EFFORTS TO IMPROVE MATH LEARNING STUDENT ACTIVITIES BY COOPERATIVE LEARNING MODEL OF STUDENT TEAMS ACHIEVEMENT DIVISION IN THE TOPIC CUBE AND BEAM IN CLASS VIII JUNIOR HIGH SCHOOL

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Abstract

This research aims to determine the increased activity of students in the topic cubea nd beam after applied cooperative learning model Student Teams Achievement Division (STAD) in class VIII Junior High School. This type of research is the Classroom Action Research. The research instrument used is the observation sheet and questionnaire. The result showed that activity of students in the first cycle has not met the ideal category because percentage of the activity students discuss/ask among students and between students and teachers do not meet the tolerance limit Percentage Ideal time only 14.66% and 6.53% (total 21.19%) of the available time while the ideal is around 25% -35%. In the second cycle of activity students discuss/ask among students and between students and teachers already meet the limits of tolerance PWI is 22.06% and 6.25% (total 28.31%). The number of students who meet PWI tolerance limits for each activity also increased from the first cycle to the second cycle to more than 50% in each activity criteria. Thus, it can be concluded that the cooperative learning model Student Teams Achievement Division can improve students' mathematics learning activities.

Keywords: Learning activities, Learning Model.

A. INTRODUCTION

Education can increase the human resources to develop all the potential of a person so that education becomes the primary means of which needs to be managed systematically and consistently through the learning process. However, in reality education in Indonesia has not been as expected, because the institutions have not been able to produce a Human Resources (HR) quality. It can be seen from the low value of the results of the national exams, especially the value of mathematic.

To show that student master mathematics is characterized by learning and studying mathematics good results. The presumption of students that math is a difficult subject certainly reduce the interest of students to learn math, so it will affect the results of students' mathematics learning. In the process of learning, the activity is needed because in principle the study is done. Do to change the behavior into activities. There is no learning if there is no activity. If the activity is low, will affect student learning outcomes in mathematics. As is stated Falah (2012: 5) that There are several factors causing low yields studied mathematics, among others, (1) teachers who are still using conventional methods, ie learning is centered on the teacher, (2) learning of mathematics that is verbal,

meaning that in explain the absence of concrete examples, (3) the student did not master math material, so that the activity of students in the classroom to be passive.

Things like this can be seen from the observation of teaching and learning mathematics by researchers in one class VIII in the field by observing the time students do learning activities. Mathematics learning activity is dominated by the activity of listening to / pay attention to the teacher's explanation, namely 51.12% of the time available and exceeds the specified tolerance limits, namely 20%   *PWI*   30%, followed by activities that are not in accordance with KBM like talking / chatting among these students exceeds the specified tolerance limits, namely 10.75% of the available time where tolerance limits are set only 0%   *PWI*   5%. While the explanation writing activity of teachers / friends, solve a problem by 33.5% of the time available, the activity discuss / ask among students is only 2.13% of the available time, the activity of asking / answering questions teachers are also low at 1.75% of the time available. This indicates that the learning activities of students in the class is still dominated by a passive activity. Lack of student learning activities like these, of course, will not result in maximum learning outcomes.

Cube and Beams is one of the range of material taught in class VIII JHS in Semester, cubes and beams of matter is not a new material for students because it has been taught and learned at the elementary level. However, based on the results of tests conducted by researchers of the 35 students in one class VIII junior high school in Medan through tests in the form of questions about cubes and beams, there are still many students who have not been able to resolve the problem properly. For example for a matter of understanding the elements on the cube, only 15 students or 42.86% of the students who were able to mention the diagonal elements. This shows that there is an obstacle that occurs in learning the material cubes and beams, which is one of them because of the extent of student learning is only able to remember or memorize without understanding of the material and also showed that the activity of students in the learning of mathematics is still low. Therefore, the need for a model of learning that students can play an active part in the process of teaching and learning mathematics. Along with interviews conducted by researchers with one of the teachers of mathematics in school is that the teacher of mathematics in general to teach the material cubes and beams using direct instructional model in the form of delivery of content through lectures, exercises, giving the tasks with the demonstration of a very minimal due to lack of means and infrastructure in the school.

These conditions indicate that the learning model used is still centered on the teacher and student activity is still low. One model of learning that is expected to involve

students actively is a model of group learning (cooperative learning) where students are expected to work together and interact socially while learning takes place. One form of cooperative learning model is a model of cooperative learning *Student Teams Achievement Division* (STAD) which is a learning model that is considered appropriate to teach mathematics. Slavin (2005: 144) says that in STAD Teams consist of four or five students representing all parts of the class in terms of academic performance, gender, race, and ethnicity. The main function of this team is to ensure that all team members to really learn and more specifically, is to prepare its members to be the quiz properly. Thus, the model type STAD cooperative learning requires the participation of all students actively in group discussions where students will realize that they have to actually pay full attention during the learning process, because then it will be very helpful in determining the value of the group.

B. RESEARCH METHOD

This research was conducted in class VIII JHS with the number of students 35 students. Implementation is done with 2 cycles and each cycle consisting of three meetings by following the class penelitiantindakan stages: planning, implementation, observation, and reflection.

Observations conducted in conjunction with the implementation of the action. Observations of the students and the observations of the researcher as a teacher. Observations carried out during the learning process, namely for 80 minutes (2 x 40 minutes). Observation of the student performed by three observers to see the ideal time students in doing mathematics learning activities with STAD cooperative learning. Observation of the teacher in this case is the research conducted by one of the teachers of Mathematics in schools to provide input to the ongoing learning by observing teachers in managing learning. The researcher selects the entire data obtained from observation sheets and questionnaires and then analyzed through several stages, namely data reduction, exposure data, and drawing conclusions.

Data observation results have been obtained, analyzed by describing the student activity during learning activities take place. The steps used to find the average frequency and the average percentage of time that students use during learning activities take place, Sinaga (2007: 170):

a. Results of observation of student activity at one time is determined freku ensinya meeting, then determined the average frequency of activity of each member of the group category of each meeting within one cycle.

b. Looking for the average percentage frequency of each activity category by dividing the average frequency for each category of activity with a lot of frequency of observations at each meeting and the results of the division multiply by 100%. Subsequently searched the average percent of time in every meeting at every cycle and incorporated into the average column percent available.

The criteria for determining the percentage of time the attainment of the ideal student and teacher activities are presented in Table 3.4. following.

Table 1. Ideal Time Achievement Criteria Student Activities

No	Student Activity	Ideal Time	Limit of Toleransce (PWI)	Criteria
1.	Listening / pay attention to the teacher's explanation / friend.	25% of WT	$20\% \leq PWI \leq 30\%$	Four of 1, 2, 3, 4, 5, 6 met and 3, 4 must be met
2.	Reading Student Activity Sheet (LAS), student book or source of subjects relevant to the subject matter.	15% of WT	$10\% \leq PWI \leq 20\%$	
3.	Write / record the teacher's explanation / friends, doing LAS / resolve problems.	30% of WT	$25\% \leq PWI \leq 35\%$	
4.	Discuss / ask between students and discuss / ask between students and teachers.	30% of WT	$25\% \leq PWI \leq 35\%$	
5.	Talking / chatting between students in groups outside the task (behavior is not in accordance with KBM individually).	0%WT	$0\% \leq PWI \leq 5\%$	

Source: Adapted from Sinaga (2007: 169)

From the observations that have been made against the teacher (researcher) conducted analyzing by using the formula:

$$Average\ Score\ (TKG) = \frac{Total\ Score}{Many\ Aspect\ Assessed}$$

Description: TKG = Level Teachers Manage Learning Ability. Furthermore, the average score (TKG) was referred to the interval determining the level of the teacher's ability to manage learning model type STAD cooperative learning as follows:

$1 \leq TKG < 2$ (Bad)

$2 \leq TKG < 3$ (Average)

$3 \leq TKG < 4$ (Good)

$TKG = 4$ (Great)

Source : Sinaga (2007: 171)

Criteria stated the teacher is able to manage learning well is the level of achievement of the teacher's ability to manage the learning of at least good enough.

Furthermore, student questionnaire responses also used in this study to determine the response of students to mathematics learning activities by implementing cooperative learning model type STAD. Results of student questionnaire responses were analyzed by percentage of each of the students' answers, degan using the formula:

$$P = \frac{A}{B} x\ 100\%$$

Where : P = Percentage of stundent' respons

A = The proportion of students who choose

B = Number of students (respondents)

Source: Trianto (2011: 243)

To state the number of students who responded, then used the percentage of students interpretation as shown in table 3.5. following.

Table 2. Percentage interpretation Student Response

Percentage of Student's Respons	Interpretation
0%	Nothing
1% − 25%	Fraction
26% − 49%	Almost Half
50%	Half
51% − 75%	Most of the
76% − 99%	Almost Entirely
100%	Wholly

Sumber: Azwar (dalam Yera : 2013)

The response of students to cooperative learning model type STAD provide interpretation at least 51%.

C. RESEARCH RESULT

Result Cycle I

cycle I study carried out on 21, 22 and May 26, 2014 during a 6-hour lesson. Before the implementation of the action prior penliti make preparations to be used in the implementation of measures that make lesson plans, create research instruments that observation of student activity sheets, observation sheets learning management and student questionnaire responses.

Based on observations during the course of the first cycle of learning using cooperative learning model type I *Student Teams Achievement Division* has shown better results as shown in Table 4.3. following.

Table 4. Calculation of Average Percentage of Time Student Activity Cycle I

Category Activity	Meeting (%)		Average Percentage (%)		Limit of Tolerance (PWI)	Ideal Time (%)	The Number of Student
	I	II					
1	30,88	28,94	29,91		$20\% \le$ PWI) $PWI \le 30\%$	25	14
2	14,44	16,62	15,53		$10\% \le$ $PWI \le 30\%$ $PWI \le 20\%$	15	25
3	29,62	29,81	29,71		$25\% \le$ $PWI \le 30\%$ $PWI \le 20\%$ $PWI \le 35\%$	30	20
4	13,06	16,25	14,66	21,19	$25\% \le$ $PWI \le 35\%$	30	12
	8,06	5	6,53		$PWI \le 35\%$		
5	3,94	3,38	3,66		$0\% \le$ $PWI \le 35\%$ $PWI \le 5\%$	0	24

Thus, it can be concluded that the students' learning activities can not be said to be ideal for student learning activities can be said to be ideal if three of the five criteria such activities are filled with the requirements of that category of activity to write / record the teacher's explanation / friends, activity discuss / ask between students and discuss / asks between students and teachers (3 and 4) must be fulfilled in accordance with the tolerance limit of the percentage of the ideal time (PWI) that have been defined.

Having carried out the act of learning consisting of two meetings in one cycle, researchers identified the problems found during the study. Based on observations and questionnaires during the study, the researchers described several things that need to be considered by researchers to be a material improvement for the next cycle, namely:

1. Researchers as teachers still need to improve in this aspect of providing motivation and encouragement to students as well as aspects of organizing students into study groups.
2. Students who are active are still dominated by the same people in a meeting one and two.
3. T otal students who meet the average percentage of time the activity in accordance with the tolerance limit (PWI) which has been set needs to be upgraded to the category of activity to listen to / pay attention to the teacher's explanation / ask friends and activities between students and discuss / ask the teacher.
4. Learning activities of students have not reached the ideal category for discussion activity / asks between students and discuss / asked the teacher not meet the tolerance limit of the percentage of the ideal time (PWI) that have been defined, while the activity is one of the conditions of student learning activity the criteria that must be met.

5. Passive activities such as listening activity / pay attention to the teacher's explanation / friends and activities that are not relevant to the learning already meet the defined tolerance limits, but should be taken in order to reduce the average percentage of time the activity of at least closer to the ideal time.

6. Interpretation of students to cooperative learning model *Student Teams Achievement Division* (STAD) is still less than 51% which is only 46.5%, this is because students are still not used to learning mathematics in groups.

Based on these reflections, the study should be carried out repairs, or in other words, this study should proceed to the second cycle to take some action to rectify any shortcomings found in the first cycle, namely:

1. Provide motivation and encouragement to students, among others by giving awards a prize to the best teams and students who are active so that other students are encouraged to be more and more active and better in mastering the material. Because according to Slavin (2005: 11) that "if the students are rewarded for pass better than what they did before, they will be more motivated to try .."

2. Doing turnover of the group by combining the good students in the activity discuss / ask among students with students who are less well in such activity, student academic performance in both the quiz individuals but lacking in social skills or learning more individually with students who are weak academic achievement , Based on the experience of a teacher is Georgiann (in Slavin, 2005) that the cooperative learning help students like to learn about the importance of interpersonal skills and academic ability in which high-achieving students will help lower achievement. This would increase the average percentage of time the activity discuss / ask among friends increases the number of students who meet the ideal category will increase.

3. Optimizing questioning (ask) and more engage students in learning, especially to students who are less active in the activity discuss / ask teachers so that students have many opportunities to express their opinions. Based on the experience Khairida (2014: 68) that "... teacher optimize questioning (asking) so that students more opportunities to respond to questions submitted by teachers and the opportunity to give an opinion or respond to students who are less active without compromising students already active.." This would increase the average percentage of time the activity discuss / ask between students and teachers and can reduce student doing passive activities.

Result Cycle II

Actions taken in the second cycle is not too different from the first cycle, only the emphasis on aspects of the present information, provide motivation and encouragement to students and guide students in study groups.

Based on observations during the course of the second cycle of learning using cooperative learning model type *Student Teams Achievement Division* has been no increase in the activity of students and already mecapai successful as expected where the average percentage of time the activity of students achieving ideal categories and an increase in some categories of activity, as shown in Table 5. following.

Table 5. Calculation of Average Percentage of Time Student Activity Cycle II

Category Activity	Meeting(%)		Average Percentage (%)		Limit of Tolerance (PWI)		The number of Stundet
	IV	V					
1	23,56	29,13	26,34		$20\% \leq$ PWI $\leq 30\%$		23
2	16,44	12,12	14,28		$10\% \leq$ $PWI \leq 30\%$ / $\leq 20\%$		22
3	26,44	33,75	30,1		$25\% \leq$ $PWI \leq 30\%$ / $PWI \leq 20\%$ / $PWI \leq 35\%$		21
4	24,31	19,81	22,06	28,31	$25\% \leq$ $\dfrac{PWI \leq 35\%}{PWI \leq 35\%}$		24
	8,19	4,31	6,25				
5	1,06	0,88	0,97		$0\% \leq$ $PWI \leq 35\%$ / $PWI \leq 5\%$		32

Thus, it can be concluded that the learning activities of students in the learning process in this second cycle has met the ideal criteria. This is evident from the category of activity to write / record the teacher's explanation / friends, activity discuss / ask between students and discuss / ask between students and teachers (3 and 4) have been met and one of the categories of other activities have also been fulfilled in accordance with the percentage of time the ideal that have been defined.

Based on observations and questionnaires during the study, the researchers described the reflection in the implementation of the action on the second cycle, namely:

1. Peneiliti weaknesses as teachers in managing the learning cycle I, among others, in the aspect of providing motivation and encouragement to students as well as aspects of organizing students into learning groups have been able to overcome. It is shown from the increase in the average scores obtained in the first cycle is 3.4 to 3.86 in the second cycle.

2. Students were more confident to ask questions and express their opinions to teachers and friends.

3. Yes aktivitasn students who do not meet the ideal category has begun to participate in their respective groups to be more active.

4. Learning activities of students have reached the ideal category for activity discuss / ask between students and discuss / ask between students and teachers already meet the limits of tolerance percentage ideal time (PWI) is set, that is equal to 28.31%.

5. The average percentage of time there is increased activity in the sense of getting closer to the ideal predefined time.

6. The number of students who meet the average percentage of time the activity in accordance with the tolerance limit (PWI) which is set to increase in the category of activity to listen to / pay attention to the teacher's explanation / ask friends and activities between students and discuss / ask between students and teachers.

7. Passive activity is activity listen / pay attention to the teacher's explanation / her friends and activities that are not relevant to the learning has decreased and approached the ideal time is 26.24% and 0.97% of the available time.

8. Interpretation of students to cooperative learning model *Student Teams Achievement Division* (STAD) was more than 51% which is 51.37% with the response most students feel happy and agree STAD learning model applied in learning mathematics.

Implementation of learning in this second cycle, showed an increase in students' mathematics learning activities. The purpose of the application of cooperative learning model *Student Teams Achievement Division* is to improve students' mathematics learning activity has been reached, then the action does not need to proceed to the next cycle, in other words the action can be stopped on the second cycle.

D. DISCUSSION

Based on this research, early learning activities of students prior to the action yet in the ideal category and learning is still dominated by a passive activity where the percentage of time the activity of attention / listening to the teacher / friend for 51.12% of the total time available and activities to do things irrelevant 10.75% of the total time available. While the percentage of active time activities such as reading a book, discuss / ask between students and teachers is still far from ideal time percentage tolerance limit (PWI) that have been defined.

After giving the action through cooperative learning model *Student Teams Achievement Division* in the first cycle showed that the students' learning activity has improved where activities passive no longer dominated learning, but the learning activities

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of students can not be said to be ideal because one of the requirements should ideally not be met and that the activities discussed / ask between students and discuss / ask between students and teachers in the amount of 14.66% and 6.53% (21.19%) of the total time available while ideally ranging from 25% to 35%. Passive activities have also been reduced, which is the percentage of time the activity of attention / listening to the teacher / friend increased to 29.91% of the total time available and activities to do things that are not relevant for 3.66% of the total time available.

Then, after a given action on the second cycle by the turn of the members of the group are heterogeneous in order to trigger an event to discuss / ask among students based on the quiz individual I and the liveliness of the students during the learning takes place on the first cycle in order to trigger the activity of the students, as well as optimizing questioning (ask) and more many engage students in learning, especially to students who are less active in the activity discuss / ask teachers so that students have many opportunities to express their opinions. In the second cycle this indicates that the learning activities of students already meet the ideal category because the requirements have been met is ideally three of the five criteria of the activity meets the tolerance limit predefined time. For a discussion activity / ask between students and discuss / ask between students and teachers has increased and has entered the PWI tolerance limit that has been set in the amount of 22.06% and 6.25% (28.31%) of the total time available in which ideally ranging from 25% to 35%. Activity attention / listening to the teacher / friend has also increased to 26.4% of the total time available and the activities of the students do things that are not relevant, namely to 0.97% of the available time in the learning process.

Based on these results, showing that it turns to action through cooperative learning model *Student Teams Achievement Division* in class VIII JHS on the material cube and beam can improve students' mathematics learning activities by implementing all phases of this learning model.

E. CONCLUSION AND SUGGESTION

Based on the results of research and discussion, it could be concluded that the learning activities of students in the first cycle has not met the ideal category as percentage of the activity students discuss / ask among students and between students and teachers do not meet the tolerance limits PWI (Percentage Ideal Time) is 14.66% and 6.53% (total 21.19%) of the available time while ideally is in the range of 25% to 35%. However, on the second cycle of activity students discuss / ask among students and between students and teachers already meet the limits of tolerance PWI is 22.06% and

6.25% (total 28.31%). Because all the criteria are met then the learning activities of students in the second cycle have met the ideal category. Furthermore, there is an increase in the average percentage of time learning activities of students from the first cycle to the second cycle, is evident from the average percentage of time that obtained in the second cycle closer to ideal time that has been set. The number of students who meet PWI tolerance limits for each activity also increased from the first cycle to the second cycle to more than 50% in each category of activity. Thus, it can be concluded that the cooperative learning model *Student Teams Achievement Division* can improve students' learning activities on the material cube and beam in class VIII JHS.

As for suggestions that can be submitted from this study are:

1. For math teachers, can use cooperative learning model type *Student Teams Achievement Division* in mathematics pa da subject matter cubes and beams.

2. For teachers who use cooperative learning model type *Student Teams Achievement Division* should optimize *questioning* (asking) with the aim that students have ample opportunity to express his opinion.

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