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## ENHANCING STUDENTS LEARNING OUTCOMES THROUGH TEAM GAMES TOURNAMENT WITH 'RED LIGHT, GREEN LIGHT' GAME

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### Abstract

This study aims to improve mathematics learning outcomes of fifth-grade students at SD Negeri 55 Palembang on the topic of fraction division through the implementation of the Teams Games Tournament (TGT) learning model integrated with the Red Light Green Light game and supported by Wordwall media, specifically the "Open the Box" feature. The research was conducted as classroom action research involving 22 students. Data were collected using test instruments and analyzed quantitatively using descriptive statistics. Preliminary observations indicated that most students had not met the passing grade, which was set at 75, with a pre-cycle average score of only 39,85%. After the first cycle of implementing the TGT model with gamification and media integration, the average score significantly increased to 93,91%, and further improved in the second cycle, reaching 96,14%. These results suggest that the use of the Teams Games Tournament model, in combination with engaging game-based activities and digital learning tools, can effectively enhance student performance in mathematics, especially in topics that students often find challenging, such as fraction division. The findings provide meaningful implications for educators seeking interactive and motivating strategies to address learning difficulties and improve student achievement in mathematics.

### Keywords:

Learning outcomes, teams games tournament, red light green light game.

## INTRODUCTION

Learning outcomes serve as the main indicators of how well students have understood, mastered, and are able to apply the knowledge and skills acquired throughout the instructional process (Ardanari et al., 2024). The assessment of these outcomes is not only related to academic achievement but also reflects the effectiveness of the methods and approaches employed by the teacher. When students' learning outcomes tend to be low, it may indicate issues within the learning process, possibly stemming from inappropriate choices of teaching methods, media, or instructional approaches. As a result, students may struggle to understand the material and risk failing to achieve the expected competencies.

According to Anggraena et al. (2021), lack of learning outcomes are often influenced by such factors, leading to a decline in students' learning motivation and a widening gap in competencies among learners. When this occurs, it not only hinders the achievement of learning objectives but also contributes to educational disparities between individuals and even across regions. This underscores the importance for educators to identify existing barriers and make necessary improvements in instructional strategies in order to enhance learning outcomes more equitably and effectively.

Mathematics is fundamental in fostering students' logical, analytical, and systematic thinking skills (Duma et al., 2024). In mathematics learning, students are encouraged not only to understand abstract concepts but also to cultivate problem-solving skills applicable to everyday life. These skills are essential for enabling students to think critically and make logical decisions in various situations. Furthermore, mathematics fosters structured and organized thinking, which is crucial in many aspects of life, including daily problem-solving.

One of the significant and challenging topics in elementary mathematics education is the division of fractions. Mastering this topic requires not only a thorough understanding of fraction concepts but also the ability to connect division operations with both visual and contextual representations. Unfortunately, many students struggle with fraction division because its abstract nature makes it seem disconnected from their everyday experiences (Rahma et al., 2024). These difficulties affect not only their academic performance but also their attitudes and feelings toward mathematics as a whole. Many students experience anxiety, fear, or even frustration during math

lessons, perceiving the material as overly complex, confusing, and unengaging. Moreover, Safira & Muthi (2024) highlight that external factors, such as monotonous teaching methods and lack of parental support, exacerbate these challenges. Consequently, student motivation declines, and reluctance to actively participate in learning increases. If left unaddressed, such negative perceptions of mathematics may hinder the comprehensive development of students' logical thinking and problem-solving skills.

A solid understanding of mathematical concepts such as fraction division requires the implementation of instructional models that foster dynamic, collaborative, and meaningful learning experiences. One effective model is Teams Games Tournament (TGT), a cooperative learning strategy that integrates teamwork, educational games, and tournaments to enhance student engagement and motivation (de Vries et al., 1978). TGT encourages positive peer interaction through group discussions and healthy competition, enabling students to learn abstract mathematical concepts in a more accessible and enjoyable manner. This model not only fosters teamwork but also creates a dynamic learning atmosphere through structured game elements (Slavin, 2020). Additionally, TGT allows students to develop critical thinking, communication skills, and a sense of responsibility during group learning activities. In a socially interactive and positively competitive setting, students are more likely to participate actively, stay motivated, and demonstrate their understanding in concrete ways.

To maximize the effectiveness of cooperative learning models like TGT, integrating simple physical activities into the lesson can help sustain students' energy and focus throughout the learning process. Such activities are particularly well-aligned with the developmental characteristics of elementary school students, who naturally enjoy movement, play, and hands-on learning experiences (Yuliarsih et al., 2024). The TGT model has been proven to improve learning outcomes by increasing student engagement, collaboration, and motivation. A study by Rezeki et al. (2024) at SDN 03 Madiun Lor with fifth-grade students showed steady improvement in both participation and academic performance across each cycle. These results show that TGT supports not only academic success but also the development of key social and teamwork skills needed in today's classrooms.

Since young learners tend to lose focus when seated for extended periods, incorporating movement-based activities can help maintain their engagement, improve motivation, and enhance participation. As highlighted in Iswandhary (2021), young children naturally learn through their five senses seeing, hearing, touching, and interacting and are more responsive to activities that involve physical movement. Rather than requiring them to remain still and silent, teachers can utilize their active nature through engaging methods such as songs, games, total physical response, and hands-on tasks. These approaches not only align with their developmental needs but also foster a more dynamic and effective learning environment. One example is an adapted version of the game 'Red Light, Green Light,' in which students solve fraction division problems as part of the game. In this activity, students are grouped and positioned at a starting line while the teacher acts as the 'traffic light,' giving cues. When the teacher says 'Green Light,' students move forward, and at 'Red Light,' they must stop. This game not only involves physical movement but also encourages collaboration, strategy, and joyful reinforcement of the mathematical content. Integrating TGT with playful physical activities like this supports the creation of active, healthy, and meaningful learning experiences that are well-suited to the needs of elementary learners.

The integration of interactive learning tools such as Wordwall aligns well with the application of the TGT model combined with physical activities like the 'Red Light, Green Light' game. Wordwall is a game-based educational platform that offers customizable, narrative-driven, and interactive formats tailored to classroom needs (Savira & Gunawan, 2022). It provides various types of digital learning games such as quizzes, spin wheels, and matching activities that are well-suited for reinforcing fraction division concepts (Putri et al., 2024). This platform allows educators to present exercises in a dynamic and engaging way, enabling students to learn through play in a competitive yet enjoyable setting. Within the TGT structure, Wordwall functions effectively as a digital tournament tool, where students take turns answering questions in a format that emphasizes both accuracy and quick thinking.

The synergy between TGT and Wordwall creates a student-centered, interactive, and technology-integrated learning experience that meets the demands of 21st-century education. That

was in line with previous studies. For example, a study in Kwara State, Nigeria, showed that using Wordwall media improved math scores among third-grade students—from an average of 41.51 in the pre-test to 50.48 in the post-test (Sulaimon, 2025), with no difference between boys and girls. Similarly, Widyasari et al. (2024) found that combining Wordwall with the TGT model at SDN Banyuagung 3 raised student mastery from 23.08% to 69.23% and improved average scores from 45.38 to 76.54. These results show that using Wordwall in collaborative learning like TGT can increase student engagement and improve learning outcomes in elementary education.

Based on observations in a fifth-grade classroom, the learning process often faces challenges such as declining student concentration and motivation. Students tend to become easily bored, particularly when lessons lack variety and rely heavily on passive activities. This condition triggers behaviors such as chatting, not paying attention, and moving around the classroom, which disrupt the learning environment. Such hyperactivity also contributes to a low level of understanding, as reflected in the pretest results on the topic of fraction division, where none of the students achieved the minimum mastery criteria. According to interviews with the mathematics teacher, the instructional methods used thus far have primarily consisted of lectures and written exercises, with little incorporation of varied or participatory activities. These findings highlight the urgent need for more engaging, interactive teaching approaches that can accommodate the dynamic learning needs of students.

Recognizing the need for more engaging and effective learning strategies in teaching fraction division, this study explores the implementation of the Teams Games Tournament (TGT) model combined with the “Red Light, Green Light” game and supported by Wordwall media in the fifth-grade classroom of SDN 55 Palembang. The TGT model promotes active collaboration within groups, facilitating interactive and competitive learning experiences. The “Red Light, Green Light” game introduces an enjoyable element that helps sustain students’ attention and motivation throughout the lesson. Meanwhile, Wordwall provides a dynamic platform for presenting fraction division problems in an attractive and interactive way. This integrated approach is expected to significantly enhance students’ learning outcomes, create a more meaningful learning environment, and minimize unproductive behaviors in the classroom.

## METHOD

This study employs a Classroom Action Research (CAR) approach aimed at improving student learning outcomes through iterative cycles of improvement. The research was conducted in two cycles, each consisting of four main stages: planning, implementation, observation, and reflection. The subjects of this study were 22 fifth-grade students at SD Negeri 55 Palembang during the even semester of the 2024/2025 academic year. The selection of subjects was based on learning difficulties observed in the class, particularly in understanding fraction operations, with a focus on division. The instruments used in this study included written tests designed to measure students’ learning outcomes, specifically their comprehension of fraction division. Data collection was carried out through the administration of pre-tests and post-tests related to the learning material. Quantitative data were analyzed by calculating average scores and comparing pre-test and post-test results to evaluate improvements in learning outcomes and the effectiveness of the implemented strategy.

## FINDINGS AND DISCUSSION

### Findings

#### *a. Pre-cycle*

Before conducting the research, the researcher carried out a preliminary observation to understand the actual condition of students during the mathematics learning process, particularly on the topic of fraction division. The observation results indicated that the learning environment in fifth grade lacked active student participation. Many students appeared disinterested and unmotivated to engage in the learning activities. This was reflected in their behavior many preferred to play by themselves, chat with seatmates, or show indifference to the teacher’s explanations. This situation suggests that the current learning approach has not been effective in capturing students’ attention or accommodating their diverse needs. As a result, students’ understanding of the material

has been suboptimal, directly impacting their low learning outcomes.

The results obtained from the pre-cycle learning conducted on Wednesday, April 16, 2025, showed that none of the students met the passing grade set for the lesson. The data from the pre-cycle results are presented in the following table:

**Table 1. Students' Learning Outcomes in the Pre-Cycle Stage**

No.	Passing Grade	Score	Description	Number of Students	Percentage (%)
1	75	$\geq 75$	Passed	0	0 %
2	75	$< 75$	Not passed	22	100 %
Total				22	100 %
Average Score				39,85 %	

Table 1 shows the results of the pre-cycle evaluation, indicating that out of a total of 22 students, none managed to achieve a score above the established passing grade of 75. All students (100%) were still below the mastery threshold and thus categorized as not yet proficient. The average score obtained by the students was also relatively low, at only 39,85%. Based on these conditions, it can be concluded that the learning outcomes of the students in Mathematics, particularly in the topic of fraction division operations, are still relatively low. One of the main identified causes is the lack of use of interactive teaching strategies and media that can capture students' interest and motivate them to learn optimally.

#### *b. Cycle 1*

Therefore, the researcher took the initiative to implement improvement actions through classroom action research (CAR) by utilizing the Teams Games Tournament (TGT) learning model combined with the Red Light Green Light game supported by Wordwall media. This intervention was carried out in two cycles, with the first cycle conducted on April 21, 2025. At the initial stage, students were provided with learning materials and videos. Subsequently, they were divided into several small groups to engage in the next learning activity, which involved completing the student worksheet. After the students completed their collaborative activities, the learning process continued with a tournament game using the Wordwall platform.

The TGT tournament began with the teacher outlining the instructions for the educational game "Red Light Green Light Fraction Division" to all participants. In this game, each group was asked to send one representative to participate in the tournament rounds in turns. The teacher then instructed that the game start with all participants standing at the starting line located at the back of the classroom. Participants were only allowed to move forward when the teacher said "Green Light" and had to immediately stop when the teacher said "Red Light." If any participant moved during the "Red Light" command, they had to return to the starting line. The first participant to reach the front near the teacher was given a question about fraction division by selecting one of the boxes containing questions on the Wordwall Open the Box platform. If the participant answered correctly, their group earned a point. Conversely, if the answer was wrong, the participant had to return to the back and allow other group members a chance to play. This game was repeated over several rounds so that every group member had an opportunity to participate. The group that accumulated the highest score was declared the tournament winner, while the other groups showed appreciation to the winner as a form of practicing relational skills and sportsmanship.

During the process, the researcher observed the involvement and enthusiasm of the students, including those who were previously less active and less motivated. Interestingly, the competitive and collaborative atmosphere created through the TGT model with the Red Light Green Light game supported by the Wordwall media was able to encourage active participation from all students.

After the tournament activity, the researcher administered an individual test to measure each student's understanding. The results of Cycle I showed improvement compared to the pre-cycle results. Complete data regarding these results will be presented in the following table:

**Table 2. Students' Learning Outcomes in the Cycle I**

No.	Passing Grade	Score	Description	Number of Students	Percentage (%)
1	75	$\geq 75$	Passed	20	90,91%
2	75	$< 75$	Not passed	2	9,09%
Total				22	100%
Average Score				93,91%	

According to the information in Table 2, a total of 20 students (90.91%) successfully achieved scores above the passing grade, while only about 2 students (9.09%) did not reach mastery. The class average score in this cycle was 93.91%. This achievement indicates a significant improvement compared to the initial condition and suggests that the implementation of the TGT model with the Red Light Green Light game supported by the Wordwall platform had a positive impact on students' understanding of fraction division.

### c. Cycle 2

Based on the results obtained in Cycle I, although there was a significant improvement in students' learning outcomes, further refinement and improvement in the learning process for Cycle II are necessary. Therefore, the researcher decided to make several adjustments, such as managing instructional time more effectively, strengthening students' motivation to collaborate within groups, and ensuring that every group member fully understands the material taught.

In Cycle II, the material will be made more challenging by introducing story problems related to fraction division. The learning activities will include story problems that require students to connect the concept of fraction division to real-world contexts, enabling them to better understand the application of fraction division in everyday life. Cycle II will be conducted on April 23, 2025, using a similar approach as in Cycle I. The data obtained from Cycle II are presented in the following table:

**Table 3. Students' Learning Outcomes in the Cycle II**

No.	Passing Grade	Score	Description	Number of Students	Percentage (%)
1	75	$\geq 75$	Passed	22	100%
2	75	$< 75$	Not passed	0	0%
Total				22	100%
Average Score				96,14 %	

According to the data recorded in Table 3, the post-test results in Cycle II show that all students (100%) successfully achieved scores above the passing grade, with every student obtaining a score of  $\geq 75$ . In Cycle II, the class demonstrated a very good improvement compared to the previous cycle, with an average score reaching 96.14%. This success reflects the effectiveness of the applied learning model as well as the increased learning outcomes of students in the learning process.

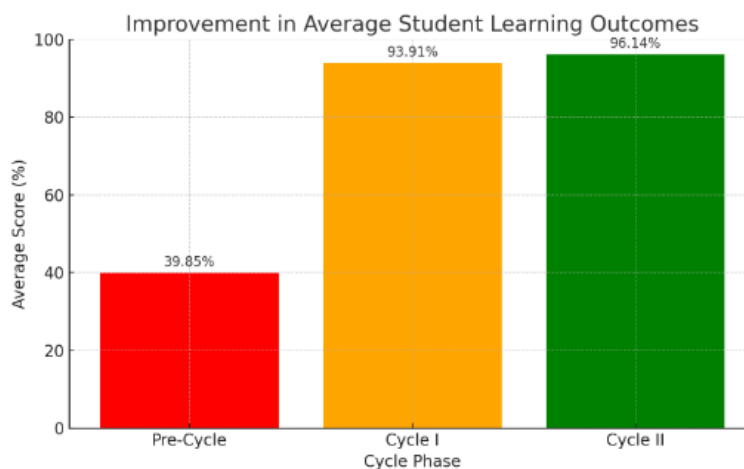
## Discussion

The purpose of this study was to examine the effectiveness of the Teams Games Tournament (TGT) learning model combined with the "Red Light Green Light" game and Wordwall media in improving learning outcomes in mathematics, particularly on the topic of fraction division, among fifth-grade students. This study primarily investigates two key aspects: the initial learning condition of the students and the impact of applying the TGT model integrated with game-based learning on students' mathematics achievement.

Preliminary observations revealed that the students exhibited low motivation and engagement during the learning process. Many appeared disinterested, preferring to play alone or chat with their peers, and paid little attention to the teacher's explanations. This lack of active participation was reflected in poor learning outcomes, as no student met the minimum passing grade, and the class average score was only 39.85%.

Following the implementation of the TGT model combined with the "Red Light Green Light" game and Wordwall media over two cycles, a significant improvement in students' learning

outcomes was observed. In Cycle 1, 90.91% of students passed with an average score of 93.91%, while in Cycle 2, all students (100%) achieved scores above the passing grade with an average of 96.14%. These results indicate that incorporating competitive and collaborative gaming elements, supported by interactive media, effectively enhanced students' motivation and understanding of fraction division.



Picture 1. Average of Student Learning Outcomes

Based on Picture 1, the improvement in students' learning outcomes indicates an increase of 54,06 points from the pre-cycle to Cycle I, and an additional increase of 2,23 points from Cycle I to Cycle II. This improvement signifies a significant enhancement in students' learning achievement following the implementation of classroom action through the cooperative learning model of the TGT type.

These findings are consistent with previous research by (Raihan et al., 2025) at SDN 4 Banda Aceh, which reported a significant improvement in students' mathematics achievement following the implementation of the TGT model, with mastery learning increasing from 67% to 83% over two classroom action research (CAR) cycles. Similarly, in the present study, the integration of the TGT model with interactive media and physical games not only enhanced students' conceptual understanding but also increased their engagement and motivation, culminating in 100% mastery learning by the end of Cycle II. This demonstrates the pedagogical effectiveness of combining collaborative learning strategies with digital and kinesthetic elements to improve both academic performance and classroom dynamics.

The implementation of the Teams Games Tournament (TGT) model, integrated with the Red Light Green Light game and supported by Wordwall interactive media, has proven to be an effective instructional strategy for improving mathematics learning outcomes among fifth-grade students at SDN 55 Palembang. As a technology-based tool, Wordwall delivers instructional materials and problem sets in an engaging and modern format, while the integration of physical gameplay through Red Light Green Light corresponds well with the developmental traits of upper elementary students, who are often kinesthetic and require interactive learning experiences. This combined approach significantly enhances student motivation, engagement, and active participation during mathematics lessons. The results of the classroom action research on the topic of fraction division indicate marked improvements in both learner involvement and academic achievement, as evidenced by the upward progression in outcomes from the pre-cycle phase to Cycles I and II. These findings reinforce the pedagogical value of merging collaborative, game-based learning models with digital media to optimize instructional quality and student performance in mathematics.

## CONCLUSION

The implementation of the Teams Games Tournament (TGT) learning model combined with the Red Light Green Light game and supported by interactive Wordwall media proved effective in improving mathematics learning outcomes on the topic of fraction division among fifth-grade students at SDN 55 Palembang. The TGT model fostered an active, collaborative, and

competitive learning environment, while the integration of physical games and interactive technology successfully enhanced students' focus, motivation, and engagement. The results showed a significant improvement in students' average scores, rising from 39,85% (pre-cycle) to 93,91% (Cycle I) and 96,14% (Cycle II). These findings suggest that a combination of cooperative strategies, educational games, and digital media can serve as an effective solution to address the low conceptual understanding of mathematics at the elementary school level.

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