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IMPROVING MATHEMATICS LEARNING ACTIVITIES AND RESULTS THROUGH REACT LEARNING STRATEGIES IN STUDENTS OF CLASS X-MIPA-1 SMA NEGERI 2 BLORA

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Abstract

The purpose of this study is to increase the activity and learning outcomes of class students X-MIPA-1 SMA Negeri 2 Blora, Blora Regency for the academic year 2019/2020 to learn mathematics on Logarithmic material through contextual learning with the REACT strategy (Relating, Experiencing, Applying, Cooperating and Transferring). This research is a classroom action research. There are three cycles in this study, where the results of one cycle become a reflection material to make improvements to the implementation of learning in the next cycle. To get the research data used formative tests, observation sheets and interviews. The research subjects were students of class X-MIPA-1 SMA Negeri 2 Blora which consisted of 35 students. Data analysis was carried out quantitatively with the benchmark of achievement of student learning outcomes classically 75%, and qualitatively for learning activities. The results of observations on student activity between cycles 1 and 2 increased by 20.7% and between cycles 2 and 3 increased 9.3%. The results showed that the percentage of mastery learning outcomes obtained from formative tests in the first cycle was 57.1%, in the second cycle 71.4% and in the third cycle 85.7%. From the results of the interviews, it is known that most of the students enjoy group learning with this strategy. In this study, it can be concluded that the REACT strategy can increase the activity and learning outcomes of students in class X-MIPA-1 SMA Negeri 2 Blora.

Keywords– Mathematics Learning Outcomes, Mathematics learning activities, REACT.

1. Introduction

It is undeniable that learning mathematics is a vehicle to facilitate students' ability to think logically, communicate and solve problems as a support for the development of science and technology. Through mathematics lessons, SMA Negeri 2 Blora, Blora Regency seeks to realize the school's vision and mission to be able to produce graduates who master science and technology (IPTEK), faith and piety (IMTAQ), have a Malay culture and are ready to continue to college and are able to compete in the era of globalization. globalization. Efforts to realize this vision and mission are still constrained in various ways, including student achievement in mathematics is still low. According to the results of the Program for International Student Assessment (PISA) study based on the mathematical literacy test, Indonesian students scored 386 out of the average PISA participants 490, Indonesia's score is certainly still far from what was expected (Organization for Economic Co-Operation and Development [OECD], 2016: 5). Meanwhile, based on the results of another study regarding the achievements of first-year students in the fields of mathematics and science, namely Trends in International Mathematics and Science Study (TIMMS), based on the results of the TIMMS test 2015 shows Indonesia's position at 45th out of 50 participating countries in the field of mathematics (Center for Educational Assessment, 2016)

According to Fontana (Suherman.dkk, 2003) "learning is a process of changing individual behavior that is relatively permanent as a result of experience, while learning is an effort to organize an environment that gives a nuance so that learning programs grow and develop optimally." According to Nasution (Riyanto, 2014) in principle learning is doing, there is no learning if there is no activity, that's why activity is an important principle in learning interactions. Meanwhile, according to Hamalik (2010), learning activities are all activities carried out in the interaction process (teachers and students) in order to achieve learning objectives. So from some of these opinions it can be said that learning activities are all activities that occur during the learning process, be it activities that involve learning activities.

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Physical or psychological activities of students in building or gaining knowledge. With this activity, it is hoped that students can gain knowledge through experience because of learning itself. According to Dewey (2009), students need to be involved and participate spontaneously. Students' desire for things they do not know encourages active student involvement in a learning process. Hamalik (2009) states that learning outcomes are changes in behavior in a person that can be observed and measured in the form of knowledge, attitudes and skills and are changes that can be interpreted as an increase and development that is better than before.

Based on the results of the 2010–2018 national exams, the achievement of SMA Negeri 2 Blora students in mathematics has not been very satisfactory because it is still categorized as sufficient. Similarly, the learning outcomes observed through the daily tests of students in class X-MIPA-1 on the subject of Exponents, the results obtained in each daily test were only about 40% - 50% of students who were able to reach the minimum completeness criteria (KKM). In addition, student activity in learning mathematics is still low, it can be seen from the circumstances where learning is still not able to involve all students to be active, lack of motivation and self-confidence of students in learning mathematics, student test results on the previous material are low and there are students seen working on assignments in other subjects while studying.

This situation that is still happening causes concern for the author as a teacher so that he feels he has to make a new breakthrough. To realize a learning model that focuses on mathematical problem solving skills, teachers must really understand that mathematics itself is closely related to the real world, or in other words mathematics is a human activity (Freudental, 2007). 1973), so that mathematical concepts and ideas must be studied as a human activity that is implemented in learning through solving problems that are familiar with children's daily lives both at the beginning, in the middle, and at the end of learning in class.

One strategy in learning is to choose an interesting learning method by considering the condition of the students. Teachers are expected to create

learning situations that are active, creative, innovative, effective and fun in the learning process, especially learning mathematics. Learning activities are seen as providing opportunities for students to increase student activity and student learning outcomes by connecting with experience, exploring, applying, collaborating and expressing students' understanding, one of which is the REACT strategy. The REACT strategy is a contextual learning strategy developed by the Center of Occupational Research and Development (CORD), which is the center of learning research and development in America CORD in 1999. This strategy is a learning strategy that has five essential elements in learning, namely Relating, Experiencing , Applying, Cooperating, and Transferring.

In learning, what is meant by relating is context related to life experiences which is a type of contextual learning that occurs specifically for young children. Experiencing, which means "experiencing" in the context of exploration, discovery, and creation is the essence of contextual learning, after all, with motivation or active students producing instructional strategies gives meaning more quickly when students can manipulate tools and materials and carry out an active research. Applying means applying and applying concepts and information in a useful context into daily activities and activities. Cooperating, meaning cooperative learning in context is sharing, responding and communicating with other students is an instructional strategy in contextual teaching. Transferring means learning in the context of existing knowledge or transfer, using and building on what students know. So that the knowledge that has been obtained by students can be used in new contexts and situations.

Several relevant studies on REACT learning strategies, namely, the results of research by Marthen (2010), Mustikawati (2013), Husna (2014), Pradani (2013) concluded that the mathematical understanding, reasoning and communication skills of junior high and high school students increase or become more with learning with the REACT strategy compared to students who study conventionally. In this study, it is hoped that the REACT strategy will increase students' mathematics learning activities and learning outcomes.

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Based on the explanation above, the researchers tried to improve students' mathematics learning activities and student learning outcomes through classroom action research with the REACT strategy. It is hoped that this strategy can increase students' learning activities in mathematics and improve mathematics learning outcomes for students in class X-MIPA-1 SMA Negeri 2 Blora through the REACT learning strategy. Given the importance of teachers in the learning process, this research is also used by teachers as an evaluation of the quality of learning carried out by teachers.

2. Method

The research is a classroom action research to improve mathematics learning activities and student learning outcomes through the REACT strategy on the arithmetic material in class X-MIPA-1. This research was carried out in the odd semester of the 2019/2020 school year in class X-MIPA-1 Senior High School (SMA) Negeri 2 Blora, which is located at Jl. Rembang km 4 Blora, Blora Regency, Central Java Province. The number of students in the class is 35 students.

This Classroom Action Research is carried out until learning activities and student learning outcomes are according to the planned targets. Each cycle consists of four stages namely; planning, action, observation and reflection. The stages of each cycle are evaluated as improvement plans in the next cycle in accordance with the changes to be achieved. The data in this study were obtained through test and non-test instruments in the form of. The test instrument, in the form of a formative test to measure student learning outcomes, this test will be carried out at the end of each cycle in the form of a description. While the non-test instrument, in the form of an observation sheet.

This research is a descriptive research that uses quantitative and qualitative methods. Quantitative data, formative test scores to measure student learning outcomes will be analyzed by simple descriptive statistics, namely by means, standard deviations and or percentages (%). While qualitative data, data from observations during learning activities. To measure the success of this classroom

action research by looking at students' mathematics learning outcomes, in this case the formative test produced has exceeded the minimum completeness criteria for mathematics subjects, which is 70 and classical completeness is 75%. While the learning activity obtained through the observations of the observer teacher is expected to be in high criteria. Guidance in observation if student activity goes very well is given a score of 5, good is given a score of 4, enough is given a score of 3, less is given a score of 2 and very less is given a score of 1. The criteria for student activity can be seen in table 1.

Table 1. Criteria for Student Learning Activities

No	**Interval (in percent)**	Criteria
1	$80 < X \leq 100$	Very high
2	$60 < X \leq 80$	High
3	$40 < X \leq 60$	Enough
4	$20 < X \leq 40$	Less
5	$0 \leq X \leq 20$	Very less

3. Result and Discussion

This classroom action research was carried out from August to December 2019. The basic competencies studied were KD. 3.1 Describe and determine the solution of exponential functions and logarithmic functions using contextual problems, as well as their relationship with KD. 4.1 Present and solve problems related to exponential functions and logarithmic functions. This research was conducted in three cycles and each cycle consisted of 3 (three) meetings.

Cycle I

The teacher begins learning by showing problems related to everyday life and asking students questions related to the concepts to be studied. The teacher provides motivation about learning objectives and directions about the learning model to be used as well as an assessment of the process to be carried out. Next, the teacher forms a heterogeneous group consisting of 5-6 students. In the experiencing stage, the teacher asks students to do activities through the student

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activity sheet (LAS) distributed by the teacher. The learning atmosphere looks a bit active, but it seems that some students are still not used to this learning. It appears that some students have not got their role in the group. There are some students who actually read other things that are not relevant to the material being studied. Student activities in groups have not been completed when the discussion time is declared over. There are still many groups that have not been able to complete their assignments, so when presenting activities in front of the class only one group can present the results of their discussions, due to the limited time of the lesson.

The results of the data acquisition results from the formative test 1 carried out at the end of the cycle can be seen in Figure 1 below. With a minimum completeness limit of 70, there are 20 students who complete (57.1%) and 15 students who do not complete (42.9%). The average formative test data in the first cycle was 72.3, with the lowest test score of 42 and the highest test score of 94.

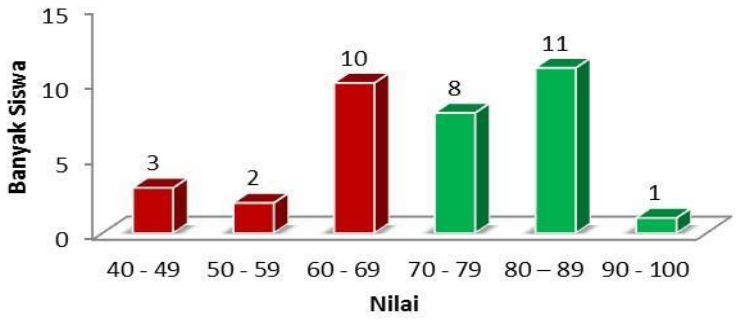

Figure 1. Bar Diagram of Cycle I . Learning Outcomes

The results of observations on students' mathematics learning activities in classroom action research in the first cycle were carried out by the observer teacher. The results of observations made on every aspect of student activities that have been converted into quantitative data form obtained an average class in the first cycle of 58% so that the criteria are sufficient. At the level of completeness learning outcomes obtained from formative tests in cycle I have not reached classical completeness 75% and students' mathematics learning activities are not

as expected so that there needs to be improvements in planning and actions in learning carried out in cycle II.

Cycle II

Some of the actions taken in this cycle were improvements related to the timing and material presented in the student activity sheet, because based on the results in the first cycle there were problems with groups of students who could not complete their work. In addition, to make learning time more efficient, the teacher asks students to arrange tables in groups before the lesson begins. Activities through student activity sheets (LAS) distributed by teachers. It can be seen from their enthusiastic faces when doing activities. The teacher observes and goes around seeing the activities of the students and provides necessary guidance by providing more motivation and providing opportunities for students who are incomplete in the first cycle, to be more active in asking if there are things that they do not understand. Learning in cycle II was running very smoothly and satisfactorily. The results obtained from cycle II can be seen in Figure 2 below:

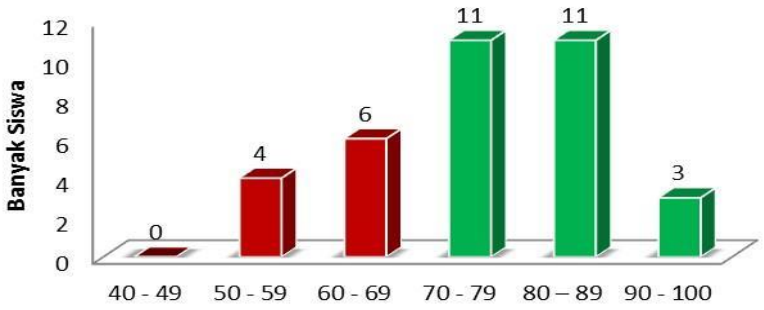

Figure 2. Bar Diagram of Cycle II Learning Outcomes

From the picture above, it can be seen that with a minimum completeness limit of 70, there are 25 students who complete (71.4%) and 10 students who do not complete (28.6%). The average formative test data in cycle II was 74.5, with the lowest test score of 50 and the highest test score of 94.

The results of observations on students' mathematics learning activities in classroom action research in cycle II were carried out by observer teachers. The

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results of observations made on every aspect of student activities that have been converted into quantitative data form obtained an average class in the second cycle of 79% so that the criteria are high.

The level of completeness of learning outcomes obtained from formative tests in cycle II still has not reached 75% completeness, so there needs to be improvements in planning and actions in learning carried out in cycle III. Furthermore, the improvement of learning is focused on: the planning stage; maximize group discussion and use of LAS, action stage; the teacher tries to make students focus and likes to ask questions, the observation stage; monitor student activity in groups as well as write and read things that are relevant to learning.

Cycle III

Cycle III was carried out after making some improvements in planning, so the implementation in cycle III looks much better, because students are already getting used to learning with the REACT strategy. Student activities are directed from the activity sheet given by the teacher. The group discussion went very well. The results of data acquisition in cycle III can be seen in Figure 3 below:

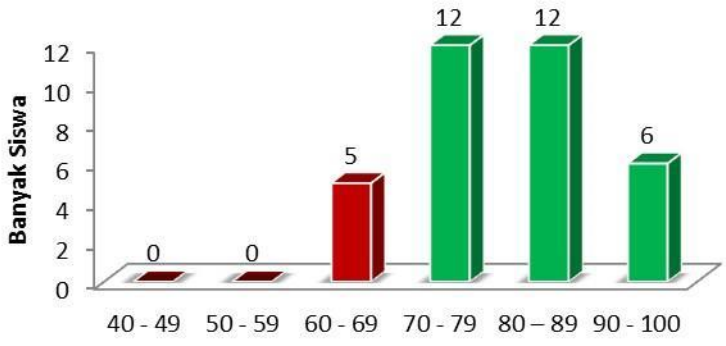

Figure 3. Bar Diagram of Cycle III Learning Outcomes

The results of observations on students' mathematics learning activities in classroom action research in cycle III were carried out by observer teachers. The results of observations made on every aspect of student activities that have been converted into quantitative data form obtained an average class in the third cycle of 88% so that the criteria are very high.

It can be seen that with a minimum completeness limit of 70, there are 30 students who complete (85.7%) and 5 students who do not complete (14.3%). The average formative test data in the second cycle is 80.1, with the lowest test score of 65 and the highest test score of 100. The level of completeness of learning outcomes obtained from the formative test in the third cycle has exceeded 75% completeness. The activeness of learning mathematics is also at a very high criterion so that the addition of the CAR cycle is not carried out.

Teacher Activity Observation Results

The results of observations on the activities of teachers and students in this classroom action research were carried out by the observer teacher at each meeting. The results of the assessment carried out on each aspect of the teacher's activities are stated in categories which are then changed in quantitative form. assessment, the observed teacher activities include relating activities (starting from problems related to life and providing motivation), experiencing (teachers provide opportunities for students to conduct experiments/activities), applying (teachers provide opportunities for students to apply knowledge/concepts). material), cooperating (the teacher directs students to study in groups), transferring (the teacher confirms the results of student work), and classroom management by the teacher from the first cycle 65% (Good). The second cycle is 83% (Very Good) and in the last cycle 91% (Very Good), the average teacher activity as a whole can be said to be Good with an average of 79.6%. The results of observing teacher activities in each cycle can be summarized in the following table:

Table 2. Average Teacher Activity Observation Results

No	Aktivitas Guru	Hasil	Kriteria
1	Siklus I	65%	Cukup
2	Siklus II	83%	Tinggi
3	Siklus III	91%	Sangat tinggi

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Finding

In general, the implementation of mathematics learning with the REACT strategy has been running as expected. From cycle I, cycle II and cycle III for the level of completeness on learning outcomes through formative tests 1, 2 and 3, respectively 57.1% (20 people), 71.4% (25 people) and 85.7% (30 person). This shows significant increases. Meanwhile, the percentages for students who did not complete were 42.9% (15 people), 28.6% (10 people) and 14.3% (5 people), showing a significant decrease as well. The increase in learning outcomes can be seen in the following graph.

Figure 4. Bar Diagram of Improving Student Learning Outcomes

From Figure 4 it can be seen that student learning outcomes are increasing as indicated by the increasing number of students who complete and decreasing the number of students who do not complete, and according to this benchmark of success, it can be seen from the achievement of classical completeness above 75% at the end of the third cycle reached 85.7% of the total students. These results strengthen the research results of Marthen (2010), Mustikawati (2013), Husna (2014), Pradani (2013) which concluded that students' mathematical understanding, reasoning and communication skills can be increased by learning REACT. Learning with the REACT strategy has increased student activity in learning, in the first cycle the average score of student activity was obtained 58% who are in the sufficient criteria, in the second cycle an average score of 79% student activity is obtained which is in the high criteria and in the third cycle the

average student activity score is 88% which is in the very high criteria. Or in other words the results of observations of student activities between cycles 1 and 2 increased by 20.7% and between cycles 2 and 3 increased 9.3%.

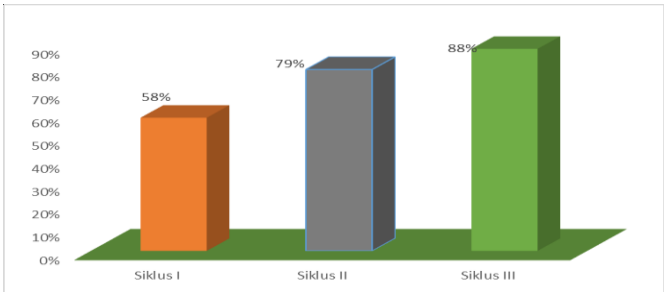

Figure 5. Math Learning Activity Bar Chart

With the opportunities given to students in their groups to work together, discuss, apply the concepts obtained and communicate the results of the discussion in writing or orally. This is in line with the opinion of Dewey (2009), that students need to be involved and participate in a learning process that can encourage active student involvement in building their knowledge. This good and successful change is expected to continue to be formed and entrenched for students in the future. These success factors are caused by several things that have been done in this classroom action research, including proper planning from cycle to cycle, preparation of learning implementation plans, increasing group discussion activities each supported by the interaction process between students and teachers, and increased activity class discussions and the appropriate design of LAS and formative tests, increasing the attention of researchers on the activeness of students in discussions.

4. Conclusion

Based on the results of research and discussion from cycles I, II and III, it is concluded that through learning with the REACT strategy, it is possible to:

1. Increase the activity of students in class X-MIPA-1 SMA Negeri 2 Blora for Mathematics subjects on Logarithmic material

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2. Improving student learning outcomes in class X-MIPA-1 on logarithmic material.

Some suggestions for implementing contextual learning with the REACT strategy are as follows:

1. Forming small groups consisting of only 3-4 students with the aim of increasing student activity in working in groups, so that all students have a role.
2. Making lesson plans and mature learning scenarios so that the use of time is more efficient.
3. Choose materials that allow for the implementation of various activities that involve all students actively.

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