The Effect of the Teams Game Tournament Learning Mode Assisted by Quizz Paper Mode on High Order Thinking Skills and Learning Outcomes in the Subject of Science in Grade V Elementary School

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Abstract: This research is motivated by the low HOTS and learning outcomes of students in science learning. The purpose of this study is to determine the effect of the Teams Game Tournament (TGT) learning model on HOTS and Learning Outcomes of fifth grade elementary school. This study uses a quantitative approach with a quasi-experimental method (quasi-experimental design) and a pre-action and post-action design. The results of the study show that: the t test is known to be tcount 1857> ttable 3160 and the sig. value. (2-tailed) <0.05. on significant differences between students who learn using the Teams Game Tournament (TGT) learning model and students who learn with conventional models on HOTS in science learning in fifth grade elementary school; the t test is known to be tcount 4.838> ttable 3.160 and the sig. value. (2-tailed) <0.05. there is a significant difference between students who learn using the Teams Game Tournament (TGT) learning model and students who learn with conventional models on student learning outcomes in science learning in grade V of elementary school; Manova test shows a sig. (2-tailed) value <0.05. there is a significant difference simultaneously or simultaneously between students who learn using the Teams Game Tournament learning model and students who learn with conventional models on HOTS and science learning outcomes in grade V of elementary school. Thus, it can be concluded that the Teams Game Tournament (TGT) learning model has a significant and effective effect in improving HOTS and learning outcomes.

Keywords: HOTS; Learning outcomes; Teams game tournament

Introduction

Education plays a crucial role in preparing quality human resources to face future challenges. One particularly fundamental type of education is elementary school (SD). At this level, students are equipped with basic knowledge, skills, and attitudes that will serve as the foundation for learning at the next level (Dai & Matthews, 2023). Within the context of elementary school education, the study of Natural and Social Sciences plays a strategic role. Natural Sciences (IPAS) is a subject that studies natural phenomena and objects in a systematic, orderly, and generally applicable manner, consisting of a collection of observations and experiments (H. Zhang et al., 2021). Through learning IPAS, students can develop critical, logical, and creative thinking skills, and gain a deep understanding of the natural world. Critical thinking skills are crucial for students to analyze, evaluate, and solve problems in everyday life, and will also impact student learning

outcomes (Mohebbi, 2025). High-Order Thinking Skills (HOTS) are increasingly becoming a major focus in the Indonesian education system, especially following the implementation of the Independent Curriculum, which encourages students to think critically, creatively, and innovatively. HOTS not only helps students understand concepts deeply but also prepares them to face complex real-life problems.

However, in many elementary schools, developing HOTS remains a challenge. Research shows that traditional, teacher-centered learning methods often hinder students from actively participating and honing critical thinking skills (Bhardwaj et al., 2025). Several factors determine students' HOTS levels. First, basic skills such as reading, writing, and arithmetic are crucial as a foundation. Second, a supportive learning environment, such as an interactive classroom atmosphere, encourages students to actively think critically. Third, the use of innovative learning methods, such as project-based learning or educational games, can stimulate student engagement in a deeper learning process (Novalia et al., 2025). At the elementary school level, developing HOTS is a crucial foundation for preparing students for further learning, particularly in Natural and Social Sciences (IPAS), which require critical and contextual thinking skills. However, based on data from several studies, elementary school students in Indonesia still have relatively low mastery of HOTS.

However, the reality in the field during the researchers' initial observations indicated that the High Order Thinking Skills (HOTS) abilities and learning outcomes of students in grades VA and VB at SDN 18 Air Tawar Timur Selatan, Padang City, were still relatively low. Initial observations were conducted in the two classes, each with 25 students. The observations revealed that HOTS and student learning outcomes pose significant challenges in the learning process (C. Zhang et al., 2024; Castells et al., 2022). Students still experience difficulties in developing higher-order thinking skills, such as analyzing, evaluating, and generating new ideas from the material they have learned. This is evident in students' low ability to answer questions that require reasoning, problem-solving, and critical and reflective thinking skills. Many students tend to simply memorize information without a deep understanding of concepts, so when faced with analytical or applied questions, they struggle to answer correctly (Oc & Hassen, 2025; Anaya et al., 2022).

Furthermore, student learning outcomes have not shown significant improvement. In evaluation activities, most students scored below the Minimum Completion Criteria (KKM), indicating a low level of understanding of the material. Students appear unable to connect learned concepts to everyday life and are less active in learning activities that require complex thinking (Pascu,

2024). These findings are supported by data from an initial interview conducted with a fifth-grade subject teacher at SDN 18 Air Tawar Selatan on December 5, 2024. The interview focused on learning model indicators, High-Order Thinking Skills, and learning outcomes. The results of the interview were that, of several indicators of High Order Thinking Skills and Learning Outcomes in learning, grade V students had not yet fully mastered the High Order Thinking Skill indicators.

Students' initial HOTS abilities can be seen from the results of the social studies report cards for classes VA and 5B in this odd semester. Class 5A achieved a grade point average of 66.6 with 18 students who had not yet completed the course, while class 5B achieved a grade point average of 64.5 with 23 students who had not yet completed the course. Therefore, these results indicate that HOTS abilities and Learning Outcomes need to be improved through more effective and interactive learning approaches to achieve optimal collaborative skills. One learning model considered effective in achieving this goal is the Team Game Tournament. The Team Game Tournament (TGT) learning model is part of a cooperative learning approach that combines learning activities with game-based competitions. In TGT, students work in groups to complete assignments, which are then followed by a game tournament to increase their learning enthusiasm (Pada et al., 2022). Previous research has shown that TGT can improve students' learning motivation, social interaction, and critical thinking skills (Pada et al., 2022).

The integration of TGT and Quizizz paper mode is believed to have a positive impact on science learning. In TGT, the use of Quizizz can enrich tournament sessions with a variety of HOTS-based questions designed to encourage students to think more critically and analytically. Furthermore, the game element offered by Quizizz can increase students' learning motivation, making them more enthusiastic about participating in the learning process (Hasanah, 2024). Previous research has also shown that this model is effective in improving student learning outcomes, especially in materials that require in-depth understanding and problem-solving (Aunurofiq & Setyasto, 2025). The application of the combination of TGT and Quizizz is also relevant to the learning needs of elementary schools, where a game-based approach is more easily accepted by students (Rofi'i et al., 2023; Wardoyo et al., 2021).

Elementary-aged children tend to be more interested in activities that involve competitive and collaborative elements. By using this approach, students not only learn to understand concepts but are also encouraged to collaborate, think critically, and evaluate their answers independently. This is expected to create more meaningful and in-depth learning. Furthermore,

this model also provides teachers with the opportunity to design learning that is more adaptive to student needs (Pimdee et al., 2024; Pan et al., 2024; Cantona et al., 2023). Teachers can tailor the questions used in Quizizz to the students' ability levels, so that each student has the opportunity to develop according to their potential (Walter, 2024; Situmorang et al., 2025). This supports the principle of differentiated learning, also emphasized in the Independent Curriculum.

Method

The type of research used was quantitative research using a Quasi-Experimental Design. The aim was to allow the research to proceed naturally without students feeling like they were being experimented on. This design is expected to contribute to the validity of the study. Furthermore, this design is suitable for the experimental research being conducted because the researcher cannot fully control external variables that could potentially influence the variables related to this study, namely Higher Order Thinking Skills and Learning Outcomes. This statement is supported by the opinion that, in a Quasi-Experimental Design, the control group does not fully control the external variables that influence the experiment (Miller et al., 2020; Schwichow et al., 2016).

The quasi-experimental design used in this study was a non-equivalent control group design. In this design, there are two groups: the experimental group, which receives the treatment, and the control group, which does not receive the treatment. The Non-Equivalent Control Group Design uses a pretest before the treatment and a posttest after the treatment. In the initial situation, both groups were first given a pretest to find out whether there was a difference between the control group and the experimental group. Measurements were carried out before and after the treatment was given, then the difference between the initial measurement and the final measurement was seen.

Result and Discussion

The results show a clear difference between the learning stimulation provided by the TGT model and the conventional model. The implementation of the TGT model, assisted by Quiziz Paper Mode, in the experimental class began with the teacher opening the lesson by covering the students' physical preparation, apprehending, motivating, and providing information about the learning activities. The teacher then divided the students into five heterogeneous groups and explained the rules that would apply during the discussion. Each group was given a team name: cloud,

rain, river, root, or sun. The teacher explained the core material on the water cycle using short video images and a question-and-answer session. Students noted important points and used the Student Worksheet (LKPD) as a guide. Each group was assigned to discuss HOTS practice questions based on images and stories. The teacher guided the discussion process among group members to ensure all members understood the material and were prepared for the tournament. The teacher distributes the printed Quiaia question sheets (Quiziz Paper mode) randomly to each group member, students work on the questions individually but the scores are collected for the group, the time to work is limited for example 15-20 minutes, after completion, the sheet is corrected by the teacher/with the answer key, then the individual and group scores are calculated, the teacher announces the group with the highest score, the winning group is given a symbolic award of praise and stars, reflection together with students and asked to convey their learning experiences.

Next, it is continued with the Evaluation of students still holding their respective barcodes that have been distributed in the group, and the teacher displays the questions via Infocus, after which students lift the barcodes that have been given and determine their answers. The teacher concludes the learning, and provides reinforcement about the water cycle and its relationship to daily life, conveys positive messages and greetings. The results of this study provide inspiration that the application of the TGT model assisted by Quiziz Paper Mode in learning can be implemented in the teaching and learning process as an effort to instill good habits in students and also improve HOTS and student Learning Outcomes. Based on the results of research conducted at SDN 18 Air Tawar Timur Padang, the above is indeed proven. The HOTS and Science Learning Outcomes of students obtained from the two sample classes show that the TGT model assisted by the Quiziz Paper Mode media has a general effect on the HOTS and Learning Outcomes of fifth-grade students.

Specifically, the HOTS of students in the experimental class taught using the TGT model assisted by the Quiziz Paper Mode media was higher than that of students in the control class taught conventionally. Similarly, regarding learning outcomes, the TGT model assisted by the Quiziz Paper Mode media generally has an effect on fifth-grade science learning outcomes. Specifically, the learning outcomes of students in the experimental class taught using the TGT model assisted by the Quiziz Paper Mode media were higher than those of students in the control class taught using the TGT model assisted by the Quiziz Paper Mode model compared to the control class taught conventionally. This indicates that the learning motivation of students in the control class was lower than that of students in the

experimental class, resulting in lower learning outcomes for students in the control class than those in the experimental class.

Differences between Students Learning Using the TGT Learning Model and Those Learning Using the Conventional Learning Model on HOTS Outcomes

The first hypothesis test in this study was to determine whether there was an effect of HOTS on students taught using the TGT model with the assistance of Quiziz Paper Mode compared to students taught conventionally. The hypothesis regarding student HOTS in both sample classes was tested using the t-test formula. Based on the calculations obtained HOTS students taught using the TGT model assisted by Quiziz Paper Mode in the very good category totaled 10 students and in the good category totaled 15 students while the sufficient category totaled 0 students, students in the less category totaled 0 and students taught conventionally in the very good category totaled 0 students, in the good category totaled 0 students and in the sufficient category totaled 15 students, in the less category totaled 10 students while in the very less category totaled 0.

Based on the number of HOTS rubrics of students in the good and sufficient categories taught using the TGT model assisted by Quiziz Paper Mode with HOTS students taught conventionally, there is a difference. From the results of the t test, it was obtained. Based on the results of the first hypothesis test, in the t column shows the magnitude of t count which is 1.857. The t count value will be compared with the t table which aims to determine the effect of the independent variable on the dependent variable, it is known that in the df column, the aqual variances row shows a value of 48 at the 5% level, the df value functions to find the magnitude of t table, the value obtained is 3.160. So if t count t table (1.857 > 3.160) and the sig value (2-tailed) obtained on HOTS students is 0.070 <0.05 then for Hypothesis 1, namely Ho is rejected and Ha is accepted. Therefore, it can be concluded that "There is a significant

difference between students who learn using the TGT learning model assisted by Quiziz Paper Mode and students who learn using the conventional model regarding HOTS in Elementary School Science learning."

Differences between Students who Learn Using the TGT Learning Model and Those who Learn Using the Conventional Model Regarding Learning Outcomes

The second hypothesis test in this study was to examine the learning outcomes of students taught using conventional learning. This can be seen in the final student tests given to the experimental and control classes. By using the TGT model assisted by Quiziz Paper Mode in the experimental class, student learning outcomes improved. Learning outcomes include behavior patterns, values, understandings, attitudes, appreciation, and skills. Learning outcomes in the two classes can be seen in the learning outcome tests completed by students individually. Based on data analysis, it can be seen that the average learning outcomes of students in the experimental class were higher than the average learning outcomes in the control class. control. The average learning outcomes of students in the experimental class were 97.2 and the average learning outcomes of students in the control class were 75.6 with a difference of 12.42.

The maximum score of students' learning outcomes in the experimental class was 100 and the maximum score of students' learning outcomes in the control class was 90. The minimum score of students' learning outcomes in the experimental class was 89 and the minimum score of students' learning outcomes in the control class was 60. The hypothesis regarding the learning outcomes of students taught using conventional learning was tested using parametric statistics using the t-test formula. Based on the data analysis obtained after the study, there was a difference in the learning outcomes of students taught using the TGT model assisted by Quiziz Paper Mode compared to those taught conventionally. This can be seen in the table below:

Table 1. Results of the First Hypothesis Test

		Independent Sample test							
		Levene'test for variances				t-test for equality of means			
		F	Sig.	t	df	Sig(2-tailed)	Mean difference	Std. Error difference	Lower Upper
Result	Equal variances assumed	3.42	.070	-1.857	48	0.70	-3.16	1.7020	-6.58 .2620
	Equal variance s not assumed			-1.857	46.009	0.70	-3.16	1.7020	-6.58 .2658

Based on the calculation in Table 1, the t-test column shows a calculated t of 4.834. The calculated t-test value will be compared with the t-table value to determine the effect of the independent variable on the

dependent variable. The df column in the aqual variances row shows a value of 48 at the 5% level. The df value is used to calculate the t-table value, which is 3.061. Therefore, if the calculated t-test (4.834 > 3.160) and the

sig value (2-tailed) for student learning outcomes is 0.070 < 0.05, Hypothesis 1, namely Ho, is rejected and Ha is accepted. So it can be concluded that "There is a significant difference between students who learn using the TGT learning model assisted by Quiziz Paper Mode and students who learn using the conventional model on student learning outcomes in elementary school science learning.

Thus, it can be generally concluded that the TGT model assisted by Quiziz Paper Mode has an effect on the learning outcomes of fifth-grade elementary school students. Specifically, it was concluded that the learning outcomes of students using TGT assisted by Quiziz Paper Mode were higher than the learning outcomes of students taught conventionally. The high score obtained in the experimental class was due to the learning process where many students were active in asking questions and each group worked together and competed to complete the learning topic. Based on calculations, there was a difference in the learning outcomes of students taught using the TGT model assisted by Quiziz Paper Mode and the learning outcomes of students taught conventionally. Learning outcomes are changes in behavior that learners acquire after experiencing the learning process (Lee, 2025). Learning outcomes will only be achieved by someone after undergoing the learning process. Changes in behavior are an indicator of whether someone has achieved learning outcomes or not.

Results Learning is measured based on whether or not there is a change in behavior in a person who has carried out the learning process (Dantas et al., 2020; Murtonen et al., 2017). Learning in the control class was conducted using conventional learning. The material was introduced through lectures and questions and answers. Students mostly sat silently listening to the teacher's information, and few sought information from other sources. In this conventional learning method, only a few students were willing to ask questions and provide feedback on the material being taught. When asked questions or explained, the teacher explained the material in their own words. Some responded immediately, while others consulted their notes, and some even refused to open their notebooks if they had any doubts.

Stimulus Differences between Students Learning Using the TGT Learning Model with Quiz Paper Mode and Students Learning Using the Conventional Learning Model Regarding HOTS and Learning Outcomes

The TGT cooperative learning model is a learning approach designed to ensure all students are actively involved in the process of thinking, discussing, and expressing opinions through structured group work. In this model, each group member has equal responsibility for understanding the material. After group discussions, all group members appear randomly to present their answers to the class. The TGT learning model involves group discussions that encourage students to work together and collaborate to complete tasks or problems. This collaboration trains students to understand the role of each group member, share responsibilities, and appreciate each individual's contribution, thus strengthening student learning outcomes through the discussion process and group presentation of material in front of the class (Mundelsee & Jurkowski, 2021).

The TGT cooperative learning model, supported by Quiz Paper Mode, simultaneously had a significant impact on improving students' HOTS and verbal learning outcomes in science. During the learning activities, students actively engaged in group discussions that required cooperation and fair division of tasks. Each group member was responsible for understanding the material and explaining the results of the discussions, thus encouraging students to help each other and collaborate effectively. Group presentation activities were one of the clearest indicators of simultaneous improvement in HOTS and communication. Students not only demonstrated the ability to work together in preparing presentations but also conveyed their opinions orally with confidence and clarity in front of the class.

Several students were able to complement their peers' explanations, provide responses to questions, and provide logical arguments. This situation demonstrated that the social interactions fostered within the group successfully fostered the development of two important skills simultaneously. The TGT model not only trains cognitive abilities but is also highly effective in developing verbal learning outcomes, as students are trained to express their opinions orally. This process fosters self-confidence, the ability to convey ideas coherently, and the courage to communicate in formal situations such as class presentations. After conducting the research, researchers observed that the TGT model had a simultaneous impact on three important aspects:

Impact on Collaboration Skills

Students learned to work together, share ideas, and complete assignments in groups, demonstrating a cooperative attitude that was not only active by one person but by the entire group.

Impact on Verbal Learning Outcomes

Students were trained to express their opinions verbally, gained confidence, and actively spoke during presentations in front of the class.

Encouraging Two-Way Learning

The learning process was no longer one-way from teacher to student, but rather a two-way dialogue that strengthened student understanding and engagement in class discussions.

Because it involved reciprocal interaction, students became more responsible for their own learning and that of their partners (Dai & Matthews, 2023). The implementation of the TGT model not only improved HOTS (Host-Sensitiveness) but also indirectly encouraged an improvement in students' verbal learning outcomes during presentations in front of the class. Students were no longer shy or pointing when reading their group work but were ready to present their work more confidently. When HOTS and communication were simultaneously influential, this demonstrated that the TGT model was effective in creating a holistic learning environment. Many students became more active in collaborating within groups, which positively impacted their verbal learning outcomes, which improved significantly. This led to a more lively learning process and sharpened student skills, further enhancing 21st-century skills (communication, critical thinking, creativity, and collaboration).

This research is supported by several other studies, namely the research results of (Dewi et al., 2024), on the effect of implementing the Teams Gate Tournament (TGT) learning model on students' mathematical problem-solving abilities. The results of the study showed that students' mathematical problem-solving abilities using the TGT learning model had an impact on their mathematical problem-solving abilities. Similarities with the research by Saputri et al. (2024), that will be applied by the researcher are that both use the TGT learning model. The difference is that Fariha et al., (2024) and Hadiprayitno et al. (2022), researchers measured students' mathematical problem-solving abilities, while this researcher uses Quiziz Paper Mode on science material and is applied to measure HOTS and Learning Outcomes. Research results by Khoirunnisa et al. (2023), on the TGT Model Assisted by the Pletokan Game Media to Improve Critical Thinking Skills of Elementary School Students. Describes the TGT model assisted by the pletokan game to improve students' critical thinking skills. The results of the study showed an increase in students' critical thinking skills through the Team Gama Tournament (TGT) model assisted by the pletokan game media from the pre-cycle, cycle 1, and cycle 2. Therefore, this classroom action research was considered successful with good criteria.

Research Results by Triyanto et al. (2022), entitled The Influence of the TGT Learning Model in terms of Critical Thinking Skills in Elementary School Thematic Learning. Based on the results of the average pre-test and post-test scores, there was an increase in the average achievement of critical thinking skills using the TGT Learning model. 4. Research conducted by Juwita et al. (2017), entitled "The Effect of the Teams Game Tournament (TGT) Learning Model Using Question Boxes on Science Learning Outcomes," concluded that science learning outcomes using the Teams Game Tournament (TGT) learning model using Question Boxes were better than those using conventional learning models. In other words, the Teams Game Tournament (TGT) learning model using Question Boxes influenced science learning outcomes for fifth-grade elementary school students at MIN (Madrasah Ibdityah Negri) 2 Buleleng, Buleleng District, in the 2017/2018 academic year. The difference between the aforementioned research and the research conducted by the researcher is that the variables used were High-Order Thinking Skills and Learning Outcomes.

Research conducted by Nurussofi et al. (2022), entitled "The Effect of the Think Pair Share (TPS) Learning Model on Critical Thinking Skills in Elementary Schools," concluded that students' critical thinking skills improved with the Think Pair Share (TPS) learning model compared to conventional learning models. In other words, the TPS learning model influences students' critical thinking skills. Differences in the stimulation of students learning using the TGT learning model compared to those learning using conventional learning models regarding HOTS and Learning Outcomes. Learning models have a significant influence on providing learning stimulation to students. In the context of developing higher-order thinking skills (HOTS) and learning outcomes, the learning model used by teachers is crucial (Khadka et al., 2025; Ramadhana et al., 2025).

One model that has been proven to have a significant impact on improving HOTS and learning outcomes is the Teams Games Tournament (TGT) learning model (Suari et al., 2025). TGT is a type of cooperative learning that involves teamwork, healthy competition through educational games, and quizzes that can increase student motivation and active engagement. Learning using the TGT model requires students to analyze information, evaluate ideas, and create solutions, which aligns with the higher-order cognitive domains in Bloom's Taxonomy: analysis (C4), evaluation (C5), and creation (C6). Unlike TGT, learning using conventional models such as lectures and question-and-answer sessions tends to be teacher-centered. In this model, the teacher is the primary source of information, while students act as passive recipients. The learning process focuses too much on memorization and basic understanding, thus not encouraging students to think critically or creatively.

This results in relatively low cognitive stimulation, thus preventing their HOTS skills from developing optimally (Afifah & Retnawati, 2019). In conventional learning, student interaction is limited and in-depth thinking activities rarely occur because teachers focus on explaining material without providing sufficient space for students to explore and discuss knowledge. In terms of the different stimuli provided, TGT learning provides more complex and active learning stimuli (Pada et al., 2022; Masegosa et al., 2024). Each student is involved in group discussions, problem-solving, and participating in tournaments, fostering a spirit of competition and cooperation. These activities not only increase student motivation but also strengthen their understanding of the material through the social process of knowledge elaboration. Meanwhile, conventional learning models tend to be monotonous and do not challenge students to think more deeply. As a result, students learning with conventional methods tend to experience boredom and difficulty maintaining long-term understanding (Tzafilkou et al., 2021).

Conclusion

Research on the application of the Teams Games Tournament (TGT) learning model assisted by Quizizz Paper Mode in fifth-grade elementary school science subjects showed significant results. The following are the conclusions of the study: Impact on Higher-Order Thinking Skills (HOTS): The TGT model with Quizizz Paper Mode significantly improved students' HOTS (Higher Order Thinking Skills). This was evident in positive changes in group dynamics, where students became more active in discussions, collaborated in problem-solving, and were able to appreciate and reach consensus. The numbering system and shared responsibility for answering questions encouraged each student to actively participate, creating a conducive learning environment; Impact on Learning Outcomes: The implementation of this model also had a significant impact on student learning outcomes. Students showed increased confidence when expressing their opinions and were more confident in arguing in front of the class during presentations. They were no longer dependent on a single student, as each group member felt they had equal responsibility. This created a more lively discussion atmosphere, and all students were directly involved; Simultaneous Effects on HOTS and Learning Outcomes: Concurrently, this learning model has been proven effective in improving HOTS and student learning outcomes. These two skills are interrelated and can be developed simultaneously. In addition to honing HOTS, students also learn to work in teams and communicate effectively, both in groups and during

presentations. These skills are crucial for everyday life and align with the needs of 21st-century skills.

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