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Bengkulu, November 13th 2021

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Improving Mathematical Problem Solving Ability With Quiz Team Method In The Fourth Semester Students Of Mathematics Education University Of Bengkulu

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Abstract. The aim of this research is to know the ways to improve mathematical problem solving ability through cooperative learning with Quiz Team method in the fourth semester students undergraduate Mathematics Education Study Program, Faculty of Teacher Training and Education, University of Bengkulu. This research is a Classroom Action Research (CAR) with four steps, namely: Planning, Acting, Observing and Evaluating, and reflecting. The subjects of this study are 33 fourth semester class B students of undergraduate Mathematics Education study program, Faculty of Teacher Training and Education, University of Bengkulu. The results of the research show that cooperative learning with Quiz Team method can improve mathematical problem solving. The improvements of student' mathematical problem solving are seen from the average test results obtained by the students, namely: in Cycle I is 70.909 and in Cycle II is 81.939.

Key words: Cooperative Learning, Quiz Team, Problem Solving

1. INTRODUCTION

According to Sutirman, one of the weaknesses that have occurred so far in the world of education is that many students whose exams get high or even perfect scores, but when in real life they do not know how to overcome problems related to learning problems [1]. There are many factors that lead to a lack of problem solving skills. According to Syaiful, one of the causes is the approach used in the learning process does not build mathematical problem solving abilities [2].

Based on the information obtained in observations with mathematics education students FKIP Bengkulu University, the problems faced in the mathematics learning process for students include: 1) during the learning process students do not dare to express opinions in solving problems, 2) students do not have many references in learning, 3) the implementation of group discussions is not effective because students work individually and there are students who rely on one member to do group assignments, 4) student involvement in the learning process is less than optimal so that student learning activities are still low, 5) lack of innovative practice in learning carried out lecturer.

Cooperative learning is a method of learning with groups. Cooperative learning can activate students both physically and mentally because in groups they are expected to work together and discuss to deliver the tasks given by the lecturer. Smart students will guide their weak friends, because the success of the group is determined by the success of each group member in contributing values to the group.

One form of cooperative learning is the *Quiz Team* method . *Quiz Team* is a test conducted by several groups of students consisting of several people. This method aims to make students more active and prepare themselves as well as possible in following the subject matter being taught and students are required to work together in teams or groups.

Based on the above background, the formulation of the problem in this research is how to improve the mathematical problem solving ability of the IVB semester students of the S1 mathematics education study program, FKIP Bengkulu University through cooperative learning with the *Quiz Team* method ?

Mathematical Problem Solving

Mathematical problem solving ability is one of the goals of mathematics subjects in higher education. According to Haji, " *mathematics as human activity* , this means that mathematics needs to be close to students' lives, must be related to everyday life, and if possible it must be real for students [3]. Haji & Abdullah said that mathematics taught in schools requires the active involvement of students and teachers in discussion, reflection, and communication, so that students are able to relate various concepts/rules in mathematics [4]. In line with Montague states that students' mathematical problem solving ability is a complex cognitive activity accompanied by a number of processes and strategies [5].

The problem-solving steps proposed by Polya, namely: 1) Understanding the problem, 2) Making a plan, 3) Implementing the plan, 4) Checking again [6]. The indicators of mathematical problem solving ability according to Nila Kesumawati are: 1) Demonstrate understanding of the problem, 2) Able to create or develop mathematical models, 3) Select and develop problem-solving strategies, 4) Able to explain and check the correctness of the answers obtained [7].

According to Haji, the problem solving ability of students who are taught through problem-based learning is better than students who are taught through ordinary learning. The problem-solving abilities consist of the ability to make pictures, guess and check, determine patterns, make tables, make lists, make models, reflect, and write mathematical sentences. The students were active in participating in problem-based learning and students' attitudes towards problem-based learning were very good. They like to be taught with problem-based learning [8].

Quiz Team Type Cooperative Learning

Giving tests to students consists of a broad and narrow scope. Quiz is a test that has a narrow scope as stated by Sujono that "the scope of the test is very limited, covering only one or two topics and may only last a short time". While the Quiz Team according to Silberman in this study is a test conducted by several groups of students consisting of several people. This method aims to make students more actively prepare themselves as well as possible in following the subject matter being taught and are required to work together in teams or groups [9].

Silberman states that there are several kinds of collaborative learning techniques that have been developed including: information seeking methods, study group methods, playing card selection techniques, and *Quiz Team* techniques . This *Quiz Team* technique requires students to work together and can increase students' motivation and sense of responsibility for the material being studied in a fun way and not make students feel afraid [10].

The *Quiz Team* procedure according to Silberman is as follows:

1. The topics to be presented are divided into several sections.
2. Students are divided into several teams
3. The lecturer explains the form of the session and starts presenting in about 10 minutes.

4. Ask team A to prepare a short answer quiz about the material assigned to them. These quizzes take no more than 5 minutes to prepare. The rest of the team took the time to check the notes to answer the question.
5. Team A tests the members of team B. If team B cannot answer, the other team is given the opportunity to answer.
6. Team A proceeds to the next question to the other team members and repeats the process.
7. When the quiz is over, continue with the second part. Appoint team B as the quiz leader. After team B completes the test, continue with the third part and determine another team as the leader and so on

2. RESEARCH METHOD

This research is included in the type of classroom action research (classroom action research) which is carried out cyclically with the aim of improving the teaching and learning process, is contextual in nature and the results are not to be generalized. Researchers are directly involved in 4 stages, namely: planning, acting, observing and evaluating, and reflecting. The research subjects were 33 semester IVB students for the 2018/2019 academic year of Bengkulu University Mathematics Education Study Program. This research was conducted in two cycles. The instrument is a tool used by researchers to obtain data about the application of cooperative learning with the Quiz Team method in improving mathematical problem solving abilities. The types of instruments used are observation sheets (observations) and tests.

Research time and location

The research was carried out from February to March 2019 in the Capita Selecta class of the Mathematics Education undergraduate study program at the Bengkulu University.

2. RESULTS AND DISCUSSION

Research result

Early Reflection

Students are given the initial test (*pretest*) with 5 grains essay. Based on the initial test (*pretest*) which was carried out as a measure of the research measure, the results obtained on the initial test (*pretest*) with an average of 64.727. Based on the above average, it shows that the initial ability in students' mathematical problem solving abilities as seen from the *pretest questions is* still lacking. The results of the pretest of students' mathematical problem solving abilities can be seen in the following tables and graphs:

Table 1 Recap of Pretest Results

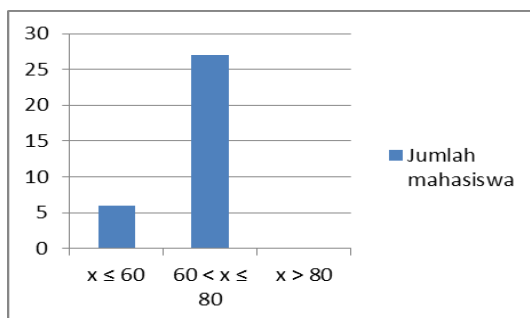| Results obtained				Note
Average score	Number of Students			
	$x \leq 60$	$60 < x \leq 80$	$x > 80$	
64,727	6	27	0	Good

Figure 1 results of the pretest student's mathematical problem solving ability test

Based on the results of the pretest, the students were divided into 11 groups (group A to group K), namely 3 people in each group. Each group consists of 1 student with high ability, 1 person with moderate ability and 1 person with low ability.

Cycle I

The researcher then did the first cycle to see if there was an increase in the student's success criteria. Cycle I was carried out in 3 meetings with the subject of a linear inequality system of two variables. At the first meeting of the first cycle, each group was given a student worksheet (LKM) containing 3 questions to be discussed and then 3 questions to be prepared along with their answers as quiz questions. After discussing the LKM, the model lecturer appointed a group as a quiz guide to carry out the *Quiz Team* . Group A was selected to guide the quiz. Group A prepared 3 quiz questions regarding the material being studied, then groups F, C and H were selected to answer the quiz questions. At the second meeting, group F was chosen as the quiz guide and groups K, E and A answered 3 quiz questions that had been prepared by group F. The third meeting was taking cycle test scores. The results of the first cycle student's mathematical problem solving ability test can be seen in the table and graph as follows:

Table 2 Recap of Cycle I . Test Results

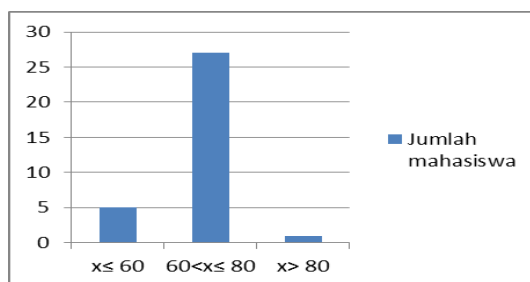| Results obtained				Note
Average score	Number of Students			
	$x \leq 60$	$60 < x \leq 80$	$x > 80$	
70,909	5	27	1	Good

Figure 2 test results of students' mathematical problem solving abilities in cycle I

Based on table 2 above, it can be seen that students who got a score of x there were 1 student who was categorized as good, students who got a score of 27 who were categorized as sufficient and who got a score of 5 people who were categorized as poor, while for the overall average score of 70.909 which was in the Good criteria. In this case,

it can be said that there is an increase and improvement in students' mathematical problem solving abilities from the initial test (*pretest*) to the *posttest* cycle I. However, the results obtained from the test of students' mathematical problem solving abilities in cycle I have not reached the PTK success criteria.

Cycle II

The researcher then conducted cycle II to see if there was an increase in the student's success criteria. Cycle II was also carried out in 3 meetings with the subject of exponentials and logarithms. At the first meeting of the second cycle, each group was given a student worksheet (LKM) containing 3 questions to be discussed and then 3 questions to be prepared along with their answers as quiz questions. After discussing the LKM, the model lecturer appointed a group as a quiz guide to carry out the *Quiz Team* . Group C was chosen to guide the quiz. Group C prepared 3 quiz questions regarding the material being studied, then groups E, I and J were selected to answer the quiz questions. At the second meeting, group J was chosen as the quiz guide and groups B, K and D answered the 3 quiz questions that had been prepared by group J. The third meeting was taking cycle test scores. The results of the second cycle of students' mathematical problem solving ability tests can be seen in table 3 as follows:

Table 3 Recap of Cycle II Test Results

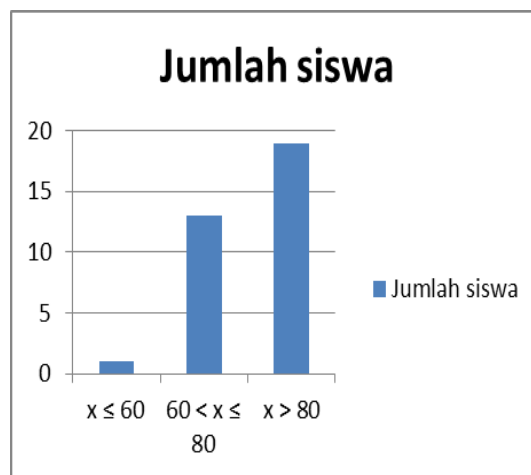| Results obtained				Note
Average score	Number of students			
	$x \leq 60$	$60 < x \leq 80$	$x > 80$	
81,939	1	13	19	Very Good

Figure 3 students' mathematical problem solving ability test results

Based on table 3 above, it can be seen that students who got a score of $x > 80$ there were 19 students who were in good criteria, students who scored   were 13 students who were in the sufficient criteria while students who got a score   were 1 person, and those who were less than 39 were not. there with an average score of 81,939 which in this case is in good criteria. Based on the data above, the average score in cycle II has met the criteria for success in CAR so that the action is stopped.

Discussion

        The results of the students' mathematical problem solving ability tests on the *pretest* , cycle I and cycle II of 33 students can be seen in the image below:
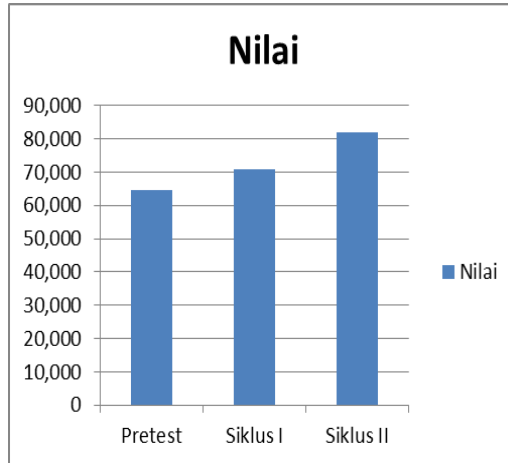

Figure 4 students' mathematical problem solving ability test results

        Based on the results of the *posttest* cycle I and *posttest* cycle II using the *Quiz Team* type cooperative learning model , it was concluded that the mathematical problem solving ability of students in each cycle had increased as seen by the number of students who were able to achieve good criteria in achieving each indicator of mathematical problem solving ability. The increase can be seen in table 4 below:

Table 4 Criteria for the success of mathematical problem solving abilities in each cycle

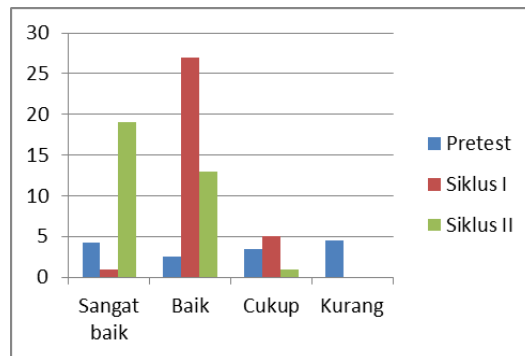| Student achievement criteria	Number of students (cycle I)	Number of students (cycle II)
Very good	1	19
Good	27	13
Enough	5	1
Not enough	0	0

Figure 5 students' mathematical problem solving ability test results

Based on the success criteria in table 5, it can be concluded that this research can be said to be successful. This can be seen based on the average score of achievement of students' mathematical problem solving ability test results who have achieved the expected success criteria. The achievement of the success criteria has increased every cycle as well as the success of achievement in the implementation of mathematical problem solving tests, namely the number of students who have succeeded in achieving the criteria from both cycle I and cycle II which has increased every cycle even though in cycle II there is still 1 student who is classified as sufficient but the average score is The average mathematical problem solving ability of students has reached the predetermined success criteria. Therefore, the research could be stopped until this second cycle.

3. CONCLUSION

The application of cooperative learning with the *quiz team* method can improve students' mathematical problem solving abilities. The improvement of students' mathematical problem solving abilities is seen from the average score of test results obtained by students, namely: in the first cycle it is 70.909 and the second cycle is 81.939. It is hoped that cooperative learning with the *quiz team* method can be applied to mathematics subject matter whose characteristics are the same as the material that has been researched to improve students' mathematical problem solving abilities.

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