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THE APPLICATION OF STAD TYPE OF COOPERATIVE LEARNING MODEL TO IMPROVE THE MATHEMATICS LEARNING OUTCOMES OF FOURTH-GRADE STUDENTS AT SDN RAWU SERANG CITY

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Abstract

This research aims to determine the increase in student learning outcomes in Mathematics of fourth-grade students at SDN Rawu Serang City, 2020/2021 academic year with the STAD type of cooperative learning model. This research is a classroom action research which is conducted in two cycles. Each cycle consists of four stages, namely: planning, implementation, evaluation, and reflection. The research subjects were 40 fourth-grade students at SDN Rawu Serang City of 2020/2021 academic year. The data collection in this study was carried out by the test method of the critical thinking ability. Furthermore, the data were analyzed using the formula of quantitative descriptive analysis techniques. The results of this research indicate that the application of the STAD type of cooperative approach can improve mathematics learning outcomes in the fourth-grade Mathematics subject at SDN Rawu Serang City in the 2020/2021 academic year. It can be seen that the average result of students' ability in the first cycle increased by 13% and the average result of students ability in the second cycle increased by 17%. Meanwhile, the students learning outcomes have increased as seen from the second post-test result which obtained a score of 80.5 with the high category. So the conclusion of this research is that the application of a cooperative approach of student teams achievement division (STAD) type can increase students' learning outcomes in Mathematics of fourth-grade students at SDN Rawu Serang City of 2020/2021 academic year.

Keywords: STAD Cooperative Learning Model; Learning Outcomes

A. Introduction

In mathematics learning, a teacher should be able to prepare a learning model that is effective and efficient in its implementation, moreover, it must also be in accordance with the needs and characteristics of students so that students can understand the material being taught well, easily, and the results are proper. But the fact is that there are still many teachers who teach mathematics using the lecture method/teacher-centered so that the teachers play an active role more than students in learning activities. Whereas in mathematics learning students should be more actively involved and the teacher only becomes a guide, so that students become more active and independent.

By applicating an inappropriate method, it causes students to feel bored, unchallenged, and not actively involved in learning activities, and the peak is the lack of a sense of meaning for students towards the learning material delivered by the teacher in the classroom. Of course, this can be fatal to the results of mathematics learning, especially mathematics is one of the subjects tested during the National Examination. Therefore in this context is the efforts to improve mathematics learning outcomes using the right method are very important for teachers to do. So it can overcome the difficulties experienced by students when studying mathematics learning materials in particularly (Jamaludin, dkk., 2017; Rahayu dan Wahyu, 2018; Putri, 2018).

Currently, Mathematics learning no longer focuses on absorption through the achievement of information but prioritizes the development of one's ability and processing of information (Hartoyo, 2000; Erath, et al., 2021). For this reason, student activities need to be increased through exercises or math assignments by working in small groups and explaining ideas to others (Sulistyaningsih, 2020; Mabruroh, dkk., 2020). Thus, the application of a learning model in mathematics is considered important to help students understand the material delivered.

One of the models that can be applied to mathematics learning and currently developing is the cooperative learning model. This model is a learning concept that helps teachers to take advantage of students' small groups who work together to achieve learning goals and allows students to optimize the learning process of one another. One of the cooperative learning models that help students understand the learning is the Student Team Achievement Division (STAD) type by dividing students into groups of four people with various abilities, gender, and ethnicity. So, it is expected to grow awareness to help each other, knowledge sharing, appreciate and support each other to achieve the common goals (Slavin, 2008;

Febriandi, 2020; Gunawan, 2020; Sulfemi dan Yasinta, 2020).

The cooperative learning model provides opportunities for students to work together in groups and solve a problem together. In this case, students have two responsibilities, namely learning for themselves and helping fellow members to learn. Success is achieved when all group members achieve the expected goals together.

Students need to be accustomed to solving problems, finding something useful for themselves, trying to find ideas, and transforming those into other situations. STAD is the most appropriate learning model for teaching the math materials to spur students to encourage and help each other to master the skills taught by the teacher with steps of delivering goals and motivation, group division, teacher achievements, team learning activities, evaluation, and team achievement awards (Taufik, 2015; Meileni, 2021).

The application of the STAD type of cooperative learning model refers to the concept of Slavin (2008:144) which consists of five main components/steps, namely: class percentages, teams, quizzes, individual progress scores, and team recognition. The steps of the STAD type of cooperative learning model consist of 5 stages, namely, the learning preparation stage (the material and determining the basic score), the material presentation stage, the group learning activity stage, the inspection stage of group work, and the last stage is a quiz.

The advantages of the STAD type of cooperative learning model are as follows: 1) Students have the opportunity to make a substantial contribution to their group, and the position of group members is equal; 2) Build active and positive interactions and better teamwork among group members; 3) Helping the students to make friends; 4) Train students to develop the aspects of social skills besides the cognitive skills; 5) The teacher's role has also become more active and more focused as a facilitator, mediator, motivator and evaluator; 6) Students have the responsibility of learning for themselves and helping fellow group members to learn; 7) Students teach each other or learning by peers (peer-teaching) which is more effective than learning by teachers; dan 8) Heterogeneous grouping of students makes the class more lively (Ariani dan Duwi, 2018; Widyastuti, 2020; Transliova, 2020; Sudarsana, 2021;)

The weakness of the STAD type of learning is it takes longer for the teacher and requires special abilities so generally, teachers are unwilling to use the cooperative model; it takes longer for students so it is difficult to achieve curriculum targets, demands certain characteristics from students (for example the cooperative character), and the contribution of low-achiever students

becomes less because it dominated by the high-achiever students (Zahro, dkk., 2018; Lovisia, 2019; Syamsu, dkk., 2019; Samsuri, 2020).

However, this STAD type of cooperative learning model has been proven to be successful, such as the research by Budi Mutiyasa and Eka Nurhayati (Mutiyasa and Eka, 2013) that the STAD-based problem-solving approach in mathematics learning can improve students' critical thinking skills.. In line with that, Anisensia, et al found that the application of the STAD type of cooperative learning model in mathematics subjects increased by 86% in cycle 2 (Anisensia, dkk., 2020). Then, the results of Sumilat's research show that the learning outcomes can be improved through an active learning process (Sumilat, 2021).

The ability to improve learning outcomes requires a learning process that emphasizes the maximum mentality of students. Students are not only required to master a number of subject material but should have played a role in developing ideas based on experience or the ability to describe observations of facts and data in everyday life. (Erlistiani, dkk., 2020). Thus, students are not only required to master the subject material, but also can use their potential. So this research aims to determine the improvement in learning outcomes of fourth-grade students at SDN Rawu Serang City, of the 2020/2021 academic year in Mathematics using the STAD type of cooperative learning model.

B. Research Methodology

This research is a classroom action research that is intended to provide information on how to take appropriate actions to improve students' activity by using a problem-based learning model that has an impact on improving student learning outcomes. This research uses an action research model developed by Kemmis and Taggart (1982) through 4 stages: planning, implementation/action, observation, and reflection. This action research is characterized by continuous change.

Implementation activities/actions and observations are combined into one when the action activities are carried out as well as the observations. Teachers as the researchers as well as the observers to observe changes in students' behavior. The observation results are then reflected to plan the next stage of action. The cycle of actions is carried out continuously, problems are resolved and the improvement in learning outcomes is maximum or does not need to be improved anymore. The research will end if the predetermined indicators can be achieved or have reached the level of saturation where the results only shift slightly or do not change at all. Obstacles and successes in

implementing actions in the first cycle must be observed, evaluated, and then reflected on to designing the actions in the second cycle.

In general, the actions of the second cycle is the corrective actions from the first cycle, but it is possible for actions in the second cycle to repeat actions from the first cycle. Action repetition is carried out to ensure that the first cycle of actions has or has not been successful. This approach was chosen because it is in accordance with the research objectives, namely knowing the application of the STAD type of cooperative learning model and the STAD type of thinking method in learning mathematics at SDN Rawu, Serang City. This research procedure consists of four stages, namely, planning, action, observation, and reflection. The research will be carried out for two cycles until the occurrence of significant results. One cycle is carried out in three meetings.

The subjects of this research were the 40 fourth-grade students of SDN Rawu Serang City, which consist of 19 boys and 21 girls.

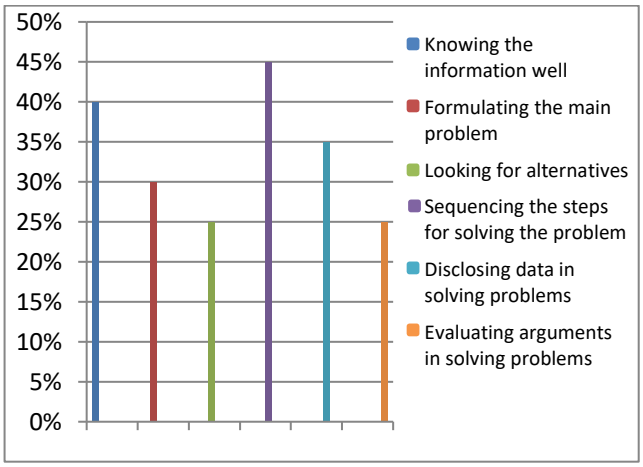
C. Result and Discussion

Each group in STAD is a heterogeneous group consisting of three different levels of student ability (low, medium, and high ability) and without distinction of gender. Students who scored above the MCC of 75 are included in students who have high abilities, while students who have an average score of 60-75 are included in the category of medium abilities students, and students who score below 60 are included in the category of low abilities students. The results of the carried out pre-test are as follows.

Table 1
The Students Pre-test Results

Activity	Total Students	Total Scores	Average Scores
Pre-test	40	2544	63.6

Based on the table above, the average score of the students' pre-test is 63.6. While the MCC that has been set for mathematics is 75. This indicates that the majority of students have not achieved the MCC well. The results above also show that there are only 12 students who are included in the high-level category (high ability), 9 students are included in the moderate level category (medium ability), and 19 students are included in the low-level category (low ability).



Graph 1. Students' Critical Thinking Result of the Pre-test

From the graph above, regarding the steps taken by students to achieve or know the level of their critical thinking skills in terms of the results of doing the pre-test, it can be seen that out of 40 there were only 16 students (40%) who were able to know the information well, 12 students (30%) were able to formulate the main points of the problem, 10 students (25%) were able to find alternatives, 18 students (45%) were able to sequence the steps for solving the problems, 14 students (35%) were able to reveal data in solving problems, and 10 students (25%) were able to evaluate arguments in solving problems. Therefore, it can be concluded that students' critical thinking skills in mathematics learning are still very low. This is proven from the six aspects none of the aspects result in more than 50%.

Next, the first cycle was carried out with the first stage (planning): make a teaching plan instrument using the STAD method, student worksheets related to the implementation of STAD, observation sheets for students and teachers, planning the groups division consisting of four students. The second stage of the CAR implementation of cycle 1 will be carried out in 3 meetings with the following steps:

a. Explaining to students about the learning implementation that will be carried out.
b. Giving apperception classically, to remember the requirements that must be mastered by students before learning the plane figure.
c. Dividing students into groups.
d. Explaining how to fill out the student worksheets.
e. Supervising the group work and providing guidance to groups in need.
f. Giving the practice questions that must be done individually to find out how far students have mastered the material that has been discussed in their groups.
g. Providing the evaluation for the action of the first cycle.
h. Providing opportunities for students to reflect on the carried out learning process.

The third stage is observation. During the learning process, the teacher and peers evaluate the process and observe the student activities. Aspects of student participation observed during the learning process were actively involved, asking questions, answering questions, and being on time. While the teacher's activities are to motivate students, ask, and answer the questions.

The fourth stage is reflection. Based on the data from observations results of the learning process implementation in the first cycle, there are the following findings:

1. The students' participation level is still low because students are not used to learning with the STAD model of mathematics learning.

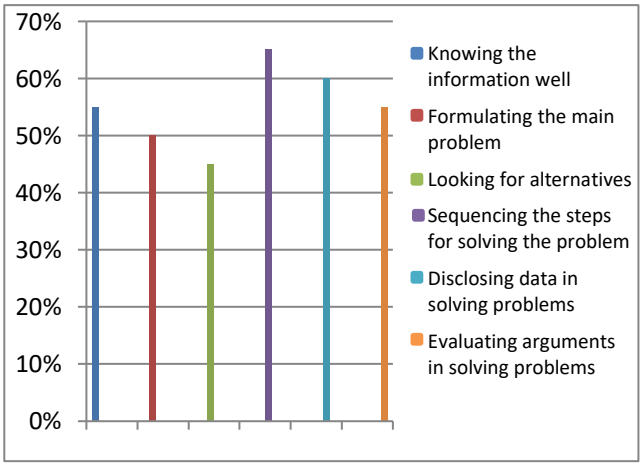
2. Students still have not adjusted to the available time.
3. Students still cannot answer the question.
4. Students are still not fully independent.

The results obtained after carrying out the first cycle are as follows.

Table 2
Students' Post-test Results in the First Cycle

Activity	Total Students	Total Scores	Average Scores
Post-test of Cycle I	40	2932	73.3

Based on the results of the first cycle post-test, showed that the student's test results about the mathematics learning outcomes in the plane figure material are in the sufficient criteria, and there is improvement in students' understanding. This is evidenced by the average pre-test score of 63.6 has increased in the first cycle post-test score of 73.3.



Graph 2. Students' Critical Thinking Result Of The First Cycle

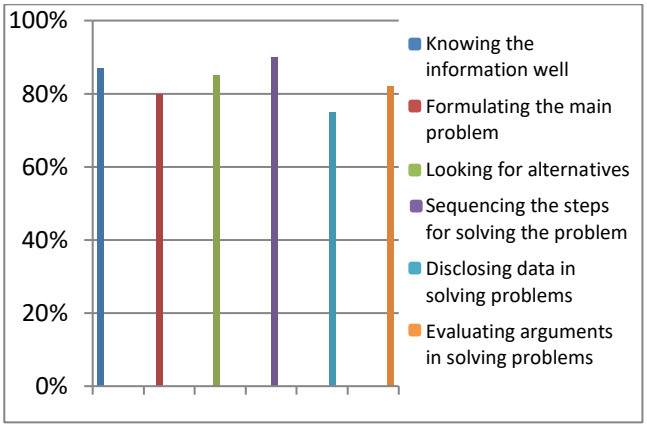
The graph above shows that 55% of students try to know the information well, 50% of students are able to formulate the main problem, 45% of students are able to find alternatives, 65% of students are able to sequence the steps of solving the problems, 60% of students are able to reveal data in solving problems, and 55% of students are able to evaluate arguments in solving the problems. If compared with the results obtained from before the action/implementation was held, the increase occurred about 13%. Although it is not too significant, there is still an improvement for the better. Therefore, the researchers will continue it to the second cycle of research in order to obtain satisfactory results in accordance with the researchers' expectations.

The second cycle is carried out according to the stages used in the first cycle. The results obtained are as follows.

Table 3
Students' Post-test Results in the Second Cycle

Activity	Total Students	Total Scores	Average Scores
Post-test of cycle II	40	3219	80.5

Based on the results of the final test of the second cycle, it shows that the student's test results related to the mathematics learning outcomes on the plane figure material is in the Good criteria and there is an improvement in students' understanding. This is evidenced by the average score of the post-test results in the first cycle of 73.3 has increased in the second cycle of 80.5.



Graph 3. Students' Critical Thinking Result of the Second Cycle

The graph above shows that 87% of students are trying to know the information well, 80% of students are able to formulate the main problem, 85% of students are able to find alternatives, 90% of students are able to sequence the steps of solving the problems, 75% of students are able to reveal data in solving the problems and 82% of students are able to evaluate arguments in solving the problems. If compared with the results obtained from the actions of the first and second cycle, the increase occurred about 17%.

In the first cycle, some students were still not loud or confident in presenting the results of their group discussions. So the class presentation activity is still not going well. In addition, the question and answer activity has not been carried out as expected because the students who ask are only a few, while the others are silent. In the first cycle of action, the students obtained mathematics learning outcomes with an average of 73.3. This shows an improvement if compared to the average score obtained before the action was held of 63.6. After continued to the second cycle, students obtained mathematics learning outcomes with an average of 80.5. Before the action was held, only 12 students reached the predetermined standard score (MCC), which was 75. This means that only 30% of students are able to complete the mathematics learning. While in the first cycle there were 25 or it could be said that 62.5% of students were able to reach the predetermined standard score. Then in the second cycle, there were 36 out of 40 students (90%) who managed to get a score above the MCC.

If compared with the previous score, of course, there was a good improvement even though the average score obtained in the first cycle was still far from the researchers' expectations, then the second cycle was carried out.

Based on the results obtained in the first cycle, it has shown the improvement of the results obtained by each individual, especially for students who have low abilities, because basically, every student as the part of the group has a great responsibility to help each other and work together. This research support by the results of research that has been carried out by experts, namely according to Rusman (2011, 203) that in this model, students have two forms of learning responsibilities, namely that is learning for

themselves and helping fellow group members to learn. Therefore, the STAD learning model is considered very helpful for students in improving their learning outcomes, especially in mathematics learning.

Likewise, the improvement that occurs in students' critical thinking skills in mathematics learning. There are six critical thinking steps that have been carried out by students in mathematics learning, namely: step one, the indicators of students trying to find out the information well have increased from before the action was 16 students (15%), then 22 students (55%) in the first cycle, and 35 students (87%) in the second cycle; step two, the indicators of students being able to formulate the main problem have increased from before the action was 12 students (30%), then 20 students (50%) in the first cycle, and 32 students (80%) in the second cycle; step three, the indicator of students being able to find alternatives, from before the action was 10 students (25%), then 18 students (45%) on the first cycle, and 34 students (85%) on the second cycle; step four, the indicators of students being able to sequence the steps of solving the problems, from 18 students (25%), 26 students (65%) in the first cycle, to 36 students (90%) in the second cycle; step five, the indicators of students being able to reveal data in solving the problems increased from 14 students (35%), 24 students (60%), to 30 students (75%) in the second cycle; and the last, step six is the indicator of students evaluating arguments in solving the problems from 10 students (25%), 22 students (55%) in the first cycle, to 33 students (82%) in the second cycle.

The results of this research are in line with the research that has been carried out by Nurhayati (2013) which states that the STAD type of learning model is able to improve students' critical thinking skills, especially in Mathematics. Basically, one of the goals of students studying mathematics is to improve their critical thinking skills.

Peter (in Sholihah, et al., 2019) shows that the purpose of mathematics education instilling critical thinking skills in the classroom is to think of students not as recipients of information but as users of information. Therefore, parents and teachers play an important role in nurturing and maintain the skills among students so that they are able to think critically and creatively in solving problems. In addition, Surya (2013: 159) argues that critical thinking is an active process and a way of thinking regularly to understand the in-depth information, thus forming a belief of the truth of the information obtained or opinions conveyed. So that when students are able to answer the questions given regularly/ sequentially as

requested, it can be said that these students have good critical thinking skills.

The results obtained in the second cycle have shown a very good improvement. This can be seen from the students' enthusiasm when participating in learning, many students do the questions and answers when the class presentation begins, besides that they also respond to the answers delivered by other groups. The results of this research support the argument of Slavin (in Eggen, 2012:144) who said that STAD can promote active and positive interaction and better cooperation with the group members. It can also be seen that each team is competing to be the best group who will get the achievements or awards from the researchers later. This is also in line with Slavin's opinion (in Rubianus, 2016) which says that heterogeneous grouping of students makes the competition that occurs in the classroom more lively.

Student learning outcomes in the second cycle also have a very good improvement, this is seen from the results of the post-test in the second cycle. Of the 40 students who took the test, there are 36 (90%) of them got results above the MCC. Where previously in the first cycle only 25 people (62.5%) passed or scored above the MCC. That means there is an improvement of about 27.5%.

D. Conclusion

The application of STAD type of cooperative learning model by dividing students into several groups and working together with their respective groups where each group consists of different children's abilities, students with high, medium, and low abilities. With teamwork, all group members should help each other, motivate, and convince each other that all group members had understood the material being taught and are able to work on the questions given. Therefore, the obtained results of mathematics learning also have significant improvement. Starting from pre-observation (pre-test) where students only got an average score of 63.6, then in the first cycle the average score increased to 73.3, and finally, the average score of students on the second cycle was above the Minimum Completeness Criteria (MCC), which was 80.5.

Thus, it can be concluded that the application of the STAD type of cooperative learning model is able to improve students' mathematics learning outcomes.

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