

# Deconstructing Problems in Elementary Social Studies Learning through the Inconsistency of Gamification Models and Their Impact on Critical Thinking Skills: A Systematic Literature Review

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## Abstract

The increasing integration of digital technology in twenty-first-century education has encouraged the use of gamification to enhance student engagement in primary school Social Studies. However, its effectiveness in supporting critical thinking remains unclear and may depend on game mechanics, instructional design, and contextual conditions. This study systematically examined the effectiveness and implementation challenges of gamification in developing critical thinking in primary school Social Studies. A Systematic Literature Review (SLR) following the PRISMA protocol was conducted to identify, evaluate, and synthesize 20 journal articles published between 2021 and 2026. The findings show that gamification does not consistently produce positive cognitive outcomes. Speed-oriented mechanics may encourage rapid responses and superficial reasoning, while competitive leaderboards may create disparities in learning experiences. Excessive reliance on external rewards may also weaken intrinsic motivation. In addition, limited digital infrastructure and the absence of structured reflection or debriefing can restrict gamified activities to surface-level engagement rather than deeper critical thinking. Overall, the educational value of gamification depends less on the presence of game elements than on their integration into instructional design. Gamification is more likely to foster logical reasoning and critical thinking when digital challenges are supported by guided reflection, meaningful feedback, and contextualized content. These findings emphasize appropriate media selection and stronger teacher competence in designing adaptive gamified learning experiences that support students' cognitive development.

**Keywords:** Critical thinking, Gamification, Primary education, Social Studies, Systematic literature review.

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## I. INTRODUCTION

The transformation of twenty-first-century education has encouraged a shift from teacher-centered instruction toward approaches that provide learners with greater opportunities to engage actively in cognitive processes. In primary education, Social Studies plays an important role in developing students' logical reasoning and social character by enabling them to understand various social phenomena. However, the implementation of Social Studies instruction continues to face several challenges. Rahmawati and Yusuf (2024) identified that Social Studies content is often perceived as monotonous because of the predominance of narrative text-based presentation. Similarly, Indriani and Fauzi (2024) indicated that instruction dominated by information transmission and linear memorization may limit students' cognitive engagement with social phenomena. These challenges highlight the need to restructure instruction through more interactive learning media without diminishing the substantive content and social values embedded in Social Studies (Yulianti & Siregar, 2024).

One increasingly adopted approach to addressing these challenges is the integration of digital technology through gamification. Gamification incorporates game elements, such as points, badges, challenges, and leaderboards, into learning activities to promote student engagement. Arif and Novi (2025) indicated that game-based interventions can support information retention and create a more responsive learning environment. Similarly, Safitri and Ahmadi (2025) found that dynamic visual stimulation in game-based media can support the learning characteristics of students at the concrete operational stage. Digital platforms therefore have the potential to support learning processes and academic achievement among primary school students when appropriately integrated into instructional design (Amron & Mustika, 2025).

Within the context of the *Kurikulum Merdeka* (Independent Curriculum), Social Studies instruction is also directed toward developing higher-order thinking skills, including critical thinking. This ability requires students not merely to recall information but also to analyze problems, evaluate information, construct arguments, and make decisions based on logical reasoning. Triana and Mulyadi (2025) emphasized the importance of assessments incorporating contextual case studies and analytical narratives to support these abilities. Within this framework, gamification has the potential to function not merely as a means of increasing engagement but also as a learning environment that enables students to explore problems more actively (Dhorifa & Rahmawati, 2025). Khairat and Sitorus (2026) further indicated that appropriately designed game integration can provide a simulated environment in which students can develop argumentation and logical reasoning skills.

Nevertheless, the benefits of gamification for cognitive processes do not consistently follow a positive pattern. Certain game-design characteristics may instead limit the depth of information processing. Ridho and Amin (2024), for example, indicated that speed-based quizzes (*time-attack*) may encourage rapid responses without providing sufficient time for analysis. From a psychological perspective, Dewantara and Rosmawati (2026) suggested that real-time leaderboards may create academic pressure for some students, whereas Maya and Ridwan (2024) indicated that repetitive use of digital rewards may shift students' learning orientation from intrinsic motivation toward external rewards. Furthermore, limited digital infrastructure, unstable internet connectivity, and insufficient opportunities for reflection following game activities may constrain the achievement of the intended cognitive outcomes of gamification (Wahyuni & Nuraeni, 2023; Diana & Purwanto, 2024; Hanah & Muktar, 2024).

These issues suggest that the effectiveness of gamification is determined not merely by the presence of game elements but by how those elements are integrated with learning objectives, content, cognitive activities, and reflection. Previous literature has also identified other issues that have received insufficient attention. Nurdin and Amiruddin (2025) highlighted potential mismatches between global game content and local cultural contexts, while Dani and Totok (2024) identified limitations in automated assessment systems that may reduce complex thinking processes to score-based outcomes. These concerns are particularly relevant to Social Studies because the development of critical thinking requires analysis, argumentation, contextual interpretation, and reflection, which cannot always be adequately represented through points, rankings, or correct-incorrect responses.

Although research on educational games and gamification continues to expand, the existing literature tends to emphasize engagement, motivation, and learning outcomes, whereas evidence regarding how gamification design characteristics support or constrain primary school students' critical thinking has not yet been systematically integrated. Moreover, variations in game mechanics, instructional contexts, digital infrastructure, and reflection strategies mean that the effectiveness of gamification cannot be assumed to be uniform across learning conditions. This gap highlights the need for a synthesis that not only identifies the potential benefits of gamification but also evaluates its implementation boundaries and the conditions that determine its effectiveness in Social Studies learning.

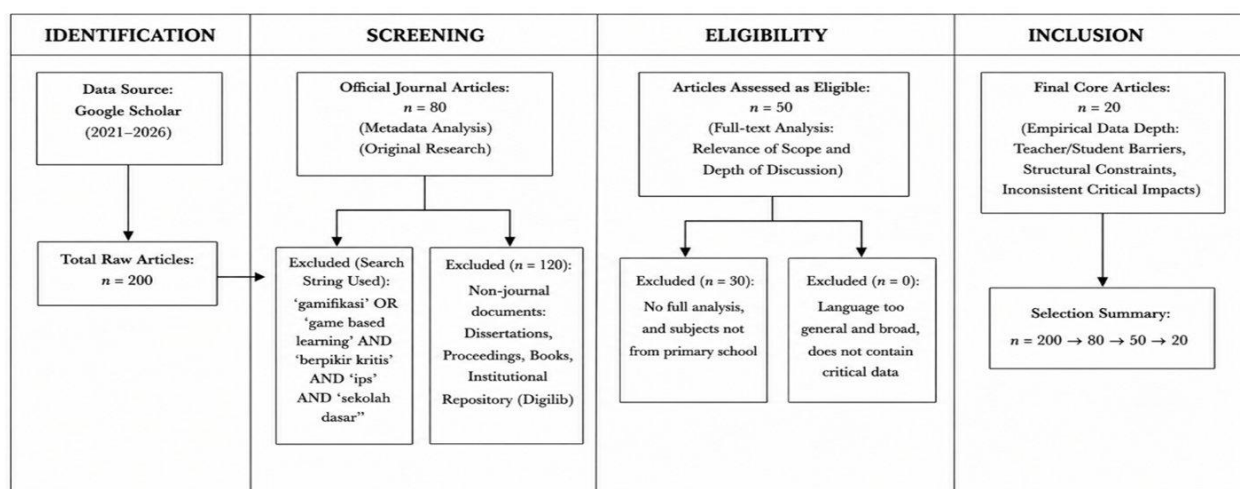
To address this gap, the present study employed a *Systematic Literature Review* (SLR), referring to the methodological framework of Kitchenham and Charters (2007), to identify and synthesize evidence on gamification in primary school Social Studies learning. The review focused on the effectiveness of gamification in supporting students' cognitive processes and critical thinking, as well as the methodological, instructional, and structural barriers affecting its implementation. Through this synthesis, the study seeks to provide an empirical basis for developing gamified instructional designs that are more adaptive, reflective, and contextually responsive to the critical-thinking needs of primary school students.

## II. METHOD

This study employed a *Systematic Literature Review* (SLR) to systematically identify, evaluate, and synthesize scientific evidence on the implementation of gamification in primary school Social Studies learning. The SLR approach enables literature searching, selection, and analysis to be

conducted through explicit and structured procedures, thereby supporting a more transparent and systematic synthesis of the available evidence (Kitchenham & Charters, 2007). The review focused on the effectiveness of gamification in supporting students' critical thinking and on the technical, instructional, psychological, and structural barriers affecting its implementation.

The literature search was conducted digitally using *Publish or Perish* (PoP), with Google Scholar as the search source. Publications were restricted to the 2021–2026 period to capture contemporary literature relevant to developments in digital learning at the primary school level. The search strategy used combinations of the keywords “*gamification*” OR “*game-based learning*” OR “*game media*” AND “*critical thinking*” AND “*Social Studies*” AND “*primary school*”. The initial search retrieved 200 records, which were subsequently selected following the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) stages of identification, screening, eligibility assessment, and final inclusion. The study selection process is presented in Figure 1.



**Figure 1.** PRISMA Study Selection Flow Diagram

At the identification stage, 200 records were retrieved using the predefined search strategy. During screening, publication types were examined to determine their suitability for the review. Undergraduate theses, master's theses, dissertations, conference proceedings, books, and documents available only through institutional repositories were excluded. Following this stage, 80 journal articles proceeded to eligibility assessment. At the eligibility stage, titles, abstracts, and full-text availability were examined to determine alignment with the review focus. Articles were excluded if they did not focus on primary education, were unrelated to Social Studies learning, did not involve relevant gamification or game-based media, or were unavailable in full text. This process resulted in 50 articles for further full-text assessment.

At the final inclusion stage, the 50 full-text articles were assessed according to their relevance to the primary focus of the review, namely the effectiveness of gamification in supporting cognitive processes and critical thinking and the barriers affecting its implementation in primary school Social Studies. Articles that did not provide sufficient evidence related to these aspects were excluded from the final synthesis. The selection process resulted in 20 articles that met all inclusion criteria and constituted the final review corpus. Accordingly, the selection process progressed from 200 records at identification to 80 articles after screening, 50 articles after eligibility assessment, and 20 articles included in the final synthesis.

Data from the 20 included articles were analyzed using *content analysis* and *thematic analysis*. Key information from each study was extracted into a matrix covering study characteristics, forms of gamification, learning contexts, cognitive or critical-thinking outcomes, and reported implementation barriers. The extracted data were subsequently reduced and grouped into thematic patterns, including game-mechanic characteristics, structural and technical barriers, psychological dynamics within the learning process, and instructional factors affecting the effectiveness of gamification. These patterns were then compared and interpreted to identify consistencies, differences, and conditions that could explain variations in findings across studies. This procedure

provided the basis for synthesizing evidence concerning the effectiveness and limitations of gamification in supporting critical thinking in primary school Social Studies.

### III. RESULTS AND DISCUSSION

#### A. Results

The literature selection process based on the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) framework resulted in 20 articles meeting the inclusion criteria from the initial 200 records retrieved through *Publish or Perish*. The included articles addressed the use of gamification or game-based learning in primary school Social Studies, particularly studies providing evidence related to cognitive or critical-thinking processes and factors affecting implementation. Data extraction revealed variations in research designs, gamification platforms or mechanics, critical-thinking indicators, and implementation challenges. The characteristics and principal findings of the 20 included articles are presented in Table 1.

**Table 1.** Characteristics and Main Findings of the Included Studies

| No. | Authors & Year                     | Research Method         | Gamification Platform /Media    | Critical-Thinking Focus                    | Main Findings and Implementation Challenges                                                                                                                                                                                                                                       |
|-----|------------------------------------|-------------------------|---------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | M. Rahmawati & Y. Yusuf (2024)     | Descriptive qualitative | Wordwall and point elements     | Analysis of Social Studies concepts        | Teachers experienced difficulties designing rewards relevant to text-intensive Social Studies content. Gamification supported initial motivation, but its contribution to critical thinking was limited when quizzes predominantly involved lower-order recall activities (LOTS). |
| 2   | S. Wahyuni & N. Nuraeni (2023)     | Case study              | Android educational game        | Contextual problem solving                 | Limited device availability and differences in digital literacy created disparities in participation. Students with lower digital literacy devoted more attention to operating the technology than to analyzing Social Studies content.                                           |
| 3   | D. Dewantara & R. Rosmawati (2026) | Quasi-experimental      | Leaderboard                     | Self-regulation and decision making        | Competition and ranking transparency were associated with academic pressure among some students. Lower-performing students demonstrated weaker critical-thinking outcomes under competitive pressure.                                                                             |
| 4   | I. Indriani & F. Fauzi (2024)      | Analytical descriptive  | Manual and digital gamification | Evaluation of information and arguments    | Teachers' administrative workload constrained the preparation of gamified scenarios. Without adequate reflective activities, learning tended to emphasize engagement rather than deeper reasoning.                                                                                |
| 5   | F. Fatmawati & R. Ruslan (2025)    | Exploratory qualitative | Local-history RPG               | Historical chronology and value evaluation | Simplifying historical content into game mechanics risked reducing the complexity of causal relationships. Students tended to remember game elements rather than analyze historical events.                                                                                       |
| 6   | Y. Yulianti & S. Siregar (2024)    | Survey                  | Kahoot                          | Inference skills                           | Teachers' limited ability to develop branching quizzes resulted in relatively linear game scenarios, restricting opportunities to practice inference and critical thinking.                                                                                                       |
| 7   | D. Diana & P. Purwanto (2024)      | Case study              | Educaplay                       | Exploration of social phenomena            | Limited internet connectivity and electricity supply disrupted the continuity of digital gamification. Under some conditions, non-digital instruction provided a more stable environment for discussion.                                                                          |
| 8   | R. Ridho & A. Amin (2024)          | CIPP evaluation         | Quizizz                         | Analysis of HOTS stimuli in Social Studies | Time-limited quizzes reduced opportunities for discussion and analysis. Speed pressure could restrict the time available for students to process more complex HOTS questions.                                                                                                     |
| 9   | T. Triana & M. Mulyadi (2025)      | Development research    | Gamified assessment             | Critical-thinking assessment               | Integrating critical-thinking assessment into game mechanics presented challenges. Game scores did not consistently correspond with students' written                                                                                                                             |

|    |                                 |                  |                                        | t                                             | critical-thinking test performance.                                                                                                                                                              |
|----|---------------------------------|------------------|----------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10 | N. Nurul & H. Hanif (2024)      | Qualitative      | Team tournament (TGT)                  | Problem solving and collaboration             | Group competition could generate interpersonal conflict. Some discussions shifted from social problem solving toward disagreements about game rules.                                             |
| 11 | R. Roni & M. Muslih (2025)      | Descriptive      | Web-game-based Social Studies tasks    | Analysis of societal dynamics                 | Unequal access to devices at home resulted in disparities in participation and learning outcomes among students with different levels of digital access.                                         |
| 12 | M. Maya & R. Ridwan (2024)      | Case study       | Badges and scores                      | Intrinsic motivation and analytical thinking  | Reliance on points and rewards was associated with reduced engagement when rewards were removed, highlighting the need to balance external incentives with intrinsic learning goals.             |
| 13 | N. Nurdin & A. Amiruddin (2025) | Content analysis | Wordwall                               | Contextualization of social problems          | Content derived from global templates was not always aligned with local contexts and cultural knowledge, potentially reducing the relevance of social cases for students.                        |
| 14 | R. Rina & K. Kasman (2026)      | Evaluation       | Word-guessing and matching games       | Critical reading of Social Studies narratives | Overly simple game mechanics were less appropriate for Grade V and VI students and could reduce their engagement with more complex Social Studies narratives.                                    |
| 15 | D. Dani & T. Totok (2024)       | Qualitative      | Automated quiz assessment              | Analysis of students' thinking processes      | Automated assessment primarily recorded correct or incorrect responses rather than the reasoning processes used by students and therefore did not fully represent critical-thinking performance. |
| 16 | L. Laila & R. Ramli (2024)      | Phenomenology    | Screen-based interactive game          | Attention span                                | Concerns about excessive screen exposure led teachers to restrict game duration, thereby limiting the time available for exploring social problems.                                              |
| 17 | R. Rahmat & Y. Yani (2026)      | Experimental     | Avatars and customization              | Equity in cognitive engagement                | Participation was uneven; more active students tended to dominate gameplay, while less active students had fewer opportunities for cognitive engagement.                                         |
| 18 | M. Maman & T. Tedi (2024)       | Correlational    | Online quiz platform                   | Cognitive flow                                | Server disruptions and lag interrupted learning activities and students' concentration during reasoning-intensive tasks.                                                                         |
| 19 | H. Hanah & M. Muktar (2024)     | Descriptive      | Curriculum-based gamification scenario | Self-reflection                               | Limited instructional time and media preparation reduced opportunities for post-game reflection, despite reflection being important for deeper thinking.                                         |
| 20 | Z. Zainal & M. Murni (2025)     | Critical review  | Free-to-play educational games         | Concentration and deep thinking               | Advertisements and visual distractions in free applications disrupted students' attention and could constrain deeper analysis of social phenomena.                                               |

Overall, the synthesis reveals that the effects of gamification in primary school Social Studies are heterogeneous and conditional. Gamification shows potential to support engagement and cognitive processes when game activities are connected to contextual problems, provide opportunities for information analysis, and are accompanied by reflective activities. However, the presence of game elements alone does not necessarily indicate improvement in critical thinking. Several studies suggest that speed-based mechanics, competition and leaderboards, dependence on external rewards, and activities dominated by lower-order thinking questions may constrain the depth of information processing.

In addition to gamification design characteristics, the synthesis identifies several implementation factors associated with variations in findings across studies. Limited access to

devices, unstable internet connectivity, differences in digital literacy, teachers' planning workload, lack of alignment between content and local contexts, and insufficient time for reflection repeatedly emerged as implementation barriers. Thus, evidence from the 20 included articles indicates that the effectiveness of gamification in supporting critical thinking is not uniform but associated with the interaction among game mechanics, instructional design quality, learner characteristics, teacher readiness, and technological conditions.

## B. Discussion

The synthesis of the 20 included studies indicates that the relationship between gamification and critical thinking in primary school Social Studies is neither simple nor uniform. Although gamification has the potential to increase student engagement, the presence of game elements does not in itself guarantee higher-order cognitive processing. Its effectiveness appears to depend on the characteristics of game mechanics, the resulting social dynamics, students' motivational orientation, the quality of instructional design, and schools' technological and infrastructural conditions. Based on the patterns identified across the reviewed studies, four major issues explain the limitations and variations in the effects of gamification on students' critical thinking.

### 1. The Paradox Between Game-Mechanic Speed and the Depth of Higher-Order Reasoning

The synthesis of studies employing digital quiz platforms such as Quizizz, Kahoot, and Wordwall indicates a potential mismatch between speed-based game mechanics and the cognitive demands of Social Studies learning. Social Studies requires students not merely to recall information but also to read and comprehend narratives, identify cause-and-effect relationships, interpret social and historical events, and evaluate information within particular contexts. Such activities require sufficient time to process information, consider alternatives, and construct reasoned arguments.

In contrast, *time-attack* mechanisms that award points according to response speed may shift students' attention from the quality of reasoning toward the speed of answering. Ridho and Amin (2024) indicated that time pressure in digital quizzes can restrict students' opportunities to process complex HOTS stimuli. Under such conditions, students may be encouraged to respond rapidly based on information recognition or short-term recall rather than engage in deeper analysis. This pattern is consistent with Ismaini and Kamelia (2025), who highlighted the importance of distinguishing game activities that primarily facilitate *Lower-Order Thinking Skills* (LOTS) from those that genuinely provide opportunities for *Higher-Order Thinking Skills* (HOTS).

This distinction becomes particularly important when in-game scores are treated as indicators of critical-thinking ability. Dani and Totok (2024) showed that automated correct-incorrect assessment does not fully capture the reasoning processes students use to arrive at their answers. Consequently, high game scores cannot necessarily be interpreted as direct representations of critical-thinking competence. Gamification intended to support HOTS should provide opportunities for students to justify their responses, evaluate alternatives, solve contextual problems, and reflect on their decision-making processes. In other words, speed may be a characteristic of gameplay, but depth of reasoning should remain a central characteristic of instructional design when critical thinking is the intended learning outcome.

### 2. Social Polarization and Unequal Cognitive Engagement in the Classroom

Another pattern emerging from the synthesis concerns the potential social consequences of competitive elements, particularly leaderboards and tournament-based games. Such elements are generally intended to promote motivation and engagement through competition. However, the reviewed evidence suggests that students do not respond uniformly to competitive environments. Dewantara and Rosmawati (2026) indicated that ranking transparency may be associated with academic pressure among some students, particularly those with lower performance levels or slower learning rates.

These conditions can produce unequal participation in gamified activities. Students who already possess stronger academic abilities, greater confidence, or higher levels of digital

competence may occupy more advantageous positions during gameplay. Conversely, repeated experiences of failure may reduce the engagement of lower-performing students. Rahmat and Yani (2026) identified a tendency for more active students to dominate gameplay, while less active students had fewer opportunities to participate in decision-making and cognitively demanding activities.

Similar issues may arise in group-based gamification. Nurul and Hanif (2024) indicated that intergroup competition can, under certain conditions, shift classroom discussions away from substantive Social Studies problems toward disagreements over game rules or interpersonal conflict. When these dynamics are not adequately managed by teachers, students' cognitive resources and attention that could otherwise be devoted to analyzing social phenomena may instead be directed toward managing competition.

These findings suggest that competition does not necessarily correspond to productive cognitive engagement. When the instructional goal is to develop critical thinking, gamification should provide relatively equitable opportunities for students to express ideas, examine arguments, and participate in decision-making. Leaderboards and group competition should therefore be accompanied by collaborative mechanisms, appropriate role distribution, and teacher support to prevent gameplay from widening differences in cognitive participation among students.

### 3. Shifts in Intrinsic Motivation and Dependence on External Rewards

A further issue concerns the relationship between gamified reward systems and students' motivational orientation. Points, badges, scores, and digital rewards are widely used to increase initial engagement. However, the synthesis indicates that excessive reliance on external rewards requires careful consideration, particularly when students begin to associate participation in learning primarily with the availability of incentives.

Maya and Ridwan (2024) found that students' engagement could decline when reward systems were removed. This finding suggests a possible shift from engagement with learning content toward engagement dependent on external incentives. This issue is particularly relevant to Social Studies because critical thinking requires curiosity, willingness to explore problems, and sustained engagement in analytical processes that do not necessarily provide immediate rewards. Accordingly, rewards should function as supporting elements rather than the primary purpose of learning activities. Points or badges may provide feedback on progress, but they should be connected to the quality of cognitive processes, such as providing justification, evaluating evidence, or generating solutions, rather than merely to speed and the number of correct answers. Such an approach can help maintain alignment between game mechanics and the intended learning objectives.

In addition to rewards, platform characteristics may influence students' attention. Zainal and Murni (2025) identified commercial advertisements, pop-ups, and visual distractions in free applications as factors that could disrupt students' concentration. Such distractions may be particularly problematic when students are required to read narratives, compare information, or construct arguments that demand sustained attention. The quality of the digital environment should therefore be considered alongside the design of game mechanics. Visually engaging gamification does not necessarily produce deep cognitive engagement when students' attention is primarily directed toward rewards or stimuli unrelated to the learning objectives.

### 4. Digital Inequality and Limited Opportunities for Reflection

The effectiveness of gamification is also closely associated with schools' structural readiness. The synthesis indicates that device availability, internet connectivity, electricity supply, and digital literacy influence the continuity of gamified activities. Wahyuni and Nuraeni (2023) identified limited access to devices and differences in digital literacy as barriers to participation, while Diana and Purwanto (2024) showed that unstable internet connectivity and infrastructural limitations could disrupt the implementation of game-based learning.

Technical disruptions are not merely operational problems; they may also interfere with the continuity of students' cognitive processes. Maman and Tedi (2024) indicated that server disruptions, lag, or interrupted connections could disrupt students' concentration during reasoning-intensive activities. Moreover, instructional time devoted to resolving technical problems reduces the time available for other learning activities. One important consequence is the reduction of opportunities for reflection and *debriefing*. Hanah and Muktar (2024) indicated that time constraints can result in insufficient post-game reflection. Yet participation in a game does not in itself guarantee conceptual understanding or meaningful interpretation of the learning experience. In Social Studies, teachers continue to play an important role in helping students connect game experiences with social phenomena, clarify misconceptions, evaluate decisions, and formulate conclusions based on logical reasoning.

These findings position *debriefing* as an important bridge between gameplay experience and the construction of understanding. Without adequate reflection, gamification may generate high behavioral engagement without necessarily producing equally deep cognitive engagement. Gamified instruction should therefore allocate time not only for gameplay but also for discussing, explaining, and reflecting on the experience. From this perspective, infrastructure readiness and time availability should be considered components of instructional design rather than merely technical concerns.

Overall, these four themes demonstrate that the effectiveness of gamification in supporting critical thinking in primary school Social Studies is conditional. Its educational potential is determined less by the number of points, badges, leaderboards, or digital features employed than by the alignment between game mechanics and the cognitive processes intended to be developed. Gamification is more likely to support critical thinking when it provides sufficient time for analysis, promotes inclusive student participation, avoids excessive dependence on external rewards, employs technology appropriate to school conditions, and incorporates adequate opportunities for reflection and *debriefing*. Therefore, the central challenge is not simply to make Social Studies learning more game-like, but to design gameplay as part of an instructional process in which reasoning, argumentation, and reflection remain the primary cognitive activities.

#### IV. CONCLUSION

Based on the synthesis of 20 journal articles selected through the PRISMA protocol, it can be concluded that gamification in primary school Social Studies does not automatically improve students' critical thinking skills. Its effectiveness is strongly influenced by the design of game mechanics, competitive dynamics, the use of external rewards, infrastructure readiness, and the availability of opportunities for reflection. Speed-based mechanics may limit the depth of reasoning, leaderboards may create pressure and unequal participation, while excessive reliance on rewards may shift students' learning motivation toward external incentives. In addition, technical constraints that reduce opportunities for *debriefing* may result in gamification promoting only surface-level engagement. Therefore, gamification is more likely to support critical thinking when it is designed contextually and inclusively, avoids excessive competition and reward dependence, and provides adequate opportunities for guided reflection.

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