Using the Learning Cycle 5e Model to Improve Student Activity and Outcomes in Relationship and Function Materials at SMA Negeri 1 Indramayu Class X Mipa 8

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Abstract: This study aims to determine the increase in activeness and student learning outcomes in the subject matter of relations and functions using the Learning Cycle 5e model. This research is a Classroom Action Research (CAR) conducted at SMA Negeri 1 Indramayu. The subjects in this study were students of class X MIPA 8, totaling 36 students. The instrument used in this study was the student observation sheet which aims to measure activeness while the formative tests given each cycle aim to measure the improvement of students' mathematics learning outcomes using the 5e learning cycle model. Based on the results of research and data analysis, the following results were found: cycle I could improve students' mathematics learning outcomes, namely out of 36 students, 27 students achieved learning completeness with a class average of 79.97 or above KKM, namely 75 with high mastery criteria and student activity that is equal to 91.66% of the target of 75%. Cycle II saw an increase in students' mathematics learning outcomes, namely out of 36 students, 36 students achieved learning completeness with a class average of 89.94 or above the KKM, namely 75 with very high completeness criteria and student activity, namely 100% of the 75% target.

Keywords: Activeness, learning outcomes of mathematics, learning cycle model 5e

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Introduction

Mathematics is a science that plays an important role as a tool to organize our daily lives in society (Nurlaily et al., 2019). With this matter mathematics is also a subject that is mandatory for all levels of education, both elementary, secondary and tertiary education (Lalian, 2018). So, this is what encourages educators to be more creative in developing and applying mathematics as a basic science (Huda et al., 2019). Hutauruk & Priatna (2017) explained that learning and understanding mathematics is very difficult, complicated and frightening because it requires students to think logically, thoroughly, diligently, systematically, and have a serious effort in learning it. However, in reality many students feel less interested in mathematics (Sari & Surya, 2021). Due to the low ability of students who are passive in the learning process, not independent and not trained in building knowledge of learning mathematics (Misnasanti et al., 2017).

This makes students feel bored, and have no motivation in improving learning outcomes, thus affecting the cognitive and psychomotor aspects of students in the process of learning mathematics (Lalian, 2018). As for Widada et al., (2018) explained that with the current learning of mathematics it is more focused on students and emphasizes students to understand concepts, facts and principles. Mathematics learning can be said to be effective if it achieves goals that are in accordance with expectations (Sari & Surya, 2021). Gaol & Sitepu (2020) explained that the higher the motivation, the higher the learning outcomes obtained by students, one of which is understanding the learning material. Therefore, motivation is the main factor that plays an important role in influencing the performance and activeness of student learning in the classroom (Salwa et al., 2021). Active learning has a very positive effect on students' ability to retain and understand the material (Hyun et al., 2017). With the delivery of material in the classroom, the obstacles faced by the teacher arise, namely when the learning model is less attractive and makes students feel bored. (Puspitarini & Hanif, 2019). Using the right model can increase student activity in learning (Warsini, 2020). And students are able to improve the ability of learning outcomes after completing the learning material as indicated by the test scores given by the teacher (Longa, 2021).

Based on the results of observations through interviews with one of the mathematics teachers at SMA Negeri 1 Indramayu on December 21, 2022 where the school is the place where researchers carry out field experience programs, it can be seen that the learning process used still uses a direct or lecture learning model. When the teacher delivers material, students are required to study independently and actively. and the teacher is only a facilitator in learning. This is due to the lack of activeness of students in literacy, which makes students ask a lot of questions to the teacher, thus causing a lack of achievement of

the completeness of the learning material. In the learning process in the classroom, students experience difficulties in learning the material, one of which is relations and functions. In addition, students who have understood the material still have difficulty solving problems.sehingga resulting in unsatisfactory student learning outcomes. So that the difficulties faced by students can be overcome and student learning outcomes can be improved, of course we need an appropriate learning model. Teachers need to apply a learning model that involves students in the learning process. Another problem is due to the use of the learning model used which seems monotonous and less varied, so that the appropriate and alternative learning model that can be used is the 5e learning cycle model (Latifa et al., 2017). Model learning cycle 5e can increase students' ability to be more curious and more familiar, as well as help students to develop problem-solving skills in the learning process in the classroom (Yaman & Karasah, 2018).

Keskin et al., (2018) explained that the important thing in the success of students in school can be seen from the way teachers teach or how to educate with good quality and effectiveness of teaching in the classroom. Therefore, the researcher is interested in conducting classroom action research entitled "Using the Learning Cycle 5e Model to Increase Student Activity and Learning Outcomes on Relations and Functions at SMA Negeri 1 Indramayu Class X MIPA 8".

Research Method

Sugiarni (2021) explains that classroom action research is a research activity in the classroom carried out by a teacher or someone with the aim of improving performance as a teacher, so that student learning outcomes obtained increase in the learning process. This is in line with Sadikin & Muhammad (2018) opinion, in this study there is an important role played by researchers and colleagues in conducting classroom teaching using a planned learning model. Sadimin (2017) explained that classroom action research is a way that teachers can use to understand problems that occur in class and find solutions to existing problems. By conducting research, the problems faced by teachers can be improved in less successful learning to become better and more effective. So as to produce students who are creative, innovative and able to solve problems (Barnawi et al., 2019). Thus, this research was conducted to provide direct improvements to the problems that occurred at SMAN 1 Indramayu. In addition, finding new solutions to the problems encountered. Therefore, it is hoped that there will be an increase in learning outcomes with the activeness of students by applying the use of the 5e learning cycle model in the learning process.

Implementation of research that will be carried out using several cycles in stages. The stages in each cycle will always be evaluated and analyzed to find out the extent of the impact of the method given to be a comparison for the next cycle. Thus in this study the stages passed were planning, action, observation, and reflection The stages above are carried out continuously until researchers find solutions that can change the learning process in a better direction so that problems that occur can be corrected and resolved thoroughly. Researchers can also obtain alternative solutions to determine the action plan to be implemented in the next action.

1) Initial Research Study Activities

Before carrying out the research, a field orientation is first carried out to obtain information or problems related to the teaching and learning process and then make lesson plans, observation sheets, and formative test questions.

2) Cycle Activities

Activities are designed using classroom action research. This activity is implemented in an effort to improve learning outcomes and student activity. The steps are arranged in two research cycles. Each cycle is divided into four stages of action, namely the planning stage, the action stage, the observation stage, the analysis and reflection stage.

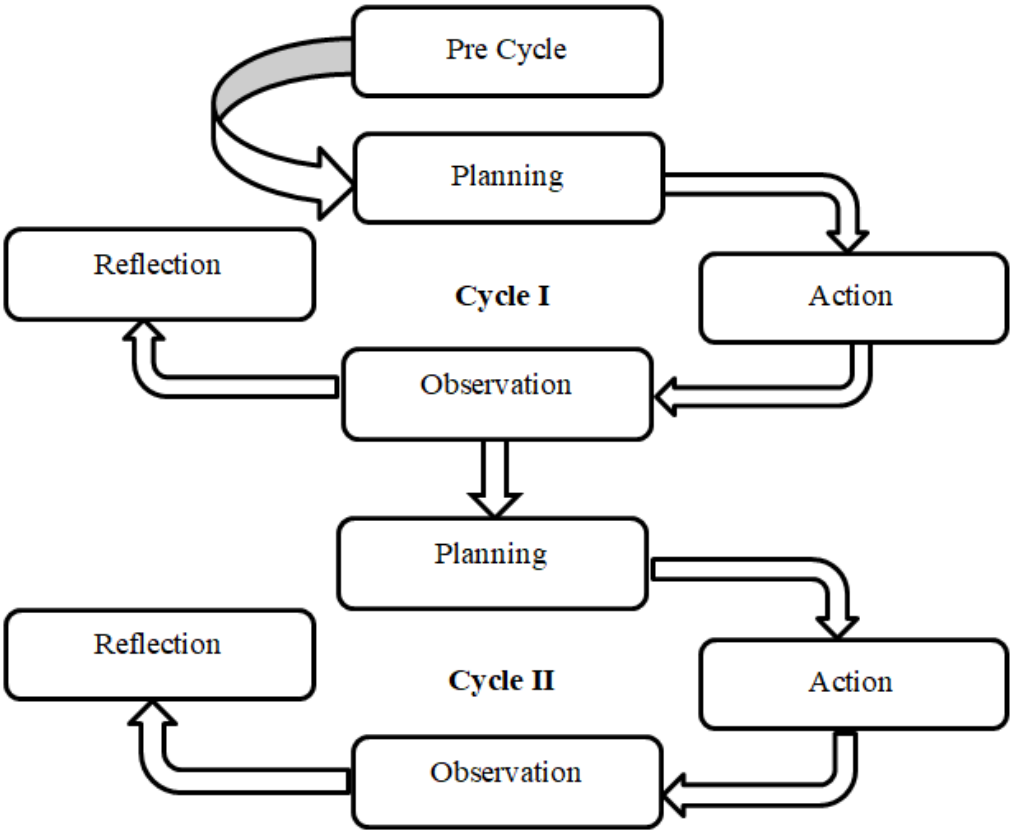

Figure 1 Action Research

This research was conducted at SMAN 1 Indramayu, class X MIPA 8, namely the school where the Field Experience Program (PPL) was located, so that researchers already knew the school environment, characteristics and abilities of students. The main material in this research is Relations and Functions. The subjects to be studied were students in class X MIPA 8. The variables observed in this study include :

1) Active Student Learning.
2) Student Learning Outcomes.

To obtain information or data in this study, a data collection tool or instrument used in this study is needed as follows:

1) Observation sheets are used to measure student learning activity.
2) Tests are used to measure the increase in learning outcomes in mathematics, especially in the subject of Relations and Functions.

The analysis in this study used a quantitative research pattern to measure the increase in students' mathematics learning outcomes in the subject of Relations and Functions using a formative test conducted each cycle with a one-sample t test and to measure student learning activeness using observation sheets. The data obtained from cycle I and cycle II were then processed using Ms.Excel to determine the increase in student learning outcomes and activeness in learning mathematics.

Longa (2021) explained that the action taken to increase the activeness of student learning is to measure how active students are in the process of learning activities. Because in order to create an interesting, active, and fun learning atmosphere. Increased active learning can be seen from the indicators that have been mentioned and then scores are made based on student learning activeness. From the results of the scores, students are categorized as very active students, moderately active students, active students, less active students, and inactive students. The level of activity is measured with a Likert scale (1 to 5) with the provision that if more than or equal to 2.75 students are considered active (A) and if less than 2.75 are considered inactive (TA) with a target of 75% success.

Table 1 Activeness Criteria

Criteria	Symbol
Very active	5
Moderately Active	4
Active	3
Less Active	2
Not Active	1

a. Assessment For Tests

   Student answers will be given an assessment score of 0 to 100 with a success target of 75% or according to the minimum completeness score (KKM), which is 75.

b. Assessment for Learning Completeness

   Analysis of learning outcomes data is used as a reference to determine the next cycle. Based on the instructions for the implementation of teaching and learning, the researcher considers that the learning material on relations and functions uses the learning cycle 5e learning model.

This is done to obtain individual student completeness data with the standard of completeness, is ≥ 75 (Sani et al., 2020). The learning completeness formula is determined using the following formula: Learning completeness $=\frac{\sum Completed\ Learning\ students}{\sum Students} \times 100\%$.

Table 2 Criteria for Learning Success Rate in Percent

Learning Success Rate in Percent	**Explanation**
>80%	Very High
60-79%	High
40-59%	Currently
20-39%	Low
<20%	Very Low

Result and Discussion

The results of this class action assessment were obtained from the data from the description test results and the observation sheets given in each cycle. The description test given aims to determine the increase in student learning outcomes in mathematics while the results from the observation sheet of student learning activity aim to determine the increase in student learning activity during the learning process. Observation results are also used as material for reflection to improve and improve classroom learning. The following is a description and learning outcomes. From the test results data conducted at the end of each cycle, analysis is carried out to obtain student learning completeness. The level of learning mastery is presented in Table 3 below.

Table 3 Completeness of Students in Learning

Explanation	Student Test Scores in Each Cycle	
	I	II
Average Score of Mathematics Learning Outcomes	79,97	89,94
Percentage of Completed Students	75%	100%
Active Student Learning	91,66%	100%

The learning completeness presented in table 4.1 shows that the average student test score in cycle I was 79.97. From the table it can be seen that 27 of the 36 students who took the test in cycle I completed their studies in the first action. So the percentage of students who complete learning is 75%, in this case the criteria according to the curriculum can be concluded that the action in cycle I is high. Cycle I generally has reached the category of having high learning activity, namely on average 3,12 > 2,75 of the 36 students who took part in learning in cycle I, only 3 students were declared to have low learning activeness and 33 students or 91.66% had high learning activeness, because the target of learning activeness was 75% so in cycle I had reached the active learning category high.

In cycle II, the average student test score was 89.94 and the number of students who completed learning in cycle II was 36 out of 36 who took the test in cycle II. So that the percentage of learning completeness is 100%. In this case the criteria according to the curriculum can be concluded that the action in cycle II is classified as very high. Cycle II generally has reached the category of having high learning activeness, namely an average of 4.16 > 2.75 of the 36 students who took part in learning in cycle II, which was stated to have high learning activeness as many as 36 students or 100%, because the target of learning activeness was 75 % so in cycle II it has reached the category of very high learning activity.

Figure 2 The teacher is delivering material in the learning process.

In Figure 2, the teacher provides material and provides an initial explanation regarding the material to be studied. In this section the teacher is only a facilitator in learning, but occasionally provides guidance for students who do not understand the material. In this lesson the teacher involves students in understanding the problem **(Engage).**

Figure 3 The teacher gives the opportunity for students to gather with their respective groups that have been predetermined.

In figure 3 students are given the opportunity to analyze questions and discuss. Students **explore** the knowledge they already know and extract information. Apart from that, students carry out **elaboration** with their friends to find solutions to problems. Students who are discussing are allowed to ask questions to get guidance from the teacher. It needs to be underlined that the teacher only guides, not accompanies students in obtaining answers.

Figure 4 The teacher is giving direction to a group that is having difficulty

In figure 4 the teacher provides guidance and the students pay attention seriously. This can be seen from the students who are very serious about paying attention to the teacher and the students giving repeated explanations of the explanations that have been made by the teacher. This is done by students to confirm that what they have understood is correct **(Extend).**

Figure 5 The teacher provides an opportunity for group representatives to present the results of their work

In Figure 5, it can be seen that students write answers on the blackboard and explain the results of their discussions with their friends. After completing the explanation, the answers are evaluated together and it is determined whether the answer is correct or not. If the answer is correct, the student gets applause from his friends. However, if the answer is wrong, then the other students and the teacher discuss and correct where the error lies in the process of answering the question given.

Conclusions

Based on the results of observations and the results of data processing during the study which included data analysis to determine the increase in student mathematics learning outcomes and observational analysis to determine student activity, the following conclusions were obtained. (1) The use of the 5e learning cycle model can increase student learning activeness in learning mathematics. (2) The use of the 5e learning cycle model can improve students' mathematics learning outcomes through the post test questions given at the end of each cycle. The results showed that the use of the 5e learning cycle model could increase students' activeness and learning outcomes in mathematics on relations and functions. Thus, the use of the 5e learning cycle model can be applied in Mathematics Teaching and Learning Activities (KBM) in schools as an alternative learning model to be able to improve student mathematics learning outcomes.

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