

THE EFFECT OF THE TEAMS GAMES TOURNAMENT (TGT) TYPE COOPERATIVE LEARNING MODEL ON STUDENT LEARNING OUTCOMES

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Abstract: This study aims to determine the effect of the Teams Games Tournament (TGT) cooperative learning model on students' physics learning outcomes regarding the topic of Quantities and Units at SMA Negeri 8 Medan. The study employed a quantitative method using a quasi-experimental approach with a pretest-posttest control group design. The research sample consisted of class X-3 as the experimental group and class X-4 as the control group, with 30 students in each class. Data were collected via pretests and posttests and subsequently analyzed using normality, homogeneity, and t-tests. The results showed that the average pretest scores were 48.83 for the experimental group and 48.67 for the control group; with $t_{\text{calculated}} (0.040) < t_{\text{table}} (2.002)$, there was no significant difference in initial ability. The average posttest scores were 80.33 for the experimental group and 66.00 for the control group. The t-test results showed $t_{\text{calculated}} (4.464) > t_{\text{table}} (1.671)$, leading to the rejection of H_0 and the acceptance of H_a . Thus, the Teams Games Tournament (TGT) cooperative learning model has a significant effect on students' physics learning outcomes regarding the topic of Quantities and Units.

Keywords: Learning Model, Teams Games Tournament (TGT), Learning Outcomes

1. INTRODUCTION

Learning is a systematic process designed to develop students' abilities through interaction between teachers, students, materials, and learning environments (Silaban et al., 2024). The success of learning is not only determined by the mastery of the material delivered by the teacher (Silaban et al., 2020), but also by the involvement of learners during the learning process (Silaban et al., 2021). One of the indicators that can be used to see this success is learning outcomes (Silaban et al., 2021). Learning outcomes reflect the level of students' mastery of the competencies that have been learned after participating in the learning process (Sirait et al., 2025). Thus, efforts to improve learning outcomes cannot be separated from the selection of learning models that are able to create an active, interactive, and consistent learning process in accordance with the characteristics of students (Randi, 2023).

The problem of improving learning outcomes is becoming increasingly important in Physics learning because the characteristics of Physics material require students to not only remember concepts (B. Silaban et al., 2024), but also understand the relationships between concepts, using principles in certain situations (Sitinjak et al., 2024), conduct analysis, and solve

problems (Alexander et al., 2026). Physics learning that is only oriented to the delivery of information has the potential to limit students' opportunities to build their understanding through interaction and learning experiences (Alexander, Sirait, et al., 2025). Therefore, the Physics learning process needs to provide a greater space for students to discuss (Silaban et al., 2025), collaborate, express opinions, and test understanding through meaningful learning activities (Harita et al., 2025).

These problems are found in Physics learning at SMA Negeri 8 Medan. Based on the results of observations and interviews that are the basis of the research, Physics learning is still dominated by lecture methods, questions and answers, and the provision of practice questions. This condition causes students' involvement in learning to be not optimal. Students tend to receive more information from teachers than actively engage in discussion activities, ask questions, or collaborate with friends. In addition, there are still students who get a score below the Minimum Completeness Criteria (KKM) for Physics subjects of 75. This condition shows that there are problems in the learning process and outcomes that need to be solved through the application of a learning model that involves students more (Simatupang et al., 2025).

These problems show that there is a gap between the learning that takes place and the expected learning characteristics (Saragih et al., 2025). Physics learning should not only place teachers as the main source of information (Amiroh et al., 2025), but also provides opportunities for learners to construct knowledge through interaction and learning experiences (Samosir et al., 2026). In this context, the cooperative learning model can be an alternative because it places interaction between students as an important part of the learning process (Pardede et al., 2024). One of the cooperative learning models that has these characteristics is the Teams Games Tournament (TGT) (Armidi, 2022).

Teams Games Tournament (TGT) is a cooperative learning model that combines group work with academic games and tournaments (Handayani, 2022). Students are placed in groups that have diverse abilities to study material, discuss problem-solving, and help each other understand concepts (Pardede et al., 2026). After group activities, students take part in academic games and tournaments that provide opportunities to demonstrate mastery of the material competitively and sportively (Pasaribu et al., 2024). The stage ended with the awarding of awards to the group based on the achievements obtained (Pane et al., 2025). The characteristics of TGT allow students to gain a learning experience that is not only oriented towards mastering the material, but also encourages cooperation, responsibility, activeness, and interaction between students (Pitriani et al., 2022).

Empirically, the effectiveness of TGT on learning outcomes has been demonstrated in a number of studies (Ifriani et al., 2025). Research on TGT in the learning of Physics of Business and Energy materials shows the influence of TGT on student learning outcomes. Other research on Momentum and Impulse materials also shows that students who receive media-assisted TGT learning get better learning outcomes than conventional learning (Hasryani et al., 2024). Similar results were found in the application of TGT assisted by monopoly games on Static Fluid materials which showed an influence on Physics learning outcomes. More recent research also showed that TGT combined with peer teaching methods can improve Physics learning outcomes in Vector materials and produce a strong effect size (Irawan, 2025).

However, previous research has shown a tendency to use TGT in combination with certain learning media, strategies, or contexts (Sirait et al., 2023). For example, TGT has been studied with the help of Macromedia Flash, monopoly games, strategies Peer Teaching, as well as other learning strategies (Alexander et al., 2024). This condition shows that empirical evidence is still needed regarding the application of TGT as the main learning model in different Physics learning contexts, especially in Quantity and Unit materials at the grade X level (Sirait et al., 2024). On the other hand, the research in this thesis shows that TGT has never been applied in Physics learning at SMA Negeri 8 Medan, while the learning problems found show low student involvement and not optimal learning outcomes (Sinaga et al., 2024).

Based on these gaps, this study positions TGT not only as an alternative learning model, but as a pedagogical intervention to overcome learning problems that are specifically found in the context of SMA Negeri 8 Medan. The contribution of this research lies in empirical testing of the influence of TGT on the Physics learning outcomes of class X students on Quantity and Unit materials through an experimental design that compares the group that receives TGT learning with the group that receives conventional learning (Sibarani et al., 2023). This focus is different from research that tests TGT with the help of additional media or strategies, so the results of the study are expected to provide an overview of the influence of the application of TGT as a cooperative learning model in more direct learning conditions (Sirait, Olfan, et al., 2026).

The selection of Quantities and Units material also has relevance to the needs of Physics learning in class X because the material is one of the bases for understanding various concepts and calculations of Physics next. The material includes an understanding of quantities, units, measurements, important numbers, and related concepts that require precision and conceptual understanding (Pardede et al., 2026). Therefore, learning that provides opportunities for students to discuss, practice, get feedback, and test understanding through game and tournament activities

has the potential to create a more active learning experience than learning that is only oriented to the teacher's explanation (Sinurat et al., 2026).

Based on this description, there is a need to obtain empirical evidence regarding the extent to which the application of the Teams Games Tournament type cooperative learning model can have an influence on Physics learning outcomes in a learning context that is still dominated by conventional approaches. This study aims to analyze the influence of the Teams Games Tournament (TGT) type cooperative learning model on the Physics learning outcomes of class X students of SMA Negeri 8 Medan on Quantity and Unit materials. In particular, this study is directed to compare the learning outcomes of students who obtain learning using TGT with students who obtain conventional learning. The results of the study are expected to enrich the empirical evidence regarding the use of TGT in Physics learning as well as be a consideration for teachers in choosing a learning model that can increase student engagement and learning outcomes.

2. RESEARCH METHODS

Research Approach

This study uses a quantitative approach with a quasi experiment method. The selection of the method is based on the purpose of the research, which is to determine the influence of the Teams Games Tournament type cooperative learning model (TGT) on the learning outcomes of students' Physics. The research involved two groups that had been formed beforehand, namely the experimental group and the control group, so that the grouping of students was not carried out randomly (Ifriani et al., 2025).

The research design used was a pretest-posttest control group design. Both groups were given a pretest to determine the initial ability of students (Siahaan et al., 2023). Furthermore, the experimental class was given treatment in the form of a TGT-type cooperative learning model, while the control class was given conventional learning. After the treatment was completed, both groups were given a final test (Posttest) to find out the learning outcomes after the learning process. The research design can be presented in Table 1. as follows (Barus et al., 2024).

Table 1. Research Design

Groups	Pretest	Treatment	Posttest
Experiments	O ₁	X	O ₂
Controls	O ₁	—	O ₂

Description:

O_1 = Pretest in the experimental class and the control class;

O_2 = posttest on the experimental class and the control class;

X = treatment using the Teams Games Tournament (TGT) learning model.

The research population is all students of class X of SMA Negeri 8 Medan for the 2026/2027 academic year which consists of eight classes, namely X-1 to X-8, with a total of 240 students. The research sample was determined using the purposive sampling, with class X-3 as an experimental class of 30 students and class X-4 as a control class of 30 students. The selection of samples was carried out based on the consideration that the class used had been formed as Intact Class So it is not possible to randomize students individually. The independent variable in this study is the TGT-type cooperative learning model, while the bound variable is the learning outcomes of students (Silaban, et al., 2025).

Research Location

The research was carried out at SMA Negeri 8 Medan, in students of class X. The research is planned to be carried out in the odd semester of the 2026/2027 Academic Year. The selection of the research location was based on the conditions of Physics learning in schools which are still dominated by lectures, questions and answers, and practice questions, while the TGT type cooperative learning model has never been applied in Physics learning at the school.

Data Source

The source of research data came from students of class X of SMA Negeri 8 Medan who became the research sample, namely class X-3 as the experimental group and class X-4 as the control group. The research data is in the form of Physics learning outcomes obtained through pretest and posttest scores on Quantity and Unit materials.

The research instrument is in the form of a multiple-choice learning outcome test arranged based on Quantity and Unit material. The instrument includes material on principal quantities and derivative quantities, measurement and accuracy, quantity dimensions, and important numbers.

Before being used in research, the instrument was first tested on students outside the sample. The test was carried out to determine the quality of the instrument through tests of validity, reliability, difficulty, and differentiating power of questions (Sirait, 2025).

Data Collection Techniques

Data collection was carried out through learning outcome tests. The test was given in two stages, namely pretest and posttest. The pretest was given to the experimental class and the control class before learning to determine the initial ability of the students. After that, the

experimental class received learning using the TGT model, while the control class received conventional learning. After the learning process was completed, both classes were given a posttest to measure the learning outcomes of students after receiving treatment.

The implementation of the research consists of three stages. The preparation stage includes the management of research permits, the determination of classes and materials, the preparation of learning tools, and the preparation of test instruments. The implementation stage includes instrument trials, instrument quality analysis, and the provision of Pretest, the implementation of treatment in each class, and the provision of Posttest. The final stage includes data collection, processing, and analysis, hypothesis testing, and drawing conclusions (Sinaga et al., 2026).

Data Analysis Techniques

The data obtained from the pretest and posttest were analyzed quantitatively. Data analysis began with descriptive analysis to find out the picture of student learning outcomes in the experimental class and the control class.

Next, an analysis prerequisite test was carried out, which included a normality test and a homogeneity test. The normality test was used to find out whether the research data was normally distributed, while the homogeneity test was used to determine the similarity of variance between the experimental class and the control class. In this study, the normality test used the Liliefors test at a significance level of $\alpha = 0.05$, while the homogeneity test was carried out using the variance similarity test.

Once the data met the assumptions of normality and homogeneity, hypothesis testing was performed using a t-test. Data Pretest It was analyzed using a two-party t-test to find out if there was a difference in initial ability between the experimental class and the control class. Next, the data Posttest analyzed using a one-party t-test to determine the influence of the TGT learning model on student learning outcomes. The test was carried out at a significance level of $\alpha = 0.05$ (Handayani, 2022).

The decision-making criteria were carried out by comparing the value with If the value is greater than , then H_0 is rejected and H_a is accepted. On the other hand, if it is smaller than , H_0 is accepted. The analysis is used to determine whether or not there is an influence of the TGT type cooperative learning model on the Physics learning outcomes of students in Quantity and Unit material. $t_{hitung} \cdot t_{tabel} \cdot t_{hitung} \cdot t_{tabel} \cdot t_{hitung} \cdot t_{tabel}$

3. RESULTS AND DISCUSSIONS

This research is a quasi-experimental research that aims to determine the influence of the TGT type cooperative learning model on students' Physics learning outcomes on Quantity and Unit material in class X of SMA Negeri 8 Medan. The research involves two classes, namely class X-3 as an experimental class and class X-4 as a control class. Each class consists of 30 students. The experimental class is given learning using the TGT model, while the control class is given learning using the conventional learning model. The research design used is a pretest-posttest control group design. Before being given treatment, both classes are first given a pretest. The purpose of the pretest is to determine the initial ability of the students while ensuring that the initial condition of the two groups is relatively the same before being given different treatment. After the learning process is completed, the two classes are given a posttest to find out the changes in learning outcomes after each class receives treatment.

The instrument used in the study was in the form of a multiple-choice learning outcome test of 20 questions. The test was given at the pretest and posttest stages with Quantity and Unit material.

Experimental Class and Control Class Pretest Data

The results of the pretest were used to determine the initial ability of students before being given treatment. Based on the results of data processing, the experimental class obtained an average score of 48.83 with a standard deviation of 16.59, while the control class obtained an average score of 48.67 with a standard deviation of 16.45. The experimental class pretest data can be seen in Table 2 below.

Table 2. Experimental Class Pretest Data

Score	Frequency (f)	Middle Value (xi)	f × Xi
20–29	2	24,5	49
30–39	6	34,5	207
40–49	8	44,5	356
50–59	9	54,5	490,5
60–69	0	64,5	0
70–79	5	74,5	372,5

Based on Table 2, the number of students in the experimental class is 30 people. The average score of the experimental class pretest is:

$$\bar{X} = \frac{\sum fX_i}{\sum f}$$

$$\bar{X} = \frac{1.475}{30} = 49,17$$

The control class pretest data can be seen in Table 3 below.

Table 3. Control Class Pretest Data

Score	Frequency (f)	Middle Value (xi)	f × Xi
20–30	4	25	100
31–40	5	35,5	177,5
41–50	6	45,5	273
51–60	7	55,5	388,5
61–70	6	65,5	393
71–80	2	75,5	151
Quantity	30		1483

The data in Table 2 and Table 3 show that the spread of values in the two classes is relatively diverse. In the experimental class, the values were in the 20–79 range, while in the control class the values were in the 20–80 range. Although there were differences in frequency at each interval, the two classes showed very close proximity to each other.

The proximity of the average score shows that descriptively the initial ability of students in both classes is relatively the same. However, these similarities need to be statistically proven through a pretest hypothesis test.

Experimental Class and Control Class Posttest Data

After the two classes received different treatment, a posttest was carried out to determine the learning outcomes of the students. The results of data processing showed that the experimental class obtained an average score of 80.33 with a standard deviation of 11.52, while the control class obtained an average score of 66.00 with a standard deviation of 15.05. Based on these results, it was seen that there was an increase in learning outcomes after learning was given. The average score of the experimental class after learning using the TGT model was higher than that of the control class that obtained conventional learning. The average difference between the posttest of the two classes was: $[80.33 - 66.00 = 14.33]$

Thus, descriptively, the average score of learning outcomes in the experimental class was higher by 14.33 points than the control class.

The differences were then statistically tested to find out whether the difference in learning outcomes was significant or only occurred due to sample variations.

Normality Test

The normality test was carried out to find out whether the pretest and posttest data in the experimental class and the control class were normally distributed. The test was carried out using

the Liliefors test at the significance level ($\alpha = 0.05$). The results of the normality test can be seen in Table 4 below.

Table 4. Normality Test Results

Data	Classes	Count	Table	Conclusion
Pretest	Experiments	0,131	0,161	Normal
Pretest	Controls	0,134	0,161	Normal
Posttest	Experiments	0,101	0,161	Normal
Posttest	Controls	0,123	0,161	Normal

Based on the following Table 4, the entire L_{cal} value is smaller than the L_{table} . This value shows that the pretest and posttest data in the experimental class and the control class are normally distributed.

With the fulfillment of the normality assumption, the research data can be continued at the homogeneity testing stage.

Homogeneity Test

The homogeneity test was carried out to determine whether the variance of the experimental class and control class data had homogeneous characteristics. The test was carried out at the significance level ($\alpha=0.05$). The results of the homogeneity test can be seen in Table 5 below.

Table 5. Homogeneity Test Results

Data	Classes	Variance	Calculation	Ftable	Conclusion
Pretest	Experiments	275,32	1,017	1,860	Homogeneous
Pretest	Controls	270,57			
Posttest	Experiments	132,64	1,707	1,860	Homogeneous
Posttest	Controls	226,55			

Based on Table 5, the F_{cal} value in the pretest of 1.017 is smaller than the F_{table} of 1.860. Similarly, in the posttest data, the value of F_{cal} of 1.707 is smaller than the F_{table} of 1.860. Thus, the variance of the data of the two groups is declared homogeneous.

The results of the normality and homogeneity tests showed that the requirements for continuing the analysis using parametric statistics had been met. Therefore, hypothesis testing was carried out using the t-test.

Hypothesis Test

Pretest Hypothesis Test with Two-Party T-Test

A two-party t-test of the pretest data was carried out to find out whether or not there was a difference in initial ability between the students in the experimental class and the control class

before being given treatment. The hypotheses used in this test were as follows: $H_0 : \mu_1 = \mu_2$, $H_a : \mu_1 \neq \mu_2$

The test was carried out at the significance level of $\alpha = 0.05$ with the degree of freedom (dk) = 58. Based on the calculation results, the tcal value = 0.040 was obtained, while the ttable value = 2.002. The test results showed that: $t_{\text{calculated}} < t_{\text{table}}$, $0.040 < 2.002$

Based on these test criteria, H_0 was accepted and H_a was rejected. Thus, it can be concluded that there was no significant difference in initial ability between the students in the experimental class and the control class.

These results show that both classes have relatively the same initial ability before being given learning treatment. This condition is an important basis in experimental research because it shows that the two groups are in relatively comparable initial conditions. Thus, the difference in learning outcomes obtained after treatment can be analyzed based on the difference in learning models applied to each class.

Posttest Hypothesis Test with One-Party T-Test

A one-party t-test on posttest data was carried out to determine the effect of the application of the TGT type cooperative learning model on the learning outcomes of students' Physics. The hypotheses used are as follows: $H_0 : \mu_1 = \mu_2$, $H_a : \mu_1 > \mu_2$

The test was carried out at the significance level of $\alpha = 0.05$ with the degree of freedom (dk) = 58. Based on the calculation results, the tcal value = 4.464 was obtained, while the ttable value = 1.671. The test results showed that: $t_{\text{calculated}} > t_{\text{table}}$, $4.464 > 1.671$

Based on these test criteria, H_0 was rejected and H_a was accepted. Thus, it can be concluded that there is a significant influence of the TGT type cooperative learning model on students' Physics learning outcomes.

The results of the study showed that the application of the TGT type cooperative learning model had an influence on the learning outcomes of Physics students on Quantity and Unit materials (Alexander et al., 2025). The conclusion was obtained based on a comparison of the results Pretest and Posttest as well as the results of statistical testing of the experimental class and the control class (Alexander et al., 2025b).

In the early stages of the study, the results of the pretest showed that the average ability of students in the experimental class was 48.83, while the average ability of students in the control class was 48.67. The average difference between the two classes was only 0.16 points. The results were further strengthened through a two-party t-test that obtained a tcal value = 0.040

and $t_{table} = 2.002$. Because the t_{cal} value was smaller than the $t_{tabulation}$, there was no significant difference in initial ability between the experimental class and the control class.

The similarity of the initial ability shows that the two classes are in relatively comparable conditions before being given treatment. Therefore, changes in learning outcomes that occur after the learning process can be analyzed based on the difference in treatment given to the two classes, while still considering other factors that can affect student learning outcomes.

After implementation Pretest, the experimental class was given learning using the TGT type cooperative model, while the control class was given conventional learning (Pitriani et al., 2022). The application of TGT in this study was carried out through several learning activities which included the presentation of materials, formation and teamwork, academic games (games), tournaments, and giving awards to groups (Yunita Sari et al., 2026). These stages provide opportunities for students to learn together, discuss, solve problems, answer questions, and compete in academic activities (Susanti et al., 2025).

In the teamwork stage, students learn in heterogeneous groups and help each other in understanding the learning material. These activities provide opportunities for students to exchange opinions, discuss, and explain the material to group members who are experiencing difficulties (Sirait et al., 2026). With this interaction, students not only get information from teachers, but also get the opportunity to build understanding through cooperation with their peers (Pardede et al., 2025).

Furthermore, the Games and Tournaments provide opportunities for students to test their understanding of the material that has been studied. Students are faced with academic questions or problems that must be solved in an active and competitive learning environment (Manurung et al., 2025). These activities make students more involved in the learning process because each group member has the opportunity to contribute to the group's achievements (Silaban et al., 2025).

This characteristic is one of the factors that distinguish TGT learning from conventional learning (Irawan, 2025). In the TGT model, students not only play the role of recipients of information, but also actively participate in discussions, cooperation, academic games, and tournaments (Hasryani et al., 2024). Thus, the learning process provides a greater space for students to interact and develop an understanding of the material being studied (Pardede et al., 2026).

The posttest results showed a clearer difference in learning outcomes between the two classes. The experimental class obtained an average score of 80.33 with a standard deviation of 11.52, while the control class obtained an average score of 66.00 with a standard deviation of

15.05. Based on this score, the average learning outcomes of the experimental class were 14.33 points higher than the control class.

The difference in learning outcomes was then strengthened through the results of a one-party t-test. The results of the analysis showed that the t_{cal} value = 4.464, while the t_{table} = 1.671. Because the t_{cal} value was greater than the t_{table} or $4.464 > 1.671$, H_0 was rejected and H_a was accepted. These results showed that the learning outcomes of students who received learning using the TGT model were higher than those of students who received conventional learning.

Thus, the application of the TGT type cooperative learning model has a significant influence on the learning outcomes of Physics students in Quantity and Unit materials at SMA Negeri 8 Medan.

The improvement in learning outcomes can be attributed to the characteristics of the TGT model which provides opportunities for students to actively participate through group cooperation activities, academic games, and tournaments (Pitriani et al., 2022). Through group work, students can help each other in understanding the material and solving problems. Meanwhile, the activities Games and Tournaments provide opportunities for students to apply the knowledge they have gained as well as test their level of understanding of the material (Ifriani et al., 2025).

In addition, the element of competition in the TGT model can create a more interesting learning atmosphere and encourage students to try to make the best contribution to their group (Siahaan et al., 2026). The existence of group awards can also provide encouragement to students to be involved in the learning process. This condition is in accordance with the theoretical foundation used in the research, that the TGT model combines elements of interaction, collaboration, competition, and reward in the learning process (Handayani, 2022).

Based on the overall study results, there was a match between the initial condition, the treatment process, and the final results of the study. The pretest results showed that there was no significant difference in initial ability between the experimental class and the control class. After being given different treatments, the posttest results showed a significant difference in learning outcomes, with the average learning outcomes of the experimental class being higher than that of the control class.

Thus, it can be concluded that the TGT type cooperative learning model has a significant effect on the learning outcomes of Physics students in Quantity and Unit materials at SMA

Negeri 8 Medan. The TGT model can be an alternative learning model that can be used in Physics learning to increase student involvement and learning outcomes.

4. CONCLUSIONS AND SUGGESTIONS

CONCLUSIONS

Based on the results of the study, it can be concluded that: The Teams Games Tournament (TGT) type cooperative learning model had a significant effect on the learning outcomes of Physics. The average posttest of the experimental class was 80.33, while the control class was 66.00. The results of the t-test showed that $t_{count} = 4.464 > t_{table} = 1.671$, so that H_0 was rejected and H_a was accepted. Thus, the learning outcomes of students who use the TGT model are higher than conventional learning.

SUGGESTIONS

Based on the results of the research that has been conducted, some suggestions that can be given are as follows: The TGT model can be used as an alternative to Physics learning to improve student engagement and learning outcomes with structured group, games, and tournament management by paying attention to time management in the classroom so that its application is more effective

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