
Improvement of Student Physics Learning Outcomes through Peer Tutor Learning Model of SMA 3 Bengkalis

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Abstract. This research was a classroom action research using a peer tutor learning model to improve physics learning outcomes. Peer tutor learning is a learning that utilizes classmates who have more ability to help their friends in carrying out an activity or understanding the concept of learning. The problem to be solved is the low physics learning outcomes of class XI IPA 3 in SMA 3 Bengkalis. This study consisted of three cycles, in each cycle consisting of four stages, namely Planning, Implementation, Observation and Reflection. This research involved 21 students which are consisting of 13 female students and 8 male students. In the pre-cycle process, the percentage of learning completeness was 19.05%, then after learning the first cycle using the peer tutoring model there was an increase in the percentage of learning completeness to 42.89%. In the second cycle, it increased again to 61.91% and in the third cycle, it succeeded in achieving the percentage of learning completeness of 85.71%. The results showed that an increase in student learning outcomes along with the application of peer tutoring models. Thus, the results of the study indicate that the use of peer tutoring models can improve the physics learning outcomes of XI IPA 3 students in SMA 3 Bengkalis.

Keyword: *Bengkalis, Learning outcome, Peer tutor learning model*

1. Introduction

The learning readiness, learning strategies and existing learning resources are a part to make learning success. Besides the teacher, the learning resources can be peers who are better at providing learning assistance to classmates in schools called peer tutors (Suherman, et al., 2003). In order to be effective in implementing peer tutoring, the teacher must make preparations from various aspects including choosing and training tutors who are responsible and formulating materials and tasks to be given (Clarkson et al., 2002). The peer tutoring system is conducted on the basis

that there is a group of students who are easier to ask, more open to their own friends than their teacher. When tutors provide assistance to other students in understanding especially in the concepts, they must be able to strengthen their understanding of these concepts well (Depaz et al., 2008). Another advantage of peer tutoring is able to reduce the gap occurs between low and high achievement student in a class. In addition, peer tutoring is also projected to motivate students in learning (Benware et al., 1984).

The low student learning outcomes are caused by various problems related to different backgrounds. The ability to solve questions among students in class XI IPA SMA 3Bengkalis experienced various problems related to the process and learning outcomes where the teaching and learning process took place in the condition of students who were less active and student learning outcomes were under the standard competence value (KKM) 65. Based on the results of daily tests, out of 21 students, only 4 students obtained complete grades (19.05%). The observation results identified that: (1) Students experienced difficulties in understanding the given material. (2) Students are not entirely able to complete the given task. (3) Learning outcomes for each exercise or assignment are not reached on time. (4) Lack of ability and courage in asking questions. (5) Students have a fairly high individual nature.

On the basis of this phenomenon, the author feels the need to conduct Classroom Action Research with the aim of describing whether the use of peer tutoring learning models can improve physics learning outcomes of students of class XI IPA SMA 3 Bengkalis.

According to Broukhous(cited by Azhar, 2008) physics learning is a lesson about natural events, which allows research by experiment, measurement of what is obtained, presentation mathematically and based on general regulatory rules. So physics learns about concepts, structures of events and natural events through experiments so that physics looks for relationships between concepts and structures of physics through reasoning which ultimately students can deduce their own learning outcomes.

According to Suyitno (2004), the learning model is a pattern or certain learning steps applied so that the goals or competencies of the learning outcomes that are expected to be fast can be achieved more effectively and efficiently. Peer tutors are part of cooperative learning. Cooperative learning is a group of teaching strategies that involve students working collaboratively to achieve common goals. Cooperative learning is a learning strategy that involves the participation of students in small groups to interact with each other (Nurulhayati, 2002). According to Edward (cited by Wardiyah, 2009) explaining peer tutoring is a learning model in which students teach other students. Hamalik (2004) mentioned also basically a peer group tutorial is to guide a group of students who comprise four to five

students at the same time. While Suherman, et al. (2003) said that the learning resources out of teachers are peers who are better at providing learning assistance to classmates in schools called peer tutors. Peer tutors not only establish effective and efficient communication and collaboration but also help develop teamwork and social aspects (Fuchs et al, 2000).

The procedures of the peer tutoring learning model according to Silberman (1996) are as follows: 1) Pre learning activities, namely a) selecting students who will become peer tutors. b) groups that become tutors are given an explanation first after school hours. 2) Implementation of learning, namely: a) teachers share heterogeneous peer group members. b) the teacher places each tutor into the group. c) the teacher explains the intent and purpose of the group division in the learning process that will be carried out. d) representatives from groups who become tutors explain the material learned to group members. e) the teacher gives assignments to each group while observing / guiding them. f) group representatives present the results of the discussion in front of the class and others respond. g) correcting the final results of the student's work and concluding the material described. h) giving rewards to the best groups.

Learning outcomes are abilities possessed by students after they receive learning experiences (Nana Sudjana, 1990). Furthermore Poerwodarminto (1991) explains the learning outcomes are the results that have been achieved after students receive teaching in a certain time. So student learning outcomes are the ultimate goals in learning that are tangible in student learning achievement, both attitudes, psychomotor and knowledge obtained based on learning experiences that result in a process of behavior change. The purpose of this study is to describe whether the use of peer tutoring learning models can improve physics learning outcomes of students of class XI IPA SMA 3 Bengkalis.

2. Methodology

This research was held in SMA 3 Bengkalis at class XI IPA 3 with totaling of 21 students which the class had the learning outcomes lower than other classes. The research was held for 3 months in 3 cycles and each cycle consisted of 2 meetings according to the four stages of each cycle (planning, action, observation and reflection). According to Arikunto (2006) classroom action research is an examination of learning activities in the form of an action that is deliberately raised and occurs in one class together. Furthermore, according to Arikunto (cited in Paizaluddin et al., 2010), the classroom action research procedure uses a minimum of two cycles, if the teacher is not satisfied then it can be proceed to the third cycle.

The Research Preparation was doing the following matter: (1) Preparing learning material. (2) Compiling instruments for the research. (3) Compiling lesson plans.

The data collection technique of this study used written test techniques and data collection instruments in the form of student worksheets (LKS) and student learning outcomes sheets (test sheets) and student assignments.

The data obtained were analyzed using descriptive analysis (analysis of completeness of student learning outcomes) aimed at showing mastery and completeness of student learning outcomes. The level of success of individual student learning for physics lessons in class XI IPA 3 was based on Minimum Completion Criteria (KKM), which were 65. While the completeness of learning outcomes in classical was 85%. The percentage of individual student mastery learning (KBSI) was calculated using a formula given by tim (2008)

$$KBSI = \frac{\text{Scores Obtained by Students}}{\text{MaximumScore}} \times 100 \%$$

While the Classical Student Learning Completion Percentage (KBSK) can be determined by the formula that is given by Depdiknas (2004):

$$KBSK = \frac{\sum \text{CompletionStudent}}{\sum \text{NumberofStudent}} \times 100 \%$$

3. Results and Discussion

Pre-cycle

Before carrying out the cycle, the researcher collected the list of student names and daily test scores (UH) students of class XI IPA 3 in the previous session. Evidently, from the results of daily tests, there were only 4 students (19.05%) who completed the minimum score (KKM 65). While 17 students (80.95%) did not complete.

Cycle I

Students do the initial test (pretest), after the teacher divides students into 5 groups where 4 groups have 4 members and 1 group consists of 5 students based on the number of students completing the previous test results, then the teacher distributes LKS, students discuss with the group to do or to learn the assignment from the LKS material given to each group. The teacher guides the discussion. At the meeting, 2 students continued the group discussion and the teacher re-explained the tutors' assignments in each

group. The teacher gives 15 minutes to discuss. The teacher always oversees the course of the discussion and helps those who find difficulties when completing the LKS. The teacher asks one of the groups to present the results of the discussion. The teacher gave a plus score to the group that responded. Students are guided to make conclusions. Then the teacher gives an evaluation question (Final Test) within 30 minutes. The results of the test are as given in Table 1:

Table 1. The Completeness of Cycle I Learning Outcomes

No	Learning Outcomes	Total	Percentage
1	Completed	9	42,86 %
2	Not Completed	12	57,14 %
	Total	21	100 %

Table 1 shows the number of students who have not finished learning has decreased, from 17 students (80.95%) to 12 students (57.14%). While students who have achieved mastery learning increase from 4 students (19.05%) to 9 students (42.86%). However, student learning outcomes are not as expected with the condition that there are still many students who have not finished learning. Therefore a second cycle is needed to improve student learning outcomes.

The results of student observations in learning, as follows: a) students are not accustomed to learning in groups, so that discussion in groups has not been seen alive. As a result, the implementation of physics learning with peer tutoring models has not been implemented properly. b) students are still afraid to ask questions or express opinions. c) students have not been able to maximize time in completing assignments. While the results of observing teacher activities, namely a) the teacher actively monitors the activities of students in the classroom by going around while students are group discussions. b) the teacher gives feedback to students to be more active. c) the teacher always gives the opportunity for students to ask questions, argue and comment. d) the teacher does not motivate students to learn.

From the results of observations of learning must be made corrective actions to improve learning outcomes, including: 1) trying better in motivating students to actively work on tasks together with groups or in discussions. 2) when learning takes place the teacher's view of the student is not only directed at one person, but thoroughly. 3) the formation of study groups needs to be overhauled because there are too many members so that in the discussion process delivered by tutors there are those who pay attention and some who do not focus. 4) improve the management of learning activities in the classroom.

Cycle II

The teacher divides students into 9 heterogeneous groups consisting of 2 groups of 3 students and 7 groups of 2 students. The number of groups is based on the number of students who completed the previous test (the final test of the first cycle) as well as being appointed as tutors. Students sit in their respective groups. Students have seen faster and no more fighting over places in their groups. The teacher distributes Student Worksheets (LKS) to each group. The teacher oversees the course of group discussions. After the group discussion ends, group representatives present the results of the discussion in front of the class and other groups respond to it. The teacher provides reinforcement and appreciation to students. Then the teacher informs how to learn well and gives assignments to be completed at home and reminds at the next meeting that a final test will be held in mastering the material. Then at the next meeting, the teacher asks one of the groups to present the results of their homework. Students have dared to appear to come to the front of the class to present the results of their assignments and then others respond. The teacher motivates students to learn and give rewards. Students and teachers conclude the material that has been learned. Then the teacher gives a question of evaluation. Students are given 30 minutes to work on evaluation questions.

Table 2. Completeness of Cycle II Learning Outcomes

No	Learning Outcomes	Total	Percentage
1	Completed	13	61,91 %
2	Not Completed	8	38,09 %
	Total	21	100 %

Table 2 shows the number of students who have not finished learning is 8 students (38.09%), while students who have achieved mastery in learning increase to 13 students (61.91%). The results of the observation / observation of the second cycle students were a) many students had dared to ask the teacher, in the second cycle there were 12 students who had begun to actively ask or express opinions and comment on the opinions of other students. b) student progress is indicated by their increased learning achievement. While the results of observations of teacher activities are a) as usual, the teacher always monitors student activities, checks and cares for students and encourages students to always be better than before. b) Teachers always motivate students to be active and not afraid to express opinions.

Based on the data obtained from the study, it was shown that in the second cycle the learning was good from the previous cycle. The target of increasing student learning outcomes is indicated by the average student learning outcomes 72.57 with classical learning completeness 61.91% have

been achieved in cycle II. However, this result is not as significant as expected, namely achieving classical completeness value (85%), so the teacher and observer decide to continue the third cycle.

Cycle III

The teacher divides students into 10 heterogeneous groups consisting of 1 group consisting of 3 students and 9 groups of 2 students. Determination of groups based on the results of evaluation (final test) cycle II which has a value above KKM (65) as many as 10 students. Students sit in their respective groups. Students look faster and no longer fight over each other in groups. Teachers share Student Worksheets (LKS) in each group. In each group there is one tutor who serves as group leader as well as tutor (instructor). The teacher oversees the course of group discussions and provides motivation and guides each group that has difficulty, especially tutors who have difficulty understanding the worksheet material provided. In addition, each observer meeting also pays attention to and assesses the learning process in the classroom both assessing the activities of the teacher as a researcher as well as the activities of the students. After each group representative presents his work, the teacher asks to complete the assignment at home final test (posttest). Next at meeting 2, after apperception, the teacher asks one of the groups to present the results of their assignments. In this cycle students or groups are brave and compete to appear first in front of the class to present the results of their discussion. Then another group responded. Then the teacher as the facilitator gives reinforcement and affirmation and gives rewards to the best groups. After the class discussion presentation is finished, the teacher makes a deeper explanation / explanation of the concept. Students understand and draw conclusions together. Then the teacher gives the final test evaluation questions and the test results are listed in the Table 3:

Table 3. Completeness of Cycle III Learning Outcomes

No	Learning Outcomes	Total	Percentage
1	Completed	18	87,71 %
2	Not Completed	3	14,29 %
	Total	21	100 %

Table 3 show fewer numbers of students who have not yet completed, namely as many as 3 students (14.29%), while students who have achieved completeness in learning are 18 students (85.71%). The conclusion of the learning process in the third cycle is the results of student learning tests that obtained KKM scores ≥ 65 as many as 18 students (85.71%) of 21 students in total. This is because the teacher in providing the material is good and repeats the learning if the students are not clear, guiding and motivating

students. Students are more active in the learning process because students are directly involved. Thus there is an increase from the pre cycle stage, cycle I, cycle II and cycle III. Therefore this action research was declared successful in improving student learning outcomes. The results of observing student activities in the third cycle are as follows: a) brave and active students ask questions, express opinions and comment on the opinions of other students. The classroom atmosphere comes alive in the discussion. b) the progress of students is getting better, indicated by the increase in their learning achievement through the final test of the learning cycle III process. While the results of observations of teacher activities are as follows: a) the teacher monitors the activities of students, pays attention / helps students and motivates students to be better and active in learning. b) the teacher always motivates students to be active in expressing opinions.

The target of increasing student learning outcomes is characterized by the average value of student learning outcomes in the class above the KKM (65) which is 84.10 with classical learning completeness 85.71% has been achieved in this cycle. So that it decided to no longer hold the next cycle. As a whole the results of the research that have begun from the pre-cycle stage, cycle I, cycle II and cycle III can be described in Table 4:

Table 4. Completeness of Learning Outcomes from Prasiklus until Cycle III

No	Learning Outcomes	Completed	Not Completed	% Completeness
1	Pra Cycle	4	17	19,05%
2	Cycle I	9	12	42,89%
3	Cycle II	13	8	61,91%
4	Cycle III	18	3	85,71%

Furthermore, to make it clearer about improving student learning outcomes from pre-cycle up to cycle III, it can be seen in the Figure 1.

Table 4 and Figure 1 show that before the implementation of learning by using peer tutors (pre cycle), the number of students who achieved completeness was 4 students or 19.05%. Then after learning using the peer tutor model there was an increase in learning outcomes in learning cycle I increased to 9 students (42.89%), the second cycle increased again to 13 students (61.91%) and in the third cycle increased to 18 students (85.71%). From these results it is known that learning using the Peer Tutor model significantly increases the percentage of mastery learning. This shows students' understanding in learning using peer tutoring models can improve student learning outcomes.

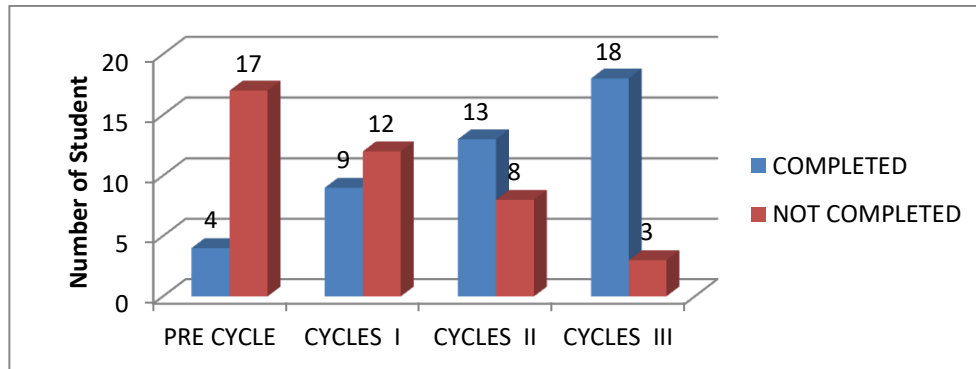


Figure 1. Pre-cycle Learning Results until Cycle III.

4. Conclusion

Based on the data description and research analysis, it can be concluded that physics learning using peer tutoring models can improve learning outcomes of students of class XI IPA 3 Bengkalis State High School 3. This is evidenced by the increase in the percentage of student learning completeness by increasing the final test value of each cycle. Although the problems faced in the application of peer tutoring, namely in preparing tutors require a lot of time and private time for students who become tutors outside school hours, but the teacher must really understand preparing the best possible learning, so that the material is delivered optimally and enrich the teaching variations, know learning models so that they can anticipate the saturation experienced by students in the learning process which in turn can improve student physics learning outcomes.

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