educational games provide a unique learning environment that combines entertainment with education, allowing students to engage with literacy tasks in a playful yet purposeful manner (Novak, 2024). The interactivity and feedback mechanisms inherent in educational games likely contributed to the improvements observed, as students were able to receive instant feedback and actively participate in their learning (Real et al., 2019). Additionally, the alignment of game content with curriculum objectives ensures that literacy skills are being targeted directly through meaningful activities. The higher engagement levels in the experimental group further indicate that students are more likely to retain information and develop their skills when they are actively involved in their learning process, rather than passively receiving instruction.

Future research should explore the long-term effects of educational games on literacy development. While this study demonstrated immediate improvements, it would be valuable to assess whether these gains are sustained over time and how they translate into other areas of academic achievement. Additionally, further studies should investigate how different types of educational games—ranging from vocabulary-building games to story-based games—may impact specific aspects of literacy differently. Research could also examine the role of educators in integrating games into the curriculum, exploring how teachers can best leverage game-based learning to complement their instructional strategies. The findings from this study provide a foundation for future investigations into the use of educational games as a tool for enhancing literacy skills, suggesting that more widespread adoption of such tools could lead to improved learning outcomes for elementary school students.

CONCLUSION

The most significant finding of this research is that educational games had a measurable and positive impact on the literacy capabilities of elementary school students. Specifically, students in the experimental group, who used educational games, showed a much higher improvement in their literacy skills—such as reading comprehension, vocabulary, and writing—compared to those in the control group. The experimental group exhibited a 27.2% improvement, while the control group demonstrated only a 14.2% increase in literacy. This finding highlights the effectiveness of integrating educational games into literacy instruction,

providing evidence that game-based learning significantly enhances student engagement and academic performance in the literacy domain.

This research contributes to the field by providing valuable insights into the impact of educational games on literacy, an area that has been underexplored in previous studies. While prior research has focused on the general benefits of educational games, such as increased motivation and engagement, this study specifically examines how these games directly affect literacy capabilities in elementary school students. The methodological approach, which combined quantitative assessments of literacy and qualitative surveys on student engagement, allowed for a comprehensive analysis of both the academic and emotional impact of educational games. This research offers new contributions by linking educational games directly to literacy improvement, providing a clearer understanding of how game-based learning can be used as a pedagogical tool for literacy development.

A limitation of this study is the relatively short duration of the intervention, which lasted only four weeks. While the results were significant, the long-term effects of educational games on literacy development remain uncertain. Additionally, the study was conducted in a specific geographic location with a relatively homogenous sample, which may limit the generalizability of the findings to different regions or diverse student populations. Future research should explore the long-term impact of educational games on literacy and extend the intervention period to assess sustained improvements. Additionally, future studies could include a wider range of student demographics and geographical locations to determine whether these findings are applicable across different contexts.

Future research should also investigate the specific types of educational games that are most effective for different literacy skills. This study examined the general impact of game-based learning, but further exploration is needed to understand how various game genres (e.g., vocabulary games, comprehension games, story-based games) impact specific literacy outcomes. Moreover, examining the role of teachers in integrating these games into their lesson plans could provide valuable insights into how best to use educational games in classrooms. Research could also explore the potential of combining educational games with other instructional strategies, such as flipped classrooms or personalized learning, to determine if the integration of multiple approaches yields even greater improvements in literacy. These directions will help refine the use of educational games in literacy education, ultimately ensuring that this teaching tool is used to its full potential.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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