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Systematic Literature Review: Developing Gamification to Enhance Elementary School Students' Learning Outcomes

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A B S T R A C T

The development of gamification as a learning media is essential to provide primary school students with a contextual, motivating learning experience that can enhance their learning outcomes. Despite its potential, research on the integration of gamification in improving learning outcomes at the primary education level remains limited. Therefore, a comprehensive literature review is necessary to identify current trends, challenges, and future opportunities for development in this area. This study aims to explore how gamification can improve critical thinking skills among primary school students from 2021 to 2025 by employing the Systematic Literature Review (SLR) method. The analysis of 18 research papers demonstrated that gamification strategies significantly improve students' learning outcomes. Furthermore, gamification not only enhances academic performance but also strengthens cognitive, affective, and social dimensions by boosting students' motivation, creativity, and meaningful engagement in the learning process. These findings suggest that implementing gamified learning media can play a crucial role in fostering a more effective and holistic education for young learners.

1. Introduction

Classroom learning is often perceived as tedious by many students because they associate it with negative terms such as boredom, examinations, homework, and punishment (Tony Buzan et al., 2008). This can lead to a dull atmosphere, causing students to lose their learning motivation due to a monotonous classroom environment and rigid teaching methods (Purnawanto et al., 2011). Learning motivation is defined as an impetus originating from the students themselves to generate enthusiasm in realizing pre-determined targets (Wardani & Setyadi, 2022). A decline in learning motivation will consequently affect the achievement of desired learning outcomes (Cahyani & Efgivia, 2021).

Education within primary schools must prioritize the provision of enjoyable and meaningful experiences to ensure that students effectively internalize knowledge and attain optimal learning outcomes (Abdiyah & Subiyantoro, 2021). Within this context, learning through play has emerged as a statistically proven strategy for enhancing student performance, primarily by fostering active participation in the process of knowledge acquisition. This pedagogical approach, facilitated by game-based mechanics, encourages exploration, collaborative interaction, and creative problem-solving, which collectively strengthen students' cognitive, affective, and psychomotor competencies (Mardiah et al., 2023). Consequently, modern instructional demands require educators to innovate and implement creative media that align with contemporary technological advancements to fulfill specific learning objectives (Berutu et al., 2023). In response to these evolving needs, gamification has surfaced as a prominent instructional medium, rapidly developing within the modern era as a versatile tool for bridging the gap between student engagement and academic rigor.

Gamification is an instructional strategy that enhances student learning motivation by integrating game elements such as leaderboards, points, missions, challenges, storylines, emotional perspectives, badges, progress bars, feedback, and rules (Carrillo et al., 2019). As the application of game attributes in non-gaming contexts, gamification has been shown to positively influence student behavior in learning (Dewi et al., 2020). Specifically, gamified learning media can boost learning motivation and, consequently, contribute to improved student learning outcomes (Wibowo et al, 2021). Furthermore, the gamification approach has emerged as a strategic innovation in 21st-century education due to its ability to balance entertainment with instruction, encouraging students to learn with greater enthusiasm and meaning. However, despite the growing importance of enhancing learning outcomes, particularly at the elementary school level—as these skills are fundamental assets for every individual—research focusing on the implementation of gamification in this specific educational setting remains limited, with most current studies being isolated or singular in scope. Therefore, a comprehensive literature review is crucial to systematically highlight how the gamification approach contributes to or has been proven effective in significantly improving learning outcomes, especially at the elementary school level.

The present study aims to critically examine the implementation of gamification strategies in fostering the development of critical thinking skills among elementary school students between 2021 and 2025. By analyzing this specific timeframe, the research captures the evolution of digital and pedagogical shifts in the post-pandemic era. The findings are expected to offer significant theoretical and practical contributions, serving as a robust reference for educators and curriculum designers. Specifically, this research seeks to inform the development of innovative, interactive, and contextualized instructional frameworks that resonate with contemporary learning needs. Ultimately, the integration of such strategies is anticipated to drive an optimal improvement in student learning outcomes, bridging the gap between theoretical gamification constructs and classroom practice.

2.   Methodology

The literature review method in this study was conducted systematically by adapting the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to ensure transparency and systematic selection. The process began with the formulation of inclusion and exclusion criteria, followed by an article search using the keyword "Gamification" across selected databases. A total of 2.541 articles were initially identified within the scope of 2021 to 2025. The initial 1,000 reference data points were imported into Mendeley Reference Manager in CSV and RIS formats for easy management. Subsequently, the article selection process was carried out through three main stages collection, appraisal, and interpretation of evidence adhering strictly to the PRISMA model. After rigorous screening, 18 articles were deemed eligible for final analysis. The software used for comprehensive data acquisition was Publish or Perish, and VOSviewer was utilized for data visualization.

Table 1. Inclusion and Exclusion Criteria

Inclusion	Exclusion
Journal Article	Books, magazines, dissertations
The article was published between 2020 and 2025	The article was published before 2020
Google Scholar and Crossref	Besides Google Scholar and Crossref
Elementary School	High School and University

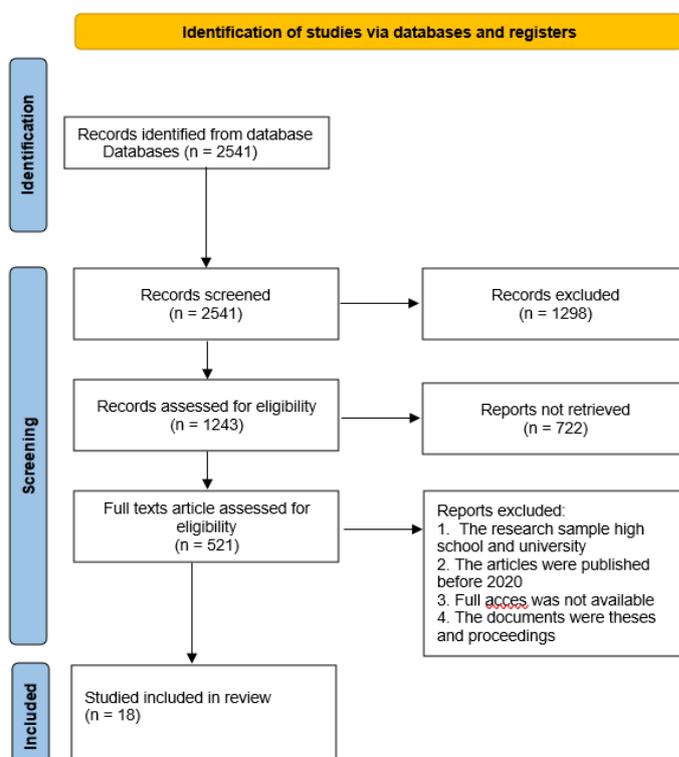The PRISMA model flowchart is presented in Figure 1.

Figure 1. PRISMA flow diagram

3.   Results and Discussion

In recent years, the integration of gamification strategies within pedagogical frameworks has emerged as a central focus for scholars aiming to optimize student learning outcomes. This systematic review synthesizes a total of 18 peer-reviewed articles, representing a balanced cross-section of the current academic landscape. The dataset is comprised of 11 publications from national journals and 7 international articles, reflecting a diverse geographical reach. These studies provide a comprehensive overview of how gamified elements are being applied globally to drive educational success. To further contextualize these findings, a detailed temporal distribution of the selected literature, spanning the specified publication years, is illustrated in Figure 2.
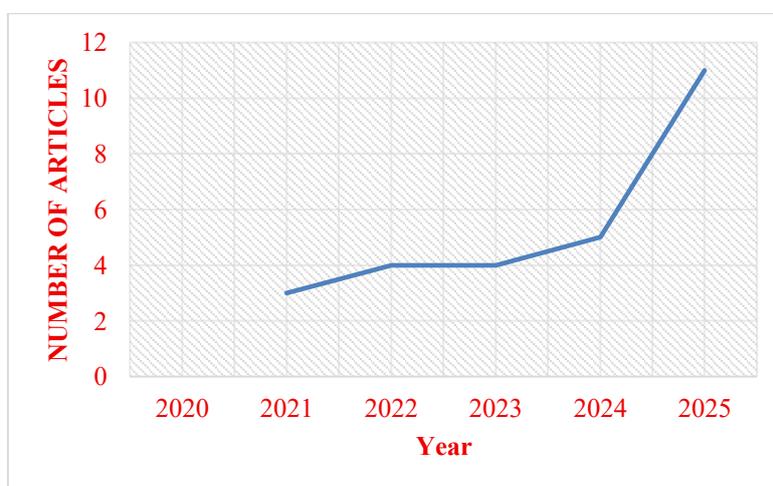

Figure 2. Representation of Article Publication Year

Based on Figure 2, "As illustrated in Figure 2, the chronological distribution of article publications exhibits a notable upward trend, reaching its peak in the final year of the 2021–2025 observation period. This growth signifies an intensifying academic interest in the subject matter over recent years. Geographically, Indonesia emerged as the predominant contributor to the field, producing 14 articles. This output significantly exceeds the contributions from other nations, including the United Kingdom and the United States, suggesting a strong regional focus or a robust research impetus within the Indonesian academic community. A more comprehensive visualization regarding the global distribution of these scholarly publications by country is further detailed in Figure 3, providing a broader context for the international research landscape.
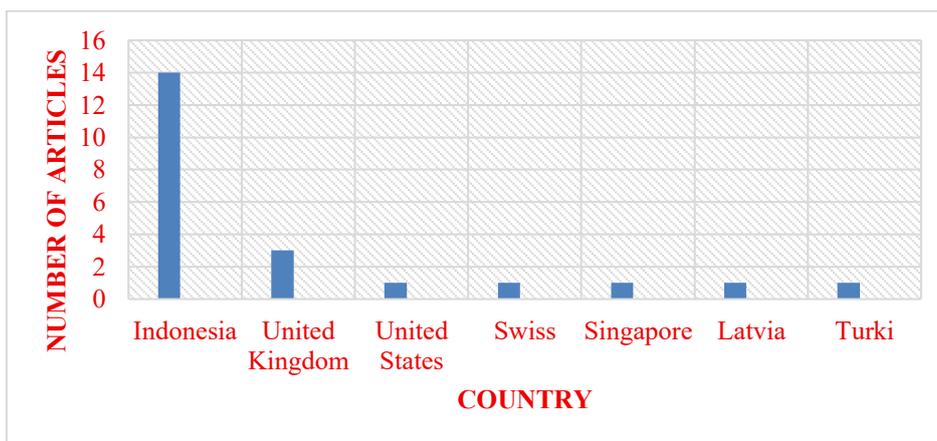
Figure 3. Scientific publications from 2021 to 2025 by country of origin

As shown in Figure 4, the distribution of research methodologies reveals a clear predominance of quantitative approaches within the identified empirical studies. Specifically, experimental research emerges as the most frequently employed design, underscoring a strong academic focus on establishing causal relationships and measurable interventions. This is followed by qualitative research, which comprises 11 distinct studies. This methodological trend suggests that while there is a significant emphasis on statistical validation in the field, there remains a substantial body of qualitative inquiry dedicated to exploring the nuanced experiences of participants. The overall distribution of scholarly publications from 2021 to 2025, categorized by research methodology, is further illustrated in Figure 4.
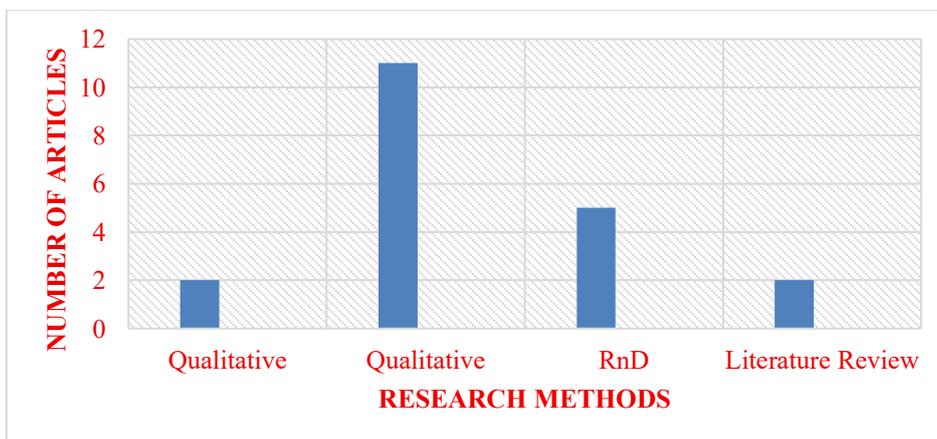

Figure 4. Scientific publications from 2021 to 2025 by on research methodes

Using VOSviewer for advanced bibliometric visualization, this study identified a robust correlation between the implementation of gamification strategies and student learning outcomes throughout the period from 2021 to 2025. The analysis suggests that gamification has evolved from a supplemental tool into a core pedagogical driver within recent educational research. These clusters highlight the convergence of digital engagement and academic performance, providing a clear

roadmap of the current research landscape and identifying emerging niches within the field of educational technology. Furthermore, the visualization results from VOSviewer regarding the synchronization and clustering of keywords are presented in Figure 5.
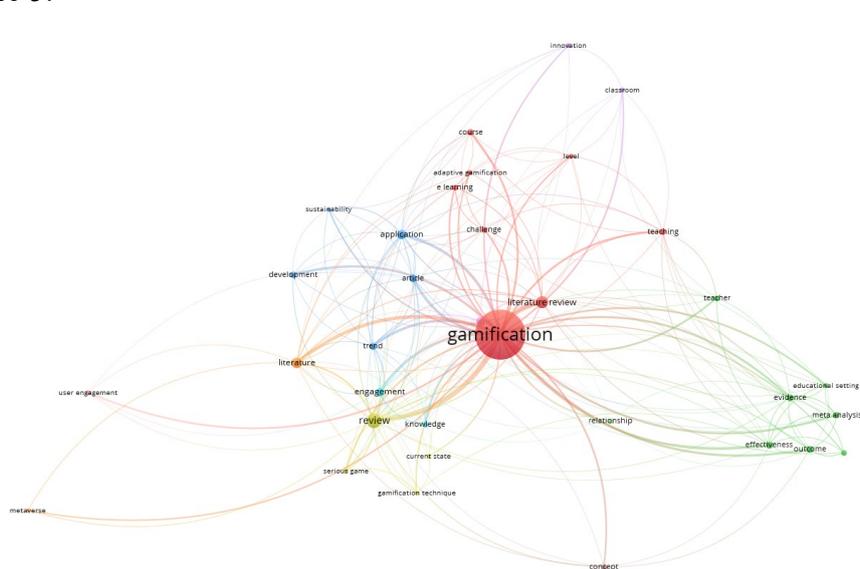

Figure 5. VOSviewer visualization based on Title

As illustrated in the keyword co-occurrence visualization in Figure 5, the network analysis reveals a highly integrated conceptual framework, with gamification functioning as the primary central node. The high density of links radiating from this core term underscores its role as the fundamental catalyst in contemporary educational discourse. Notably, the close spatial proximity and strong associative strength between gamification and the clusters of "motivation" and "learning outcomes" highlight a robust empirical synergy. This interconnectedness suggests that research in this field predominantly views gamification not as an isolated tool, but as a strategic mechanism specifically designed to trigger psychological drivers (motivation) which, in turn, yield measurable academic gains. Furthermore, the prominence of these connections indicates that the current research trajectory is centered on validating the efficacy of game-based interventions in enhancing student performance and engagement.

The data indicate that the variation in the number of publications across the specified period contributed to a diverse increase in overall publications. Direct research conducted in the United States by (Manuel et al., 2024) highlighted that gamification developed through tools or in immersive environments can generate greater motivation for learning among primary education children, fostering commitment, enthusiasm, and participation in their educational process. Similar findings were reported in the United Kingdom by (Judy et al., 2021), whose study at the primary school level focused on elementary students in mathematics. The implementation of gamification showed a significant positive effect on learning outcomes when comparing pre-test and post-test scores across all assessed areas. These assessed areas, crucial for improving learning outcomes, included

interpreting data, conducting analysis, evaluating situations, drawing conclusions, presenting concepts, and effectively managing cognitive processes. This is further supported by (Syahrizal Dwi et al., 2021), who stated that the implemented gamification approach has a positive effect on students' knowledge retention, regardless of age and gender.

A study by (Rayan et al., 2024) revealed a significant positive influence on learning outcomes through the application of gamified learning, structured across five key segments: student understanding, student motivation, illustrating science values, examining correlations, and student motivation. The gamification media utilized were concrete but implemented in a sophisticated and efficient manner, emphasizing enjoyable learning while simultaneously training students in problem-solving. This finding is further supported by the work of (Noe Manuel et al., 2024) in a different country, Singapore, which suggested that the analysis of gamification tools resulted in an improvement in learning outcomes. This improvement was achieved by conducting formative assessments of students' subject matter and applying statistical interventions to gauge the effectiveness of the approach.

Gamification is widely recognized as a powerful tool to enhance learning outcomes, primarily by leveraging game-based mechanics, aesthetics, and game thinking to motivate students during instructional activities (Ariyanto et al., 2023). Specific gamification elements, such as earning points and using leaderboards, have been shown to significantly boost student learning performance (Ortiz-Rojas et al. 2025). Supporting this evidence, a similar study by (Anintia et al., 2025) demonstrated that gamification was highly effective in improving students' intrinsic motivation, engagement, and understanding, resulting in an active participation rate of 85% and an average grade increase of 20% compared to conventional teaching methods.

Given that primary school students are still fond of playing (Caroline et al., 2024), gamified learning media presents an opportune solution to address declining student motivation. The integration of gamification into the learning process not only enhances learning motivation but also encourages students to study more diligently and remain motivated to achieve the highest scores (Qodr et al., 2020). Furthermore, this approach makes learning more enjoyable and interactive for students while effectively helping them hone the essential knowledge required in the modern era.

The implementation of gamification in lower-grade primary education has emerged as a transformative strategy for enhancing both learning motivation and foundational literacy outcomes. By integrating game-design elements—such as points, leaderboards, and narrative quests—into reading and writing instruction, educators can create a high-engagement environment that resonates with the developmental needs of young learners. Research indicates that such gamified environments effectively stimulate intrinsic motivation, encouraging students to persist through challenging phonological and decoding tasks (Hanus & Fox, 2015). Furthermore, the interactive nature of gamification provides immediate feedback, which is crucial for early literacy development as it allows students to correct errors

in real-time and internalize linguistic rules more effectively (Sailer et al., 2017). Consequently, this pedagogical approach not only bolsters student engagement but also leads to significant improvements in measurable learning outcomes, ensuring that students achieve essential literacy milestones through a structured yet enjoyable process (Deterding et al., 2011).

Beyond its immediate impact on engagement, the integration of gamification as both a pedagogical approach and a specialized instructional medium facilitates a profound shift in the overall classroom dynamic. For young learners, the structural elements of gamification—such as scaffolding through progressive levels ensure that the academic challenge remains balanced with their developing skill sets, thereby maintaining high levels of self-efficacy and preventing the frustration often associated with early literacy acquisition (Ryan & Deci, 2017). This balanced approach directly correlates with superior long-term retention of linguistic concepts and enhanced cognitive resilience. Furthermore, for educators, gamification serves as a robust diagnostic and instructional tool; it provides teachers with real-time data on student progress, enabling more precise, data-driven, and personalized interventions (Kapp, 2012). By adopting gamified media, teachers can transition from traditional instructional roles to becoming facilitators of an immersive learning ecosystem, which fosters a more creative, responsive, and innovative teaching environment (Plass et al., 2015).

The synthesis of literature from 2021 to 2025 provides robust evidence that gamification, as both a pedagogical approach and an instructional medium, significantly optimizes literacy development and learning motivation in primary education. By integrating immersive elements—such as narrative-driven challenges, real-time feedback loops, and reward-based scaffolding—gamification effectively lowers the affective filter of lower-grade students, transforming complex phonological and decoding tasks into achievable, high-interest activities. Recent empirical studies consistently demonstrate that this method fosters a state of 'flow,' where increased task persistence directly translates into superior vocabulary acquisition, reading fluency, and comprehension levels compared to conventional methods. Moreover, the dual-utility of gamified platforms allows for data-driven teaching, empowering educators to provide personalized literacy interventions that are both timely and effective. Ultimately, the successful deployment of gamification bridges the gap between digital-native students' psychological needs and the rigorous requirements of early literacy standards, establishing a sustainable foundation for long-term academic excellence.

4. Conclusion

Extensive literature reviews indicate that the increasing adoption of gamification within elementary education effectively stimulates student motivation, which serves as a critical catalyst for the significant improvement of overall learning outcomes. This pedagogical strategy plays a transformative role in reinforcing students' cognitive, affective, and social domains by fostering heightened levels of

creativity and sustained engagement in meaningful learning activities. By strategically leveraging game-based elements whether through digital technology integration or kinesthetic physical activities educators can facilitate the indirect development of essential competencies within a structured yet enjoyable framework. Furthermore, such purposeful learning experiences bridge the gap between play and formal instruction, ensuring that young learners remain intrinsically motivated while achieving specific developmental milestones. Ultimately, gamification creates a student-centered environment that aligns academic rigor with the psychological and social needs of the 21st-century classroom.

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