IMPROVEMENT OF PROBLEM SOLVING SKILLS BY USING COOPERATIVE INTEGRATED READING AND COMPOSITION MODEL WITH POLYA STRATEGY IN JUNIOR HIGH SCHOOL

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IMPROVEMENT OF PROBLEM SOLVING SKILLS BY USING COOPERATIVE INTEGRATED READING AND COMPOSITION MODEL WITH POLYA STRATEGY IN JUNIOR HIGH SCHOOL

By

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Abstract

The purpose of this research is to know improving of students' problem solving skills by using combination of CIRC model dan Polya strategy. This research used a qualitative approach with Classroom Action Research (CAR), design implemented in two cycles. Each cylces has two meetings. Researcher and mathematics teacher grade VIII D of Al-Islam 1 Junior High School of Surakarta as the subject of the action. The number of students of grade VIII D are 36 students as subject that receive the action. Data collection techniques are used observation, test, documentation and field notes sheet. The technique of data analysis consists of: data reduction, data presentation and data conclusion. Based on the research result it can be conclude that the application of combination of CIRC model and Polya strategy can improve student's problem solving skills of student grade VIII D. It can be seen from increasing in the percentage of indicators problem solving skills, namely (1) understanding the problems, increased from 33, 3% to 72.2%, (2) planning strategy, increased from 38, 9% to 75%, (3) executing plan, increased from 41, 7% to 77, 8% and (4)checking the answer, increased from 0% to 52.8%.

Keywords : CIRC, Polya Strategy, problem solving skills.

INTRODUCTION

The importance of learning mathematics for learners to have the ability to solve problems that include the ability to understand the problem, devised a mathematical model, solve the model and interpretation the obtained solution. Approach to problem solving is the focus in mathematics which include a closed issue, the settlement has a single solution and solving problems in different ways (open ended). Some of the skills to understand the problem in directly problem solving is to understand and identify what is known, what is being asked, then

students are asked to find or prove, pick -solving approach or strategy, completing the model, to interpret the solution. So that, problem solving should be the main focus of the mathematics curriculum (Sobel, 2004: 60).

Based on the results of observations at Al - Islam 1 Junior High School of Surakarta grade VIII D, there is a problem in the completion of the students do math problems . The errors are on the order and problem solving skills, including (1) 66.7 % of students who have not been able to identify the elements that are known and asked the question, (2) 61.1 % of students have not been able to plan the completion strategy, (3) 58.3 % of students have not been able to apply strategies to solve problems, and (4) 100 % of students no one has to re-examine the answers given. The root of the problem in this research is a process where learning is not appropriate in the teaching and learning activities in the classroom, so students have difficulty in solving problem solving.

Teachers have a crucial role for the learning process (Kokom K, 2013 : 253). For teachers it can be said to be spearheading the implementation of the education is very influential in the learning process. Expertise and authority of the teacher is crucial continuity of teaching and learning in the classroom and outside the classroom effect. Teachers should be good at bringing the students to the goals to be achieved.

The selection of models and instructional strategies affect student learning outcomes are achieved. One model of learning that can be applied in anticipation of problems that arise during the process of learning mathematics in junior Al - Islam 1 Surakarta class VIII D is a combination of CIRC model and Polya learning outcomes, although in this study the results of student learning does not become the main focus.

Improvement of problem solving skills in this research can be observed through observations fr strategy. CIRC models include one type of learning model of cooperative learning. The main activities in the CIRC is to solve the problem include a series of activities with specific, ie one member of the group/multiple members read each question, making predictions about the intentions or interpret. Steps CIRC models, among others: (1) forming a group consisting of 4 persons,

(2) provide a discourse of teachers in accordance with the topic of learning, (3) students work together to read the material and solve the problems set by the teacher on a piece of paper, (4) students presented the results of the group, (5) and the students and teachers make inferences (Tjipto S, 2011: 25).

In ensuring the success of solving the problem is not just a formula that can be used, but the process and the role of the teacher by providing experiences in solving problems also affect (Sobel, 2004:61). From these two combinations Polya strategy can help students to improve problem solving skills. Process is referred to in the strategy Polya stages in problem solving. The stages commonly known as See (understand the problem), Plan (plan), Do (implement the plan), and Check (test answer). From the above description, model selection CIRC combination Polya Strategy is expected to practice skills that learners are integrated between read something and write. The integration of reading and writing using the stages in solving a problem is expected to enhance the problem solving skills of learners.

Based on the explanation, there needs to be imprevement of problem solving skills in mathematics learning process. One of effort that concern teacher is learning method that used, because it will affect to the students's problem solving skills. To increase the problem solving skills of students, mathematics teacher should need to use the learning cooperative methods. Through the implementation of cooperative learning type CIRC model and combined Polya strategy, as expected can improve problem solving skills of students.

The purpose of this research is to improve problem solving skills of students in mathematics learning in grade VIII D of Al Islam 1 Junior High School of Surakarta by using combination of CIRC model and polya strategy.

RESEARCH METHODS

The research conducted at AL-ISLAM 1 Junior High School of Surakarta grade VIII D in academic year 2013/2014 by the number is 36 students. The time for research activities carried out in Januari 2014. The researcher served diagnose, make a concept and action design with mathematics teacher.

Research activities in Classroom Action Research (CAR) departing from the real problems faced by the teacher in the learning process, then an alternative solution of the problem is reflected and followed up with concrete actions planned and measured (Sutama, 2010: 134).

Classroom Action Research conducted by researcher, teacher and principals in the classroom for perceiving problems faced by researcher and the teacher aims to solve problems that arise in the classroom is student problem solving skills is low. Implementation of these actions is carried out by the researcher with the help of the mathematics teacher collaboratively.

This research consists of several phases of activities, included 1) Knowing Problems Phase, 2) Preparation Actions Phase, 3) Action Planning Phase, 4) Measuring Implementation Phase, 5) Observation and Interpretation Phase, 6) Reflection Phase, 7) Report Preparation Phase (conclusion). Exposure Classroom Action Research results are brought together with a description of the problem, formulation of the problem, objectives and assessment theory. The conclusion of the result of increased learning mathematics process, namely improve the student's problem solving skills in mathematics learning.

Data collection techniques used in this research included : 1) observation and interviews, 2) tests, 3) field notes and 4) documentations to get optimal results. This study used data triangulation technique to keep the validity of the data. Analysis of the data in this study starts from the beginning to the end of data collection (analysis of process and product). Data analysis conducted on each data collected by either quantitative data or qualitative data. Quantitative data analyzed by the percentage (%), that is simplest quantitative. Qualitative data analyzed by make qualitative category. Over all, the data from the research field is processed and analyzed descriptive qualitatively.

Technical qualitative analysis refers to the analysis model Miles and Huberman (1992: 16-19) were conducted in three sequential components are: 1) Data reduction which includes the selection of data through strict selection, through summary or brief description, categorization it in a wider pattern, 2) Presentation of data is done in order to organize the data that constitute a

systematic compilation of information from the data reduction starting from planning, implementation, observation and reflection on the actions of each cycle, 3) Inferences or verify a quest for the meaning of the data, noting the regularity and classification data. The collected data is presented in a systematic and meaningful.

RESULT AND DISCUSSION

First dialogue between researchers and teachers of mathematics held on October 1, 2013 in front of the classroom AL-ISLAM 1 Junior High School of Surakarta grade VIII D. This dialogue resulted in an agreement that: 1) attempt to improve problem-solving skills students need to be done, 2) identify suspected problems as a barrier to developing students 'problem-solving skills, 3) alternative learning practiced in efforts to improve students' problem solving skills AL-ISLAM 1 Junior High School of Surakarta grade VIII D in mathematics learning is through a combination of Model CIRC and Polya Strategy. Indicators of the achievement of the desired problem-solving skills of researchers, namely (1) understanding the problems (more than 65% of students), (2) planning strategy (more than 65% of students), (3) executing plan (more than 65% of students), and (4) checking the answer (more than 50% of students).

Improvement of problem solving skills in learning math using combination of Model CIRC and Polya Strategy conducted in two cycles. Each cycle consists of four stages: (l) planning, (2) the implementation of the action, (3) observation, (4) analysis and reflection. Each cycle consists of two meetings with each meeting time is 2 x 40 minutes.

Having completed the first cycle and observe the action, researchers and teachers together to reflect on the level of achievement of the objectives of the act. In the first cycle, there are several indicators of the success of problem-solving skills of students who have achieved and there are some that have not been reached.

In the first cycle, the indicator implement plans and checks are still low and has not increased in accordance with the expected success rate. The cause of both

indicators are still low, the indicator still many students plan melaksanakn wrong in doing calculations, such as addition and multiplication process. This is because time is considered to students so that they feel less haste in the process of calculation. Based on the results of the above reflections, researchers and teachers partner together researchers evaluated the actions that have been implemented, then the researcher and the teacher concluded that the class action cycle I have not experienced a significant improvement and in need of repair in cycle II.

After the execution and observation of class action cycle II, researchers and teachers together to reflect on the level of achievement of these goals . In this second cycle all indicators have been achieved. A class act with a combination of CIRC model and Polya strategy running smoothly and according to plan, although there are slight disadvantage that there are still some students who are forced to look at this model of learning and less enjoyed.

Based on the second cycle of reflection, an increase in the indicators had a significant problem-solving skills and in accordance with the achievement of desired by researchers, so that teachers and researchers to the conclusion that the class action combination of CIRC model and Polya strategy ended on the second cycle.

After the execution and observation of class action cycle II, researchers and teachers together to reflect on the level of achievement of these goals. In this second cycle all indicators have been achieved. A class act with a combination of CIRC model and Polya Strategy running smoothly and according to plan, although there are slight disadvantage that there are still some students who are forced to look at this model of learning and problem solving skills are less menikmatinya. Improvement these students may indirectly improve student om the following table :

Table 1. Table of Problem Solving Skills Improvement

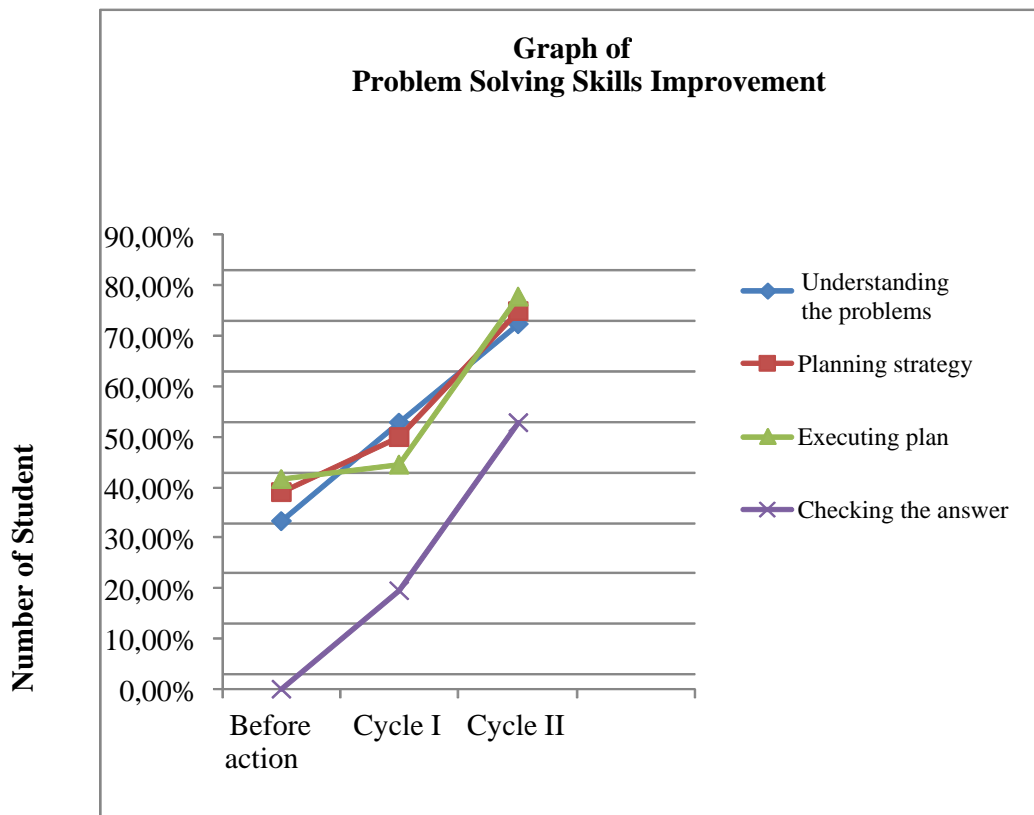| Indicators	Percentage (Number of Students)		
	Before Action	Cycle I	Cycle II
Understanding the problems	33,3 % (12)	52,8% (19)	72,2% (26)
Planning strategy	38,9% (14)	50% (18)	75% (27)
Executing plan	41,7% (15)	44,4% (16)	77,8% (28)
Checking the answer	0% (0)	19,4% (7)	52,8% (19)

Figure 1. Graph Of Problem Solving Skills Improvement

Based on table 1. and graph 1. it can be concluded that the application of combination of CIRC model and Polya Strategy can improve problem-solving skills of AL-ISLAM 1 Junior High School of Surakarta grade VIII. It can be seen from the increase in indicators of problem-solving skills. Increasing happened in

the indicators have an impact on students' mathematics learning outcomes, but the study results are not the primary focus in this study. Here is an explanation of each indicator:

1. Understanding the problems

    Usually students have to restate the problem in his own language. Imagine situations in mind the problem is also helpful to understand the structure of the problem (Sri W, 2010: 35). In this indicator is said increase can be seen from 33.3% of students were able to understand the problem, but after the class action cycle I and cycle II there was an increase from 52.8% to 72.2% of students.

    In this study, it can be seen that after the action, problem solving skills of students in the indicator to understand the problem is said to increase after the applied combination of CIRC model and Polya. This is supported by the results of the study Desti (2012) which states that out of 25 students, with the indicator to understand the mathematical model measures 8% of students before and after the action to 64% of students.

2. Planning strategy

    Plan solution built by considering the structure of problems and questions that must be answered. If the problem is a matter of routine with the task of writing an open mathematical sentence, it is necessary to translation problems into mathematical language (Sri W, 2010: 35). In this indicator is said increase can be seen from only 38,9% of students were able to completion plan, but after the class action cycle I and cycle II there was an increase from 50% to 75% of students.

    In this study, it can be seen that after the action, problem solving skills of students in the completion of the planned indicators increased is said to increase after the applied combination of CIRC model and Polya. This is supported by the results of the study Desti (2012) which states that out of 25 students, with a plan indicators, measures 8% of students before and after the action to 76% of students.

3. Executing plan

   If the solution requires computing, most students will use a calculator to compute than with paper and pencil to calculate and reduce concerns that often occurs in problem solving. If inconsistencies arise when implementing the plan, the process should be reviewed to find the source of his troubles (Sri W, 2010: 35). In this indicator is said increase can be seen from only 41,7% of students were able to implement plan but after the class action cycle I and cycle II there was an increase from 44.4% to 77.8% of students.

   In this study, it can be seen that after the action, problem solving skills of students in carrying out the plan indicators increased is said to increase after the applied combination of CIRC model and Polya. This is supported by the results of the study Desti (2012) which states that out of 25 students, with plans to implement the indicators, measures 8% of students before and after the action to 64% of students.

4. Checking the answer

   An important part of this step is to make the expansion problem involving the search of alternative solutions (Sri W, 2010: 35). In this indicator is said increase can be seen from only 0% of students were able to implement plan but after the class action cycle I and cycle II there was an increase from 19,4% to 52,8% of students.

   In this study, it can be seen that after the action, problem solving skills of students in the indicator check is said to increase is said to increase after the applied combination of CIRC model and Polya. This is supported by the results of the study Desti (2012) which states that out of 25 students, with indicators to re-examine the actions answers 0% of students before and after the action to 44% of students.

This suggests a combination of CIRC model and Polya can improve students' problem-solving skills. The conclusion is supported by previous studies, Desti (2012) concluded that the application of problem-solving learning model through Polya strategies can improve student learning outcomes. Riasar (2010) conclude

that result showed that there was significant difference between the effectiveness of traditional teaching method and problem solving method in teaching of mathematics at elementary level. Kokom Komariyah (2011) in his study also concluded that the method of teaching problem solving Polya models can enhance students' ability in solving mathematical problems. In addition, Yustina Titik Purwanti (2010) also obtain the results of research on methods of CIRC. He concluded in his research, that the use of CIRC method can make the learning process more dynamic, varied and fun so that increases student learning outcomes.

CONCLUSION

This study is a class action about the application of combination of CIRC model and Polya Strategy to improve problem-solving skills of AL-ISLAM 1 Junior High School of Surakarta grade VIII academic year 2013/2014. The results were conducted by researchers and collaborate with teachers of mathematics can be summarized as follows :

1) Combination of CIRC model and Polya Strategy can improve students' problem solving skills, with the following steps: (1) forming a group consisting of 4 persons, (2) provide a discourse of teachers in accordance with the topic of learning, (3) students work together to read the material and solve the problems by using polya steps and set by the teacher on a piece of paper, (4) students presented the results of the group, (5) and the students and teachers make inferences.

2) There is an increasing problem solving skills through a combination of Polya Strategy CIRC models can be seen from the following indicators : 1) Understanding the problems, increased from 33, 3% to 72.2%, (2) Planning strategy, increased from 38, 9% to 75%, (3) Executing plan, increased from 41, 7% to 77, 8% and (4) Checking the answer, increased from 0% to 52.8%.

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