

## **Implementation of Learning Problem Solving in Improving Critical Thinking Ability Mathematics Students**

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**Abstract:** *Critical thinking is one of the important indicators for students to be competing in the world of work and personal life, students must have the ability to solve problems and must be able to think critically. One effort to improve critical thinking skills, especially in math lessons is to implement problem-solving learning. This article describes the implementation of problem-solving learning in improving students' critical thinking skills of grade VIII SMP Negeri 5 Bulukumba obtained through classroom action research that is conducted for 2 cycles with the result that with the application of learning problem solving can improve the ability of critical thinking as seen from the indicators the success of 35 people or 87.5% of students have completed learning mathematics and as many as 5 people or 12.5% of students have not finished learning math. In addition, the activity of students in the learning process also achieved the success indicator that overall there is 70.5% in the first cycle increased to 88.5% in cycle II and the implementation of learning (the ability of teachers in managing class and student activities) increased in the same category the good category.*

**keywords:** *Critical Thinking, Problem-Solving*

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### **I. Introduction**

Thinking is a mental activity to build and gain knowledge. In a learning process, the thinking ability of learners can be developed by enriching meaningful experience through problem-solving problems. One of the thinking abilities that belong to high-order thinking is the ability to think critically. Critical thinking skills can be developed through mathematics learning in schools or colleges, which focus on strict systems, structures, concepts, principles, and relationships between elements and elements. One of the goals of learning mathematics for junior high school students According to Kurikulum 2013 is showing a logical, critical, analytical, meticulous and thorough attitude, responsible, responsive, and not easily give up in solving problems.

In the era of globalization is growing rapidly, the impact on students is the more complex the problems to be faced. Therefore, it takes a sufficient ability to be able to deal with it. The ability that must be possessed by students one of them is the ability to think critically. Johnson (Nisa, 2011: 2) mentions that a critical thinker will emerge several attitudes such as caution in conclusions, quick admittance of ignorance, longing for new information, patient in investigating evidence, tolerant of new points of view, and willing to acknowledge the excess angle view of others compared with himself. The attitude of a critical thinker as mentioned above is recognized as necessary for students during the learning process. The importance of critical thinking is also expressed by Peter (2012: 39) that "Student who is able to think critically is able to solve problem effectively". In order to compete in the world of work and personal life, students must have the ability to solve problems and must be able to think critically. Therefore, critical critical thinking skills are developed in every learning activity.

To improve students' critical thinking skills, many efforts have been made to improve aspects related to learning processes and activities, such as improvements in the curriculum, objectives, implementation of learning, and evaluation. However, in fact the current state of mathematics learning still does not meet the desired expectations, both process and learning outcomes. This can be seen from several studies and research results that have been done, including: 1) Indonesian students from the test results and survey PISA 2015 is still relatively low. Successively average achievement score of Indonesian students for mathematics is ranked 63 out of 69 countries evaluated. Rank and average score; 2) TIMSS 2011 results, the rank of Indonesian children perched in position 38 of 42 countries for mathematical achievement, and occupies position 40 of 42 countries for science achievement. The average mathematics and science achievement scores were 386 and 406, respectively, remained significantly below the international average score. The result of national examination in the year 2016 in junior high school, there is a decrease average value 6.04 points, because in 2015 the average value is 56.28, while this year to 50.24; 3) Mathematics learning in SMP Negeri 5 Bulukumba during the last three years it is known that the declining learning outcomes seen from the value of national examination since

the last three years ie in the year 2014 average national exam mathematics subjects 67.9, Year 2015 to 65.14, and the Year 2016 decreased to 61.96.

Based on the results of preliminary observations before the study was conducted in SMP Negeri 5 Bulukumba which obtained the result that most students acts show their ability in thinking if faced with problems such as answering the question where they do some who understand about the content because but unable to finish it because it forgot the formula, who do not know the contents of the matter, and they solve the problem but are able to know the answer because they are accustomed to seeing such problems in the fast way they get on certain study guidance. Furthermore, the results of interviews with one of the teachers of Mathematics Subjects, it is known that students have difficulty in solving problems given by teachers. Students solve many problems without a deep understanding. In addition, the average value of daily test is still relatively low ie 59 where the average value of students has not reached the value of Minimum Exhaustiveness Criteria (KKM) that is 70.

This shows that the still low ability of critical thinking of students in learning mathematics. When solving the problem, students are only oriented to the final answer. As a result students' reasoning ability has not developed well. The reasoning ability is inseparable from critical thinking skills. In addition, the other shortcomings of the students are less active students in learning mathematics including the reluctance of students to ask when given the opportunity by the teacher.

One effort to improve critical thinking skills, especially in math lessons is to implement problem-solving learning. The problem-solving process provides an opportunity for students to play an active role in learning, searching, and finding their own information or data to be processed into concepts, principles or conclusions. Thus, in the learning required skills of critical thinking in solving problems. In order for learning to run well, students are first trained to be skilled in the process of solving problems. Skill categories include students asking questions, answering questions / responding, conveying ideas / opinions, actively listening, being on duty, and so forth.

This is in accordance with Kamdi (2007: 77) which explains Problem Based Learning is a model of learning that involves students to solve problems through the stages of scientific methods so that students can learn the knowledge associated with the problem and also have the skills to solve problems. With the application of the model, it can: a) provide opportunities for learners to solve problems according to ways or individual learning styles respectively. By knowing each individual's learning style, we are expected to help adjust to our approach to learning; b) Development of critical thinking skills; c) Learners are trained to develop ways of discovery, questioning, articulating, explaining or describing considering or making decisions and making decisions

There are several research results that explain the effectiveness of the application of problem-solving learning model in improving students' thinking skills diantaranya (1) Fachrurazi, 2011 with the results of research that there are differences in the improvement of critical thinking skills and mathematical communication skills between students who learn mathematics using problem-based learning model with students who obtain conventional learning in terms of learning and school-level factors, its learning with problem-based learning model mostly positive attitude toward learning mathematics; (2) Linda M. Clark & Joan M. Raines, 2015 with the results of research that the application of learning problem solving and critical thinking skills is very useful in all areas of education. In problem solving, students use critical thinking skills, problem analysis, and synthesis and application of learned concepts. The application of learning problem solving problems involvement, liveliness, and high student motivation.

## **II. Method**

This study includes the type of Classroom Action Research degan model proposed by Kemmis and McTaggart. This model consists of four components in each cycle, namely planning, implementation, observation, and reflection are carried out in cycles and each cycle consists of at least three meetings and each meeting is held for 2 hours lesson. Instruments used in this research are: test questions, instructional learning sheets, student activity observation sheets, learning implementation observation sheets, and student response questionnaires. Data analysis techniques used in this study include quantitative techniques and qualitative techniques. Qualitative techniques are used to describe the implementation of action plans, illustrate the constraints that arise in the implementation of learning and describe the activities or participation of students in learning activities and students' critical thinking skills in accordance with the results of observation. While quantitative techniques used to describe the effectiveness of learning that includes learning outcomes and students' critical thinking skills math. The subjects of this study are students of Class VIII SMP Negeri 5 Bulukumba as many as 35 people.

### **III. Research Result**

Based on the results of student activity analysis can be explained that with the application of learning problem solving can increase student learning activities obtained from the observation cycle I and cycle II with some items observed ie percentage of average students who attend at the time of learning activities as much as 90.18% increase to 93.23%, the students who pay attention to the teacher's explanation at the time of the presentation of the material as much as 50.56% increased to 77.34%, students who gave opinion / question to the teacher or other students about teaching materials as much as 54.43% , 33%, students who actively discussed in solving problems with their group friends as much as 76.78% increased to 85.33%, students who volunteered to do the problem or presented the results of group discussion as much as 32.56% increased to 63.56%, students which responded to the presentation of the results of other group discussions as much as 51.67% increased 68.89%, and students who raised tangan want to make conclusions of materials that have been taught as much as 51.11% increased 72.78%.

Based on these results, this indicates that student activity has increased. Thus, the ability to think critically math students by implementing learning Problem solving, especially student activity can be said to have increased. The result of this research is supported by Muhsetyo theory (2007: 127) which explains that problem solving can be: 1) Train students to design an invention; 2) Think and act creatively; 3) Solve realistic problems; 4) Identify and conduct investigations; 5) Interpret and evaluate observations; 6) Stimulate the progress of students' thinking progress to solve the problems faced appropriately; and 7) Can make school education more relevant to life. The findings are in line with the results of Sulastris research, 2016 with the results of research that the learning by using the method of problem solving on the students of grade VIIIc SMP Negeri 2 Tolitoli can improve student activities and learning outcomes. Student learning activity on the first cycle of 3.94 and included in the category quite active, while the student learning activities on the second cycle of 6.31 with the category is very active.

The implementation of learning through the ability of teachers in managing the class and activities of students is also very decisive success or failure of the learning process. Based on observation analysis of teacher activity from cycle I to cycle II has increased. In cycle I and cycle II the activity of teachers with 21 items of assessment all done well. In the first cycle the average ability of teachers in the good category is 3.68 and on the second cycle increased to 3.89 where both cycles are in the good category.

So it can be concluded that the activities of teachers conducted during the learning process has increased. With the increasing of activity, hence generally ability of critical thinking of student mathematics can be said to increase, because student and teacher activity increase from cycle I to cycle II. The result of this research is supported by the theory of Djamarah and Zain (2006: 93) suggests that with the application of Problem Solving can: 1) Make education in school becomes more relevant to life, especially with the world of work; 2) The process of teaching and learning through problem solving can familiarize students with and deal with problems skillfully, when faced with problems in family life, community, and later work, a capability that is very meaningful to human life; and 3) This method stimulates the development of students' creative thinking skills and comprehensive, because in the process of learning, students do a lot of mental by highlighting the problems from various aspects in order to find solutions.

Furthermore, from the research results obtained that the critical thinking skills of mathematics students of class VIII SMP Negeri 5 Bulukumba has increased. This can be seen from the increasing of average score and percentage of critical thinking ability of mathematics of Grade VIII students of SMP Negeri 5 Bulukumba. The average score obtained by students has increased from 52.83 in the first cycle to 77.51 in cycle II, and if categorized based on the Standard Value then from 40 students who take the test in the first cycle only 58.78% of students in the category did not reach the standard value and 45.43% in categories reached standard values. While in the second cycle, has increased from 40 students who took the test obtained that 93.61% in the category reached the standard score and 5.46% of students in the category did not reach the standard value. The highest value of the cycle I is 82.13 and increased in cycle II to 92.12, while the standard deviation decreased from 17.28 in the first cycle to 8.45 on cycle II.

Based on the increase of percentage and the average standard value of critical mathematical thinking ability, the result of mathematical critical thinking ability has improved after implementing Problem-solving Learning in Grade VIII students of SMP Negeri 5 Bulukumba. These findings are in line with the results of Shanti's research, 2015 with the result of research that the learning approach (problem solving with cooperative setting and problem posing with cooperative setting) is effective and problem posing approach with cooperative setting is more effective than problem solving approach with cooperative setting on learning mathematics from the achievement of competency standards, critical thinking skills, and students' emotional intelligence.

Student response in applying of learning model is in positive category obtained from questionnaire about student response to learning. Students who love to learn math with Learning Problem solving 37 students 92.5%, students who like how to teach teachers in implementing learning Problem solving as much as 38 students or 95%, students who can understand math after implemented Problem solving 38 students or 95%

students who felt the ability to solve math problems increased after learning Problem solving as many as 37 students or 92.5%, students who are able to develop the ability of mathematical thinking as much as 36 students or 90%, students who become active after implementing learning Problem solving as much as 36 students or 90% , students who believe themselves increased in issuing opinions as many as 35 students or 87.5, students who are more motivated in formulating and solving problems as much as 35 or 87.5%, students who like to ask as many as 36 students or 90%, students who enjoy learning math by implementing Peme learning problem in the next meeting as many as 37 students or 92.5%.

Based on the results of this study that students class VIII SMP Negeri 5 Bulukumba achieve success indicators as many as 36 people or 90% of students have completed learning mathematics and as many as 4 people or 10% of students have not finished learning math. In addition, the activity of students in the learning process also achieved the success indicator that overall there are 77.78% in the first cycle increased to 88.33% in cycle II and the implementation of learning (the ability of teachers in managing class and student activities) increased in the same category ie in either category.

#### **IV. Results and Discussion**

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## **V. Results and Discussion**

Based on the results of the above research, the conclusion in this study is the implementation of learning Problem solving can improve students' critical thinking skills mathematics seen from the test of students' critical thinking ability increased from 82.13 in the first cycle to 92.12 in cycle II, the student activity is at good category that is assessed from 14 indicators with 87%, learning activity is in good category with value 3.89, and student response mencapai 92% who likes to follow learning.

## **VI. Recommendations**

Based on the above conclusions, the researchers suggest several things to note are as follows: 1) Math teacher should be able to implement learning problem solving in order to improve students' critical thinking ability of mathematics; 2) To the researchers, is expected to float this learning so that students more easily understand the mathematics material that is taught so as to improve students' critical thinking skills in teaching and learning process in school; and 3) To the Researcher Candidate, can develop the results of research by reviewing first and able to conduct better research again.

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