ICEE-2

Improving Observing and Communicating Skills Through the Implementation of Problem Based Instruction on Learning Biology in Senior High School

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Abstract. The purpose of this research is to improve observing and communicating skills of student on learning biology. The research was a Classroom Action Reasearch (CAR) that has been done in two cycles and each cycle consists of plan, action, observation, and reflection. The subjects of this research are 36 students of X grade. Data are obtained by observation, test, interview, and documentation. The analysis of this data use quantitative descriptive technique. The validity of data use technique of triangulation. The target of this research is to increase percentage of observing and communicating skills about ≥ 30% does archieved. The improvement of observing skill can be showed by increasing the average percentage that reached by student from 50,79% in pre-cycle to 66,11% in cycle I, and increase to 81, 97% in cycle II. The improvement of communicating skill can be showed by increasing the average percentage that reached by student from 40,19% in pre-cycle to 54,75% in cycle I, and increase to 77,99% in cycle II. Based on the result above the conclusion of this research is there's an improvement of observing and communicating skills of student using problem based instruction.

Keywords: Problem based instruction, Observing skill, Communicating skill, Ecosystem

INTRODUCTION ~ Science is knowledge of natural phenomena, the results of experiments and observations using scientific methods to solveproblems (Widowati, 2008). Learning science focuses on the process of finding and processing information through observing, measuring, solving problems, asking questions, and so on (Wenno, 2008). The ability to undertand, communicate, and apply science to solve problems so that emerging attitudes and sensitivy to self and the environment in making decisions based on various considerations of science is called science literacy. Students need scientific literacy in order to have a good quality of life and productive as the purpose of science education at the International Council of the Association for Science Education (ICASE) "to prepare citizens who are empowered to lead productive lives and to enjoy the best possible quality of life . "(UNESCO-PROAP, 2001).

Biology is part of science, so learning biology in class should be in accordance with the principles and nature of biology as science. Biology as a science is the provision of activity experiences that involve intellectual skills (minds on), manual skills (hands on), and social skills (hearts on). Science is formed through scientific methods. To implement the scientific method, special skills are needed called Science Process Skills.

The results of observations conducted in SMA Kebakkramat shows students observing skill by 28.24%, skills and develop hypotheses to explain by 37.04%, amounting to 36.11% predicting skills, skills of asking questions of 33.80%, the skill of designing and implementing trial by 46.76%, amounting to 35.65% interpreting skills, and communication skills by 32.87%. Observing skills

and communication skills are the two aspects of the PPP with the lowest percentage that is equal to 28.24% and 32.87% with the category is not good according to Widayanto (2009).

The low skills of observing and communicating caused by several factors, including: students' understanding of science and technology is still low(Rustaman, 2003). Schools do not apply contextual learning (Chaguna & Yango, 2008), The lack of utilization of laboratory infrastructure (Jack, 2013). The ability of teachers to implement contextual learning is still lacking (Karamustafaoğlu, 2011). As well as the desire of students to learn independently low, and yet the implementation of learning activities that develop students' skills to observe and communicate optimally (Youssef and Mohammed, 2016).

One way to improve the mastery of skills students are observing and communicating with the application of learning-oriented problem-solving process. One model of learning has the potential to improve the skills of observing and communicating student is Problem Based Instruction. Problem Based Instruction is learning in which students engage in an open learning, student-centered, and based on hands-on activity. Problem Based Instruction encourages students to analyze problems, search for information, draw up hypotheses, and solving a problem.

Problem Based Instructiona constructivism learning approach, which says that knowledge is not static, but constantly evolving and changing for students construct new experiences that force them to base yourself and modify previous knowledge. Teachers act as presenters of the problem, the questioner, holding a dialogue, a facilitator of learning, set up support and encouragement to improve student growth and intellectual inquiry. The main principle of constructivism approach is not acceptable knowledge passively, but actively constructed by the individual (Nasution, 2008).

METHOD

Participants

Participants were students of SMA Kebakkramat X8 class in the school year 2016/2017, amounting to 36 students, with 10 men and 26 women. X8 class is quite heterogeneous in terms of background and academic achievement.

Research Procedure

Research procedures used in conducting the study is based on a class action research spiral model according to Kemmis and Mc. Taggart (2005) which includes: planning (planning), action (acting), and observation (observing) and reflection (reflecting). The study was conducted in two cycles of learning.

Collecting and Analysis

Data were collected through direct observation and tests the skills to observe and communicate. Observation sheet is based on indicators of skill to observe and communicate Rankin, (2006) as the results

of the test answers were analyzed with the same guidelines.

RESULTS AND DISCUSSION

Based on observational data and test results, observe skills and communication skills of students change from Pre-Cycle to Cycle II. There are variations in observing and communicating change students' skills at each cycle. Increasing the average score stage Pre-Cycle, Cycle I and Cycle II more is presented in Figure 4.1. and Figure 4.2.

1. Results of Observing Skills

Measurement of skills observed showed an increase in the average score of each cycle outcomes ranging from Pre-Cycle, Cycle I and Cycle II. Results Pre-Cycle show class observing skills X8 are in the unfavorable category with a score of 50.79%. I cycle observing skills scores increased by 15.32% to 66.11% in the category quite well. Research targets are achieved in the second cycle, the score has increased by 31.18% to 81.97% in both categories. This shows that the treatment through the implementation of Problem Based Instruction able to improve their skills in the classroom observing Kebakkramat SMA X8. comparison of the results observing skills acquired between stages Pre-Cycle, Cycle I and Cycle II is presented in Figure 4.1.

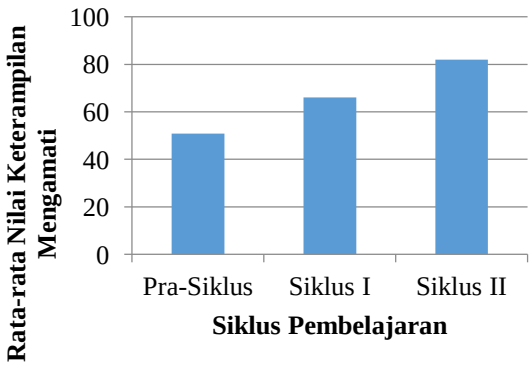

Figure 4.1. Scores Comparison Viewing Skills Pre-Cycle, Cycle I and Cycle II

2. Results of Communication Skills

Measurements such as communication skills show an increase in achievement scores for each cycle ranging from Pre-Cycle, Cycle I and Cycle II. Results Pre-Cycle show X8 class communication skills are in the unfavorable category with a score of 40.19%. Cycle I score of communication skills has increased by 14.56% to 54.75% in the category quite well. Target reached in Cycle II studies, scores increased by 37.8% to 77.99% in both categories. This shows that the treatment through the implementation of Problem Based Instruction able to improve their communication skills in the classroom Kebakkramat SMA X8. Comparison of the results obtained communication skills between stages Pre-Cycle, Cycle I and Cycle II is presented in Figure 4.2.

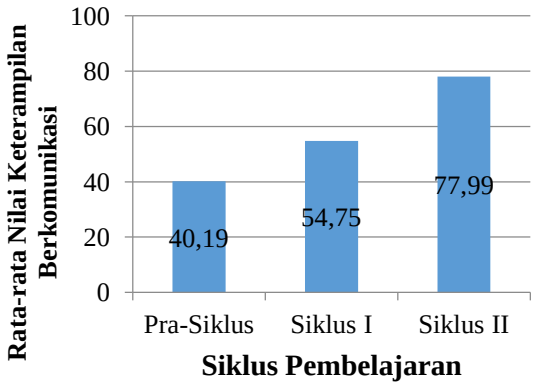

Figure 4.2. Scores Comparison Communication Skills Pre-Cycle, Cycle I and Cycle II.

Cycle I

1) The Result of Observations and Test of Observing and Communication Skills.

Aspek KPS	Rata-rata Capaian Skor (%)	Kategori
Mengamati	69,44	Cukup Baik
Berkomunikasi	47,11	Kurang Baik

Data observation and written tests are used to determine the final data observing and communicating skills students gained an aerage of both. Cycle observing skills I had an average achievement score of 63.89% and amounted to 59.84% of communication skills. Results observation observing skills and communication skills first cycle X8 grade students in general have increased achievement scores compared with pre-cycle stage. The average test skills students observe first cycle was 69.44 with a category quite well, while the average test communication skills of students at 47.11 with unfavorable category. The average level of achievement observing and communicating skills of students has increased, although not yet meet the target of research that is ≥30%. Performance improvement observing skills First cycle higher at 15.32% compared with the skill of observing with performance of 14.56%. Increases and decreases in the value of observing and communication skills of students Cycle I is proportional to the decrease in value each student as shown in Figure 4.3.

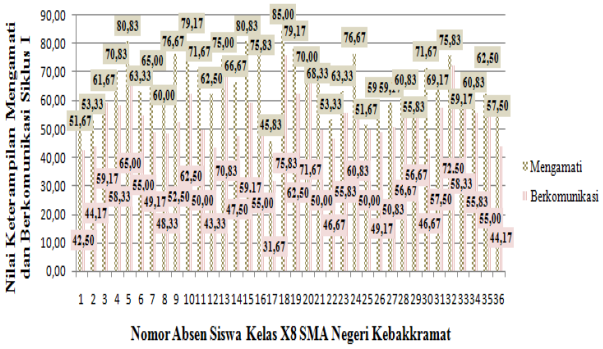

Figure 4.3. Graph Value Observing and Communication Skills Grade First cycle X8

Based on Figure 4.3. it appears that the first cycle an increase in the value of the skills to observe and communicate on most students. The highest value observed in Cycle I of skills obtained by students absent number 18 with a value of 85, while the three lowest values observed Cycle I acquired skills students absent numbers 17, 1, and 25 with the value of each student in a sequence of 45.83, 51.67 and 51.67. The highest value of the first cycle ie communication skills gained 75.83 absent student number 18, while the three lowest values Cycle I gained communication skills of students absent numbers 17, 1, and 12 with each student scored 31.67, 42.50, and 43.33.

Students absent numbers 1 and 17 while still ranks second to bottom, but experienced a slight increase in the average value of observing and communicating skills of Pre-cycle activities. Students absent numbers 1 and 17 tend to be passive during lessons well when activities outside the classroom observation or during classroom activities.

Cycle II

1. **Observations and Test of Observing and Communication Skills**

   The results of observation and communication skills students were in either category because it has a score of more than 75% ie 80.21% and 80.07%. Skills observe Cycle II has an average achievement score of 82.75%, while 80.07% of communication skills. Results observation observing skills and communication skills Cycle II X8 grade students in general have increased achievement scores compared to the phase Pre-Cycle and Cycle Measurement I. The results of observing and communicating skills tests at the stage of the second cycle students are in good category and is good enough. The average achievement scores observing skills Cycle II of 81.97% with a good category, while the average achievement scores of communication skills second cycle of 73.96% with a category quite well. These results are higher than the results of a test of skill to observe and communicate with students in the Pre-Cycle and Cycle I. Final data results of action taken at the second cycle was obtained through

observation and tests provide a change scores to observe and communication skills of students from Pre-cycle stage until the first cycle. Target study, which rose ≥30% has been achieved in Cycle II. Aspects of communication skills is an aspect with a score higher than the increase in observed skills.Increases and decreases in the value of the skills to observe and communicate Cycle II each student is presented in Figure 4.3.

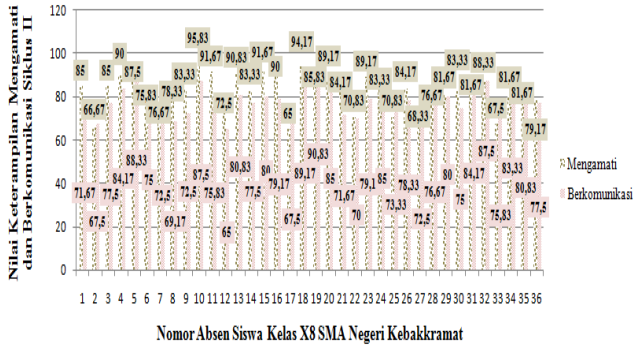

Figure 4.3. Graph Value Observing and Communication Skills Grade II X8 Cycle

Based on Figure 4.3. it appears that in Cycle II increased skill scores observed in the majority of students when compared with the value at the Pre-Cycle and Cycle I. The highest value observed skills acquired Cycle II students absent number 10 with a value of 95.83 while the lowest value obtained numbers of students absent 17 , 2, and 33 with the value of each student in a sequence of 65, 66.7, and 67.5. The highest value of communication skills gained 90.83 Cycle II of absent students number 19, while the lowest value obtained absent student numbers 12, 2, and 17 with each student received grades of 65, 67.5, and 67.5. All students experienced an increase in the average value of observing and communicating skills in Cycle II.

Students absent numbers 2 and 17 although it remains on the lower order, but increased the average value observing skills and communication skills of the activities Pre-Cycle to Cycle II. Students absent numbers 2 and 17 tend to be passive during lessons better when direct observation of activities, discussions, and during classroom activities.

DISCUSSION

Increasing the skills to observe and communicate students from Pre-Cycle to Cycle II caused syntax Problem Based Instruction. Core activities of Problem Based Learning Instruction consists of 5 stages: 1) gives the orientation of the issues to students; 2) organize the students to learn; 3) guiding the investigation of individuals or groups; 4) develop and present work; 5) analyze and evaluate the problem solving process (Arends, 2008).

Phase student orientation at issue is the stage of determining the subject matter to be solved by the students. At this stage the students do activities to observe and identify phenomena or issues presented by

the teacher (Kuhlthau, 2007). Stage orientation of students on issues capable melatihkan observing skills students because it encourages students to discover problems through observations made (Branch & Oberg, 2004). Provision of questions and the selection of appropriate learning media by teachers on students on the issue orientation stage can help students gather information and establish subject matter based on the evidence or the observed phenomena (Lee et al., 2012). Syntax orientation of students on issues relevant to the learning theories of John Dewey emphasizes learning from experience.

Phase organize students to learn the stages teachers help students to define and organize learning tasks related to the issue. Phase organize students to learn to encourage students to draft their own investigations to solve the problem in accordance with the problems that have shown earlier in the phase of student orientation at issue. This stage is to train communication skills of students through the scaffolding provided by the teacher. In line with Vygotsky's theory that says learning is a social interaction between students and teachers and peers. Social activities with others spur pengonstruksian new knowledge and improve the intellectual development of students (Sugiyanto, 2009).

The next stage is to guide individual and group investigation. Teachers encourage students to collect appropriate information, carry out experiments, explanations, and troubleshooting. At this stage, the students carry out investigations to obtain data. Syntax guide the investigation of individual and group melatihkan students to improve their skills to observe for the data collection phase the students are required to master the skills of observing, ranging from skills determine differences and similarities as well as the characteristics of a detailed, specifying the relevant data, using the various senses, using the tool correctly , and determines whether the object susatu have similarities or differences are more obvious (Harlen, 2014). In line with the theory of Bruner who developed the theory of discovery learning that encourages students are involved actively in learning to gain experience independently. Learning invention was developed based on cognitive learning theory and the theory of constructivism. Learning is packed by providing opportunities for students to actively interact with its environment, resulting in a change either in the environment or in the student's own (Dahar, 1998). Another learning theory that is also relevant in this syntax namely Jean Piaget learning theory which states that learning is a process to get information through the construction of knowledge consists of three phases: assimilation, accommodation, and equilibrasi (Anitah, 2009). Learning invention was developed based on cognitive learning theory and the theory of

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The next stage is to develop and present the work. At this stage the teachers assist students in planning and preparing the work of appropriate such as reports, video footage, and models, as well as help them to share their work with friends and making a presentation related to the results of investigations have been carried out. Phase develop and present the work to improve their communication skills siswamelalui activities communicating the activities and ideas that they have, listen to the ideas of other groups and respond to the results obtained, reported the results in the form of oral or written, presenting the conclusions in the form of oral and written brief, clear and the right, comparing the results obtained with a variety of literature, and choose the appropriate way of presenting results (Rankin, 2006).

The last stage is to analyze and evaluate the problem solving process. Students together with teachers reflection or evaluation of the investigation they have done and the processes they would take in the investigation. This stage can improve the communication skills of students.

Another factor influencing the improvement of each cycle is that the

better the quality of learning. The learning process at this stage of the second cycle better than Cycle I. Agree with Brown (2004) which states that the development of students during classroom action research was influenced by the improvement in the quality of learning that is applied by the teacher. Teachers make improvements each cycle of learning through reflection and re-planning stage in an effort to repair the next cycle. The better the quality of learning that teachers in learning, the greater the improvement of the quality of students.

Based on the results of the discussion above, it can be concluded that the implementation of Problem Based Instruction able to improve the skills to observe and communicate with students. Skills observe students include the skills to identify differences and similarities are evident from the object of observation, skill use multiple senses for observation, skills to identify differences in detail of the object of observation, skill identify whether the object of observation more similarities or differences, skills in using the right tools to aid in the assessment, and skills to collect the relevant data. Student communication skills include communicating skills activities and ideas that they had, listening skills and ideas from other groups respond to the results obtained,

CONCLUSION

Based on the results of this study concluded there was an increase of skills to observe and communicate graders SMA X8 Kebakkramat in the school year 2016/2017 through the implementation of Problem Based Instruction on learning the material Biology Ecosystem.

SUGGESTION

1. School

   Schools should optimize the use of facilities and infrastructure to support the learning process, especially biology laboratory so that learning objectives can be achieved.
2. Teacher
   1. Teachers should be able to get used to the implementation of Problem Based Biology Instruction on learning because it can improve the skills to observe and communicate with students.
   2. The use of varied teaching methods should be improved agardapat create learning fun for students.
3. Other researchers

   Research on the Problem Based Learning Instruction in biology should be further developed in order to further optimize the skills to observe and communicate with students.

ACKNOWLEDGEMENT

The authors thank profusely to the supervisor, teacher tutors, and others who helped this research.

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