Learning The Implementation Of Resolution Model Polya Combined with Jigsaw Learning To Solve Problems On The Story Discussion Of Significant Operation In Class Algebra VIIB SMP Negeri 1 JEMBER Odd Semester Academic Year 2020/2021

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Abstract: In mathematic studies, the one that always be something hard are the story questions, whereas, there is held the research by using problem solving Polya Model that more focus to the problem solving questions. The polya model uses 4 steps. The steps are (1) understanding the problem, (2) make a plan (3) doing the plan, (4) recheck and combined with jigsaw learning model group focused. In this research, the problems are: (1) how to apply the Polya problem solving models combined with jigsaw learning model in sub study algebra operation. (2) what are the activity of the students as long as Polya problem solving models combined with jigsaw learning model applied. (3) how are the completeness of student learning after the applyment of Polya problem solving models combined with jigsaw learning model sub study algebra operation. Research result shows that in first cycle, the classical completeness has not been reached yet, whereas the second cycle should be occured. In second cycle, the classical completeness has fulfilled by 76%. It means that the research has a good rate.

Keywords—Polya Model Problem Solving, Jigsaw Students Activity, Result of Students's Learning

1. INTRODUCTION (*Heading 1*)

Education is a conscious and planned effort to create an atmosphere of learning and the learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society and the nation (Law No. 20 of 2003 concerning the National Education System). Furthermore, states that education is essentially a continuous process that exists in humans to overcome problems in life [4]. Therefore, students as a component in education must always be trained and accustomed to think independently to solve problems.

Mathematics as one of the basic sciences, both its applied aspects and its reasoning aspects, has an important role in improving science and technology knowledge. This means that to a certain extent mathematics needs to be mastered by all citizens in order to be able to survive in the era of globalization and advanced technology. For this reason, the implementation of learning in front of the class is not enough only to equip students with various knowledge of mathematics, but more than that, real efforts are needed to be carried out intensively to develop students' thinking skills, including problem solving. The development of creative thinking skills is one of the focuses of learning mathematics. Through mathematics learning, students are expected to have the ability to think logically, analytically, systematically, critically, and creatively, and have the ability to work together [1]. The development of creative thinking skills needs to be done because this ability is one of the abilities desired by the world of work according to the *Career Center of the Maine Department of Labor USA* [5]. There is no doubt that the ability to think creatively is also a determinant of the excellence of a nation. The competitive power of a nation is largely determined by the creativity of its human resources.

Learning mathematics not only learns about addition or subtraction operations, but also learns about many things that underlie almost all activities of Indonesian society. Mathematics is a branch of science whose objects are abstract, because the objects are only the creation of human reason and are not empirical facts.

Learning activities are closely related to two activities, namely learning and teaching. Learning is often done by students individually. When students learn, there will be mental changes in students. Skinner says that learning is a behavior [2]. When people learn, the response gets better, on the other hand, if they don't learn, the response decreases. According to Gagne learning is a complex activity, learning outcomes are in the form of capabilities, after learning people have skills, knowledge, attitudes and values [2]. Thus, learning is often defined as the process of receiving new information to be digested and then applied in real life by each individual. Learning will affect the actions taken by each individual in his life.

Teaching in the process of development is still considered an activity of conveying or transferring knowledge. This kind of view is still commonly used among teachers. The results of research and expert opinion are expected to further refine traditional concepts regarding the delivery of knowledge in these teaching activities. The

teaching process is more specifically as a mentoring process for the success of information income (learning) for students. In other words, teaching is no longer focused on teaching lectures to convey all knowledge to students, but teaching in the current curriculum concept is how the teacher's creativity applies to being able to convey knowledge in an attractive and easily accepted way by students.

The current Indonesian education curriculum has been designed to provide the concept of learning as a process of receiving knowledge based on personal activities. So more students are required to be active in seeking all information, but the teacher still accompanies the student's learning process. Likewise with learning mathematics. Teachers can apply these new methods to vary the implementation of learning in class. This is needed so that students do not feel bored with learning mathematics. Especially if you remember that most students think that mathematics is the most frightening subject, so that some variations are needed in the learning process so that learning mathematics is more interesting.

Based on observations and interviews with teachers in the field of mathematics studies class VIIB SMP Negeri 1 Jember which was held on 1 September 2020, it shows that there are still many students who have difficulty understanding the story questions and material in the algebra chapter, the level of completeness is still very minimal, ranging from 37.5% of students. who do not pass the class from year to year with a passing standard of 75. This can be seen from the results of their tests on number material, especially story problems and the results of tests on algebraic material. So far, teachers often use the lecture method in the learning process. During the learning process in the classroom using the lecture method, only a few students seemed active and some were passive. With this background, we will try to solve the pattern problem.

In learning, especially mathematics learning in schools, it is not enough to only provide a large amount of knowledge to students, but students need to have the skills to make choices and solve various problems using logical reasoning. One way to improve students' thinking skills is to provide a number ofskills problem-solving combined with a jigsaw learning model.

The jigsaw learning method or model is a cooperative learning technique in which students, not teachers, have greater responsibility in implementing learning [1]. The purpose of this jigsaw learning model is to develop teamwork, cooperative learning skills, and to master in-depth knowledge that would not have been possible if they tried to learn all the material alone.

For these problem solving skills will be achieved by students if in teacher learning conditions students to be able to construct their knowledge and facilitate students to carry out learning activities that involve problem solving. To teach problem solving, one of the models that can be used is the problem solving model of the pattern.

This is in accordance with Sutawidjaja's opinion that problems in mathematics can be in the form of story problems [10]. Storymore difficult for problems arestudents to solve than problems that involve numbers. In solving the story questions, students are required to know what is known and what is being asked in the questions. Furthermore, students can create a mathematical model and solve the mathematical model based on the appropriate formula or procedure. The results of this model are then reinterpreted into the original problem.

The use of the polya learning model in the subject of the operation of the algebraic form is expected to be able to improve students' ability to analyze and understand a problem, make a solution plan, and then review the results of their work. Sweden states that math story problems are questions that are expressed in the form of stories taken from students' daily experiences related to mathematical concepts [7]. Mathematical story problems are presented in the form of a story or a series of simple and meaningful sentences. The meaning here means that the problem contains a problem that demands a solution. Hudojo states that the meaning of the problem is the suitability of the problem with the level of thinking of students [7]. Thus, story questions are one form of question that is considered effective for teaching students' thinking skills, especially for problem solving.

Based on these problems, a study was conducted with the title "Application of Problem Solving Learning Model Combined with Jigsaw Learning Model to Solve Story Questions on the Subject of Algebra Operations in Class VII B Students of SMP Negeri 1 Jember Odd Semester 2020/2021 Academic Year".

2. RESEARCH METHODS

The subjects of this study were class VII B students of SMP Negeri 1 Jember. This type of research is classroom action research. While this type of research is classroom action research (PTK).

In this study, the preliminary action taken was to conduct interviews with class VII B mathematics teachers. This interview aims to obtain information about the teaching methods used by the previous teacher and how student activities during learning, as well as to find out the obstacles and weaknesses of students in mastering concepts. math that he had before. The results of the preliminary actions are used to plan the cycle.

The data collected were observational data which were the activities of students and researchers during learning, student worksheet scores (LKS), ability test scores and daily test scores.

Data analysis in this study is qualitative data analysis and quantitative data analysis. The qualitative data analysis used is descriptive of the data obtained from the interviews, while the quantitative data analysis is used to process data in the form of numbers obtained from the results of tests and

observations. Data analysis in this study can be described as follows:

1) Learning outcomes are determined at the end of the cycle using the formula:

$$HB = 20\% \sum LKS + 30\% \sum UK + 50\% \sum UH$$

$\sum LKS$ = Jumlah skor Lembar Kerja siswa
$\sum UK$ = Jumlah skor tes uji kemampuan
$\sum UH$ = Jumlah Skor ulangan harian [3]

    a. twenty percent for LKS because students still receive assistance and guidance from teachers or their peers in working on LKS.

    b. Thirty percent for the ability test because students have started to be required to take the test individually even though they are allowed to see the notes and assignments that have been given by the teacher.

    c. Fifty percent for daily tests because in addition to students being required to take the test individually, students are also not allowed to see notes and assignments that have been given by the teacher.

From the learning outcomes, it can be seen that the completeness of learning in the learning that has been implemented. The criteria for completeness of student learning outcomes can be stated as follows:

    a. individual absorption, a student is said to have completed learning if he reaches a score of $\geq$ 75 from a maximum score of 100 (learning completeness standard minimumin junior high school mathematics),

    b. Classical absorption, a class is said to be complete learning if there is a minimum of 70% that has achieved a score of $\geq$ 75 from a maximum score of 100 (standard of Minimumlearning completeness in junior high school mathematics).

2) The percentage of student learning completeness after learning takes place in with the formula:

$$P_1 = \frac{t}{T} \times 100\%$$

Information:
P_1 = percentage of student learning completeness
t = number of student who complete learning
T = total number of students[3]

3) the percentage of student learning activities in learning is calculated by the formula:

$$P_2 = \frac{\sum AS}{S} \times 100\%$$

Information:
P_2 = percentage of student activity
$\sum AS$ = total score of activity achieved
S = maximum total score of student activity. [3]

4) The percentage of teacher activity in learning is calculated by the formula:

$$P_3 = \frac{\sum AG}{G} \times 100\%$$

Information:
P_3 = percentage of teacher activity
$\sum AG$ = total score of teacher activity achieved
G = maximum number of teacher activity scores [3]

Table 3.1 Category of Assessment of the Percentage of Student Learning Activities and the Percentage of

Activities in the Activity Category	Value
Very Good	$86.63\% \leq P_2, P_3 < 100\%$
Good	$73.29\% \leq P_2, P_3 < 86.63\%$
Fairly Good	$59.5\% \leq P_2, P_3 < 73.29\%$
Poor	$46.5\% \leq P_2, P_3 < 59,5\%$
Very Less	$33.3\% \leq P_2, P_3 < 46.65\%$

(Adapatation from the Ministry of National Education, 2004: 17)

(Adapatation from the Ministry of National Education, 2004: 17)

[4]

5) The criteria for completeness of PTK
This PTK research is said to be complete if it has achieved classical completeness.

3. RESULTS AND DISCUSSION

The Application of Problem Solving Learning Polya Model Combined with Jigsaw Learning Model to Solve Story Questions on the Subject of Algebra Operations in Class VII B Students of SMP Negeri 1 Jember went well. In cycle I, the first learning material taught is fractions of algebra, the second learning material taught is the use of algebra to solve problems. For cycle II, the material in the first and second learning is the same as the material in cycle I. The reason for using the same material is in order to improve learning outcomes and student activities in cycle I if the learning outcomes and student activities in the first cycle do not reach classical completeness. If in the first cycle classical completeness has been achieved, the second cycle will still be carried out which aims to further improve student learning outcomes and activities.

Based on the results of reflection in the first cycle, the resulting learning is less conducive, because students are less active and there are still some students who have not been able to answer the teacher's questions correctly. Students seem not to concentrate on the lesson and only a few students who learn well answer the teacher's questions. The cause of this may also be an error by the teacher, because the teacher is less clear in explaining the previous subject matter, does not motivate students, or does not involve students in learning activities.

Research Results and Discussion Cycle I and Cycle II

1) Research Results Cycle I

From the implementation of cycle I, data were obtained, namely student learning outcomes data, teacher activity observation data and student activity observation data.

a. Learning Outcomes

After analyzing the data from the results of the test cycle 1, there were 24 students (60%) who completed the test, 16 students (40%) who did not complete the test with the highest score of 100 and the lowest score of 40. The most mistakes were made in making plans and check back. From the results of the interviews, students were not used to making plans and checking again.

b. The results of observations of teacher

activities. The core activities carried out by the teacher include orienting students in learning, in this case the teacher provides guidance to groups that are experiencing difficulties. Students in their groups carry out activities with teacher guidance, however, teacher guidance is still not evenly distributed in each group. Teachers provided more guidance to groups who were active asking questions, while groups that tended to be passive only got brief teacher guidance.

In closing activities, the teacher guides students in making conclusions, most of them are still done by the teacher so that students are not used to thinking on their own. In general, in this first cycle the teacher still dominates the learning.

The percentage of teacher activity in the first cycle was quite good at 67%. Teacher preparation is mature enough and during the learning process the teacher has implemented the Jigsaw I learning model in accordance with the lesson plans that have been made. However, it needs to be improved again in cycle II with improvements such as equal distribution of guidance to each group, guiding students in writing discussion results, and giving students the opportunity to get used to thinking on their own.

c. Observation results of student activities

Based on the results of observations of student activity, student activity was only 38.6%, this is because students still lacked confidence and were still awkward to work in groups. In addition, the monitoring of student behavior in conducting group discussions is still lacking. It can be seen that there are still students who play and disturb friends so they don't pay attention to the teacher's explanation. Lack of activity in learning needs improvement by providing motivational encouragement to students to be serious in doing assignments, unifying opinions, not being able to disturb friends and having active discussions and

giving praise to students who ask and answer questions. Teachers must be able to give attention and motivation to student activities in their groups. This problem will be attempted to improve in cycle II.

Thus, from the results of observation and reflection in cycle I it can be concluded that the activities and learning outcomes of students have not met the indicators of success. This will be corrected in the second cycle of learning by providing direction and motivation so that students carry out active discussions. Working closely with the group, maximizing the involvement of clever students to actively guide members who are still lacking, confident during presentations, dare to ask questions, and dare to answer good questions given by peers and teachers. In order to work on the problem, it needs to be improved, especially in Polya's steps to make plans and check again.

2) Discussion of Cycle II

a. Learning Outcomes

In cycle II, classical learning completeness was obtained by 76%. Thus the learning outcomes in cycle II are in accordance with the established success indicators. The success of this learning outcome is due to the implementation of cycle II learning students have interacted with the learning model applied so that the Jigsaw type learning model which is more student-centered makes student activity more and results in better learning outcomes. Besides, the role of the teacher as a guide and facilitator also influences the success of student learning outcomes. However, the polya stage at the step of re-checking has not been successfully improved.

b. The results of observations of teacher activities

The achievement of expected student learning outcomes as defined in the indicators of success cannot be separated from the role of the teacher in the learning process. Remembering the teacher is one component that affects student learning outcomes. Based on the results of the teacher activity sheet in cycle II, it can be seen that teachers are increasingly skilled in implementing the Jigsaw type of cooperative learning model. The teacher's abilities such as orienting students in learning, guiding discussions, directing presentations, and giving feedback have increased marked by an increase in the percentage of observations from cycle I to cycle II by 12.2% (from 67% to 79.2%).

c. The results of observations of student activities

The learning outcomes that have been achieved in cycle II are also influenced by the many student activities during learning activities. In cycle II, students can follow the learning path as expected in the Jigsaw II learning model. Student activities such as paying attention to teacher explanations, asking questions, completing assignments with group discussions, thinking together, working together and expressing opinions are quite good. Marked by the acquisition of a fairly high percentage of observation results, namely 79.5% (from the previous cycle I, namely 38.6%)

In the second cycle, classical learning completeness was obtained at 76%. Thus the learning outcomes in cycle II are in accordance with the established success indicators. Based on the results of the study, the main obstacle for students in solving story problems was their weak ability to plan completion and re-check. However, in this research, planning skills can be improved. The weakness of students at the rechecking stage is because students are more fixated on the way the teacher teaches without developing a way to solve a problem in their own way. On this occasion, no further research was carried out to find out the cause of the weakness of students at the rechecking stage due to insufficient time given. For other researchers, this can be used as a development to conduct further research.

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4. CONCLUSIONS AND SUGGESTIONS

Based on the results and discussion, the conclusions can be drawn following.

1) The Application of Problem Solving Learning Polya Model Combined with Jigsaw Learning Model to Solve Story Questions on the Subject of Algebra Operations in Class VII B Students of SMP Negeri 1 Jember went well. Based on the results of the study, the main obstacle for students in solving story problems was their weak ability to plan completion and re-check. However, in this research, planning skills can be improved. The weakness of students at the rechecking stage is because students are more fixated on the way the teacher teaches without developing a way to solve a problem in their own way. On this occasion, no further research was carried out to find out the cause of the weakness of students at the rechecking stage due to insufficient time given. For other researchers, this can be used as a development to conduct further research.

2) In cycle II, classical learning completeness was obtained by 76%, which means an increase from cycle I. Thus the learning outcomes in cycle II are in accordance with the established success indicators.

3) The teacher's ability such as orienting students in learning, guiding discussions, directing presentations, and giving feedback has increased marked by an increase in the percentage of observations from cycle I to cycle II by12.2% (from 67% to 79.2%).

Based on the results of this study, the following suggestions are proposed.

1) Based on the results of the research, the application of the Polya model of learning can help solve problems, as evidenced by the level of completeness in cycle II and the response from the teachers of SMP Negeri I Jember is very good.

2) On this occasion, no further research was carried out to find a solution so that the re-checking stage had increased. In applying the Polya model of problem solving, students should be more guided in making plans to solve problems, because each problem has its own scale and at the rechecking stage, students are not only guided to prove the correct answer, but are also guided by using other methods to solve these problems, so that students are more creative in solving other problems or similar problems that have been taught.

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