Implementation of Interactive Educational Games to Enhance Reading Literacy Skills of Elementary School Students

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INTRODUCTION

Reading literacy is a fundamental skill that plays a crucial role in elementary education because it influences students' ability to absorb information and communicate effectively. This skill serves as the foundation for mastering other subjects, thereby supporting students' academic achievement.[1] However, low reading interest remains a major challenge in literacy learning. Many students show limited enthusiasm for reading because the materials are not

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[1] A Thoha, Titik Haryati, "*Budaya Literasi Sebagai Sarana Peningkatan Mutu Pendidikan Melalui Program Gerobak Baca Di Sd Negeri Cokro*", Jurnal Inovasi Pendidikan Dasar, Vol. 4, No. 2, (2024), hlm. 59.

appealing or relevant to their personal experiences.[2] In addition, the use of traditional teaching methods often fails to stimulate students' learning motivation, as such methods tend to be monotonous and lack interactivity. Therefore, innovation in more creative and engaging instructional approaches is needed to increase students' interest and involvement in reading literacy activities.

The use of technology, particularly digital media, provides significant opportunities to enrich students' learning experiences. With technological support, instruction can be delivered in a more enjoyable and interactive manner.[3] Digital media also enable students to access diverse information sources more rapidly and conveniently. In addition, technology facilitates varied learning formats, including educational videos, learning applications, and games that support the instructional process. The incorporation of technology in education effectively replaces static traditional teaching methods with approaches that are more responsive to students' evolving needs. Thus, the application of technology within educational processes has the potential to enhance students' motivation and active engagement in learning activities. Overall, technology integration emerges as a critical factor in creating a more modern and effective learning experience.[4]

Interactive educational games offer an innovative learning approach by integrating gameplay elements with educational objectives.[5] This approach aims to create engaging and efficient learning experiences. Students are actively invited to participate directly in the learning process, distinguishing it from conventional instructional methods. The main advantage of educational games lies in their ability to attract students' interest through enjoyable game elements. This feature helps stimulate students' motivation to focus on the learning materials. Moreover, educational games facilitate easier comprehension of academic concepts through practical and applied approaches. With technological advancements, educational games become increasingly relevant for fostering an interactive learning atmosphere and contribute to enhancing students' motivation.[6]

Interactive educational games enhance students' reading literacy by transforming learning into a more engaging and enjoyable process. This game-based approach stimulates students' interest and encourages deeper interaction, which in turn improves their reading skills.[7] Previous studies consistently demonstrate that educational games increase motivation and active participation among learners. Platforms such as Wordwall, for instance, transform conventional reading sessions into captivating experiences and help students retain vocabulary more effectively. Similarly, the implementation of games like Scramble Fun Learning results in marked improvements in vocabulary recognition and reading comprehension.[8] Well-designed educational game systems improve reading comprehension

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[2] Triani, Nurdhiana, Tri Bodroastuti, Fitri Absari, Rosy Febriyanti, Paundra Maulana, dan Tjandra Tirtono, *"Increasing Al-Hikmah Elementary School Students' Reading Interest Through the Creative Literacy Program"*, Jurnal Pengabdian dalam Negri Volume, Vol. 2, No. 5, (2024), hlm. 1-2.

[3] Said, S. *"Peran Teknologi Digital sebagai Media Pembelajaran di Era Abad 21"*, Jurnal PenKoMi: Kajian Pendidikan dan Ekonomi, Vol. 6, No. 2 (2023), hlm. 194-202.

[4] Wahyudi, N. G. *"Digital Tools in Indonesian Primary Education"*, Indonesian Research Journal on Education, Vol. 4, No. – (2024), hlm. 444-451.

[5] Rahmadhea, S. *"Pemanfaatan Game Edukasi Untuk Meningkatkan Pemahaman Siswa Dalam Pembelajaran Sains Minat"*, Jurnal Pembelajaran IPA, Vol. 2, No. 2 (2024), hlm. 33-39.

[6] Saba, S. S. *"Pemanfaatan Game Edukasi untuk Meningkatkan Minat dan Pemahaman Siswa dalam Pembelajaran Sains"*, Journal Sains and Education, Vol. 2, No. 2 (2024), hlm. 33-39.

[7] Marlina, L., Pasaman, M. I. N., & Padang, M. I. N. K. *"Penggunaan Game Edukasi Interaktif untuk Meningkatkan Kemampuan Membaca Pemahaman Siswa"*, Jurnal Pendidikan Dasar Indonesia, Vol. 1, No. 3 (2025), hlm. 95-99.

[8] Sopacua, J., et al. *"Scramble Fun Learning sebagai Inovasi Permainan Edukatif untuk Meningkatkan Literasi Membaca Siswa"*, Jurnal Pengabdian Masyarakat, Vol. 2, No. 3 (2025), hlm. 192-201.

through immediate feedback and cooperative interaction. Despite challenges related to resources and teacher training, the benefits offered by educational games provide strong justification for their adoption in literacy instruction. Educational games possess significant potential to enhance reading literacy skills among elementary school students, although certain implementation challenges persist.

Educational games hold significant potential to enhance reading literacy among elementary school students, even though several implementation challenges persist. Research findings indicate that game-based learning produces substantial improvements in literacy outcomes, promotes active student participation, and creates a more enjoyable learning environment. Specific games, such as Game *Dinding Kata* (Word Wall Game), produce substantial gains in students' reading skills, accompanied by positive feedback from teachers regarding student engagement.[9] The HAPCAB model likewise proves effective in improving alphabet recognition and generates high levels of participant satisfaction.[10] Furthermore, educational games help address functional illiteracy issues, particularly in regions where traditional methods have proven inadequate. These games also benefit students with dyslexia by enhancing their reading abilities in an enjoyable manner. Nevertheless, implementation challenges such as the need for teacher training and limited school resources continue to exist.[11]

Nevertheless, implementation challenges remain, including the need for teacher training and limited resource availability in schools. Studies consistently identify inadequate technological infrastructure, low teacher readiness, and limited access to technology as primary obstacles to the adoption of educational games. Insufficient supporting policies for integrating educational games into the curriculum further compound these barriers.[12] These studies also emphasize the importance of structured teacher training and point out issues related to technological readiness within schools. Therefore, the overall findings indicate a need for improved technological infrastructure, comprehensive teacher training, and more systematic educational policies to effectively support the implementation of educational games.[13]

Research on the implementation of interactive educational games to enhance reading literacy among elementary school students presents promising findings while also identifying several significant challenges. Educational games consistently demonstrate success in increasing students' motivation, participation, and reading ability through enjoyable and interactive approaches. For example, games such as Scramble Fun Learning and platforms such as Wordwall show substantial improvement in students' vocabulary mastery and reading comprehension. In addition, educational games hold potential for addressing issues of illiteracy, particularly in regions where traditional methods prove ineffective. Nevertheless, these studies consistently report major barriers to implementation, including limited resources, insufficient teacher training, and low technological readiness in many schools. Technological infrastructure limitations and the lack of policies supporting the integration of

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[9] Enrekang, U. M. *"Word-Wall Education Game to Enhance Literacy Skills in Elementary Schools"*, Journal of Elementary Learning, Vol. 8, No. 1 (2024), hlm. 338-350.

[10] Masae, Y., et al. *"Enhancing the Alphabet Recognition Skill by Using Educational Games (HAPCAB Model)"*, Journal of Information System and Education Development, Vol. 2, No. 4 (2024), hlm. 28-30.

[11] Mulyani, S. *"Pengembangan Media Pembelajaran Interaktif Berbasis Game"*, Jurnal Edukasi Digital, Vol. 2, No. 3 (2023), hlm. 5-10.

[12] Anggraini, M., Sumarti, S. S., Subali, B., & Ellianawati, E. *Literatur Review: "Pengembangan Game Edukasi pada Mata Pelajaran Bahasa Jawa di Sekolah Dasar"*, JURNAL LOCUS: Penelitian & Pengabdian, Vol. 4, No. 6 (2025), hlm. 3028-3038.

[13] Ashabul, B. *"Persepsi Guru Terhadap Penggunaan Game Edukasi dalam Meningkatkan Keterlibatan dan Pemahaman Siswa di Sekolah Dasar"*, Jurnal Ilmu Pendidikan dan Pengajaran, Vol. 1, No. 1 (2025), hlm. 14-20.

educational games into the curriculum further aggravate these issues. Teachers often require additional training to optimize the use of digital tools in learning, while time constraints and limited school resources slow down the adoption of these methods.

The primary gap identified in the literature lies in the lack of systemic support in terms of policy, training, and infrastructure necessary to maximize the potential of educational games in improving reading literacy. While various studies recommend the need for comprehensive educational policies, technological infrastructure development, and teacher training, many schools continue to face constraints in accessing these resources. Therefore, this study aims to conduct an in-depth examination of the implementation of interactive educational games as a means of improving reading literacy skills among elementary school students, with an emphasis on existing challenges such as resource limitations, teacher training needs, and technological readiness. Using a Systematic Literature Review approach, this research is expected to provide more comprehensive recommendations to address the identified gaps and support the effective integration of educational games within the elementary education system.

RESEARCH METHOD

This study aimed to investigate the application of interactive educational games in enhancing reading literacy skills among elementary school students. Researchers employed a qualitative approach using the Systematic Literature Review (SLR) method. The primary objective of this research was to identify, analyse, and synthesise recent findings from various studies that examined the use of interactive educational games in the context of reading literacy, as well as to uncover the challenges and factors that influenced the successful implementation of such games in elementary schools.

Researchers conducted the literature search by accessing several relevant academic databases, including Scopus, Google Scholar, and ERIC. They used specific keywords related to the research topic, such as "interactive educational games," "reading literacy," and "elementary school." The search was restricted to articles published between 2021 and 2025 to ensure the relevance and currency of the findings included in the review.

Researchers established inclusion and exclusion criteria based on several considerations. They included only articles that specifically addressed the implementation of interactive educational games to improve reading literacy at the elementary school level. Additionally, only studies that adopted relevant qualitative or quantitative research methods and were published in indexed journals were selected for inclusion. Researchers excluded articles that were not directly related to the topic, lacked relevant data, or were not available in Indonesian or English.

The selection and data extraction process followed the pre-established inclusion criteria. Researchers extracted data that encompassed the types of educational games used, the learning approaches applied, the outcomes achieved in relation to reading literacy, and the challenges or inhibiting factors encountered during implementation. They subsequently analyzed this information to highlight existing research gaps and to provide recommendations that could support more effective educational practices in improving reading literacy through the use of interactive educational games.

RESULTS AND DISCUSSION

The synthesis of the reviewed literature revealed that the implementation of interactive educational games in reading instruction at the elementary school level comprised three interrelated focal areas. First, studies highlighted the types of interactive educational games that proved most effective in enhancing students' reading literacy skills, particularly

through multimodal approaches that integrated audio, visual, and textual elements. Second, several investigations examined the impact of educational games on enhancing students' motivation and engagement during reading activities. Third, the literature review identified key challenges faced by teachers and schools in implementing interactive educational games, including limitations in digital infrastructure and pedagogical readiness.

Table 1. Focus Area and Key Insight/Research Variable

No	Focus Area	Author(s)	Key Insight / Research Variable
1	Types of interactive educational games effective for improving elementary students' reading skills	Muthi (2025)	Interactive multimedia-based children's stories improved early graders' reading literacy skills through integrated audio, visual, and textual engagement.
2	Types of interactive educational games proven effective for enhancing elementary students' reading skills	Rahmat et al. (2024)	The Word Wall game effectively enhanced elementary students' literacy skills through contextual and enjoyable reading activities
3.	Impact of interactive educational games on student motivation and engagement	Priscilla (2025)	Reading gamification using points, challenges, and rewards increased students' intrinsic motivation and enthusiasm for literacy activities.
4	Impact of interactive educational games on student motivation and engagement	Ulpa & Jamal (2024)	Digital educational games increased active participation and learning motivation in reading instruction.
5.	Challenges in implementing interactive educational games in elementary schools	Muruga & Jamaludin (2025)	Major challenges included limited digital infrastructure, insufficient teacher training, and operational barriers at the school level.

Based on the research findings presented in Table 1, the main focus of this literature review is to analyze the effectiveness, impact, and challenges of using interactive educational games to enhance reading literacy in elementary schools. Overall, the scope of the reviewed studies covers the development of reading skills through game-based digital media, the improvement of students' motivation and engagement in learning, and the readiness of the elementary education ecosystem to integrate interactive technologies. The synthesis indicates that the successful implementation of interactive educational games depends on the alignment between technological support, pedagogical design, and sustained institutional commitment within classroom practice.

Types of Interactive Educational Games Most Effective in Enhancing Elementary Students' Reading Skills

The reviewed studies demonstrated that interactive educational games effectively improved reading skills among elementary school students by employing engaging formats that promoted active participation and positively influenced multiple components of literacy. Interactive children's stories that combined audio, visual, and interactive elements created enjoyable and contextual reading experiences, which enhanced word recognition, reading

comprehension, and students' interest in reading.[14] Students' active participation in these games also showed increased enthusiasm and engagement, which correlated with improved literacy outcomes.

Furthermore, interactive EDU-game puzzles proved effective in expanding vocabulary, grammar, and comprehension through immediate feedback and enjoyable learning experiences.[15] Researchers consistently found that the effectiveness of these games depended heavily on careful design that maximized student engagement and learning outcomes. Studies also revealed that systematically implemented educational games exhibited a positive relationship with students' reading comprehension performance while simultaneously raising engagement and motivation levels, thereby rendering the learning process more enjoyable.[16] Despite these advantages, implementation faced persistent challenges, particularly regarding the need for teacher training and adequate infrastructural support for innovative learning tools.

Word Wall games, interactive multimedia, and digital game-based learning were identified as highly effective interactive educational methods for improving reading skills in elementary students. Numerous studies indicated that the Word Wall game significantly enhanced literacy performance, including reading, writing, and text comprehension.[17] Interactive multimedia grounded in social-cognitive approaches produced substantial improvements in reading comprehension scores among first- and second-grade students.[18] Digital game-based interventions yielded particularly significant results for students with special needs, who exhibited accelerated reading development during the intervention period.[19] Tablet-based reading games increased reading efficiency immediately after implementation, although the effects declined over time.[20] Augmented reality methods showed significant improvements in reading ability, while role-playing and hunting games proved effective in smaller-scale studies.[21] Overall, these various types of interactive educational games highlight the importance of adopting innovative media to support reading literacy development at the elementary level.

The mechanisms underlying interactive educational games' enhancement of reading literacy operate through several key principles. Active student engagement via clear challenges and directed objectives sustained attention to text, while multimodal processes that integrated text, audio, images, and interaction reduced initial cognitive load and simultaneously enriched meaning construction. Immediate feedback played a critical role in

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[14] Muthi, I. *"Efektivitas Pemanfaatan Cerita Anak Interaktif untuk Meningkatkan Kemampuan Literasi Membaca Siswa SD Kelas Rendah"*, Jurnal Pendidikan Literasi Anak, Vol. 3, No. 4, (2025). hlm. 106-119.

[15] Julia, P., Nafis, B., & Ananda, R. *"Unlocking English Skills: The Impact of Interactive Edu-Game Puzzles on Elementary Students A Literature Review"*, Jurnal Bahasa dan Sastra Inggris, Vol. 7, No. 1 (2024), hlm. 109-115.

[16] Bebanco, M., & Andilan, J. *"Effectiveness of Educational Games in Teaching Reading Comprehension and Level of Engagement Among Learners"*, Psychology and Education: A Multidisciplinary Journal, Vol. 42, No. 8 (2025), hlm. 1.

[17] Rahmat, R., et al. *"Word-Wall Education Game to Enhance Literacy Skills in Elementary Schools"*, ICSTEE: International Conference of Science and Technology in Elementary Education, Vol. –, No. –, (2024), hlm. 135-150.

[18] Nurmahanani, I., Munir, M., Mulyati, Y., & Sastromiharjo, A. *"Social Cognitive Approach Through Interactive Multimedia for Early Reading Learning"*, Dinamika Jurnal Ilmiah Pendidikan Dasar, Vol. 13, No. 1 (2021), hlm. 32-37.

[19] Salgarayeva, G. I., et al. *"Enhancing Education through Digital Tools"*, European Journal of Contemporary Education, Vol. 10, No. 2 (2021), hlm. 450-461.

[20] van Uittert, A., Verhoeven, L., & Segers, E. *"Responsiveness to a Game-Based Intervention to Enhance Reading Efficiency in First Graders"*, Journal of Computer Assisted Learning, Vol. 38, No. 1 (2022), hlm. 178-191.

[21] Khusniyah, N. L., & Ariawan, S. *"The Effectiveness of Role-Playing Games (RPG) in Teaching Reading for Second Grade Students at MAN 2 Lombok Tengah"*, Jurnal Pendidikan Bahasa Inggris, Vol. 1, No. 1 (2023), hlm. 1-8.

calibrating decoding skills, vocabulary, and comprehension strategies precisely when errors occurred. Alignment of game mechanics with reading objectives for instance, morpheme matching or main-idea missions transformed practice into purposeful activity rather than mere play.

Evaluation of the evidence indicates that effect sizes were strongest for Word Wall games, early-grade interactive multimedia, and digital game-based learning for students with special needs, where significant comprehension gains occurred. Tablet-based and augmented reality interventions produced moderate effects, with improvements evident immediately post-intervention but declining without sustained maintenance. RPGs and hunting games showed promising outcomes; however, the evidence base remains limited and will require replication with larger samples. The broader context of implementation remains a critical factor, as the effectiveness of these games depends on instructional design quality, teacher readiness, and available infrastructure. Without adequate support, the learning benefits of these games may decline, underscoring the need for comprehensive preparation and resource allocation within the school environment.

Impact of Interactive Educational Games on Student Motivation and Engagement in Reading Instruction

The integration of interactive educational games significantly contributed to heightened motivation and participation among students during reading instruction. This approach transformed conventional reading activities into more engaging and enjoyable learning experiences while fostering positive attitudes toward literacy tasks. Gamification strategies markedly enhanced intrinsic motivation, with most participants displaying greater satisfaction and enjoyment throughout reading activities.[22] Immediate feedback from platforms such as Word Wall further reinforced enthusiasm and vocabulary retention.[23] Game elements, including badges, points, and leaderboards, generated healthy competition and heightened awareness of individual progress, thereby promoting active student participation. Interactive educational games also correlated with elevated engagement levels, as students actively participated in diverse game-based activities. Multimedia-supported learning environments created more stimulating atmospheres that helped mitigate constraints such as overcrowded classrooms. Nevertheless, several educators emphasized the necessity of adequate teacher training and vigilance regarding potential cognitive overload to ensure effective classroom implementation.[24]

Empirical studies consistently demonstrated that interactive educational games exerted a significant positive influence on motivation and engagement in reading instruction. Multiple investigations revealed that game-based media substantially increased early reading motivation among elementary students and encouraged active participation throughout the learning process.[25] Experimental results indicated statistically significant differences between groups exposed to interactive media and those taught via conventional methods, with the former exhibiting markedly higher motivation gains.[26] Gamification approaches likewise produced significant increases in motivation scores, underscoring the efficacy of game-based

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[22] Priscilla, I. "*Gamification for Reading Motivation in Fourth-Grade Students*", Revista Educación y Tecnología, Vol. 9, No. 3 (2025), hlm. 1-24.

[23] Angelica, W., & Afriani, I. H. "*Engaging Indonesian Elementary School Students in Reading Activities through Web-Based Educational Games*", English Language Teaching Methodology, Vol. 4, No. 3 (2024), hlm. 470-481.

[24] Nurhasanah, I., & Firdaus, M. "*Unlocking Better Reading Skills: How Multimedia and Interactive Tools Make a Difference*", ALACRITY: Journal of Education, Vol. –, No. –, (2025), hlm. 892-907.

[25] Ulpa, M., & Jamal, N. A. J. "*Pengaruh Penggunaan Game Edukasi Terhadap Motivasi Belajar Siswa*", Tadzkirah: Jurnal Pendidikan Dasar, Vol. 9, No. 2 (2024), hlm. 1-10.

[26] Prasetyo, A., et al. "*Pengaruh Media Pembelajaran Interaktif terhadap Motivasi Belajar Siswa*", Journal Central Publisher, Vol. 1, No. 11 (2023), hlm. 1257-1264.

strategies in cultivating learning enthusiasm. Overall, the use of educational games created enjoyable learning environments, increased enthusiasm, and encouraged active participation in literacy activities, making them a promising instructional method for optimizing reading skills from an early age.[27]

The use of interactive educational games positively influences students' motivation and engagement in reading through several key mechanisms. Challenges, goals, and game elements enhance students' focus and encourage active participation, while enjoyable learning experiences and reward systems foster intrinsic motivation. Immediate feedback helps student correct errors and reinforces reading comprehension, whereas interactive media present information in engaging and contextual formats. Evidence shows consistent increases in motivation, enthusiasm, and interest in reading across various learning contexts. However, most studies remain limited to quasi-experimental designs with small samples, making the findings not fully generalizable. In addition, the effectiveness of implementation depends on teacher readiness and the availability of technological infrastructure in schools.

Challenges Encountered in Implementing Interactive Educational Games to Enhance Reading Literacy in Elementary Schools

The implementation of interactive educational games in elementary schools faced multifaceted barriers encompassing technological, pedagogical, and resource-related dimensions. Many schools, particularly those in rural areas, lacked adequate digital infrastructure, including reliable internet connectivity and sufficient devices, which severely restricted students' access to game-based learning platforms.[28] Technical glitches within the games themselves further compromised effectiveness, especially for students who adapted slowly to digital environments. From a pedagogical perspective, low digital literacy among teachers and limited opportunities for professional development resulted in suboptimal application of gamification strategies. Variations in students' motivation and cognitive readiness further influenced their level of engagement in game-based learning activities. Financial constraints and crowded teaching schedules additionally restricted the optimal and sustainable use of interactive educational games in the classroom. Nevertheless, innovative approaches such as Scramble Fun Learning demonstrated that reading literacy could still improve even in resource-constrained settings, underscoring the necessity of creative adaptation supported by adequate infrastructure.

Other large-scale studies likewise reported persistent obstacles in implementing interactive educational games despite their demonstrated effectiveness in improving reading literacy. Insufficient information technology facilities, lack of technical support staff, and disruptions to school operations such as strikes, flooding, or non-academic activities emerged as major barriers to implementation.[29] These challenges were further exacerbated by the need for sufficient teacher training to optimize the use of digital media in literacy instruction.[30] Empirical evidence nevertheless showed positive outcomes, indicating that interactive educational games could increase reading skills by up to 3.63 times compared with conventional methods, although effect sizes remained moderate. However, the outcomes

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[27] Saputra, L. D., & Yasip, Y. *"Penerapan Game Edukasi untuk Meningkatkan Keterampilan Literasi Peserta Didik Kelas III"*, JUPEIS: Jurnal Pendidikan dan Ilmu Sosial, Vol. 4, No. 3 (2025), hlm. 487-493.

[28] Muruga, K., & Jamaludin, K. A. *"Challenges in the Application of Digital Gamification Approaches in Teaching and Learning at Primary Schools"*, International Journal of Research and Innovation in Social Science (IJRISS), Vol. IX, No. –, (2025), hlm. 6629–6640.

[29] Amorim, A. N., Jeon, L., Abel, Y., et al. *"Escribo Play Learning Games Can Foster Early Reading and Writing for Low-Income Kindergarten Children"*, Computers & Education, Vol. 177, No. –, (2022), 104364.

[30] Alwi, N. A., Kenedi, A. K., Anita, Y., Handrianto, C., & Rasool, S. *"Socio-Cultural Approach through Digital Teaching Modules: A Solution to Improve Beginning Reading Skills in Elementary Schools"*, International Journal of Recent Advances in Multidisciplinary Research, Vol. 6798, No. –, (2024), hlm. 4366-4377.

were not uniformly distributed: while some students experienced substantial gains, others showed declines in literacy performance. This variation suggests that the success of interactive educational games depends heavily on the readiness of school infrastructure, teacher support, and contextual adaptation at the classroom level. The collective findings indicate that innovative strategies and comprehensive institutional support will be essential for optimizing the use of interactive educational games to improve reading literacy in elementary schools.
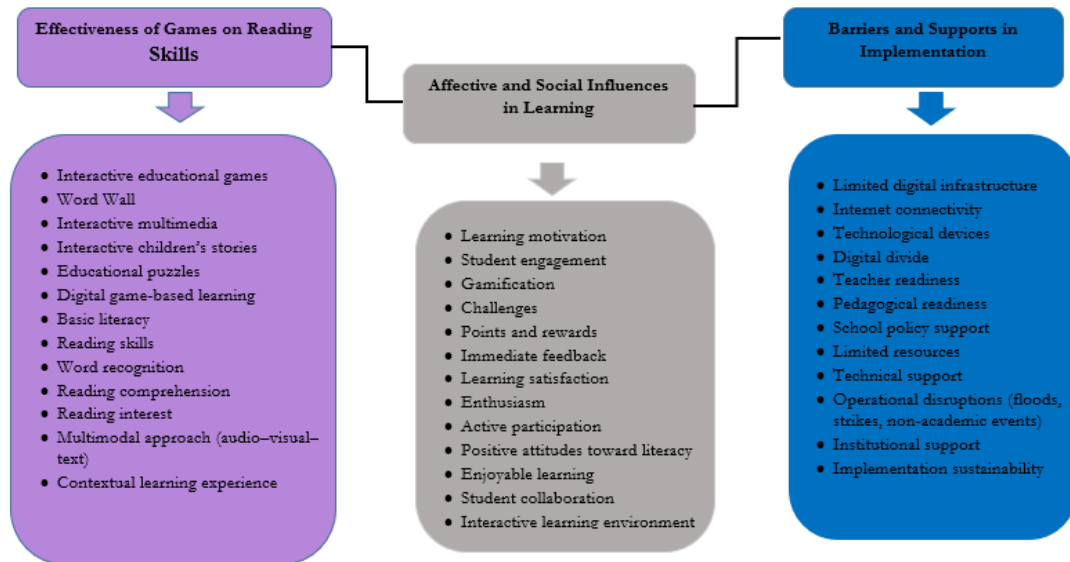

Figure 1. Conceptual Framework of Interactive Educational Games Implementation in Enhancing Reading Literacy

This figure illustrates three key components in the implementation of interactive educational games: (1) the effectiveness of games in improving reading skills, (2) affective and social influences on students' learning engagement, and (3) barriers and supports in the implementation process. These interconnected elements collectively contribute to the successful enhancement of reading literacy among elementary school students.

CONCLUSION

The findings of this study demonstrated that interactive educational games were effective in enhancing elementary students' reading abilities by increasing motivation, engagement, and reading comprehension through enjoyable and context-based approaches. However, their implementation encountered several barriers, including limited digital literacy among teachers, inadequate technological infrastructure, and restricted school resources. The success of implementation depends largely on the readiness of the educational ecosystem, particularly in terms of policy support, teacher training, and sufficient infrastructure management. Therefore, it is essential to strengthen teachers' competencies through continuous professional development and to improve technological facilities in schools especially in rural areas—to ensure equitable access to game-based learning media. Future research will need to develop gamification strategies that are context-sensitive and adaptable to the constraints faced by schools in order to address these challenges effectively.

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van Uittert, A., Verhoeven, L., & Segers, E. (2022). Responsiveness to a game-based intervention to enhance reading efficiency in first graders. *Journal of Computer Assisted Learning, 38*(1), 178–191.