

Problem Based-Learning To Improve Mathematical Abilities In The Context Of Forming The Critical Thinking Character Of Elementary School Students

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Abstract. Problem-based learning math is forming children critical thinking in solving problems. Therefore, it can make children whose character so as to answer the question of educational quality improvement is expected in particular on education in elementary schools. The purpose of this research is to develop a problem-based learning math in elementary school. This study uses classroom action research approach. The results obtained in this study showed an increase in math skills of elementary school students

Keywords: mathematical ability; students; Problem-Based Learning.

1. Introduction

Mathematics is one of the subjects taught at all levels of education who possess a very important role in the mastery of science and technology. Learning mathematics in elementary school (SD) should receive serious attention from various parties such as educators, government, parents, and the community, for learning math in elementary school is a stone of the basic concepts that are used as a basis for study at the next level, in addition to the mastery of mathematics strong early required for the acquisition and creation of technology in the future

The efforts of teachers in teaching and learning are very important part in achieving the success of the planned learning objectives. Teachers should pick a wide variety of approaches, strategies, methods appropriate to the situation so that the planned learning objectives to be achieved (Robert. E. Slavin, 2005: 15). Therefore, the selection of the learning model is an important thing. The learning model is a form of program guidelines or instructions teaching strategies designed to achieve a lesson. The guide contains the teacher's responsibility to plan and implement, and evaluate learning activities.

To be able to apply the thinking mathematically, explicitly in Competency-Based Curriculum Elementary School in 2004 formulated the goal of teaching mathematics in elementary school as follows: (1) to foster and develop numeracy skills (using numbers) as a tool of everyday life, (2) foster the ability of students who can be converted through mathematical activities, (3) develop a basic knowledge of mathematics as a provision for further study, and (4) forming the logical attitude, critical, creative, and disciplined. To achieve the goal of teaching to

four can be realized through the teaching process by providing problem-solving exercises (problem solving).

In order to assess possible that we can take to improve the learning of mathematics in our country, such as the ability to solve problems, and the era of globalization, especially in math education, we should examine the possibility to take advantage of information about the formation of matter (problem solving) mathematics for improvement learning of mathematics. Furthermore, NCTM (Nation Council Teachers of Mathematics) in 1989 stated that the exercise of problem solving will be able to produce individuals who are competent in the field of mathematics. With the thought and practice of mathematical problem solving (problem solving), will make people think of math. Think mathematically is to think of common sense, logical, critical, creative and practical.

The learning model is based on several theories of learning, such as the theory of constructivism, meaningful learning theory of David Ausubel, Vigotsky learning theory and learning theory Jerome S. Bruner. Problem-based learning by Moffa (in Andi Prastowo, 2013: 69) is "a learning using real-world problems as a context for students to learn about critical thinking and problem solving skills, as well as to acquire the knowledge and concepts that are the essence of the subject matter".

Problem-based learning is one instructional approach used to stimulate high-level thinking in a situation-oriented students in real world problems, including inconsistencies in learning how to learn. (Ibrahim and Nur in Rusman, 2014: 241). Learning strategies using real-world problems as a context for students to learn about critical thinking and problem solving skills, as well as to acquire the knowledge and concepts that are the essence of his subjects. In this case the students involved in the investigation to integrate problem-solving skills and concepts of the various contents of the subject matter. "This strategy includes the collection of information related to the question, synthesize, and present their findings to others". Bern and Erickson (Kokom Komalasari, Ibrahim, Nur and Ismail (Rusman 2014: 243) argues that the steps (syntax) Problem Based Learning is as follows. Phase 1: Orientation to the problem. In this phase, the teacher identifies learning objectives, explaining the necessary logistics, and motivate students engage in problem solving activities. Phase 2: Organize students to learn. This phase requires a teacher to help students learn to define and organize tasks related to the issue. Phase 3: Guiding experience of individual / group. This phase teachers will encourage students to collect appropriate information, carry out experiments to get an explanation and problem solving. The next phase 4: Develop and present the work. Phase four is the teacher help students in planning and preparing the appropriate work such as reports and help them to share their work with friends. And last phase 5: Analyze and evaluate the problem solving process. In this fifth phase teachers help students to reflection or evaluation of their investigations and the processes they use.

2. Research Methods

This research was conducted using classroom action research methods. In the context of this research is a concept that will be acted upon math skills of elementary school students, especially in elementary GMIM 3 Tomohon. While the action under study is the use of problem-based learning model in primary school students. This

study refers to the model proposed by Thursday and Mc. Taggart where this model includes four stages: planning, action, observation, and reflection. (Aqip Z, 2006: 129. The research subjects in this study were students in sixth grade III GMIM Tomohon. The data obtained through the questionnaire will be analyzed using descriptive analysis techniques.

3. Results and Discussion

Research result

Action Research (PTK) was conducted in the fourth grade N Sarongsong, with the number of students 15 people consisting of 6 girls and 9 boys. The learning model used is problem-based learning to improve student learning outcomes on the theme of my neighborhood N Sarongsong fourth grade. Cycle I held on Thursday, November 22, 2018 with the theme of my neighborhood and sub-themes of my neighborhood and Cycle II was held on Monday, November 26, 2018, the second cycle is an improvement of cycle I.

Cycle I held with the theme of my neighborhood and sub-themes of my neighborhood. At this stage the initial steps were taken by the researchers are: 1) Select and set the theme and sub-themes of learning. 2) Learning Implementation Plan (RPP). 3) Determination and selection of media and learning resources. 4) Designing the shape, the number of working groups. 5) Preparing Student Worksheet (LKS). 6) Prepare Sheet Ratings (LP). 7) Prepare the observation sheets as guidelines for monitoring in accordance with the actions that will be used.

Implementation of learning using the steps in problem-based learning model with the theme of my neighborhood as follows: The learning activities starting with teacher deliver learning objectives to be achieved, the teacher opens the material by showing a drawing of a map of Lani's neighborhood and asking questions about the image to the students to gain early knowledge of the environment with public facilities. Students individually make questions based on the picture then the questions are given to their seatmate to answer the questions. Students learn to define and organize tasks related to the issue. Students are divided into groups by means of student counting numbers 1 to 4, who called the number 1 will be a member of the group 1 and so on, forming 4 groups. Teachers shared reading texts on public utilities and taxes to each group. Students are required along with the group's friends seek public facilities and tax benefits. And teacher guides the students are divided into groups to conduct investigations or gather information about public utilities and taxes. Each group plan, and prepare a suitable work such as reports and share their work with friends through student worksheet (LKS). Teacher explains Lani neighborhoods, public utilities and taxes to the students. Students work on evaluation through evaluation sheets (LP), this is done to determine the learning outcomes of each student about the material they receive. Teachers and students reflect on material learned to equate or straighten things are less clear. And teacher guides the students are divided into groups to conduct investigations or gather information about public utilities and taxes. Each group plan, and prepare a suitable work such as reports and share their work with friends through student worksheet (LKS). Teacher explains Lani neighborhoods, public utilities and taxes to the students. Students work on evaluation through evaluation sheets (LP), this is done to determine the learning outcomes of each student about the material they receive. Teachers and students

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The activities cover the end of the implementation of learning activities. These activities include: Students are given homework, teachers motivate students to study hard at home, and the last teacher moral message about the area where I live and you close.

Based on the results of observations made by the class teacher and researcher for KBM were found several unsuccessful experienced by teachers and students as follows: in the orientation of students on the problem: teachers do not convey the purpose of learning, less poses a problem to motivate students to engage in problem solving, as a result students are less motivated to learn. Organize students to learn: the lack of ability of teachers to associate the material that is given to the problems that exist around or ever experienced by students themselves, so that students do not use their thinking skills to solve problems. Teachers have good assist students in gathering information but due to lack of praise and motivation as well as teachers are not familiar with the character of students so that by the time the task in groups there are some students who just chatting with friends, lazy, busy with other work. In developing and presenting the work: the teacher told each group to present the material / conveying work with their group of teachers select one student from each group to present the material, there are students who are afraid have to read the group's work because he only played while his friends perform the task. At the end of the activity that is evaluated by giving each student assessment sheets. The study results obtained in the first cycle can be seen in the table below. the teacher asked each group to present the material / conveying work with their group of teachers select one student from each group to present the material, there are students who are afraid have to read the group's work because he only played while his friends are working on the task. At the end of the activity that is evaluated by giving each student assessment sheets. The study results obtained in the first cycle can be seen in the table below. the teacher asked each group to present the material / conveying

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Table 1. Outcomes Cycle I

No.	Score	Frequency
1	50	1
2	55	2
3	60	4
4	65	2
5	70	2
6	75	1
7	80	2
8	85	1

Based on the results from the table above, the percentage of mastery learning students in the first cycle is 66%. In the first cycle is not successful. This is because the concept given they are much less understood by students. For that need to be taught back so they can understand so that the desired results can be achieved. In this reflection stage observer data obtained during the learning actions discussed with the teacher to assess the degree of success obtained in this first cycle less satisfactory results. Because the application of problem-based learning on the theme of my neighborhood are still many obstacles such as teachers not optimally apply to both measures problem-based learning in teaching and learning, it is because teachers have not been able to understand the characteristics of students, besides that there seagain students in the study group was still lacking active in solving problems and more playful.

Therefore, based on the results obtained in implementing the actions of this first cycle, the researchers along with classroom teachers and principals are trying to make improvements to the learning cycle II. In this second cycle of learning is focused to correct any deficiencies that exist in the first cycle including problem-based learning more particularly measures that exist in the problem-based learning, because it has not been implemented optimally. Observation phase performed by the class teacher. It turned out that the actions taken in cycle II increased learning outcomes. This is due to researcher (Practitioners) have improved the deficiencies that occurred in cycle I. From the observation of researchers and students are no longer congested, KBM going well where teachers express purpose of learning and motivate students to get involved in solving the problem by linking the material provided with issues once they are experiencing so that students are motivated to learn and teachers to follow the steps of problem-based learning and students were very active when the teacher provides questions and tasks given in the form of worksheets that done in groups, as well as work assigned individually there is an increase in things that occur in the first cycle can be overcome properly.

The results of the study cycle of two can be seen in the table below.

Table 2 Results of Learning Cycle II

No.	Score	Frequency
1	70	1
2	75	2
3	80	3
4	90	2
5	100	6

Based on the results from the table above, the percentage of mastery learning students in the second cycle has reached 88%, the study was conducted only until the second cycle. So using problem-based learning model learning outcomes of students has increased. In general, the implementation of two cycles of learning has been successful where student learning outcomes have achieved the standards set. The success achieved in the implementation of the second cycle was 88 %. Thus stated that the measures in this second cycle was on the designation well and succeed. This success can be achieved for their good cooperation in making improvements to the deficiencies that occur in the first cycle, for that good cooperation between researchers and the school is needed in every lesson in the classroom. Because of achieving results in the second cycle has been very satisfactory, in action research on the second cycle, it can be stopped. Presumably with the hope of learningbased problems continue to be applied in the classroom either on subjects thematic as well as other subjects in order to improve learning outcomes.

Discussion

Based on the implementation obtained in the first cycle there are some students whose grades have not been satisfactory, it is influenced by the model used by teachers has not done well and less motivating students to learn, teachers are dominating the learning process, less develop students' ability to think so there are some students who only talked with his friend, and dreamy, so that the learning process is not going well and the learning objectives have not been achieved so that only 66% of learning outcomes. To the researchers held discussions with the class teacher to continue the action in the second cycle.

In the second cycle, learning outcomes obtained by the students reached 88% already increased it means the learning process carried out by the application problem-based learning model with the theme of my neighborhood received good response from students thus showing satisfactory results, This is because students are already active in both group and individual work, as well as focusing on the material that will be solved in the use of media that has been provided by the teacher. Therefore while the learning process the teacher should be able to create an atmosphere of active and can excite students and make the situation comfortable classrooms so that students are able to attend and receive the materials provided.

4. Closing

From the results of existing studies, the researchers conclude with the application of problem-based learning model on the theme of the area where I live, giving the benefit to students, for example, to train children to think critically in linking the opinions or ideas of his colleagues with the same job in the worksheets of students in the group. Thus the application of problem-based learning model can improve student learning outcomes on the theme of my neighborhood N Sarongsong fourth grade.

Based on the conclusion, researchers put forward suggestions as follows: first as a teacher candidates presumably with new insights expected to improve the quality and capabilities in the application of learning effective and efficient so used the knowledge to improve the ability to design and implement learning models that correspond to the learning objectives. Second, by using a thematic learning Problem Based Learning model, would be able to provide new insights for elementary school teachers to undertake the creation of teaching styles in the classroom to improve intellectual, social and emotional students.

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