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STAD cooperative learning model to improve scientific attitudes and learning outcomes grade VIII students of SMPN 3 Pacitan

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ABSTRACT

Learning is basically a process of changing attitudes due to experience. SMPN 3 Pacitan has the following conditions: The average student score is 61.98, the scientific attitude of students is not good and the classical completeness is 55.00 with KKM at SMPN 3 Pacitan of 60. So the STAD Type Cooperative learning model is used to improve scientific attitudes and student learning outcomes. This study aims to determine the improvement of scientific attitudes and student learning outcomes. This research is a Classroom Action Research (PTK) and was conducted in three cycles. Data were collected using observation, questionnaire and test methods. The results of the analysis using the t-test were obtained: The scientific attitude of students has increased in each cycle, indicated by an increase in the number of students who fall into the category of good scientific attitude. The completeness of students' affective learning outcomes in cycle I was 70%, then increased to 80% in cycle II and 92% in cycle III. The completeness of students' psychomotor learning outcomes in cycle I was 57.5%, 80% in cycle II and 92.5% in cycle III. The classical completeness of students' cognitive learning outcomes in cycle I was 60%, then decreased to 55% in cycle II and increased to 87.5% in cycle III. From the analysis, it can be concluded that the Student Teams Achievement Divisions (STAD) cooperative learning model can improve students' scientific attitudes and learning outcomes.

INTRODUCTION

National education aims to ensure the quality of national education in order to educate the nation's life and shape the character and civilization of a dignified nation (PP No. 19 of 2015). One of the realizations is through quality education in every educational unit in Indonesia. In science subjects, students are trained to analyze a natural phenomenon related to everyday life, for example, the formation of shadows on a mirror, to analyze these symptoms students need an attitude like a scientist or called a scientific attitude, therefore it can be said that science lessons can foster scientific attitudes in students. SMPN 3 Pacitan is a junior high school located at Jalan Mayjend Sutoyo No 54, Lingkungan Pojok, Kelurahan Sidoharjo, Kecamatan Pacitan, KPacitan. The conditions of SMPN 3 Pacitan are as follows: First, during learning the teacher uses a teacher-centered learning model, this

makes it difficult for students to understand the material provided. Second, science learning is rarely held group work and discussions to find and understand the concepts of the material being taught and third, the average value of the Midterm Examination (UTS) of class VIII G students in science subjects reached 61.98 and classical completeness reached 55.00% while the KKM of SMPN 3 Pacitan was 60. In connection with this fact, there is a need for an improved learning model that can foster scientific attitudes and improve student learning outcomes. One of the learning models that can be offered in accordance with these conditions is the STAD (Student Team-Achievement Division) Cooperative learning model.

Learning is not just receiving information and memorizing it. Learning is an important process for changing human behavior and learning includes everything that is thought and done. Learning also plays an important role in human development, habits, attitudes, beliefs, goals, personalities, and even perceptions (Anni 2016: 2). Cooperative learning refers to a wide variety of teaching methods in which students work in small teams to help each other learn the subject matter (Slavin 2019:4). STAD Type Cooperative Learning is one of the cooperative learning models using small teams with the number of members per team of 4-5 students heterogeneously (Trianto 2017: 52). STAD type cooperative learning begins with the delivery of objectives, team activities, class presentations, quizzes and team recognition. Baharuddin (1982:34) states that: "scientific attitudes are basically the attitudes shown by scientists when they carry out activities as a scientist". In other words, the tendency of individuals to act or behave in solving a problem systematically through scientific steps. There are several scientific attitudes stated by Mukayat Brotowidjoyo (1985: 31-34) including: an inquisitive attitude, a critical attitude, an objective attitude, an attitude of wanting to find, an attitude of respect for the work of others, a diligent attitude and an open attitude.

A learning process is expected to produce something called learning outcomes. The learning outcomes can be in the form of knowledge, attitudes and skills which can be classified into cognitive, affective and psychomotor aspects. Cognitive aspects include thinking skills, including the ability to understand, memorize, apply, analyze, synthesize, and evaluate. Affective aspects include behavioral traits such as feelings, interests, attitudes, emotions, and values. Psychomotor aspects include imitation, manipulation, precision, articulation, and naturalization (Research Team of Postgraduate Program UNY 2013: 1-5). The learning outcomes examined in this study include affective cognitive aspects and psychomotor aspects. Based on the background of the problem above, the problem to be studied in this class action research is whether the use of cooperative learning model type Students Teams Achievement Division (STAD) can foster scientific attitudes and improve learning outcomes of students in class VIII SMPN 3 Pacitan. The purpose of this study was to determine the improvement of scientific attitudes and learning outcomes of 8th grade students of SMPN 3 Pacitan through the application of the cooperative learning model type (STAD).

METHOD

The location of this Classroom Action Research (PTK) is SMPN 3 Pacitan. The subjects of this study were students of class VIII G. The number of students to be studied was 40 students, consisting of 22 male students and 18 female students. The factors studied in this study are scientific attitudes and learning outcomes which include cognitive, affective and psychomotor aspects. The research was conducted in three cycles with different materials. Each cycle consisted of planning, implementation, observation, and reflection. There are three ways of collecting data in this study, namely as follows: 1) observation sheet which is to assess the learning outcomes of affective aspects and psychomotor aspects and to assess students' scientific attitudes. 2) questionnaire method to assess scientific attitudes. 3) test method (quiz) to obtain data on students' cognitive learning outcomes on the subject of light reflection. The percentage of determining students' learning outcomes and scientific attitudes

is calculated using the following formula: For the results of each scientific attitude indicator compared to the range of student success criteria as follows: 76 - 100% = good 56 - 75% = sufficient 40 - 55% = not good ,<40% = not good To determine the level of significance of the increase in cognitive, affective, psychomotor and scientific attitudes of students from cycle I to cycle III, a t-test is used with the following equation: t = (Arikunto 2006: 275) If t counts, then t counts. > t table with 5% significance, then the value will increase significantly.

FINDINGS AND DISCUSSION

Description of the Implementation of STAD Type Cooperative Learning is as follows: In cycle I, the teacher emphasized the course of the physics learning process with the application of the Student Teams Achievement Divisions (STAD) type cooperative learning model. Then the teacher conducted team formation. Team formation is based on the initial score (UTS score) of students. Initially students were ranked according to the initial score, after which students were grouped into 3 groups, namely the upper group, middle group and lower group. From these groups, one student from the upper group, two students from the lower group and one student from the lower group were taken and gathered into one team. The research class consisted of 40 students, so 10 heterogeneous teams were formed (different academic levels and gender). After forming the team, the teacher distributed the LKS, each team got 1 LKS. Students were given the opportunity to conduct experiments according to the instructions on the LKS and were accompanied and guided by the teacher. When students conduct experiments, the teacher guides students in the team to discuss and draw temporary conclusions from the results of the experiment. After that, the teacher appointed a representative of one team to make a presentation. After all teams have finished presenting, the teacher guides students to draw final conclusions. After that, students are asked to return to their respective seats and are ready to take the quiz. The last activity is team recognition the goal is to motivate students to be more motivated to study harder.

Based on the results of observations during learning, in cycle I there were several obstacles such as students not being able to prepare tools and materials perfectly. The second obstacle is when conducting experiments, there are still many students who talk to themselves, joke with their friends, lack of diligence in conducting experiments and students' curiosity is lacking. The third obstacle is in the experimental equipment, for example in the laser used, the light from the laser is not clearly visible on the mirror so that the reflected light is difficult to observe. During the experiment, some students could not cooperate well. In addition, students lacked discipline during learning resulting in non-optimal time utilization. In cycle II there was little progress such as, students were able to prepare their own tools and materials, students were ready and had begun to adapt to the STAD Type Cooperative learning model. In the implementation of the experiment, most students have cooperated well, but there are also students who have not been able to cooperate well. The time allocation available is still not enough to implement the STAD type cooperative learning model. Another obstacle is the lack of active students in asking questions during learning. In cycle III students have shown significant changes, students are used to using the STAD type cooperative learning model. For the allocation of time, students did not experience difficulties, students worked well and could make good use of time The value of the quiz results achieved also showed significant changes better than cycle I and cycle II. Aspects of assessment Achievement of Success Indicators Cycle I Cycle II Cycle III Highest score 90 80 80 This research can be said to be successful if classical completeness reaches at least 85% of the number of students in the class. Lowest score 10 30 50 Average 55 54.75 67.25 Classical completeness 60% 55% 87. 50% From the results of data analysis, the following research data were obtained: After analyzing the test data, the data regarding the highest score, lowest score, average score and classical completeness in cycle I, II, and III are presented in Table 1.

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Table 1. Student cognitive learning results

Assessment Aspect	Achievement			Achievement Indicators
	Cycle I	Cycle II	Cycle III	
The highest score	90	80	80	This research can be said to be successful if classical completion reaches at least 85% of the number of students in the class.
Lowest value	10	30	50	
Average	55	54.75	67.25	
Classical completeness	60%	55%	87.50%	

The t-test results show that cognitive learning outcomes from cycle I to II have decreased, while the t-test results of cycle II to III have increased significantly because tcount> ttable. Based on the results of data analysis, it was found that students' cognitive learning outcomes in cycles I and II were not complete because the percentage of classical completeness obtained was less than 85%. While in cycle III it was classically complete. Based on the t-test, cognitive learning outcomes in cycle I to cycle II decreased, this is because there were more variations of experiments. Not achieving the indicator of classical completeness of cognitive learning outcomes in cycles I and II was because students were not familiar with the learning model applied. Students' lack of familiarity with cooperative learning was due to students' lack of understanding of the steps and objectives of STAD type cooperative learning, therefore the teacher had to explain the steps and objectives of STAD type cooperative learning beforehand. Cooperation between students was not good, this was shown by clever students who did not want to help less clever students, the absence of team assignments, the lack of students asking questions or expressing opinions. The average score of students in cycle II has decreased, cooperation between groups is not good as well as, smarter students do not want to help less intelligent students.

To overcome this, the teacher must provide more direction and motivate students to be more active in asking questions. motivate students to be more active in asking questions and expressing opinions. In cycle III, the average score of students has increased, this is because in cycle III students have become accustomed to the STAD type learning model, students have understood the objectives and steps in STAD type learning. This can be seen in the conducive classroom situation, students are more active in asking questions and expressing opinions, students have also been able to work well with their teammates. When presenting members in the team help each other to answer questions asked by students who are not presenting. Students are no longer shy to ask questions or express opinions. From this explanation, it can be seen that students learn actively and try to find knowledge by conducting experiments. This is in line with Suparno's opinion (2006: 13) that learning is a process of students actively building their own knowledge. The significant increase in students' average scores in cycle III shows that learning through the application of the STAD Type Cooperative learning model can improve students' understanding of the subject matter of light reflection. This is reinforced by the results of research from Ong Eng Tek (1997). stated that the findings of the study indicated that the mathematics achievement of students who had experienced learning with the Students Teams Achievement Division (STAD) type cooperative learning approach was significantly higher than students who did traditional learning. Assessment of affective learning outcomes includes: communication, responsibility, cooperation, tolerance. The results of observation and data analysis are presented in Table 2.

Meanwhile, the t-test result between the affective learning outcomes of students in cycle II and III obtained a tcount of 2.73 and t table 1.68. Both t-test results show that students' affective learning outcomes from cycle I to II and cycle II to III have increased significantly because tcount> ttable. Based on the results of data analysis, it is known that affective learning outcomes have increased significantly in each cycle. This increase in affective learning outcomes occurs because students are

directly involved in learning so that students are motivated and interested in participating in learning. In cycle I, students were not yet classically complete but in cycle II and cycle III the classical completeness was in accordance with the success indicator of 75% (Depdiknas 2002:69). In cycle I most students never asked questions and expressed opinions. This was because students were still shy in expressing their opinions. Therefore, the teacher motivated students so that they would not be shy anymore, the teacher also gave more points for students who actively asked questions and expressed opinions. During class presentations, students are given the opportunity to ask questions and express opinions. When expressing opinions, tolerance is also needed, tolerance for their friends' opinions and also willingness to listen during presentations. During the process, initially there were still students who talked to themselves, not listening to the explanations of other students who were presenting. This is because students are not very interested in participating in the learning process. Students are also still shy to ask questions and express opinions. After the teacher gave an explanation and gave an understanding to listen and respect people who were speaking, students began to reduce talking to themselves and respect others and began to pay attention to other students and the teacher. During learning, the teacher only provides opportunities for students to control themselves and be responsible for making decisions. The teacher also guides students to cooperate with their teammates. This aims to form the independence of self-confidence and a sense of responsibility of students. In line with the opinion of Hamalik (1998: 13) which states that students need to learn to be responsible for their behavior.

Table 2. Students' affective learning outcomes

No.	Assessment aspect	Achievement			Achievement Indicators
		Cycle I	Cycle II	Cycle III	
1	Communication	72.50%	78.13%	80%	This research can be said to be successful if the completeness of each aspect of the assessment is at least 75% and classical completeness is at least 75% of the number of students in the class.
2	Responsibility	67.50%	71.25%	76.88%	
3	Cooperate	70%	74.38%	75.63%	
4	Tolerant	73.75%	77.50%	80%	
5	Lowest value	43.75	50.00	56.25	
6	The highest score	87.50	87.50	93.75	
7	Average	71.14	75.55	77.76	
8	Classical completeness	70%	80%	92.50%	

Assessment of psychomotor learning outcomes includes: preparing tools and materials, conducting experiments, asking questions and giving responses. The psychomotor learning outcomes are presented in Table 3.

Table 3. Student psychomotor learning outcomes

No.	Assessment aspect	Achievement			Achievement Indicators
		Cycle I	Cycle II	Cycle III	
1	Prepare tools and materials		80.63%	90.63%	This research can be said to be successful if the completeness of each aspect of the assessment is at least 75% and classical completeness is at least 75% of the number of students in the class.
2	Assembling tools and materials		75.63%	83.75%	
3	Measure		73.75%	90.63%	
4	Read measurement results		67.50%	84.38%	
5	Conclude		70.63%	70.63%	
6	Ask	59.38%	71.88%	71.88%	
7	Lowest value		54.14	66.67	
8	The highest score		87.5	95.83	
9	Average	66.15	73.23	81.98	
10	Classical completeness		80%	92.50%	

Based on the results of the t-test between the psychomotor learning outcomes of students in cycle I and II, the t-count is 2.29 and the t-table is 1.68. While the t-test results between the psychomotor learning outcomes of students in cycle II and III obtained a tcount of 4.19 and t table 1.68. Both t-test results show that students' psychomotor learning outcomes from cycle I to II and cycle II to III have increased significantly because tcount> ttable. In cycle 1, the learning outcomes of the psychomotor aspects were classically incomplete. The incomplete learning outcomes were achieved because students were not used to conducting laboratory experiments, nor were they used to the STAD type learning model. Most students did not understand how to measure object distance, shadow distance, object height and so on. But after the teacher gave guidance to each team, students understood and could do the experiment well. They were able to prepare the tools and assemble them. They can also measure and read the measurement results. The development of direct experience carried out in this learning makes it easier for students to remember knowledge and can improve understanding. knowledge and can improve understanding. This is in accordance with the opinion of Nasution (2018: 75) that learning will give the best results if it is based on experience. The table shows that students' scores in asking questions are the lowest. This is because in cycle 1 students were mostly silent and shy in asking questions, therefore the teacher motivated students not to be shy in asking questions. more assessment for students who want to ask questions or express opinions. Scientific attitudes are measured using two ways, namely by questionnaire and observation sheet. The value of each aspect of scientific attitude is presented in table 4. The results of the assessment of scientific attitudes through questionnaires and observation sheets during the learning process of each cycle are categorized as presented in table 5.

Table 4 Recapitulation of students' scientific attitudes

No.	Aspects of Scientific Attitude	Aspects of Scientific Attitude			Aspects of Scientific Attitude			Aspects of Scientific Attitude
		Cycle I	Cycle II	Cycle III	Cycle I	Cycle II	Cycle III	
1	curious attitude	83.50 %	87.67 %	89.50 %	69.17%	77%	85%	Scientific attitude is said to be good if the range of scientific attitude is 76% to 100%
2	critical attitude	79.25 %	80.50 %	81.25 %	60.50%	63.25%	67.25 %	
3	objective attitude	67.75 %	66%	70%	60.50%	64.75%	75%	
4	attitude of wanting to discover	76.50 %	84.25 %	84.75 %	69.25%	78.75%	79.50 %	
5	an attitude of respect for the work of others	74.50 %	75%	77%	77.50%	80.50%	82.50 %	
6	diligent attitude	79.50 %	76.50 %	77.50 %	70%	74%	82.33 %	
7	open attitude	68%	81.25 %	84.25 %	70%	75.25%	78.75 %	

For scientific attitudes measured using observation sheets, in cycle I with II, the tcount was 4.21 and the ttable was 1.68. While cycle II with III obtained a tcount of 4.008 and t table 1.68. Both t-tests showed that students' scientific attitudes measured using questionnaires from cycle I to II and cycle II to III experienced a significant increase because tcount> ttable.

For scientific attitudes measured using a questionnaire, in cycle I with II obtained a tcount of 1.49 and t table 1.68. While cycle II with III obtained a tcount of 4.21 and t table 1.68. Both t-tests show that students' scientific attitudes measured using questionnaires from cycle I to II and cycle II to III have increased significantly because tcount> ttable.

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Table 5. Categories of students' scientific attitudes

No.	Category	Number of Students					
		Questionnaire			Observation sheet		
		Cycle I	Cycle II	Cycle III	Cycle I	Cycle II	Cycle III
1	Good	22	30	38	17	27	35
2	Enough	18	10	2	22	13	5
3	Not good	0	0	0	1	0	0
4	Not good	0	0	0	0	0	0

An inquisitive attitude grows when the teacher provides apperception and motivation to students. The growth of students' curiosity makes learning more exciting because students are motivated to discover knowledge through experiments. An inquisitive attitude also grows when students discuss, during the discussion there will be differences of opinion. It is the difference of opinion that fosters students' curiosity. The experimental activity that fosters a critical attitude is hypothesizing. Students' hypothesizing ability has increased in each cycle even though the scores obtained are low. This happens because students are given freedom and are accustomed to making conjectures or estimates based on their experience and knowledge. To test the hypothesis, students conduct an experiment. In order to get experimental data, students make observations and measurements, students do not just accept conclusions without strong evidence, therefore they prove it through experiments. During the experiment, students are also objective, this can be seen when students observe the shadow formed by a flat mirror. The data entered in the observation table is in accordance with what they observed without being affected by personal bias. Learning in teams will motivate students to be able to complete the tasks given by the teacher, this is because learning in teams teaches students to work together between students in the team.

Therefore, it is said STAD type cooperative learning can foster an attitude of discovery. During the experiment, perseverance is needed to be able to complete the experiment well. In cycle I some students had a lack of perseverance, they were lazy to repeat the experiments they had done even though the results were not satisfactory. In cycle II, students' perseverance has begun to change for the better, this can be seen when taking data on the concave mirror experiment. At that time there were several students who experienced errors in data collection. After students received guidance from the teacher, they were willing to repeat the experiment. In cycle III, students' perseverance was good. This can be seen from the seriousness of students in conducting experiments according to the instructions on the LKS. To find out whether the learning carried out by the teacher is in accordance with the lesson plan for the STAD type cooperative learning model, it is necessary to carry out an assessment, this assessment is called an assessment of the learning process. This assessment is called teacher performance assessment or teacher performance. The results of the teacher performance assessment in cycle I obtained 72.22%, for cycle II amounted to 88.88% while cycle III amounted to 100%. It can be said that the results of the teacher performance assessment have increased significantly in each cycle.

CONCLUSION

Based on the results of research and discussion, it can be concluded that the STAD Type Cooperative learning model can improve students' scientific attitudes during the learning process. This is indicated by, during learning there is an increase in the number of students who fall into the category of good scientific attitudes in each cycle. This scientific attitude can grow if students are more active in asking questions, expressing opinions, seeking their own knowledge, cooperating with their

teammates well and students are more diligent in completing experiments and teachers must be able to motivate students and guide students not to talk or play alone. The application of the STAD Type Cooperative learning model can also improve student learning outcomes, both cognitive, affective and psychomotor aspects of students. It was shown from the average score and classical completeness obtained significantly increased in each cycle. Students' learning outcomes can increase if, the allocation provided is sufficient, the tools and materials used must be good, and the teacher must also be able to further optimize the application of the STAD Type Cooperative learning model.

SUGGESTIONS

Based on the research that has been conducted, the researcher can propose the following suggestions: 1) in the application of the STAD Type Cooperative learning model the teacher must prepare well, because in its implementation it consists of several stages. 2) teachers should clearly explain these stages to students before carrying out learning activities, because most students do not understand the STAD Type Cooperative learning model. 3) In planning the STAD type cooperative learning, teachers should be more mature in planning the time allocation so that the material can be learned thoroughly. Teachers should be able to provide good quality experimental equipment so that the experiment runs smoothly.

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