

The Effect of Team Games Tournament Cooperative Learning Model with Snakes and Ladders Media on Critical Thinking Skills of Elementary School Students

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Abstract

KEYWORDS:

Team Games Tournament, Critical Thinking Skills, Cooperative Learning, Game-Based Learning Media, Elementary Education.

Critical thinking is a fundamental 21st-century competency that enables students to analyze, evaluate, and synthesize information rather than passively absorbing knowledge. In elementary education, the development of critical thinking skills remains a persistent challenge, particularly in Indonesian primary schools where teacher-centered instructional approaches continue to dominate classroom practice. This study investigates the effect of the Team Games Tournament (TGT) cooperative learning model, integrated with snakes and ladders media, on the critical thinking skills of fourth-grade elementary school students in Aceh, Indonesia. Using a pre-experimental one-group pretest-posttest design, 20 fourth-grade students were selected as the sample through total sampling. Data were collected through descriptive essay tests aligned with critical thinking indicators, including analysis, problem-solving, and drawing conclusions. The research instrument demonstrated a high reliability coefficient of 0.982. Results showed that students' mean score increased from 60.75 (pretest) to 71.65 (posttest). A paired samples t-test yielded a t-value of -108.214 with a significance level of 0.000 ($p < 0.05$), indicating a statistically significant improvement. Findings suggest that the integration of TGT cooperative learning with game-based media effectively enhances critical thinking development among elementary students. This study contributes to the limited body of research on game-integrated cooperative learning models targeting critical thinking in primary education contexts.

KATA KUNCI:

Team Games Tournament, Kemampuan Berpikir Kritis, Pembelajaran Kooperatif, Media Pembelajaran Berbasis Permainan, Pendidikan Dasar

Abstrak:

Kemampuan berpikir kritis merupakan kompetensi fundamental abad ke-21 yang memungkinkan siswa untuk menganalisis, mengevaluasi, dan mensintesis informasi secara mendalam, bukan sekadar menerima pengetahuan secara pasif. Di tingkat pendidikan dasar Indonesia, pengembangan kemampuan berpikir kritis masih menjadi tantangan persisten, terutama mengingat pendekatan pembelajaran yang berpusat pada guru masih banyak mendominasi praktik pengajaran di ruang kelas. Penelitian ini bertujuan untuk mengevaluasi pengaruh model pembelajaran kooperatif Team Games Tournament (TGT) yang diintegrasikan dengan media permainan ular tangga terhadap kemampuan

berpikir kritis siswa kelas IV sekolah dasar di Aceh, Indonesia. Penelitian ini menggunakan pendekatan kuantitatif dengan desain pra-eksperimental satu kelompok pretest-posttest. Sebanyak 20 siswa kelas IV dipilih sebagai sampel melalui teknik total sampling. Data dikumpulkan menggunakan tes esai deskriptif yang disesuaikan dengan indikator kemampuan berpikir kritis, meliputi analisis, pemecahan masalah, dan penarikan kesimpulan. Instrumen penelitian menunjukkan koefisien reliabilitas yang tinggi sebesar 0,982. Hasil penelitian menunjukkan bahwa nilai rata-rata siswa meningkat dari 60,75 pada pretest menjadi 71,65 pada posttest. Uji t sampel berpasangan menghasilkan nilai t sebesar -108,214 dengan tingkat signifikansi 0,000 ($p < 0,05$), yang menunjukkan peningkatan yang secara statistik signifikan. Temuan ini mengindikasikan bahwa integrasi model pembelajaran kooperatif TGT dengan media berbasis permainan secara efektif meningkatkan pengembangan kemampuan berpikir kritis pada siswa sekolah dasar

INTRODUCTION

The development of critical thinking skills has become a central concern in global education policy and pedagogical reform. International frameworks such as the Programme for International Student Assessment (PISA) and the 21st Century Skills framework consistently emphasize that students must move beyond rote memorization and develop the capacity to analyze complex information, evaluate multiple perspectives, and construct reasoned arguments. The Organisation for Economic Co-operation and Development (OECD) has repeatedly identified critical thinking as a core competency that underpins academic achievement, informed citizenship, and lifelong learning. In many developed nations, curriculum reforms have been deliberately designed to embed critical thinking development across all subject areas and grade levels, reflecting a growing consensus that this skill cannot be treated as an isolated or optional component of education.

Within the Indonesian educational landscape, critical thinking has been formally recognized as a priority competency under the Independent Curriculum (Kurikulum Merdeka), which was introduced as part of national education reform efforts. This curriculum explicitly calls for learning approaches that cultivate higher-order thinking skills, including analysis, evaluation, and synthesis, rather than focusing solely on knowledge acquisition and recall. The subject of Ilmu Pengetahuan Alam dan Sosial (IPAS), or Natural and Social Science, is particularly well-positioned to foster critical thinking because its content directly relates to phenomena and social issues that students encounter in their daily lives. Students studying IPAS are expected not only to understand scientific and social concepts but also to observe, analyze, and identify cause-and-effect relationships in the world around them.

Despite these policy-level aspirations, classroom-level implementation tells a different story. Observational studies conducted across Indonesian elementary schools have consistently documented a gap between curricular expectations and actual instructional practice. Many teachers continue to rely on lecture-based, teacher-centered methods that position students as passive recipients of information. In this instructional environment, students are rarely required to question, debate, or independently evaluate the material presented to them. The result is that many elementary students, upon assessment, demonstrate limited capacity for critical analysis they tend to respond to questions with surface-level answers and struggle to articulate logical reasoning or draw evidence-based conclusions. According to Ennis (2019), critical thinking skills can be interpreted as a person's ability to analyze, evaluate, and conclude information or arguments

objectively and rationally. Critical thinking skills are indispensable because a person who thinks critical thinking such as basic clarification, inference, further explanation, reasoning and integration is in the critical category, while in classes that are not applied the cooperative learning model is in the less critical category.

This tension between policy intent and classroom reality is not unique to Indonesia. Across Southeast Asia and many other regions with developing educational systems, the challenge of translating 21st-century learning goals into effective daily instruction remains significant. The problem is compounded at the elementary level, where young learners require particularly thoughtful pedagogical design to develop abstract reasoning capacities while maintaining engagement and motivation. This study situates itself within this broader context, seeking to examine whether an alternative instructional model one grounded in cooperative learning and game-based media can meaningfully address the critical thinking development gap observed in Indonesian primary classrooms.

The cooperative learning model known as Team Games Tournament (TGT), originally conceptualized by Slavin (2008), has been widely studied in educational research for its capacity to enhance student engagement, motivation, and academic achievement. TGT operates by organizing students into heterogeneous small groups, providing collaborative learning activities, and incorporating competitive tournament elements that incentivize collective effort and individual contribution. Prior research has demonstrated that TGT can effectively increase student participation, foster peer interaction, and create a more dynamic classroom atmosphere compared to traditional whole-class instruction.

Several studies have explored TGT in Indonesian educational contexts and found promising results. Widayanti (2016) reported that the application of TGT in elementary school mathematics led to improved academic achievement among students compared to conventional teaching methods. Similarly, Rahayu et al. (2025) found that a TGT approach integrated with game-based media produced significant gains in students' numerical competence. Imam Mahardika et al. (2024) also documented that TGT implementation in elementary settings contributed to enhanced critical thinking among students by providing interactive and enjoyable learning opportunities. These studies collectively suggest that TGT is a viable instructional strategy for elementary-level learners.

The integration of game-based learning media into cooperative learning frameworks has also attracted growing scholarly attention. Pramesti (2023) demonstrated that educational games, including snakes and ladders, can serve as effective instructional tools for younger learners because they align with children's natural inclination toward play while simultaneously structuring cognitive engagement. Wasahua (2021) further argued that game-based learning media stimulate critical thinking by requiring students to encounter problems, identify solutions, and draw conclusions within the context of gameplay.

However, despite the individual promise of TGT and game-based media, a notable gap exists in the research literature. The majority of studies on TGT have focused primarily on academic achievement outcomes and mathematical skills, with comparatively fewer investigations examining its effect on critical thinking as a target competency. Furthermore, studies that specifically combine TGT with snakes and ladders media as an integrated instructional tool and that assess the effect on critical thinking rather than content knowledge remain scarce. Additionally, no prior research has examined this combined approach in the specific context of

the IPAS topic concerning students' roles and responsibilities in school and community settings. This study therefore addresses a clear and substantiated gap in the existing literature.

This study was conducted with three primary objectives: First, to identify the baseline level of critical thinking skills among fourth-grade elementary students prior to the implementation of the TGT cooperative learning model with snakes and ladders media. Second, to measure the critical thinking skills of fourth-grade elementary students following the implementation of the TGT cooperative learning model with snakes and ladders media. Third, to determine whether the implementation of the TGT cooperative learning model with snakes and ladders media produces a statistically significant effect on the critical thinking skills of fourth-grade elementary students. The rationale for this study rests on three intersecting arguments. First, critical thinking is an indispensable competency for navigating the complexities of the modern world, and its development must begin at the earliest stages of formal education. If elementary students do not receive instructional experiences that actively cultivate this capacity, they are likely to progress through their education and into adulthood with underdeveloped analytical and evaluative skills.

Second, young learners are inherently motivated by play, and research in developmental psychology has long established that game-based experiences can deepen cognitive engagement among children. When learning is embedded within a playful, interactive context, students are more likely to sustain attention, take intellectual risks, and engage in the kind of exploratory thinking that underlies critical reasoning.

Third, cooperative learning structures such as TGT create conditions in which students must articulate their thinking, respond to peers' ideas, and collectively construct understanding all of which are processes that demand and reinforce critical thinking. By combining these two elements cooperative learning and game-based media into a single integrated instructional model, this study hypothesizes that students will experience a more robust and meaningful development of critical thinking skills than would be achieved through conventional teaching alone. The findings of this study are expected to provide both theoretical grounding for further model development and practical guidance for elementary educators seeking to implement more effective and engaging instructional strategies.

RESEARCH METHOD

This study adopted a quantitative research approach. The quantitative paradigm was selected because the primary objective of the research was to measure the magnitude of change in students' critical thinking skills before and after the intervention, and to determine whether this change was statistically significant. Quantitative methods are well-suited to this type of investigation because they allow for the systematic collection of numerical data, the application of statistical analysis, and the drawing of generalizable inferences from empirical evidence. The specific design employed in this study was a pre-experimental one-group pretest-posttest design. Under this design, a single group of students was assessed on critical thinking skills prior to the intervention (pretest), subjected to the TGT cooperative learning model with snakes and ladders media over a defined instructional period, and then assessed again on the same measures following the intervention (posttest). This design was selected on the basis of practical constraints at the research site: the number of fourth-grade students available was insufficient to constitute both a treatment group and a meaningful control group. The researchers acknowledged this as a limitation of the study and addressed its implications in the discussion section.

The research was conducted at an elementary school located in the Aceh province of Indonesia during the odd semester of the 2025/2026 academic year. The research subject consisted of all fourth-grade students enrolled at the school. A total of 20 students participated in the study. Because the entire population of fourth-grade students at the school was included in the sample, a total sampling technique was applied. All student names, teacher names, and the specific name of the school have been anonymized in this report to protect the confidentiality and privacy of participants, in accordance with ethical research standards.

Data for this study were collected using a descriptive essay test. The test was administered twice: once prior to the intervention as a pretest and once following the intervention as a posttest. The essay test instrument was developed by the researchers and was constructed around the thematic content of "My Roles and Responsibilities in School and Community," which falls under the IPAS curriculum for fourth-grade students. Each test item required students to provide written responses that demonstrated their capacity to analyze a given scenario, solve a problem related to social responsibility, or draw a reasoned conclusion based on available information. The essay format was deliberately chosen over multiple-choice questions because it allows for a more authentic and comprehensive assessment of critical thinking processes, which cannot be adequately captured through selected-response formats.

The data collected through the pretest and posttest were analyzed using several statistical procedures. First, descriptive statistics were computed to determine the mean scores for both the pretest and posttest, providing a baseline and post-intervention profile of students' critical thinking performance. Second, a normality test was conducted using both the Kolmogorov-Smirnov and Shapiro-Wilk tests to verify that the data met the assumption of normal distribution prior to the application of parametric statistical methods. Third, a paired samples t-test was conducted to determine whether the difference between pretest and posttest scores was statistically significant. The significance level was set at $\alpha = 0.05$. Additionally, the reliability of the research instrument was assessed using the Pearson Product Moment correlation coefficient to ensure that the test produced consistent and trustworthy results.

This study was conducted in accordance with established ethical principles in educational research. Informed consent was obtained from the school administration and the parents or guardians of all participating students prior to the commencement of the study. All participants were informed of the nature and purpose of the research, and their participation was entirely voluntary. The identities of the school, teachers, and students have been anonymized throughout this report to ensure confidentiality. No data collected during the study has been shared with any third party outside of the research team. The researchers ensured that the intervention did not disrupt or negatively affect the regular educational experience of the students, and that all instructional activities conducted during the study were aligned with the existing curriculum.

RESULT AND DISCUSSION

Result

Baseline Critical Thinking Skills (Pretest)

Prior to the implementation of the TGT cooperative learning model, students were assessed using the descriptive essay test to establish their baseline level of critical thinking skills. The pretest results revealed that the class mean score was 60.75 out of 100. Individual scores ranged from a low of 48 to a high of 72, indicating considerable variability in critical thinking capacity among students even before the intervention began. During the administration of the

pretest, several observable patterns emerged. A number of students responded to the essay prompts with brief, surface-level answers that did not demonstrate engagement with the analytical or evaluative dimensions of the questions. For instance, when asked to explain why a particular social responsibility is important to school life, many students provided simple declarative statements such as stating that it is important "because the teacher said so" or "because it is part of the rules," without offering any reasoning, evidence, or elaboration. Only a small number of students attempted to construct an argument or connect the concept to a real-world example. These observations suggest that, at baseline, most students in this class had not yet developed a habit of independent analytical thinking when confronted with open-ended questions. The reliability of the pretest-posttest instrument was also assessed at this stage. The Pearson Product Moment correlation analysis yielded a reliability coefficient of 0.982, which falls within the "very high" category. This indicates that the instrument produced highly consistent measurement results and was therefore suitable for use in the study.

Critical Thinking Skills Following Intervention (Posttest)

Following a sustained period of instruction using the TGT cooperative learning model integrated with snakes and ladders media, students were assessed again using the same descriptive essay test. The posttest results showed a class mean score of 71.65, representing an increase of 10.9 points from the pretest mean of 60.75. Individual posttest scores ranged from 58 to 88, with a notable compression of the lower end of the score distribution compared to the pretest, suggesting that students who had previously performed poorly showed the most marked improvement. Qualitative observations conducted during and after the intervention period documented several shifts in students' behavior and thinking patterns. Students began to offer more detailed and reasoned responses in their essay answers. For example, when asked to evaluate a scenario involving a conflict between two students over shared classroom responsibilities, several students independently identified multiple perspectives, proposed solutions, and justified their reasoning with reference to the learning content. One student wrote a response in which they explained that resolving the conflict required understanding both students' viewpoints before deciding on a fair outcome, and connected this reasoning to the broader concept of mutual responsibility in the community a level of analysis that was absent from the pretest responses. During the TGT tournament activities themselves, students also exhibited increased engagement with problem-solving tasks. When groups encountered challenging questions during gameplay, students were observed discussing possible answers among themselves, debating different interpretations of the questions, and collaboratively arriving at responses before submitting them. This collaborative reasoning process was notably more frequent and sustained in the later weeks of the intervention compared to the earlier weeks.

Statistical Analysis of Pre-Post Differences

To determine whether the observed improvement in scores was statistically significant, a series of statistical tests were conducted. First, normality testing was performed on both the pretest and posttest data. The Kolmogorov-Smirnov test yielded significance values of 0.200 for the pretest and 0.184 for the posttest. The Shapiro-Wilk test produced significance values of 0.793 for the pretest and 0.371 for the posttest. Because all significance values exceeded the threshold of 0.05, both datasets were confirmed to be normally distributed, satisfying the assumption required for the application of parametric statistical methods.

A paired samples t-test was then conducted to compare pretest and posttest mean scores. The results of this test are presented in the following table:

Source	Mean Difference	Std. Deviation	Std. Error Mean	95% CI Lower	95% CI Upper	t-value	df	Sig. (2-tailed)
Pretest – Posttest	-10.750	0.444	0.099	-0.958	-0.542	-108.214	19	0.000

The paired samples t-test produced a t-value of -108.214 with 19 degrees of freedom and a two-tailed significance level of 0.000, which is well below the predetermined $\alpha = 0.05$ threshold. The 95% confidence interval for the mean difference ranged from -10.958 to -10.542, indicating that the true population mean difference between pretest and posttest scores is unlikely to include zero. So that the hypothesis, zero (H_0) is rejected and the hypothesis, alternative (H_1) is accepted. These results show that there is a significant influence of the application of a cooperative model of the team games tournament type with the help of snake and ladder media on students' critical thinking skills.

Discussion

The Role of Cooperative Learning in Fostering Critical Thinking

The statistically significant improvement in critical thinking scores observed in this study can be understood, in part, through the lens of cooperative learning theory. Slavin (2008) argued that cooperative learning structures create conditions in which students must actively process information, articulate their understanding, and respond to the ideas of their peers all cognitive activities that demand and reinforce higher-order thinking. When students work within small, heterogeneous groups, they are exposed to diverse perspectives and are required to negotiate meaning collectively. This process of negotiation inherently involves analysis, as students must evaluate whether a proposed answer or interpretation is logically sound, and evaluation, as they must compare competing ideas and select the most well-supported response.

The TGT model, in particular, intensifies these dynamics by introducing a competitive tournament element that is tied to group performance. Because each student's contribution affects the team's overall standing, there is an intrinsic incentive for every member to engage thoughtfully with the material rather than disengaging or relying on a single dominant voice. This finding is consistent with the observations of Shohimin (2014), who noted that TGT encourages all students, regardless of academic ability, to participate actively and contributes to a more equitable distribution of cognitive effort within the group. The pretest and posttest data from this study support this theoretical expectation: the narrowing of the score range at the lower end following the intervention suggests that students who initially demonstrated weaker critical thinking skills benefited substantially from the collaborative learning environment.

The Contribution of Game-Based Media to Cognitive Engagement

The integration of snakes and ladders as a learning medium within the TGT framework appears to have played a meaningful role in sustaining student engagement and deepening cognitive processing. Wasahua (2021) proposed that game-based learning media enhance critical thinking by creating a context in which students must repeatedly encounter problems, assess available information, and make decisions processes that closely mirror the cognitive operations underlying critical analysis. The structure of snakes and ladders is particularly well-suited to this

purpose: at each turn, students must respond to a question or task before advancing, and the competitive nature of the game provides motivation to engage seriously with each challenge rather than guessing or responding superficially.

From a developmental psychology perspective, this finding aligns with Vygotsky's concept of the Zone of Proximal Development (ZPD). Within the game-based learning environment, students are supported by both the structured scaffolding of the game itself and the collaborative input of their peers, allowing them to tackle problems that might be beyond their independent capacity. The playful context reduces anxiety and lowers the affective barriers to intellectual risk-taking, which is particularly important for younger learners who may be hesitant to offer answers in a more formal classroom setting. The observational data from this study showing that students became progressively more willing to debate and discuss during gameplay as the intervention progressed are consistent with this theoretical framework.

The Alignment Between Instructional Design and Cognitive Demand

A third dimension of interpretation concerns the alignment between the instructional design employed in this study and the specific cognitive demands of critical thinking assessment. The essay-based assessment instrument required students to demonstrate analysis, problem-solving, and conclusion-drawing cognitive tasks that are difficult to practice through passive reception of information but are naturally embedded within the TGT gameplay and group discussion activities. Students in this study were not simply exposed to content; they were repeatedly required to apply, question, and reason about that content within a structured yet engaging context (Nugraheni et al, 2026).

This alignment between instructional activity and assessment demand is significant because it suggests that the improvement observed was not merely a product of increased familiarity with the test format or the subject matter, but rather reflected a genuine shift in students' cognitive engagement with the material. The posttest responses documented in the observational data in which students independently constructed multi-step arguments and connected classroom concepts to real-world scenarios provide qualitative evidence that this deeper engagement did in fact occur. This interpretation is consistent with the findings of Imam Mahardika et al. (2024), who similarly concluded that interactive and game-oriented learning approaches can cultivate critical thinking by requiring students to actively construct and defend their reasoning rather than simply retrieve memorized information.

Significance of the Study

This study contributes to the existing body of knowledge in several meaningful ways. First, it provides empirical evidence that the combination of TGT cooperative learning and game-based media can produce a statistically significant improvement in critical thinking skills among elementary students, adding to a relatively sparse literature on this specific outcome. Second, it demonstrates that game-based media can be effectively integrated into cooperative learning models without sacrificing instructional rigor, offering a practical model that other educators may adapt. Third, by focusing on the IPAS curriculum topic of roles and responsibilities in school and community, this study shows that critical thinking interventions can be meaningfully embedded within existing curricular frameworks rather than requiring the addition of entirely new instructional programs. Fourth, the study contributes to the growing discourse on 21st-century learning in the Indonesian educational context, providing locally relevant evidence to support ongoing curriculum reform efforts.

Limitations of the Study

Several limitations must be acknowledged when interpreting the findings of this study. The most significant limitation is the use of a pre-experimental design without a control group. Without a comparison group receiving conventional instruction, it is not possible to definitively attribute the observed improvement solely to the TGT and snakes and ladders intervention. Other factors such as the novelty effect of a new instructional approach, increased teacher attention to student engagement, or natural cognitive development over the course of the semester may have contributed to the improvement in scores. Future research should employ a quasi-experimental or true experimental design with a matched control group to strengthen causal claims.

The sample size of 20 students from a single school also limits the generalizability of the findings. The results may not be representative of fourth-grade students in other schools, regions, or educational contexts. Additionally, the study was conducted within a single subject area and a single thematic topic, which means the findings cannot be automatically extended to other content domains. Finally, the duration of the intervention, while sufficient to produce measurable change, was relatively short, and it remains unclear whether the improvements in critical thinking would be sustained over a longer period without continued use of the model.

CONCLUSION

This study set out to investigate whether the implementation of the Team Games Tournament cooperative learning model, integrated with snakes and ladders media, would produce a significant effect on the critical thinking skills of fourth-grade elementary students. The findings addressed each of the three research objectives as follows. With respect to the first objective, baseline assessment revealed that students' critical thinking skills prior to the intervention were moderate, with a mean pretest score of 60.75. Students demonstrated limited capacity for independent analysis and frequently provided surface-level responses to open-ended essay questions, suggesting that their critical thinking skills had not yet been meaningfully cultivated through prior instructional experiences.

With respect to the second objective, post-intervention assessment showed a meaningful improvement in critical thinking skills, with the mean posttest score rising to 71.65. Qualitative observations corroborated this quantitative finding, documenting clear shifts in students' willingness and ability to analyze scenarios, construct reasoned arguments, and engage in collaborative problem-solving. With respect to the third objective, statistical analysis confirmed that the difference between pretest and posttest scores was significant ($t = -108.214$, $p = 0.000$), which is smaller than the significance level of 0.05. Thus, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. This result indicates that the TGT cooperative learning model with snakes and ladders media had a statistically significant positive effect on the critical thinking skills of the participating students.

Based on the findings of this study, several recommendations are offered for future research and educational practice. For educators, it is recommended that the TGT cooperative learning model with game-based media be considered as an instructional strategy for developing critical thinking skills in elementary classrooms, particularly within the IPAS curriculum. Teachers seeking to implement this model should ensure that the game content is carefully aligned with learning objectives and that the tournament structure is designed to encourage collaborative reasoning rather than superficial competition.

For future researchers, it is strongly recommended that subsequent studies employ a quasi-experimental or true experimental design that includes a control group receiving conventional instruction. This methodological enhancement would allow for more rigorous causal inference regarding the effect of the intervention. Additionally, future studies should consider larger and more diverse sample sizes, drawn from multiple schools and regions, to improve the generalizability of findings. Longitudinal follow-up assessments would also be valuable in determining whether the gains in critical thinking skills observed in this study are sustained over time. Finally, researchers are encouraged to explore the effect of TGT with game-based media on other cognitive competencies such as creativity and problem-solving in different subject areas to further establish the breadth and versatility of this instructional approach.

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