

Integration of Gamification in the Practice of Social Science Learning Pedagogy in Elementary Schools

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ARTICLE INFO

Keywords:

gamification;
IPAS learning;
elementary school;
student engagement;
case study

Article history:

Received 2025-10-02

Revised 2026-03-20

Accepted 2026-03-31

ABSTRACT

Low student engagement in Natural and Social Sciences (IPAS) learning remains a persistent challenge in Indonesian elementary education, particularly in contexts where teacher-centered approaches dominate. Gamification has emerged as a promising pedagogical strategy to enhance motivation and participation; however, qualitative insights into its classroom implementation remain limited. This study aims to explore how gamification is applied in primary IPAS learning and how it influences student engagement and motivation. This research employed a qualitative case study design conducted at an elementary school in Majalengka, Indonesia. Data were collected over one week through classroom observations, semi-structured interviews with two teachers and eleven Grade 5 students, and documentation analysis of lesson plans and learning media. Data were analyzed using the interactive model of data reduction, display, and conclusion drawing. The findings indicate that gamification—implemented through digital platforms such as Wordwall and Quizizz, as well as paper-based adaptations—significantly enhanced students' behavioral, cognitive, affective, and social engagement. Students demonstrated increased participation, enthusiasm, collaboration, and persistence in completing learning tasks. Teachers also reported a more dynamic and interactive classroom environment. However, challenges were identified, including limited instructional time, varying levels of digital literacy, and technical constraints. These results suggest that gamification can serve as an effective and adaptable pedagogical approach to foster student engagement in elementary IPAS learning. Its successful implementation depends not only on technology but also on teachers' pedagogical design and contextual adaptation, highlighting the need for sustained professional development and infrastructure support.

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1. INTRODUCTION

The rapid advancement of digital technology has transformed the educational landscape, urging teachers to design learning experiences that suit the characteristics of 21st-century learners. In Indonesia, the teaching of Natural and Social Sciences (IPAS) in primary schools often encounters low student engagement and limited intrinsic motivation because lessons still rely heavily on teacher-centered approaches. This condition highlights the urgent need for innovative pedagogical strategies that can foster curiosity, active participation, and enjoyment in learning.

One promising approach to address this issue is gamification, which refers to the integration of game design elements into non-game contexts such as education. Numerous studies have demonstrated that gamification can increase students' motivation, participation, and learning outcomes by utilizing mechanics like points, badges, leaderboards, and challenges (Werbach & Hunter, 2012; Sailer & Homner, 2020). Global evidence has shown that gamified learning fosters active engagement and enhances knowledge retention (Rodrigues et al., 2019). However, the effectiveness of gamification is influenced by contextual factors, including teachers' readiness, students' digital literacy, and the availability of technological infrastructure.

Although research on gamification in education has grown considerably, most existing studies employ quantitative approaches focusing primarily on measuring learning outcomes. In contrast, qualitative studies that explore teachers' and students' direct experiences in classroom implementation remain limited, especially at the elementary level (Faradina et al., 2025). This gap indicates the need for in-depth exploration of how gamification is integrated into real learning contexts, how it shapes students' engagement and motivation, and what obstacles teachers encounter in the process.

This issue becomes particularly relevant within Indonesia's local educational settings, such as Majalengka, a semi-rural district in West Java where digital infrastructure is gradually developing. Investigating how gamification is implemented in such emerging digital contexts can provide a nuanced understanding of both its potential and limitations in improving learning engagement.

Accordingly, this study aims to explore the implementation of gamification in IPAS learning at SDIT Tazkia Insani Majalengka, focusing on how teachers apply game-based strategies in lesson planning and classroom activities, how these strategies affect student motivation and engagement, and what challenges arise during their implementation.

2. METHODS

This study employed a qualitative research design using a case study approach, which was considered appropriate for exploring the implementation of gamification in real classroom contexts. The research was conducted at SDIT Tazkia Insani, an Islamic private elementary school located in Majalengka, West Java, Indonesia. The school was purposively selected because it is one of the early adopters of digital-based learning and has integrated gamification tools into classroom practices, making it suitable for examining the phenomenon in depth. Purposed to make this research more easier to understand, the research flow is presented in Figure 1.

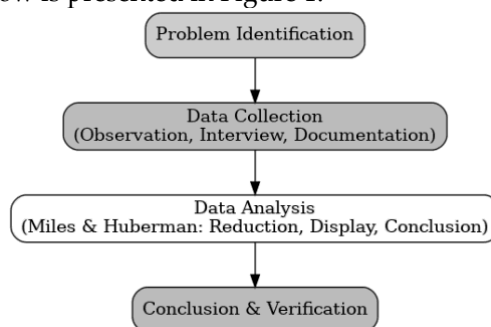


Figure 1 Research flow of gamification implementation study

2.1 Participant

The participants consisted of two teachers and eleven Grade 5 students who were directly involved in gamified IPAS learning activities. In addition, two Grade 5 classes (rombel) were observed to capture the broader classroom dynamics. The students ranged in age from 10 to 11 years old. Teachers were selected purposively based on their experience in using gamified media such as Wordwall and Quizizz in instructional practices.

2.2 Data Collection

Data were collected over the course of one week using three complementary techniques that supported each other to ensure the richness and validity of the findings. Classroom observations were conducted to document how gamification was integrated throughout the teaching and learning activities. In addition, semi-structured interviews with teachers and students were carried out to gain deeper insights into the applied methods, levels of engagement, and challenges encountered during implementation. The data collection process was further supported by documentation analysis, which involved reviewing lesson plans, instructional media, and digital learning resources used in the classroom. To strengthen the credibility of the findings, triangulation of data sources and methods was applied, as illustrated in Figure 2, which presents the triangulation strategy employed in this study. The overall research process from problem identification to conclusion drawing—followed the sequence shown in Figure 1, while Figure 3 visualizes the interactive model of qualitative data analysis adapted from Miles and Huberman (1994).

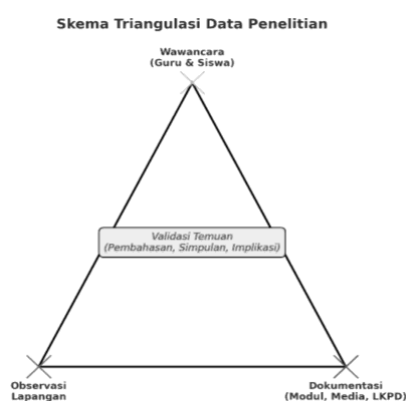


Figure 2 Triangulation of data collection methods

2.3 Data Analysis

The collected data were analyzed using the interactive model of Miles and Huberman (1994), involving three stages: data reduction, data display, and conclusion drawing. Patterns and themes were identified inductively, focusing on how gamification influenced student engagement and motivation.

2.4 Ethical Considerations

All research activities were conducted with permission from the school principal and participating teachers. Informed consent was obtained verbally from students and their parents prior to data collection. The participants' identities were anonymized to maintain confidentiality, and participation was voluntary throughout the study.

Model Analisis Data Kualitatif - Miles, Huberman, & Saldña (2014)

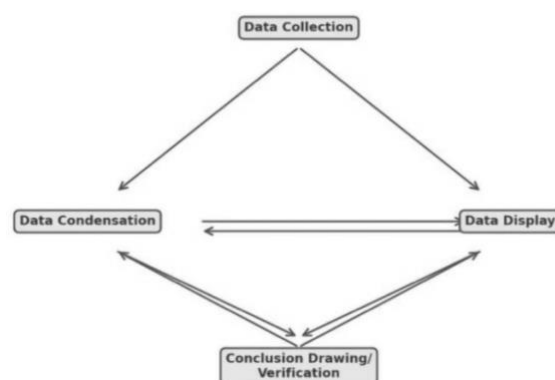


Figure 3. Interactive model of qualitative data analysis (Miles, M. B. & Huberman, 1994)

3. FINDINGS AND DISCUSSION

3.1 Findings

The findings of this study illustrate how gamification was applied in IPAS learning at SDIT Tazkia Insani, focusing on classroom implementation, student engagement, and encountered challenges. Data collected through observations, interviews, and document analysis reveal that teachers designed and executed gamified lessons intentionally, ensuring that game-based activities aligned with the learning objectives and classroom context.

During the planning stage, teachers collaborated to adapt lesson plans and determine which materials were most suitable for gamification. One teacher explained that each game was chosen based on its potential to reinforce the intended learning goals. Before beginning the activity, the teacher explicitly communicated the learning objectives to students, emphasizing that playing was part of the learning process. Lesson plans and instructional media confirmed this alignment, as the design documents showed game-based tasks placed strategically within each phase of learning.

The classroom observations showed that the teachers applied gamification through both digital and non-digital means. In the opening activities, Wordwall games such as "Pairing Words" and "Pop-and-Drop" were used to recall prior knowledge and introduce new concepts in an enjoyable way. The teacher observed that students became more enthusiastic and asked more questions when lessons began with a game. In the main learning phase, Quizziz and paper-based "speed quizzes" were employed to reinforce understanding and stimulate healthy competition among students. While Quizziz was used in limited sessions due to school restrictions on device use, the paper-based version allowed all students to participate equally.

Evidence from observations and interviews indicates that gamification enhanced student engagement across cognitive, affective, and behavioral domains. Students were visibly active and motivated throughout the activities. Many volunteered to answer questions, encouraged their peers, and celebrated success together. One student commented that "it feels like playing, not studying, but I still understand the lesson," while another said that seeing their name on the leaderboard "made me happy and want to keep trying." The classroom atmosphere became lively, with laughter and peer encouragement marking every game session.

However, several challenges emerged during implementation. Teachers reported limited instructional time because of transitions between explanation and gameplay, and managing students' excitement sometimes required extra effort. Technical problems, such as slow internet connections or delayed projector responses, occasionally disrupted the flow of lessons. One teacher mentioned that "when the projector loads too long, the students start talking and lose focus." Some students also felt

discouraged when losing repeatedly or struggling with difficult questions, with one remarking that “losing too often makes me lazy to continue.”

Despite these obstacles, the overall results demonstrate that gamification contributed to a more engaging, interactive, and student-centered learning process. Teachers’ reflective notes also indicated that students maintained their interest even when technical barriers arose, as they often requested to replay the games or create new challenges. Documentation analysis further confirmed that the integration of game-based activities supported lesson objectives by providing a structured yet flexible format that promoted both fun and meaningful learning experiences. To provide a clearer overview of the findings, the main aspects of gamification implementation are summarized in Table 1.

Table 1 Summary of Research Findings

Focus	Findings	Supporting Evidence
Teaching Methods	Gamification embedded in all lesson stages (opening, main, closing), Wordwall for warm-up activities (pairing words, pop-and-drop), Quizizz for reinforcement and assessment, Contextualized content linked to real-life problems, Game elements: points, leaderboards, rewards.	Lesson plans, classroom interview, teacher interview
Student Engagement (Behavioral)	Active participation and attentiveness, Students eager to take turns, Persistence in answering even difficult questions	Classroom observation
Student Engagement (Cognitive)	Students applied analysis and problem-solving strategies, Games supported deeper understanding of IPAS concepts, Preferred interactive tasks over traditional drills.	Student interview, classroom observation
Student Engagement (Affective)	Students expressed joy and motivation, Positive emotions reinforced through ranking and rewards, High scores fostered pride and persistence.	Classroom observation
Student Engagement (Social)	Collaboration and peer support observed, students shared strategies and encouraged peers, Enhanced teamwork and social interaction.	Classroom observation
Challenges	Time management difficulties due to game sessions and technical delays, Variation in students’ digital literacy, Teacher faced adaptation issues in creating interactive content, Limited internet stability and device availability hindered smooth implementation.	Teachers interview, classroom observation

3.2 Discussion

The findings of this study provide strong evidence that gamification serves as a powerful pedagogical strategy to increase student motivation and engagement in elementary IPAS learning. This aligns closely with the principles of Self-Determination Theory (Ryan & Deci, 2017), which emphasizes that intrinsic motivation flourishes when learners’ psychological needs for competence, autonomy, and relatedness are fulfilled. Within the gamified classroom environment, students experienced all three elements. Points and leaderboards provided a sense of competence as learners could measure their progress, while freedom during group challenges enhanced their autonomy. Simultaneously, the collaborative and playful atmosphere of gamified activities cultivated relatedness among peers, reinforcing a sense of belonging in the learning process.

These findings are consistent with previous meta-analytical and empirical research that demonstrated how gamification can foster motivation and engagement in educational settings. As Sailer and Homner (2020) observed, “gamification offers significant small positive effects on cognitive, motivational, and behavioral learning outcomes.” Their findings validate the positive behavioral and emotional responses recorded in this study, where students exhibited increased enthusiasm, volunteered to participate actively, and showed persistence when completing gamified tasks. Likewise, Hürsen and Bas (2019) highlighted that “gamification applications positively impact students’ motivation to learn science and contribute to the development of positive attitudes toward lessons.” The parallels with the present study are evident in how gamified IPAS sessions shifted classroom dynamics from passive listening toward joyful participation, curiosity, and collaborative learning.

Beyond its motivational function, the present research underlines that the effectiveness of gamification is fundamentally pedagogical rather than purely technological. As Rodrigues et al. (2019) argued, “gamification is not only a technological tool but a design framework that enhances user engagement through motivational elements.” This is reflected in how teachers in this study designed a hybrid approach that combined digital platforms like Wordwall and Quizizz with low-tech adaptations, such as paper-based quizzes that mimicked competitive digital gameplay. This hybridization allowed teachers to preserve the motivational structure of gamification while ensuring inclusivity for students with limited access to devices or weaker digital literacy. This perspective is supported by Bloom’s (1956) taxonomy of learning objectives, which posits that engagement is optimized when learning activities stimulate both cognitive and affective domains. Through gamified tasks, students did not merely recall or understand concepts but also applied, analyzed, and evaluated them in a dynamic and competitive context.

The results also provide practical evidence supporting the SAMR model (Puentedura, 2010), which describes the progressive transformation of learning through technology. In this study, gamification represented the *Modification* and *Redefinition* stages, as teachers restructured traditional IPAS lessons into interactive experiences that would not have been possible without digital and game-based frameworks. Wordwall and Quizizz were not used simply to substitute worksheets; instead, they redefined how motivation and feedback were embedded within the learning process.

However, despite its promising outcomes, several challenges were identified. Teachers faced limited instructional time due to the integration of game segments within a fixed schedule, while varying levels of digital literacy among students caused uneven participation. Moreover, technical issues such as unstable internet connectivity occasionally disrupted learning continuity. These constraints mirror the concerns raised by Nursetyo (2023), who stated that “*efektivitas gamifikasi tidak ditentukan oleh teknologi yang digunakan, melainkan oleh bagaimana guru merancang tantangan belajar yang bermakna bagi siswa.*” Therefore, this study emphasizes that the sustainability of gamified learning requires not only adequate infrastructure but also teacher capacity-building in designing pedagogically sound and context-sensitive gamified lessons.

Another critical insight derived from this study relates to the contextual uniqueness of Indonesian elementary education, particularly in semi-rural areas such as Majalengka. Unlike previous research that mainly focused on urban or higher education settings, this study shows that gamification can still be effective even under moderate technological constraints. The adaptation of digital platforms into hybrid or paper-based forms demonstrates the flexibility of gamification in diverse classroom environments. This finding contributes to the growing body of qualitative literature showing that meaningful educational innovation in Indonesia does not depend solely on advanced technology but rather on teachers’ creativity, commitment, and reflective practice.

Ultimately, the discussion underscores that gamification is not a temporary trend but a sustainable educational innovation when rooted in sound pedagogy, localized adaptation, and continuous teacher reflection. When integrated thoughtfully, gamification becomes more than a classroom strategy; it becomes a cultural shift toward active, student-centered, and meaningful learning experiences.

To summarize the interrelation between the theoretical framework and the empirical findings, Figure 4 illustrates the conceptual model of gamification implementation in IPAS learning. The model depicts how gamification elements such as points, leaderboards, rewards, and digital media—stimulate student motivation and engagement, which in turn enhance the overall learning experience in a fun, interactive, and collaborative manner. At the same time, it highlights contextual challenges related to time constraints, teacher pedagogical skills, and digital literacy, which must be addressed to ensure sustainable integration of gamification in elementary classrooms.

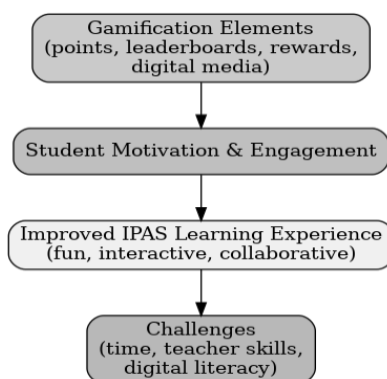


Figure 4 Conceptual model of gamification implementation in IPAS learning

4. CONCLUSION

This study concludes that gamification significantly enhances student engagement, motivation, and collaboration in Natural and Social Sciences (IPAS) learning at the elementary level. By integrating digital platforms such as Wordwall and Quizizz, teachers were able to embed elements of points, leaderboards, and rewards that transformed classroom dynamics into more interactive and enjoyable experiences. These results demonstrate that gamification can serve as an effective pedagogical approach for fostering meaningful participation and enthusiasm among young learners. However, the study also reveals several challenges, including limited instructional time, variation in students' digital literacy, and teachers' need for greater digital competence. Addressing these issues is essential to sustain the positive outcomes of gamified learning.

From a practical perspective, the findings carry important implications for multiple stakeholders. Teachers need continuous professional development in designing and managing gamified lessons effectively. Schools should invest in strengthening digital infrastructure and providing adequate devices to support interactive learning. Meanwhile, educational policymakers are encouraged to facilitate localized adoption of gamification strategies through training and integration into the Merdeka Curriculum framework. To fully realize gamification's potential in IPAS learning, efforts must extend beyond classroom innovation toward systemic support in teacher training and infrastructure development. With consistent collaboration between educators, schools, and policymakers, gamification can evolve from an instructional experiment into a sustainable strategy for nurturing curiosity, collaboration, and scientific literacy in Indonesia's elementary education.

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