

## THE EFFECT OF COOPERATIVE LEARNING TEAM-GAMES-TOURNAMENT MODEL TOWARD STUDENTS' SCIENCE LEARNING OUTCOME

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### Article Info

#### *Article history:*

*Received July 17, 2023*

*Revised September 09, 2023*

*Accepted September 20, 2023*

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#### *Keywords:*

*Cooperative Learning;*

*Team-Games-Tournament;*

*Science Learning Outcome;*

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### ABSTRACT

Students studying science must be able to think critically, creatively, and aggressively. Learning should be planned in an engaging manner to maintain student engagement and produce high-quality learning. Teachers are expected to become proficient in multiple learning models in addition to using repetitive techniques or strategies when delivering material in class. In actuality, traditional and classical models are frequently employed by educators in the teaching and learning process. In order to make learning more relevant, educators should improve this learning model. The cooperative learning model is chosen to achieve this goal. The cooperative learning model is designed to encourage group cooperation and interaction between students. This research aims to analyze the improvement in science learning outcomes through the implementation of The study was conducted to explore the effectiveness of the TGT (team games tournament) cooperative learning model in the middle school in South Sulawesi for science learning outcomes. The research subjects were 21 junior high school students in grade 8. The type of research is pre-experimental through the one-group pretest-posttest design. The results showed that students' science learning outcomes increased significantly compared to the pretest score (sig. 0.00<0.05).

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## 1. INTRODUCTION

To encourage students to actively participate, every primary and secondary education unit's learning process needs to be engaging, stimulating, enjoyable, demanding, and inspiring. Additionally, it must allow for enough room for initiative, originality, and independence in light of the kids' skills, interests, and stages of physical and mental growth (RI Minister of National Education Regulation No. 41, 2007). This regulation shows that students' active role in learning is a must. Learning is designed to teach students, which means that the learning process must be student-centered. The student-centered approach has become the center of attention in teaching and learning as the

emphasis on shifting away from the teacher-centered approach grows. Student-centered involves students in enhancing content-building (Tang, 2023).

Science has been proven to have a central role in creating new knowledge that is applied to a wide range of human experiences on a wide scale and drives technological development (Salunke et al., 2019). Science is at the heart of new technologies that have changed world life drastically in the last decade (Fukuda, 2020). Therefore, science learning has a strategic role in improving the quality of Indonesia's human resources. As part of the global community, we cannot escape the influence of developments and scientific products in the form of increasingly extraordinary technology. However, the harsh reality must be faced by the world of Indonesian education today, where disappointing results were obtained from the 2019 Program for International Student Assessment (PISA). The low science achievements of Indonesian students are clearly visible in the 2018 Program for International Student Assessment (PISA). In the science performance category, Indonesia is ranked 9th from the bottom (71), with an average score of 396 (OECD, 2019).

The government has made various efforts through policy direction and curriculum changes that favor optimal learning for students. However, the key to every good movement is, of course, the teacher. The reality in the field is that conventional teaching methods are still widely used in schools, where teachers and books are the main learning sources. Traditional methods make students passive learners, like empty glasses waiting to be filled by the teacher. However, on the other hand, several research results show that cooperative learning has a direct impact on successful learning outcomes (Damayanti et al., 2022; Veloo et al., 2018). So, it is a good idea to evaluate several existing cooperative learning techniques that might be adopted in the teaching and learning process. One of these strategies or models is the team-game-tournament technique. Teams, Games, and Tournaments is a cooperative learning model developed by Slavin (Slavin, 2011).

The cooperative learning model is basically designed so that students are able to carry out the learning process in a more relaxed manner without ignoring student responsibility, honesty, healthy competence, and active involvement of students in the learning process (Brown & Palincsar, 2018). The TGT (Team Games Tournament) type of cooperative learning model is a learning model that can be used by various levels of education. This learning model is designed to increase cooperation between students, interact with each other, motivate students to learn, and improve learning activities and outcomes. students in the learning process. This model is designed for games and tournaments (Pongkendek et al., 2019; Novritasari et al., 2022).

#### Definitions of the Terms: Team-Games-Tournament

Team Games Tournaments (TGT) were originally developed by David DeVries and Keith Edwards (1972) at Johns Hopkins University (Wyk, 2011). TGT is a type of cooperative learning method. At the start of implementing TGT, the teacher will divide all students into small, heterogeneous groups according to their academic abilities and capabilities. Each group will be named a team, and each team will be led by a captain who plays the role of group leader in organizing and motivating team members (Najmi

et al., 2021). After the group division is complete, the teacher will give each group a problem package containing questions or assignments related to the material they have studied. The group will try to complete the task using cooperative strategies (Alhara et al., 2021). Once all groups have completed the task, the game or tournament will begin. Each group will compete in various games or tournaments involving the material they have learned. The teacher will be a facilitator, providing direction and answering students' questions during the game. After the game is over, the teacher will hold a debriefing session, where students will discuss their experiences during the game, identify weaknesses and strengths in understanding the material, and provide feedback to their teammates (Najmi et al., 2021; Alhara et al., 2021).

Based on the background, this research would study the effectiveness of implementing the Team Games Tournament (TGT) cooperative learning model toward students' science learning outcomes

## 2. METHOD

The research design used was the one-group pretest-posttest design, where there was no comparison or control group (Creswell, 2014). The instruments used in the pretest and posttest use the same measurements. This is intended to be able to see an increase in students' science learning outcomes on teaching materials for the movement of objects and living creatures in the surrounding environment before and after treatment. This design is presented in the following diagram (Fraenkel, 2012):

**Table 1.** *The One Group Pretest-Posttest Design*

| <b>O<sub>1</sub></b> | <b>X</b>         | <b>O<sub>1</sub>'</b> |
|----------------------|------------------|-----------------------|
| <i>Pretest</i>       | <i>Treatment</i> | <i>Posttest</i>       |

O<sub>1</sub> : Pretest (science learning outcomes)

X : Treatment (implementation of the cooperative learning TGT)

O<sub>1</sub>' : Posttest (science learning outcomes)

Purposive sampling is used with the consideration that research can be carried out effectively and efficiently, especially in terms of licensing procedures, specified research time, conditions of research subjects, supervision, and conditions of research sites. The class used as the research sample was VIII.11, with a total of 22 students.

To determine the effectiveness of implementing the cooperative learning model, TGT, on student learning outcomes, several instruments are as follows:

### - Test

The test instrument used is a written test in the form of multiple choices that is prepared based on the learning indicators to be achieved and the indicators in the revised Bloom's taxonomy C1, C2, C3, and C4 (Anderson & Krathwohl, 2010). The questions in this test are also questions about the implementation of the TGT cooperative learning model.

#### - Observation sheet

The observation sheet instrument takes the form of structured observation using a checklist sheet containing yes-and-no columns. Observations were carried out when the learning process was in progress to observe the implementation of the TGT cooperative learning model.

#### - Student and teacher response questionnaire

Student and teacher response questionnaires were used to determine student and teacher responses regarding the implementation of the TGT model in efforts to enhance student science learning outcomes.

The data in this research was processed through descriptive analysis and inferential analysis. Inferential analysis includes normality tests carried out on the pretest and posttest results to determine whether the improvement experienced by students is significant or not. The normality test in this study used the Kolmogorov-Smirnov test.

Then, to find out whether there was a significant improvement after implementing the cooperative learning model, a test of the average difference between the pretest and posttest scores was carried out. If the assumptions of parametric statistics are met, which means that the data is normally distributed and the variance of both data is homogeneous, then it can be analyzed using parametric statistics.

Data obtained from a one-group pretest-posttest design can be analyzed using a dependent samples t-test, also called a paired sample t-test (Coladarci et al., 2011). If the sig (2-tailed) significance value is  $> 0.05$ , then  $H_0$  is accepted, and it can be concluded that the average posttest score is the same as or smaller than the pretest score. If the sig (2-tailed) significance value is  $< 0.05$ , then  $H_0$  is rejected, and it can be concluded that the average posttest score is higher than the pretest score.

### 3. RESULTS AND DISCUSSION

#### 3.1 Results

Data on the average value of student learning outcomes on heat transfer material after implementing collaborative learning is shown in Table 2.

**Table 2.** Recapitulation of pretest, posttest and average values  $\langle g \rangle$  learning outcome

| Statistic Value    | Average Value (%) |          | $\langle g \rangle$ | Category |
|--------------------|-------------------|----------|---------------------|----------|
|                    | Pretest           | Posttest |                     |          |
| Average score      | 61,11             | 80,07    | 0,5                 | Moderate |
| Deviation standart | 4,25              | 3,15     |                     |          |

Table 2 shows that the average score and standard savings of students' pretests are  $61.11 \pm 4.25$ . After learning using the TGT (team games tournament) cooperative learning model, the students' science learning outcome (posttest), as shown in Table 2, was  $80.00 \pm 3.15$ . Table 1 also shows that the increase in students' science learning outcomes is in the medium category, as indicated by the  $\langle g \rangle$  gain of 0.5.

Knowing that learning using the TGT (team games tournament) cooperative learning model can increase students' science learning outcomes, a hypothesis test is

carried out to find out whether the improvement that occurs in students' posttest results is significant or not. Before testing the hypothesis, an assumption test is first carried out, namely testing the prerequisites for the results of the data analysis. The prerequisite tests carried out in the research were only normality tests and homogeneity tests of pretest and posttest data.

Testing the normality of the data was carried out using the Kolmogorof-Smirnov test using SPSS version 20, with a confidence level of 95% or with a sig > 0.05. A recapitulation of normality test results for pretest, posttest, and posttest differences or gains can be seen in Table 3.

**Table 3.** The normality and homogeneity test results for science learning outcome

| Test Components | Significance | Conclusion  |
|-----------------|--------------|-------------|
| Normality       | 0,534        | Ho accepted |
| Homogeneity     | 0,076        | Ho accepted |

Based on Table 3, it shows that the significance value of the normality test on the difference or gain data between the pretest and posttest is  $0.534 > \alpha$  ( $\alpha = 0.05$ ), which indicates that the data is normally distributed. Data from data homogeneity testing obtained a significance value of 0.076. The significance of the test results is greater than the significance value determined by the researcher (sig.  $0.076 > \alpha$  0.05), so Ho is accepted. It can be interpreted that the distribution of variance of the pretest and posttest data is homogeneous. Once it is known that the pretest and posttest data are normally distributed and the variance is homogeneous, a mean difference test is carried out using the parametric paired-samples t-test with the help of SPSS 20.

The final step is hypothesis testing, carried out by testing the average difference in the increase in students' science learning outcomes using the parametric paired-samples t test. This is done after carrying out a normality test on the difference between pretest and posttest data. The results of the paired sample t test are presented in Table 4.

**Table 4.** Test results for average differences in students' science learning outcome

| Asymp. Sig. (2-tailed) Value | $\alpha$ | Result                 |
|------------------------------|----------|------------------------|
| 0,000                        | 0,05     | H <sub>0</sub> Ditolak |

Table 4 indicates that there is a significant difference in the average student score following the implementation of the TGT (team games tournament) cooperative learning model. This indicates that Ho is rejected or Ha is accepted. The test's significance value for the difference in average student science learning outcomes is  $0.00 < \alpha$  ( $\alpha = 0.05$ ). Thus, it can be said that using the TGT (team-game-tournament) cooperative learning approach has improved overall student scientific learning outcomes.

### 3.2 Discussion

The data collection was carried out in two meetings; the first meeting was a pre-test. This test was conducted to determine the students' scores before giving them treatment. The next step is to administer the treatment through the TGT learning model. After finishing the treatment, a final test (post-test) is provided.

Based on the above results, there are differences in the results of the average score of both tests. The average score shows that the treatment of the TGT learning model is applied to find out the effect on students' science learning outcomes after being given a post-test. After implementing the TGT cooperative model, it showed a good improvement, with an achievement of  $> 0.50$ . It also implied that the team-games-tournament strategy is effective in engaging the students in science lessons. Thus, it is proven that the TGT learning model influences students' science learning outcomes. (Rahim et al., 2019; Luo et al., 2020; Capinding, 2021; Winanti et al., 2022)

Besides learning science subjects, students were able to develop positive behavior not only in the lessons presented to them but also in their interactions with classmates. Students are engaged in the learning process. Apart from learning science, students also learn different skills, such as working in a group, leading group members, communication and presentation, creativity, etc. (Capinding, 2021). Thus, these activities are helpful for learning science as well as other skills required for the 21st century.

#### 4. CONCLUSION

The TGT (team games tournament) cooperative learning model significantly influences students' science learning outcomes. The results can be seen from the average pre-test score of 61.11. After implementing the TGT cooperative learning model, the post-test average score increased to 80.07. This is strengthened by the results of the hypothesis test. The significance value of the test for the difference in average student science learning outcomes is  $0.00 < \alpha$  ( $\alpha = 0.05$ ), so it can be concluded that overall student science learning outcomes are better after implementing the TGT (Team-Games-Tournament) cooperative learning model.

#### ACKNOWLEDGEMENTS

The author would like to thank MTs As'adiyah Puteri Sengkang that has given permissions for doing this research

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