LEARNING ACTIVITY

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LEARNING ACTIVITIES AND LEARNING OUTCOMES AFTER THE IMPLEMENTATION OF STUDENT TEAMS ACHIEVEMENT DIVISIONS OF COOPERATIVE LEARNING ON VIBRATION AND WAVE TOPICS

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Abstract

Evaluation of science learning achievement on conventional manner show that students were less active in the learning process, low cognitive performance, interest in learning science were low, and difficulty in learning science topic. As a result student's and learning achievement. The difficulty was caused by low teacher ability to manage it, so that the learning was less effective and interesting. Therefore, learning model is needed to support student mastery. One of them was cooperative learning model of student teams achievement division. This research aimed to describe the implementation of the syntax and student learning achievement after learning using cooperative learning model of student teams achievement divisions Vibration and Wave. This study was a descriptive research with quantitative approach. It used One-Shot Case Study. The Subjects of this study were students of class VIII of State Junior High School 3 Jombang consisting of 30 students. The implementation of the syntax was observed by implementation of the syntax sheet. Learning achievement were determined based on mastery of learning achievement and mastery of learning indicator on minimal mastery criteria. The results of the research showed that: (1) Implementation of the syntax at the first and second meeting reached the average 89,5% with very good criteria , (2) Student learning outcome reached the average 77% while the learning indicator value got the average 86,5 with mastery category.

Keywords: *Cooperative Learning Model of Student Teams Achievement Divisions, Learning Achievement, Vibration and Wave*

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INTRODUCTION

Science learning emphasizes providing personal experiences through the process of observing, questioning, reasoning, and trying. Providing learning experiences is intended to increase student creativity. The difficulty in learning science generally occurs because the management of learning is less effective and interesting. Learning like this makes the classroom atmosphere tends to be centered on the teacher so that it makes students passive and has difficulty learning science.

Based on the results of observations on September 10, 2018, the value of students' cognitive learning outcomes in the Physics subject was unsatisfactory, with an average score of 69.77 learning completeness. This average score is still below the minimum completeness criteria, namely 77. The number of students who achieved learning completeness was 59.5% and those who had not yet completed it were 40.5%. The low achievement of cognitive learning outcomes is because most students do not like physics. Students who like to read and memorize subject matter tend not to be willing to understand physics formulas and concepts. Physics concepts require an understanding of physics formulas. Without this effort it will be difficult to understand the concept of physics. Low interest in learning physics affects student learning outcomes.

The results of filling out the questionnaire for grade VIII I students showed that 90% stated that the teacher explained more often in front of the class. This data shows that the implementation of Science-Physics learning is still conventional. As many as 55% of students considered the Vibration and Waves topic difficult, and 40% of students liked group learning activities / discussions. Student mastery of physics subject matter is greatly influenced by students' understanding of the subject matter and the way the topic is delivered. The learning process that still provides teacher dominance does not provide access for students to develop independently through discovery in their thinking processes (Al-Tabany, 2015).

Physics is a subject that requires student concentration and appropriate learning methods to maximize student learning outcomes. In addition to the need for experiments or demonstrations in learning, an atmosphere that supports student learning is also needed. The success of the physics learning process can be seen from the level of mastery of the topic. It is assumed that the higher the mastery of the topic, the higher

the student learning outcomes. Therefore, appropriate learning methods are needed and can support student mastery, one of which is by applying cooperative learning methods.

According to Al Tabany (2015) cooperative learning is a learning model that aims to build a spirit of togetherness to maximize learning outcomes. This learning arises from the concept that students will find it easier to find and understand difficult concepts if they discuss each other with their friends. One type of cooperative learning model that creates an atmosphere that supports the learning situation is the Student Team Achievement Divisions (STAD) cooperative learning.

The suitability of the Vibration and Wave topic to be applied in STAD-modeled learning is based on the following considerations. First, the Vibration and Waves topic requires a higher level of reasoning and understanding of concepts so that it requires students to be active during the learning process. Second, the Vibration and Waves topic is difficult topic so that it requires the ability to work together, think critically, and develop students' social attitudes. One of the ways to achieve this is through STAD cooperative learning.

Several studies on the application of the STAD cooperative learning model are related to student learning outcomes including the results of research by Ege and Nuryadin (2014) which show that the application of the STAD cooperative learning model influences learning outcomes in the Human Digestive System topic. The average learning outcomes after the implementation of the research was 76.19, an increase of 42% from the average learning outcomes before the application of the STAD learning model, namely 53.57.

The results of research conducted by Jannah et al., (2016) showed that the STAD cooperative learning model in students' physics learning on Static Fluid topic was able to improve student learning outcomes. Classical completeness of student learning outcomes has increased in cycle I to cycle III of the five phases of STAD cooperative learning, namely 6.90%, 67.85%, and 86.67%. This indicates that learning physics with the STAD model has a positive effect, which is shown by the completeness of the study.

Based on the above background, a research was conducted with the title "Syntax Implementation After Learning Using the Student Teams Achievement Divisions (STAD) Cooperative Model on Vibration and Wave Topic". The objectives of this study are as follows: (1) Describe the implementation of learning by students using the STAD cooperative learning model in class VIII SMP Negeri 3 Jombang on the subject of vibrations and waves. (2) Describe student learning outcomes in class VIII SMP Negeri 3 Jombang after learning by using the STAD cooperative learning model on Vibration and Waves topic.

METHODS

This type of research is a descriptive study with a quantitative research approach. The research design used in this study was pre-experimental design, namely using a single treatment one treatment group and no control group. After the treatment, the results were observed (Sugiyono, 2016). The form of the research design used is a one-shot case study which is described as follows:

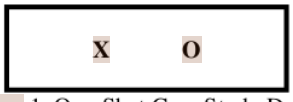

Figure 1. One-Shot Case Study Design

Information:
X : The treatment given was in the form of STAD cooperative learning model
O : Observation

The research was conducted at SMP Negeri 3 Jombang in the even semester of the 2018/2019 academic year. The population in this study were all students of class VIII SMP Negeri 3 Jombang, and the sample used for this study was 30 students of class VIII I. The sampling technique was purposive sampling technique. namely considering the sampling (Sugiyono, 2016). The class chosen is a regular class and has not received the material used in the research. After being carried out by using purposive sampling technique, there is one selected class, namely class VIII I consist of 31 students. The class received treatment in the form of the application of the STAD cooperative learning model.

The data collection techniques in this study used observation and test methods. The method of observation is carried out by direct observation using a learning implementation observation sheet instrument (Sugiyono, 2016). Observations were made on the implementation of the learning syntax using the STAD cooperative model. The assessment is carried out in the form of tests and non-tests. Assessment of the test form with a test instrument in the form of multiple-choice tests. While the non-test assessment is in the form

of observation of learning activities using the STAD cooperative learning model which is used to determine whether learning is carried out or not.

The data analysis technique used in this research is quantitative descriptive which is obtained based on the percentage of syntax implementation using the STAD cooperative learning model. Sugiyono (2016) states that the determination of the score is based on the statement being assessed, if you judge "Yes" the score is 1 and "No" the score is zero. The percentages obtained are then categorized based on the guidelines in Table 1.

Tabel 1. Interpretation of Syntax Implementation Data, adapted from Riduwan (2015)

Implementation (%)	Criteria
80 ≤ Syntax implementation ≤ 100	Very good
60 ≤ Syntax implementation < 80	Good
40 ≤ Syntax implementation < 60	Moderate
20 ≤ Syntax implementation < 40	Less
0 ≤ Syntax implementation < 20	Very less

The data analysis technique used for the test instrument is to calculate the average value by referring to the Minimum Completeness Criteria (KKM). After obtaining the posttest results data are recapitulated per indicator, then analyzed to determine the completeness of the learning indicators. Before calculating the completeness of the learning indicators (KIP), the calculation of the completeness of the question indicators (KIS) is carried out.

The completeness of the learning indicators (KIP) obtained were then criticized based on the guidelines in Table 2.

Tabel 2. Learning Indicator Completeness Results Criteria

Completeness of Learning Indicators	Criteria
≥ 77	Tuntas
< 77	Tidak Tuntas

(Source: The value of the minimum completeness criteria for science subjects at SMP Negeri 3 Jombang).

RESULTS AND DISCUSSION

1. Syntax implementation after learning using the STAD Cooperative Learning Model

Observation activities in this study were carried out to determine the implementation of syntax at the learning stages using the STAD cooperative learning model. Observations were observed by 2 fellow students of the Faculty of Education, Hasyim Asy'ari University as observers 1 and 2. The results of observations of syntax implementation at meetings 1 and 2 can be seen in Table 3.

Tabel 3. Results of Syntax Implementation Observation

No	STAD Cooperative Learning Steps	Syntax Execution				Average (%)	Inf
		∑ Answer "Yes"		(%)			
		O1	O2	O1	O2		
I	***Stage I:* Delivery of Goals and Motivation**						
	1. Students answer the teacher's questions.	14	15	97	100		
	2. Students record the material / theme and learning objectives to be achieved.	14	15	87	70	89	BS
II	***Stage II:* Presentation of the Topic**						
	Observation 3. Students observe the pendulum picture of a rope that is given upward and downward strokes.	14	15	97	100		
	Asking question 4. Students submit questions from the results of their observations in subsequent learning activities.	9	15	63	63	87	BS
	Collecting data	15	15	100	100		

No	STAD Cooperative Learning Steps	Syntax Execution				Average (%)	Inf
		∑ Answer "Yes"		(%)			
		O1	O2	O1	O2		
	5. Students pay attention to the vibration and wave material described by the teacher.						
	Stage III: **Division of Groups**						
	6. Students form groups in accordance with the provisions of the teacher.	15	15	100	100	100	BS
	7. Students study the "Vibrations and Waves" worksheets.	15	15	100	100		
	Stage IV: **Learning Activities in Teams**						
	Associate	15	15	97	100		
	8. Students discuss the results of the experiment and answer in teams (teamwork).						
	9. Students make conclusions from the results of the experiments that have been carried out.	15	15	97	100		
	Communicate	12	12	30	30	82	BS
	10. One student presents the results of his group discussion.						
	11. Students pay attention to the explanation from the teacher.	15	15	100	100		
	Stage V: **Quiz / test**						
	12. Students work on quiz questions independently under the supervision of the teacher.	15	15	100	100	100	BS
III	***Stage VI:*** **Team Achievement Award**						
	13. Students pay attention to information from the teacher to calculate the results of the quiz.	15	15	100	100		
	14. Students pay attention to information on the acquisition of group scores and giving awards to groups that meet the criteria of good team, great team, and super team	5	15	67	100	95	BS
	15. Students make conclusions about the meaning of transverse wave material, longitudinal waves, their characteristics and the relationship between periods, frequency, and wave propagation.	14	15	97	100		
	16. Students listen to information from the teacher.	13	15	93	100		
	17. Students answer greetings.	13	15	93	100		
	Average					**92%**	**BS**

Information:

O1 : Observer 1 : Istifadatun Na'imah
O2 : Observer 2 : Zuhrotun Nurani
Krt : Kriteria
0 – 19 = Very less
20 – 39 = Less
40 – 59 = Moderate
60 – 79 = Good
80 – 100 = Very good

Based on Table 3 regarding the recapitulation of the results of syntax implementation observations, it can be seen that the stages of STAD cooperative learning at meetings I and II reached 92 with very good criteria. Observations and assessments are carried out by the observer during learning using the STAD cooperative learning model. The aspects that were observed were the activities of the students which included each stage of learning using the STAD cooperative learning model.

The results of observations of syntax implementation using the STAD cooperative learning model at meetings I and II reached an average of 92. These data indicate that the stages of learning with the STAD

cooperative learning model carried out by students worked very well. Learning in this research is in accordance with the lesson plan at the first meeting and the second meeting.

2. Student Learning Outcomes after Learning Using the STAD Cooperative Learning Model

Data recapitulation of students' posttest results after learning using cooperative learning models. The following is presented the data from the posttest results.

Tabel 4. Ketuntasan Siswa setelah Pembelajaran dengan Menggunakan Model Pembelajaran Kooperatif STAD

Students no-	Score	Information
01	80	Complete
02	100	Complete
03	80	Complete
04	90	Complete
05	90	Complete
06	70	Not complete
07	80	Complete
08	80	Complete
09	90	Complete
10	90	Complete
11	90	Complete
12	80	Complete
13	80	Complete
14	60	Not complete
15	90	Complete
16	70	Not complete
17	90	Complete
18	90	Complete
19	70	Not complete
20	60	Not complete
21	70	Not complete
22	90	Complete
23	80	Complete
24	90	Complete
25	80	Complete
26	80	Complete
27	70	Not complete
28	90	Complete
29	90	Complete
30	90	Complete

Information:
*Complete if score ≥ 77 (Minimum Completeness Criteria of Science subject in SMP Negeri 3 Jombang)

Table 4. shows that student learning outcomes reached an average of 77 based on the posttest results. Based on Table 4 of 30 students who did the posttest, there were 77% of students whose scores reached the KKM and there were 23% of students whose scores had not reached completeness. According to the data above, this completeness is triggered because 77% of students are active and enthusiastic in learning.

Based on student completeness data, it is known that 23% of students did not complete the learning outcome test. Some students who do not complete the posttest are because these students still need a more approach to be able to accept learning and have good discussions through learning activities in teams. This can be seen from the implementation of the syntax does not follow all the stages of the STAD cooperative learning model properly. There are only a few indicators of the implementation of the syntax that they do so that they have an impact on student learning outcomes

Based on the results of the research, learning using the STAD cooperative learning model has realized the completeness of learning outcomes, namely 77% with KKM 77. This is in line with research conducted by

Prastiti (2017) which shows that most student learning outcomes are complete well. The following shows the completeness of the learning indicators.

Tabel 5. Completeness of Learning Indicators

No	Learing Indicators	Problem Indicators	*Posttest*		
			QIC	CLI	Crt
1.	Explain the meaning of vibration.	Students can explain the meaning of vibration.	100	100	T
2.	Identify the vibration components.	Students can determine the components of the vibration.	67		
		Students can determine the components of the vibration.	90		TT
		Students can determine the amplitude of the pendulum vibration.	10	56	
3.	Identify the effect of the length of the rope on the period of vibration.	Students can determine the effect of rope length on the size of the period.	73	73	TT
4.	Explain the meaning of waves.	Students can explain the meaning of transverse waves.	100	100	T
5.	Identify the wave component.	Students can identify the hills and troughs of the waves.	100		T
		Students can identify wavelengths	93	96,5	
6.	Identify the difference between the direction of the vibration and the direction of propagation of transverse and longitudinal waves.	Students can distinguish the direction of the vibration and the direction of propagation of transverse and longitudinal waves.	97		T
		Students can determine the difference between transverse and longitudinal waves	90	93,5	
		Average		**86,5**	**-**

Information:
*Complete if KIP (%) ≥77 (Minimum Completeness Criteria of Science subject in SMP Negeri 3 Jombang)
Crt : Criteria
QIC : Question Indicator Completeness
CLI : Completeness of Learning Indicators

There are 6 learning indicators that are measured through the posttest achievement. Of the 6 indicators, there are 4 indicators of complete learning with completeness in an average range of 90-100.The completeness of this indicator is due to the delivery of material regarding the meaning of vibration, understanding of waves, wave components, and differences in the direction of vibrations and the direction of propagation of transverse and longitudinal waves. students look enthusiastic in learning the material. The results of the posstest regarding these indicators the average student answered correctly with an average score of 96.

Of the 6 learning indicators, there are 2 indicators of incomplete learning. Incomplete question indicators and learning indicators are due to learning time in mastering the material quickly. Thus, there are question indicators with completeness values of 40% and 6% that fall into the criteria that are not in line with expectations. Theoretically, the implementation of cooperative learning, including STAD, is directed at achieving higher-order thinking skills. High order thinking skills require habituation to solve reasoning problems in the long term (Yuana, 2018).

CONCLUSION

Based on the results of the research that has been carried out, it can be concluded as follows: (1) Syntax implementation in learning using the STAD cooperative learning model on the Vibration and Wave material at the first and second meetings reaches an average percentage of 92 with a very good category. (2) Student learning outcomes by applying the STAD cooperative learning model on the Vibration and Waves material

reached an average of 77 while the completeness of the learning indicators reached an average of 86.5 so that they were categorized as complete.

Based on the above conclusions, the suggestions put forward in this study are: The implementation of learning can be achieved maximally with the teacher's strategy of applying the STAD cooperative learning model as an alternative learning model, because the results of this study show very good criteria; The role of the teacher is very influential in supporting complete learning outcomes properly. Students who do not complete the posttest are because these students still need a more approach to be actively involved and have good discussions through learning activities in teams. STAD cooperative learning model requires special abilities from teachers, therefore teachers are required to be able to act as facilitators, mediators, motivators, and evaluators properly; Researchers should consider things to minimize the limitations of the study, such as when the group division of students is still not used to groups with friends determined by the teacher so that students must be a little forced and monitored to join the group members that have been determined. The teacher should often warn students not to leave the group and return with their daily group.

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