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Integrating Zep Quiz into IPAS Instruction to Enhance Fourth Grade Students' Critical Thinking Skills

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ABSTRACT

This study aims to improve fourth-grade students' critical thinking skills through the integration of Zep Quiz in Integrated Science and Social Studies (IPAS) learning. The research addressed the following question: How does the use of Zep Quiz enhance students' critical thinking skills in IPAS learning? Employing a Classroom Action Research (CAR) design, the study was implemented in three cycles, each consisting of planning, action, observation, and reflection. The participants were 23 students (14 boys and 9 girls). Data were collected through teacher and student activity observation sheets and a critical-thinking-skills test administered at the end of each cycle. Descriptive quantitative analysis was used to assess improvements, with the Minimum Mastery Criterion (KKM = 75) serving as the benchmark for student achievement. The findings showed a consistent increase in students' critical thinking performance: the mean score rose from 68.26 (56.52% mastery) in Cycle I to 77.04 (78.26% mastery) in Cycle II, and further to 86.09 (91.30% mastery) in Cycle III. Teacher and student activity scores also increased from the "fair" to the "very good" category across cycles. These results indicate that the implementation of Zep Quiz which provides interactive, gamified, and student-centered learning experiences effectively enhances students' critical thinking skills and supports more active cognitive engagement during IPAS instruction.

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1. INTRODUCTION

Primary education plays a crucial role in shaping students' critical thinking skills as one of the essential competencies of the 21st century, which require learners to analyze, evaluate, and solve problems in a rational manner. Within the framework of the Merdeka Curriculum, elementary school learning is expected not only to emphasize cognitive achievement but also to strengthen higher-order thinking skills (Higher Order Thinking Skills/HOTS). Critical thinking is one of the four key competencies of the 21st century alongside communication, collaboration, and creativity that must be cultivated from an early age [1]. Therefore, learning at the elementary level should be designed to enable students to actively explore, question, and interpret knowledge more deeply.

Integrated Science and Social Studies (IPAS) is one of the subjects with strong potential to develop critical thinking skills. IPAS requires students to observe real-world phenomena, analyze causal relationships, and connect scientific concepts with everyday experiences. However, preliminary observations in Grade IV indicate that many students still rely on rote memorization without meaningful conceptual understanding. This aligns with Martir et al. (2021), who found that IPAS learning in elementary schools remains largely teacher-centered, resulting in passive student engagement and suboptimal critical thinking development [2]. Similar concerns are also highlighted in recent studies emphasizing the need to transform IPAS learning toward more analytical and inquiry-based practices [3].

The shift from teacher-centered to student-centered learning demands that teachers innovate in their use of digital learning media. Technology-based tools have been shown to increase students' motivation, engagement, and conceptual mastery. Interactive digital platforms can enhance learning attractiveness and support the development of critical thinking skills by engaging students in the exploration, evaluation, and interpretation of information [4]. Therefore, teachers must select learning media that effectively combine game elements (gamification) with real-time assessment features to create meaningful learning experiences.

One digital platform increasingly used in classrooms is Zep Quiz, an interactive quiz tool that enables teachers to present questions in engaging formats incorporating visuals, audio, and dynamic graphics. Digital quiz platforms such as Zep Quiz, Kahoot!, and Quizizz are known to promote active participation, strengthen concept retention, and create enjoyable learning environments [5][6]. Compared to similar platforms, Zep Quiz offers advantages including streamlined navigation, rapid device integration, multiple HOTS-based question types, and more flexible feedback mechanisms that allow teachers to monitor student misconceptions more efficiently. Previous studies also indicate that platforms with real-time analytics contribute to deeper cognitive engagement, especially in science learning contexts [7].

The theoretical foundation supporting the use of interactive digital media such as Zep Quiz is grounded in Vygotsky's social constructivism theory, which posits that learning occurs optimally through interaction with peers and challenging stimuli [8]. In IPAS learning, Zep Quiz acts as an external stimulus that triggers students' cognitive processes through activities requiring interpretation, evaluation, and reflective thinking. Additionally, the gamification principles embedded in Zep Quiz are rooted in behaviorist motivation theory, where immediate feedback and reward systems help reinforce positive learning behaviors [9]. As such, Zep Quiz supports both social interaction and cognitive engagement—two essential components of critical thinking.

Digital quiz-based learning is also aligned with active learning principles proposed by Bonwell and Eison (1991), which emphasize engaging students in meaningful thinking, discussion, and problem-solving activities [10]. In the IPAS context, Zep Quiz provides opportunities for students to respond to analytical, evaluative, and reflective questions that require connecting scientific ideas to real-world contexts. Marsela et al. (2024) also found that interactive quiz media significantly improved elementary students' learning outcomes and critical thinking abilities [11].

Critical thinking encompasses interpretation, analysis, evaluation, inference, and logical explanation of information [12][13]. These skills are essential in IPAS learning to help students move beyond factual recall and toward assessing information accuracy and connecting concepts to daily experiences. Anderson and Krathwohl emphasize that critical thinking can be fostered through learning activities requiring students to analyze and evaluate existing knowledge structures [14]. Supporting this, Reta (2012) demonstrated that students trained with interactive and problem-based learning approaches show higher learning achievement compared to those using conventional methods [15].

Given these challenges and opportunities, implementing Zep Quiz presents an innovative alternative to improve students' critical thinking skills in IPAS learning. Its interactive features encourage students to think quickly, accurately, and reflectively, while enabling teachers to monitor learning progress in real time. This is supported by Hasnawiyah and Maslena (2024), who noted that integrating digital media in learning fosters adaptive and enjoyable learning experiences for elementary students [16]. However, despite the increasing use of digital quiz platforms, research specifically examining the impact of Zep Quiz on critical thinking skills in IPAS learning remains limited, especially in Indonesian primary school contexts [17]. Thus, this study intends to address this research gap.

Therefore, this study addresses the following research question: How does the integration of Zep Quiz improve fourth-grade students' critical thinking skills in IPAS learning?

2. RESEARCH METHOD

This study employed a Classroom Action Research (CAR) approach, which aims to improve students' critical thinking skills through the implementation of Zep Quiz media in IPAS learning. The classroom action research model used refers to the spiral design of Kemmis and McTaggart, which consists of four main stages: planning, acting, observing, and reflecting [18]. Through these repeated cycles, teachers and researchers can continuously improve the learning process until optimal results are achieved [19].

This research was conducted in Grade IV of UPT SD Negeri 99 Suppa, Pinrang Regency, during the odd semester of the 2025/2026 academic year, involving 23 students 14 boys and 9 girls. All students were included as research subjects using the saturated sampling (total sampling) technique because the population was relatively small and considered representative [20]. The research activities were carried out in three cycles, and each cycle consisted of the stages of lesson planning using Zep Quiz, classroom implementation, observation of teacher and student activities, and reflection on the outcomes to determine necessary improvements for the next cycle.

The research instruments consisted of a critical thinking skills test, teacher and student activity observation sheets, and field notes. The critical thinking test was developed based on Facione's (2015) indicators, which include aspects of interpretation, analysis, evaluation, inference, and logical explanation. Observation sheets were used to assess the implementation of learning and the level of student participation during the learning process. Meanwhile, the field notes were used to record classroom situations and students' responses toward the use of Zep Quiz media. Data were collected through observation, achievement tests, and documentation, and then validated using the triangulation technique to ensure data accuracy and consistency.

Data analysis was conducted using descriptive quantitative and qualitative methods. Quantitative data were obtained from the results of students' critical thinking tests, analyzed by calculating the mean score and percentage of learning mastery based on a minimum mastery criterion (KKM) of 75. Classical mastery was considered achieved if at least 85% of students obtained a score of ≥ 75. Meanwhile, qualitative data from observations and field notes were analyzed through the stages of data reduction, data display, and conclusion drawing [18]. This study was considered successful if there was an improvement in students' critical thinking skills and learning activities in each cycle, reaching the "good" or "very good" category.

3. RESULTS AND DISCUSSION

Results

This classroom action research was carried out in three cycles to improve students' critical thinking skills through the use of *Zep Quiz* in IPAS learning. Each cycle included the stages of planning, action implementation, observation, and reflection. Observations were conducted on teacher activity, student activity, and students' critical thinking performance measured through end-of-cycle tests. Improvements were observed consistently from the pre-cycle to Cycle III.

Improvement in Critical Thinking Skills

The observations revealed an increase in the average critical thinking score of students in each cycle. The improvement can be seen in Table 1 below:

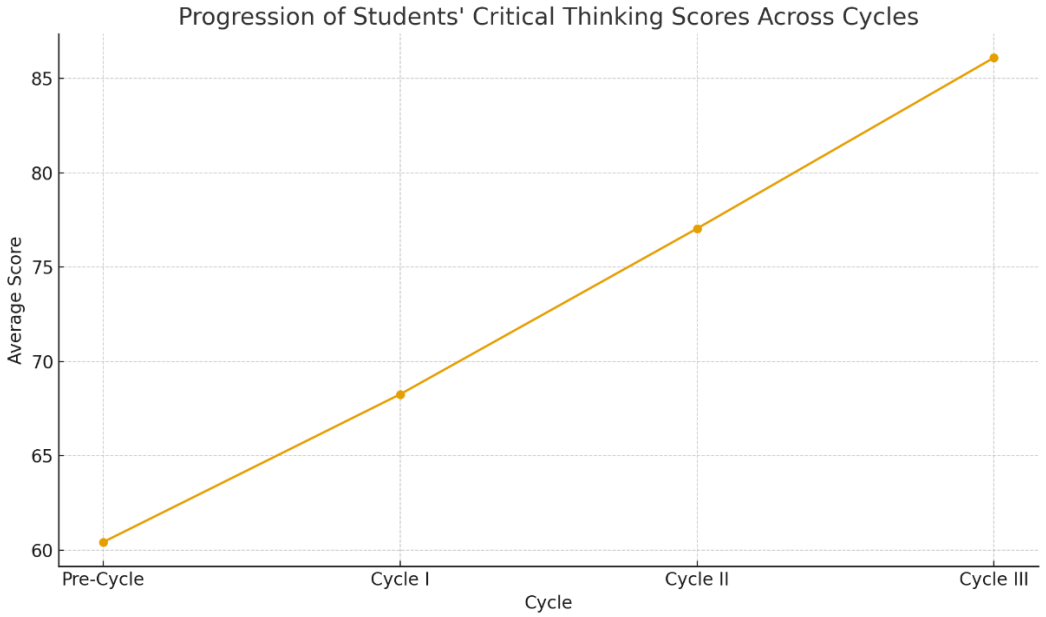
Table 1. Recapitulation of Fourth-Grade Students' Critical Thinking Skills

Cycle	Number of Students	Average Score	Number of Students Achieving Mastery	Mastery Percentage (%)
Pre-Cycle	23	60,43	9	39,13%
Cycle I	23	68,26	13	56,52%
Cycle II	23	77,04	18	78,26%
Cycle III	23	86,09	21	91,30%

Table 1 shows that the average score of students' critical thinking skills increased from 60.43 in the pre-cycle to 86.09 in Cycle III. The percentage of classical mastery also improved from 39.13% to 91.30%, exceeding the research success criterion of ≥ 85% of students achieving the minimum mastery score (KKM) of 75.

In addition to the improvement in learning outcomes, there was also an increase in teacher activity during the learning process using Zep Quiz. The observation of teacher activity was based on indicators of planning, implementation, classroom management, and assessment using a 1–4 rating scale. The average results of the teacher activity observations are presented in Table 2 below:

To further illustrate this progression, the trend of students' critical thinking scores is presented in Figure 1.



Improvement in Teacher Activity

Teacher activity showed continuous improvement throughout the three cycles.

Table 2. Teacher Activity in IPAS Learning Using Zep Quiz

Cycle	Average Score	Category
Cycle I	3,0	Good
Cycle II	3,5	Good
Cycle III	3,9	Very Good

Table 2 shows an improvement in teacher activity from the "Good" category to the "Very Good" category in Cycle III. The teacher became more skillful in managing time, providing motivation, and utilizing Zep Quiz features optimally to stimulate student engagement.

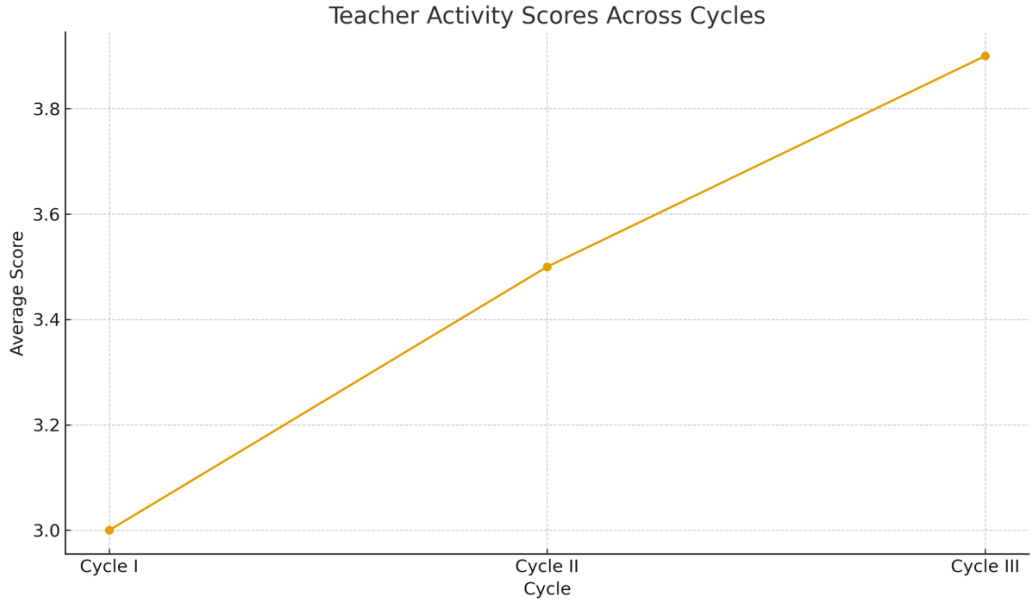


Figure 2 shows a steady improvement in teacher activity during the implementation of *Zep Quiz*, increasing from an average score of 3.0 in Cycle I to 3.9 in Cycle III. This indicates that the teacher became

more proficient in facilitating interactive learning, managing classes, and optimizing digital tools across the cycles.

Improvement in Student Activity

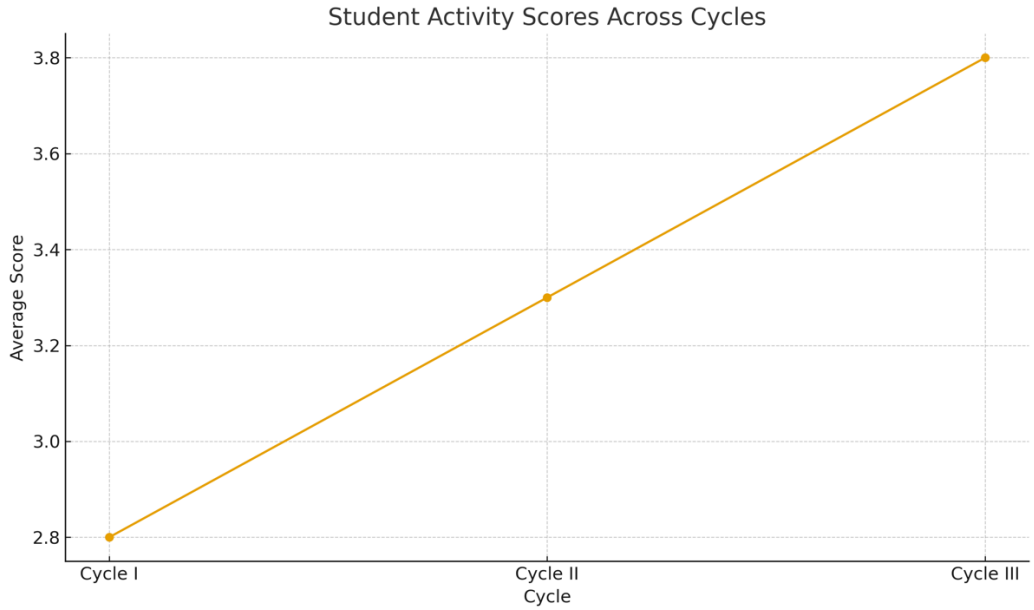
A similar improvement was also observed in student activity during the learning process. Students appeared more enthusiastic and actively participated in answering questions, discussing, and collaborating in small groups. The observation results of student activity over three cycles are shown in Table 3.

Table 3. Student Activity in IPAS Learning Using Zep Quiz

Cycle	Average Score	Category
Cycle I	2,8	Fairly Good
Cycle II	3,3	Good
Cycle III	3,8	Very Good

Table 3 indicates a significant improvement in student activity, from the "Fairly Good" category in Cycle I to the "Very Good" category in Cycle III. This demonstrates that the use of Zep Quiz successfully enhanced students' participation and engagement in the learning process.

Figure 3 illustrates a consistent rise in student activity throughout the three cycles. The average score increased from 2.8 in Cycle I to 3.8 in Cycle III, indicating higher levels of engagement, enthusiasm, and active participation as students became more familiar with the *Zep Quiz* learning environment.



Overall, the results of the study showed consistent improvement across three main aspects: critical thinking skills, teacher activity, and student activity. The classical mastery level in Cycle III reached 91.30%, surpassing the research success indicator of ≥ 85%. This improvement demonstrates that the implementation of Zep Quiz in IPAS learning effectively created a more active, competitive, and enjoyable learning environment, which significantly enhanced students' critical thinking skills.

Discussion

The results of this study indicate that the implementation of *Zep Quiz* had a positive effect on improving students' critical thinking skills in IPAS learning. As a gamified learning platform, *Zep Quiz* provides an interactive, competitive, and engaging environment that encourages students to think quickly, process information, and make decisions based on logical analysis. This finding is consistent with Alghamdi, who stated that digital quiz platforms can enhance students' cognitive engagement through interactive and competitive learning experiences [21]. The steady increase in students' scores across the three cycles demonstrates that gamified digital tools can effectively strengthen analytical reasoning and reflective thinking.

The improvement in teacher activity from the "Good" to the "Very Good" category also shows that teachers became more skillful in utilizing digital media to guide the learning process. Teachers shifted their

role from being mere transmitters of information to facilitators who scaffolded students' thinking through HOTS-oriented questions and structured discussion. This finding reinforces Nikmati's research, which suggests that interactive digital media can strengthen the teacher's role in creating active learning environments and promoting higher-order thinking skills [22]. The enhanced teacher performance contributed directly to better learning experiences and more meaningful classroom interactions.

The increase in student activity further confirms the effectiveness of *Zep Quiz* in fostering motivation, engagement, and self-confidence. The immediate feedback and scoring system provided by the platform encouraged students to correct errors, reflect on their reasoning, and actively strive for improvement. This aligns with behaviorist learning theory, which posits that reinforcement such as rewards and positive feedback can strengthen desired learning behaviors [23]. The competitive yet enjoyable nature of the gamified tasks also helped students stay focused and enthusiastic throughout the learning process.

From the perspective of social constructivist theory, the use of *Zep Quiz* facilitated collaborative interactions between students and teachers. Students learned not only through individual analysis but also through sharing reasoning, discussing answers, and engaging in collective problem-solving. According to Schunk, learning enriched through social interaction enhances the internalization of knowledge and supports the development of critical thinking [24]. Thus, the improvement in learning outcomes observed in this study cannot be separated from students' active involvement in constructing their own understanding through guided interactions.

These findings are also consistent with international studies on gamified learning. Wang and Tahir (2020) found that gamified quizzes significantly improve learning performance and higher-order thinking by enhancing motivation and cognitive engagement in primary science classrooms [25]. Similarly, Licorish et al. (2018) reported that platforms such as *Kahoot!* promote deeper cognitive processing, strengthen recall, and improve classroom participation, especially when supported by teacher-facilitated reflection [26][27]. These studies reinforce the conclusion that digital quiz platforms including *Zep Quiz* enhance students' cognitive abilities when implemented within student-centered and interactive learning environments.

Importantly, the improvements found in this study emerged not only from the gamification features of *Zep Quiz* but also from the teacher's deliberate use of student-centered learning strategies. Guided questioning, group discussions, and reflective feedback played a key role in deepening students' cognitive engagement. Therefore, the overall gains in critical thinking skills are the result of a synergistic interplay between: (1) *Zep Quiz* as a gamified stimulus, and (2) student-centered instructional practices that encourage active, participatory, and reflective learning.

Theoretically, this study supports key learning frameworks. From a behaviorist perspective, real-time scoring and feedback function as reinforcement that strengthens learning behaviors. From a constructivist viewpoint, the analytical and reflective tasks embedded within the quiz foster the construction of meaning from new information. From a socio-cultural perspective, peer interaction and collaborative engagement facilitate the co-construction of knowledge. Together, these theoretical lenses highlight how digital quiz platforms activate multiple cognitive pathways that contribute to the development of critical thinking.

Practically, several implications arise from this study. Teachers can integrate *Zep Quiz* as an assessment-for-learning tool to monitor understanding in real time and deliver immediate feedback. Schools may adopt gamified learning platforms to increase engagement and support active learning across subjects. Curriculum planners can incorporate digital quiz–based activities into IPAS modules to align with the Merdeka Curriculum's focus on HOTS and experiential learning. Furthermore, teacher professional development programs should include training on designing and implementing digital quiz pedagogy to strengthen students' 21st-century skills, particularly critical thinking, collaboration, and reflective learning.

Overall, the implementation of *Zep Quiz* has proven effective in improving the critical thinking skills of fourth-grade elementary students. This digital medium provides meaningful, challenging, and enjoyable learning experiences while supporting the development of essential competencies needed in modern education. Thus, *Zep Quiz* can be recommended as an innovative and effective learning tool for elementary classrooms.

CONCLUSION

Based on the findings of this classroom action research conducted over three cycles, it can be concluded that the implementation of Zep Quiz in IPAS learning effectively enhanced the critical thinking skills of fourth-grade students. The improvement was reflected in the steady increase in students' critical thinking scores from 60.43 in the pre-cycle to 86.09 in Cycle III and the rise in classical mastery from 39.13% to 91.30%, surpassing the established success criterion of ≥ 85% of students achieving the minimum mastery score (KKM) of 75. These results confirm that Zep Quiz positively contributed to strengthening students' analytical, evaluative, and reflective thinking abilities. The use of Zep Quiz also brought significant improvements to teacher and student activities. Teacher performance progressed from the "Good" to the "Very Good" category, indicating increased effectiveness in facilitating interactive learning, delivering HOTS-based

questions, and managing technology-supported instruction. Likewise, student activity rose from “Fairly Good” to “Very Good,” demonstrating higher levels of engagement, motivation, and active participation throughout the learning process. Importantly, the improvement in students' critical thinking skills was not solely the result of gamification features but rather the combined effect of Zep Quiz and student-centered learning practices. The platform supported guided questioning, collaborative discussions, and reflective feedback key components that deepened students’ cognitive engagement and facilitated the construction of meaningful understanding. This synergy between digital media and active learning strategies played a central role in the success of the intervention. In conclusion, Zep Quiz is an innovative, interactive, and effective digital learning tool for developing critical thinking skills in elementary IPAS learning. Its alignment with the principles of 21st-century education particularly digital integration, creativity, and higher-order thinking makes it a valuable resource for teachers seeking to create more engaging and cognitively stimulating learning environments. Therefore, Zep Quiz is recommended as an adaptive and supportive medium for promoting active learning across various subjects in primary education.

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