The Effect of Teaching Model ‘Learning Cycles 5E’ toward Students’ Achievement in Learning Mathematic at X Years Class SMA Negeri 1 Banuhampu 2013/2014 Academic Year

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Abstract. Based on the survey showed that mathematics teacher still dominated in teaching and learning process. The process of learning is centered on the teacher while the students only work based on instructions provided by the teacher without any creativity and activities that stimulate students to explore their potential. Realized the problem above the writer interested in finding the solution by applying teaching model ‘Learning Cycles 5E’. The purpose of his research is to know whether teaching model ‘Learning Cycles 5E’ is better than conventional teaching in teaching mathematic. The type of the research is quasi experiment by Randomized Control test Group Only Design. The population in this research were all X years class students. The sample is chosen randomly after doing normality, homogeneity test and average level of students’ achievement. As the sample of this research was X.7’s class as experiment class used teaching model learning cycles 5E and X.8’s class as control class used conventional teaching. The result showed us that the students achievement in the class that used teaching model ‘Learning Cycles 5E’ is better than the class which did not use the model.

1. Introduction
Learning is the most basic activities in the whole process of education at schools. This means that the success or failure of education goals depends on how the learning process experienced by the students in the classroom. The learning activities at schools also require students to learn optimally. It is expected that learning goals in gaining minimum competency achievement that must be full filled by the student. Mathematics is an abstract and deductive science as well as its usefulness in daily life. Sometime people think that mathematic is abstract in science and learn a lot of formulas that lead to difficulties students understand the concepts of math. So that students are less excited when learning time takes place. In addition, the learning process is not as effective as less precise methods used, and the lack of learning resources can also lead them not interested in learning. Consequently, the result the score of the learning outcomes decreased.

Problems of decreasing student learning outcomes is not much different from the observations done during the Practice Field Experience at SMAN 1 Banuhampu. Based on these observations, the researchers noticed that the learning process still a one-way. The process of learning is centered on the
teacher while the students only work based on instructions provided by the teacher without any creativity and activities that stimulate students to explore their potential. The usual steps in learning involved; teachers prepare students to learn, explain the material, giving the example of the problems, then provide practice questions, students asked to do the exercises and ends with the provision of homework. The lack of variety of learning such the example above caused boredom for students. So that when the teacher explains the lesson only some of the students pay attention while the others are busy with other activities. When the teacher asked them to solve problems (do the test) only a few students done it seriously, most of them just cheated on his friend’s work, and some did not do at all.

Some problems can be as source of poor behavior of student in learning mathematic such as monotonous method, lack of the opportunity for the students to explore their own capabilities, lack of understand of the teacher’s explanation, and the classroom atmosphere less conducive. These conditions indicated that learning is still dominated by teachers so that students are less active in the learning process, majority of students have not been able to construct their own knowledge. Addressing problems in teaching mathematics above. It is important to give the opportunity for the students to construct their own understanding through learning activity. Constructivism learning theory stated that learning is an active activity in which students construct their own knowledge and find the meaning of something they learned. Teachers act as facilitators, helping student activity in the form of knowledge that learning is an active process of the student. One of the learning activities is based on constructivism theory is a ‘Learning Cycle 5E’ model.

Teaching model ‘learning cycle 5E’ is part of the learning based on theory of constructivism [1]. Model learning cycle 5E introduced by Robert Karplus in Science Curriculum Improvement Study/SCIS [2]. According [3] is a model of learning cycle that enables students to find their own concept or consolidate concepts learned, prevent misconceptions, and provides opportunities for students to apply the concepts that have been learned in new situations. Teaching model ‘learning cycle 5E’ is a learning model that is centered on students which consists of five phases. They are engagement, explanation, elaboration, and evaluation; [4]; [5]; [6]; [7].

In engagement phase. Students are invited to correlate their knowledge to the material that will be learned. The teachers should facilitate the students to relate their own knowledge to the teaching material based on their experience in daily life. The teachers should be able to awaken and develop the students interest and curiosity about the topics that will be discussed. This is done by asking some questions about the factual processes in everyday life (related topic). Thus, students will give a response. Then, students can be used as a foothold for teachers to know students prior knowledge on the subject. In addition teachers need to identify the presence of conceptual errors on the students. In this case the teacher must build engagement between the everyday experiences of students with learning topics to be discussed. Exploration phase is the second step. In the this phase teacher formed small groups of 2-4 students, and then give them the opportunity to work together in their groups without direct instruction from the teacher (teacher distributed learning material in the form of student’s activities sheets). In this group, students are encouraged to test hypotheses or create new hypotheses, try alternative solutions in the group. At the time teacher conduct and record observations and ideas or opinions that developed in the discussion conducted by the students. In this phase, the teacher acts as a facilitator and motivator. Basically the goal of this stage is to check the knowledge of the students if it is correct, it is still wrong, or perhaps partly wrong, partly right. Explanation phase. At this stage, teachers are required to encourage students to explain a concept with a sentence / thought itself, ask for clarification on the evidence and explain other students, and each other think critically. After doing the discussion, teacher gives explanations of concepts discussed before, use former student explanation as a basis for discussion. The next is Elaboration. At this stage students tried to apply the concepts and skills they have learned in a new situation or a different context. Thus, students will be able to learn significantly, because it has been able to implement/apply the newly learned concepts in new situations. At this stage it’s hoped that teachers and students' motivation will increase. Increasing student motivation can certainly boost student learning outcomes. The last steps is Evaluation. At this phase teachers can observe students’ knowledge or understanding in applying
new concepts. Students can do a self-evaluation by asking open-ended questions and seek answers through observation, evidence, and the teachers as an evaluation of the implementation process of learning cycle 5E model. The results of this evaluation can be made by the teacher to know whether it has gone very well, fairly well, or still less. Similarly, through self-evaluation, students will be able to know the lack or progress in the learning process which has been done.

In previous studies conducted by [8] states that teaching model learning cycle 5E is one alternative of learning models that can improve student learning outcomes. [9] suggests the influence of learning cycle can improve student achievement in terms of initial ability of students. [10] stated that the application of the teaching model learning cycle 5E can improve students' mathematical problem solving abilities. Based on these results, the alleged application of learning cycle 5E can improve students' mathematics learning outcomes.

Based on the explanation above it can be concluded that the teaching model ‘learning cycle 5E’ can facilitate students to construct their own knowledge. Before the study began, the teacher tried to arouse interest and curiosity of students to the material to be learned. Then the students build their math knowledge with members of his group followed by communicating and discussing the knowledge they gained from solving problems. After that, students are given the opportunity to apply new knowledge. These five stages are the things that must be done in implementing the teaching model ‘learning cycle 5E’. In this research, students were grouped based on academic ability of students. A highly capable students will join to each group. It is aimed to help the group in discussing the material given. Because some of them involved in low ability student.

Student learning outcomes showed by the evaluation process or test, then the results of the test assessed by the teacher.[11] states that there are three aspects of the assessment of learning, namely: a) cognitive sphere, in terms of thinking skills, including the ability to memorize, understand, apply, analyze, synthesize, and evaluate; b) affective sphere, includes character behaviors such as feelings, interests, attitudes, emotions, and values;c) The sphere of psychomotor, include imitation, manipulation, precision, articulation, and naturalization. Based on the above description learning outcomes in learning mathematic by using teaching model ‘learning cycle 5E’ is the result of learning on the cognitive obtained after carrying out tests. Based on this description above the researcher intends to try applying teaching model ‘learning cycle 5E’ on the result of teaching mathematic at X years class at SMAN 1 Banuhampu in the 2013/2014 academic year. The main purpose of this study was to determine whether learning outcomes of students who take mathematics learning by using teaching model ‘learning cycle 5E’ is better than the students who take the learning by using conventional learning models in class X SMA N 1 Banuhampu in 2013/2014 academic year.

2. Method

This research was conducted by using a quasi-experimental methods.[12] argues that the quasi-experimental research is experimental research is not successfully pursue or realize the things that are required on a purely experimental research (True Experiment). The design used randomized control group only design.

This experimental study has a population of all students in grade X SMAN 1 Banuhampu enrolled in the 2013/2014 academic year. The samples in this study were taken randomly (random is done only on the selection of the class). It means researchers took two classes at random from all one class as an experiment and another as a control class. Every member of the population gets equal opportunity to become members of the sample. Because in this study population members are distributed to the whole class, then the sample selection is done on these classes. This is done because it is not possible to random system against these individuals. In this research, researcher implemented quasi-experimental research by giving treatment in the experimental class by applying teaching model ‘learning cycle 5E’ and model conventional learning in the control class.

3. Results and Discussion
This study was conducted to see the effect of the teaching model ‘learning cycle 5E’ on learning outcomes. Implementation of learning by using Teaching model ‘learning cycle 5E’ which was implemented in the experimental class X.7 gave the better result than learning from ordinary class at X.8. The stages are implemented are first, engagement that aims to arouse students’ interest and curiosity of the material to be studied.

First stage, the results showed that the process of engagement have not maximized yet because of the curiosity of students toward the material is low. It may be caused by lack of active students in initial discussions to identify the material provided. On the second stage; exploration, students are grouped by ability evenly and then given the opportunity to discuss the matter within each group the aim is for students to discover/ comprehend the material provided. [13], argues that cooperation is an important tool in helping to achieve the solution of social problems, helping individuals to adjust to other people. In Exploration phase [6] students are given the opportunity to work both independently and in groups, this phase gives students concrete experiences that help students begin to build concepts and develop skills without instruction or guidance directly from the teacher. At this stage the student activity looks quite active in group discussions, this indicates that the purpose of the learning cycle 5E to activate students in the learning process can be done well, students do not look shy to express opinions in front of his friends though sometimes wrong. In explanation phase, at this stage the student should be able to explain a concept by using his own words before the other groups. At this stage showed that students brave enough to explain their findings in front of his friends. In elaboration phase, student should be able to apply concepts and skills learned in different contexts. In this study, the researchers observed that students were able to apply through other matters relating to the material being studied. In evaluation phase, at this stage the students are expected to evaluate themselves by asking several questions aimed to solidify the understanding of the material that has been given. In this phase showed that the students asked some questions if they were less familiar with the material provided. It means they realized their weaknesses in learning process and ask for the teacher’s help to give more explanation.

From the findings above it can be concluded that the learning outcomes of students increased from one meeting to another. This is evidenced by the results of the average value of student work sheets or LKS is increased from the first meeting until the fifth meeting. At the five phases applied to the learning model It showed that the exploration stage indicated students more active in the learning process, they are able to focus on understanding the material in their own group. After testing the hypothesis with t test results are obtained as follows.

![Table 1. Final Tests Hypothesis Testing](image)

| Elements | Class Experiment | Control class |
|----------|------------------|---------------|
| N        | 28               | 29            |
| X̄        | 81               | 67            |
| S        | 12,55            | 14,97         |
| S²       | 167,5025         | 224,1009      |

Based on Table 1. It can be conclude that \( t_{hitung} = 21,34 > t_{table} = 1,6725 \), mean \( H_0 \) rejected, in other words the learning outcomes of students who used teaching model ‘learning cycle 5E’ is better than the usual learning. It shows that the application of teaching model ‘learning cycle 5E’ can improve student learning outcomes. This is supported by studies Marok[14], which states that a teacher can not accommodate the concept for students, but through the questions, teachers can help students construct meaning from the concept of their own experience.

Learning cycle 5E model gave a positive impact on student learning outcomes. Students look more active in learning, they discover new ideas within the group, and not ashamed to express their opinion, although sometimes it’s wrong or different with other friends. In the implementation teaching model ‘learning cycle 5E’ also found weaknesses. The weaknesses found such as the limited time allocated, some students feel bored sit in group work, it may be caused by a group of their friends which cannot cooperate one to another, consequently they do not want to finish their activities on their LKS. But the
researchers sought for the purpose of this study can be achieved well. That is the way to maximize time and made it clear to students that learning in groups will train students to learn actively, independently work on the problems and is responsible for their own work. The average value of 81 experimental class, while the class only controls 67. It can proved by the results of the final tests on the experimental class is better than the control class.

4. Conclusion

Based on the results of research and discussion can be taken conclusion that mathematics learning outcomes of students who follow the teaching model ‘learning cycle 5E’ is better than the students who followed conventional teaching in grade X SMAN 1 Banuhampu 2013/2014 academic year. It needed other strategies to use the time allocated effectively in applying this model. As a whole students can be involved in learning process by activated them in each of the phases. As the result it can reduce the role of the teacher in teaching and learning process. Students also can showed their ability to solve the problem in learning mathematic by sharing the idea to their friend in the work group.

5. References

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