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The Implementation of Cooperative Learning with Jigsaw Type to Improve Student Learning Outcomes on Natural Science Subject

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Abstract

The aimed of this research is to know the result of student learning using jigsaw type cooperative learning. The research method used is classroom action research (PTK) with two research cycles. This research was conducted in SMP Negeri 16 Bekasi class VIII.4. The results of the test in the first cycle is still less satisfactory with the number of students who completed 19 people or approximately 41.30% with an average value reached 75, while the minimum Exhaustiveness Criteria (KKM) in the SMP is 78. Improvements made for the implementation of cycle II. The result is obtained as many as 40 students or approximately 78.26% with the average value is 82. The Cooperative learning type jigsaw can improve student learning outcomes in SMP Negeri 16 Bekasi class VIII.4.

Keywords: Learning outcomes, Cooperative Learning Type Jigsaw

INTRODUCTION

There is an old paradigm about Education which states that the learning process runs only in one direction, so that activities are dominated by teachers. As the result of one-way learning process is when the teacher is wrong in choosing a learning strategy, it affects the lack of motivation and student activeness so that the results of learning to be not maximal.

Based on the results of interviews with science teachers in SMP Negeri 16 Bekasi, student learning outcomes are less than the maximum. This is because the lack of motivation to learn students with learning methods that do not vary. In addition, other problems arise one of them with subjects of Natural Sciences (IPA). Science is a universal science that underpins the development of modern technology, has an important role in various disciplines and advance the human mind. Once the importance of building the ability to think science, then IPA is given to all students starting from elementary school known as saint lessons, it is introduced to equip students to have logical, analytical, systematic, critical, and creative thinking skills. From year to year until now, there are still many students who think that science is a difficult lesson and even frightening, thus making the interest of learning is very low like a person who lost before the game.

Teachers of science subjects class VIII SMPN 16 Bekasi complained that students have less attention to the lessons of science, and have difficulty in solving problems related to the material of Force and Pressure. One effort that can be done to improve student learning outcomes in learning is through variation of learning models. Selection of appropriate teaching methods will help students understand the subject matter of science.

Some learning concepts include; Active Learning, Contextual Teaching Learning and so on, which essentially offers a learning strategy that prioritizes student activity rather than teacher activity. It is for this purpose that teachers should have the courage to experiment with a model of teaching, create an inexpensive medium, or the application of a specific teaching strategy that can theoretically be accountable for solving learning problems.

Cooperative learning consists of various kinds, one of which is jigsaw type cooperative learning. Jigsaw type learning is a combination of two things: learning with the capabilities of each individual and group learning. The core in cooperative learning is the existence of positive cooperation and mutual help

between members of a group. With jigsaw type cooperative learning it is expected that students are happy and enthusiastic during the learning process, so that they can solve the problem (Sari, *et al*, 2016).

Jigsaw is a cooperative learning where students learn and work in small groups collaboratively whose members consist of 4 to 6 people with heterogeneous group structure. Furthermore, it is said also the success of learning each group depends on the ability and activities of group members both individually and as a group. Jigsaw type cooperative learning model is a learning type proposed by Slavin (2008). Jigsaw learning model is a theory of learning constructivism based on cognitive learning theory. In this case the role of educators only as facilitators and mediators in the learning process. Educators create enough conditions for a conducive learning environment for students.

Jigsaw type learning model has eight components. The eight components are as follows. (1) Teams, namely the formation of heterogeneous groups consisting of 5 to 6 students, (2) Placement Test, which is the provision of Pre-test to students or see the average student's daily values for teachers to know the weakness of students in certain areas, (3) Student Creative, performs tasks within a group by creating situations where individual success is determined or influenced by the success of the group, (4) Team Study, the learning stages to be undertaken by groups and teachers providing individual assistance to students in need, Team Scores and Team Recognition, which is scoring of group work results and awarding criteria to the group that succeeded brilliantly and the group considered less successful in completing the task, (6) Teaching Group, which is a brief presentation by teachers ahead of group assignment , (7) Fact Test, which is the implementation of small tasks based on the fact that in earn students, and (8) Whole Class Units, which is the giving of the material by the teacher back at the end of the lesson with the problem-solving strategy.

METHOD

This research includes classroom action research (PTK), This research was conducted in SMP Negeri 16 Bekasi. The research starts from September 2013 to November 2013 in class VIII.4.

The instruments used in this research are:

1. Observation sheet, to obtain data about the condition of jigsaw type cooperative learning model implementation in class.

2. Test the results of learning, to obtain data about student achievement after applied model of cooperative learning type jigsaw previously validated by experts.

To make things easier in troubleshooting, there are several factors investigated:

1. Student factors, see or pay attention to the activity and ability of students in learning;
2. Teachers factor, see or pay attention to the teacher in presenting the technical subject matter used in applying jigsaw type cooperative learning model correctly (assessed by observer).
3. Lesson materials factor, see the source or lesson materials used whether to support the implementation of learning models that are applied and in accordance with the objectives to be achieved.

This classroom action research procedure, planned to consist of 2 cycles. Each cycle is carried out in accordance with the changes to be achieved as to what has been designed in the factor under investigation. In detail the classroom action research procedure is described as follows:

1. Initial activity phase, including:
   a. Pre-observation
   b. Initial test: to find out the students' early ability to understand the concept of Force and Pressure in action, it will be used as the initial value needed in group division through jigsaw type cooperative learning. In addition, it is necessary in processing the value of improving student achievement through jigsaw type cooperative learning.
2. Planning, as for the activities undertaken in this stage include:
   a. Create a lesson plan
   b. Create an observation sheet to see the condition of classroom teaching when a jigsaw cooperative learning model is applied
   c. Design an evaluation tool to see if the science material has been mastered by the students
   d. Create a reflexology journal
3. Implementation of actions, activities undertaken in this stage is to implement the learning scenario that has been made
4. Observation / evaluation, at this stage conducted observations on the implementation of action and evaluate
5. Reflection of results obtained in the observation / evaluation stage is collected and analyzed in this stage.

6. Weaknesses that occur in each cycle will be fixed in the next cycle.
7. Data sources: data sources in this study were research personnel consisting of students and teachers.
8. Data type: data type in this research is qualitative and quantitative data. Qualitative data were obtained by means of evaluation observation sheet, self-reflection journal and data quantitatively obtained by means of evaluation of learning outcomes.
9. Data on the implementation of learning and changes that are classed in the class, taken based on direct observation using observation sheets and reflexology journal.
10. Data on student learning outcomes is taken through the results of the learning test each cycle.

RESULT AND DISCUSSION

The researcher conducted preliminary observations and brief interviews with science fellow science teachers class VIII.4 SMP Negeri 16 Bekasi. The result of observation shows that the result of science learning of students especially for class VIII.4 is still low and the learning model used is conventional learning model. Based on these results, it was decided to apply jigsaw type cooperative learning model in teaching the subject of Force and Pressure in class VIII.4. On September 2, 2013, a preliminary test was held on Grade VIII.4 students to find out the students' early abilities on Force and Pressure materials. Initial test scores used as a reference to know the improvement of science learning outcomes of students of grade VIII.4 SMP Negeri 16 Bekasi after applied jigsaw cooperative learning model type. The initial test questions were material related to the subject. From the results of the preliminary tests it is seen that students who score more than or equal to 80 reached 15.22% (7 students) with an average value of 68 This suggests that students' science learning achievement is still relatively low.

Cycle I

a. Planning

Once set out to apply jigsaw type cooperative learning model in teaching the subject matter of Science and Pressure, then the next activity is to prepare some things that are needed at the time of implementation of the action, the author do the following:

1. Make a learning plan for action cycle I

2. The observation sheet of the students during the implementation of the learning process in the class
3. Make Student Worksheet (LKS)
4. Create an evaluation tool for the first cycle action test
5. Create a journal for reflexology.

b. Implementation of Action

At this stage, learning activities with jigsaw type cooperative learning model are implemented in accordance with the prepared learning plan.

c. Observation

Furthermore, each group is disseminated to learn in another group with each group member having to master different material for later returning group of origin to be conveyed to the members of the group distributed LKS to be discussed with the members of the group, the teacher gives guidance to the students in the group especially the group who have difficulty in solve problems in LKS. The next activity is the students are asked to present their group work in front of the class and students in other groups pay attention and compare with their work.

The results of observations on teachers show the following:

1. Teachers lack motivation and perception.
2. Teacher explains the purpose of learning
3. Teacher organizes students in 8 study groups and each group consists of 5-6 people
4. Teachers do not equally provide guidance to each group
5. Teachers prepare LKS as a tool in learning.
6. Teachers have not been able to manage time well, consequently there are stages in learning scenarios that are not implemented because of time out.

The result of the observation on the students shows the following things:

1) At the first meeting the students are still rigid in their group
2) There are still many students who are less active in solving problems that exist in the LKS has been given
3) Some students still hesitate to express their opinions
4) Only a few students are able to present the work of the group and there are students who feel nervous when the number is called to present the results team work

d. Evaluation

The results of the first cycle test showed that an increase compared to the initial test result of 15.22% (7 students) scored 80 on the initial test and increased to 41.30% (19 students) the score above the KKM Although the test results cycle I showed an increase, but because it has not reached the indicator of success then the research continued on cycle II.

e. Reflection

1) Analysis of the observations is used as a material to determine the next action. The presence of the observer affects the performance of the teacher so that it becomes awkward and the classroom atmosphere is rather rigid, this is apparent when the teacher gives an explanation, the volume is less clear and the movement is less flexible.
2) Jigsaw type cooperative learning model is considered new for the individual teachers of science subjects, so the teacher does not equally provide guidance to each groups / individual.

Cycle II

1. Teachers should motivate students to learn that students are more passionate in learning science and teachers should give perceptions.
2. Teachers should be assertive by rebuking / sanctioning the students who do not pay attention to the teacher's explanation and who are unwilling to cooperate with the group's friends.
3. Teachers should always give the widest opportunity to the students to ask things that are not understood.

Teachers must be able to manage time efficiently so that all the stages of activity in the lesson plan can be accomplished. Observation result of student showed that:

1. Students pay close attention to explanations teacher
2. Some students have dared to ask the unintelligible things that have to do with the material that is taught.

Most of the students have been able to present their group results. The results of the second cycle test showed an increase in learning achievement of science students compared to the first cycle of 41.30% of students who have obtained the value of 80 in the first cycle increased to 78.26% students have obtained value 80 in cycle II. The reflection activities carried out in the second cycle of action showed encouraging results for both subject teachers and for observers.

Observations made by observers indicate that learning by using Jigsaw type cooperative learning model has got better results, although there are still some students who have not been able to express opinions, but the students are actively involved in implementing the task group.

When viewed from the results of the test on the evaluation of the implementation of action cycle II, that has reached 78.26% of students who have scored 80 or in other words has achieved success indicators, then this research has been successfully implemented according to the plan of implementation of research with three cycles of action. Implementation of Jigsaw Cooperative Learning Model for Improving Problem Solving Abilities is as follows:

Before the Jigsaw type cooperative learning, several instruments were formulated: Learning Implementation Plan (RPP), reading assignment questions, expert sheet questions, final evaluation of the cycle and student activity sheet. To improve students' learning outcomes in cooperative learning type Jigsaw done giving a problem that aims to improve thinking and examine the problem. These questions are given prior to the implementation of classroom learning, which is homework, when students discuss group in class and during final test cycle. The questions given in the step are a matter of description. Activity sheets are used to measure students' affective learning outcomes during the learning process student activeness, students' cognitive learning outcomes are also observed. Observations are used as an indicator of student cognitive learning outcomes in a classical and done after the learning is complete. Efforts made teachers to improve student learning outcomes is to seek the provision of questions in accordance with learning to use language that is easy to understand students and its content was adjusted to the material being studied. Students are also always reminded to do the reading task so that before the implementation of learning students already have initial knowledge. During the discussion, the students were also briefed by the teacher. If during the discussion students are busy with activities that are not related to the discussion then the students are reminded by the teacher to return to discuss well.

To know the description of the percentage of students' learning ability as students' cognitive abilities

can be seen in Table 1. The results of the next cycle that is done at each end of the cycle obtained a significant increase of students' cognitive learning outcomes from cycle to cycle. The ability to answer questions that are the result of cognitive learning has improved after applying Jigsaw cooperative learning model type and fulfilling the success indicator.

Table 1 the cognitive of students grade VIII.4

No	Information	After action	
		Cycle I	Cycle II
1	High	82	95
2	score	58	75
3	low	68	79
4	score		
	Average	41,30	78,26
	KKM		

Table 1 shows the cognitive value of students after being treated using jigsaw type cooperative learning has increased. The use of discussion in small groups has proven to improve the quality of student learning. This is in accordance with the opinion of Dimyati and Mudjiono (1994) that one of the goals of teaching on the small group is to develop problem-solving skills rationally supported by Slavin's (2008) opinion which states that children of the same age will be easier to work with. The success of Jigsaw type of cooperative learning to improve problem solving skills is also supported by Perkins's (2001) opinion which suggests that Jigsaw type cooperative learning techniques can help students understand problem-solving procedures, make learning more efficient, and improve students' learning experience. To know the description of percentage affective ability of students can be seen in Table 2.

Table 2 The Affective of Students

No	Information	After action	
		Cycle I	Cycle II
1	High	80	90
2	score	55	75
3	low score	70	82
4	Average	70,78	93,6

Student's affective learning outcomes are activities undertaken by students during the learning process to achieve learning outcomes. Student activity observed in material learning process using Jigsaw type cooperative learning model that is: doing reading task, active role in group discussion by asking and giving opinion, and doing presentation with in group. The task of reading is important in this study because by doing the reading task, the students get the initial knowledge before the learning so that the learning goes smoothly. Based on the results of research Garderen (2004) states that students are encouraged to read more to improve understanding skills. All the affective learning outcomes in each cycle are increased.

Observation of teacher performance aims to know the

performance or ability of teachers in implementing the learning process. Observation the performance of teachers is done because the teacher is an important component in supporting the success of learning activities. The teacher is in charge of organizing and controlling the life of the class. Ways and strategies teachers implement the learning process is very influential on the success of learning activities. Referring to the opinion by Dimyati & Mudjiono (1994) which states that the adjustment of learning model that is adjusted to the condition of students, learning materials, and school conditions, it can improve the quality of learning outcomes. Teachers also function as informatory (convey knowledge or convey material). Motivator (student motivation), and facilitator (providing facilities or way out if students have difficulty during learning process). Teachers are also required for learning to create a fun atmosphere, livelier learning, and less tension. With the situation, the students become more active to ask questions, argue, and discuss. Durori (2002) states that active, creative, and fun learning activities can create a relaxed environment, not stressing students and achieving high success.

Observation of teacher performance is done every type Jigsaw cooperative learning. Observation of teacher's performance involves delivering appreciation materials, conveying goals and motivating students, delivering materials or information, using teaching tools or media, organizing students into groups, guiding working groups and learning, conducting assessments during teaching and learning, and drawing lessons.

CONCLUSION

Based on the results of research that has been implemented and described in the previous chapter, obtained an increase in learning outcomes of science students using jigsaw type cooperative learning model of the subject of Force and Pressure.

SUGGESTIONS

Suggestions that can be submitted from the results of this study include; Teachers can use Jigsaw type cooperative learning model as a consideration to remind students' learning ability, teachers should be more skilled to organize students when group formation and discussion so that time for learning is more effective. The implementation of classroom learning should not only emphasize the cognitive and psychomotor aspects alone, but the affective aspect also needs to be carefully considered in order to improve and seek ways to improve the quality of teaching, and to develop regularly and

sustainably. In addition, teachers should be able to expand the research variables that can contribute to efforts to improve science learning outcomes, either through research with quantitative approach or qualitative approach.

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