

Implementation: Problem based Learning Model to Increase the Students Critical Thinking Skill

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Key words: Learning model, problem based learning, ability, critical thinking, students

Abstract: This study is a classroom action research that aims to improve student's critical thinking skills through the application of problem based learning model. This research was conducted during three learning cycles. Data collection technique used in research is observation and test. Data analysis used is quantitative descriptive analysis. The results showed that the use of problem-based learning model can improve the critical thinking skills of grade 5 primary school students. The results of the study include student activity on the first cycle reached the percentage of 66.50% while in the second cycle reached 83.75% and in the third cycle reached 88.75%; student's critical thinking ability in the first cycle reached 55.56% percentage while in cycle 2 reached 70.37% and on the third cycle reached 85.29%. It can be concluded that the use of problem-based learning model can improve the critical thinking skills of grade 5 primary school students.

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INTRODUCTION

Education determines the development and quality of individual self including in terms of determining the development progress of a nation. Through education, the quality improvement can be done. This is what will make the students as the successor and implementer of development can make improvements.

One of the factors of educational success is in the hands of the teacher. But in reality, the teacher is always less able to provide a clear description of the material being taught. Teachers do not give students the opportunity to actively seek their own knowledge. As a result, students do not really understand what they have learned. Learning method of lecture causes the less trained students to develop their reasoning power in solving a problem or applying the concepts he/she learns.

Students only listen to what the teacher explains, so that, students are not accustomed to put forward ideas in mind. This is what makes students become passive and causes student's critical thinking skills to be low.

An attempt is needed to change the learning strategy to solve the problem of the inability of the students in understanding the learning in the classroom and the effort to stimulate the students to think critically, logically and effectively. The learning strategy should be able to grow and develop creativity and train student's critical thinking skills learning and in solving problems encountered in everyday life.

The ability to think critically is necessary for students to be able to solve problems. Norris (Saeed and Rousta, 2013) states that in general, the teaching of critical thinking is important for an individual who is learning. Not developing critical thinking skills will hamper

student's ability to solve problems. Teacher as a teacher should not be negligent because he needs to pay attention to the process of thinking not to stop or get off track too far. For that it is necessary role of teacher as a facilitator. It is also required when students have difficulty or when students experience various cognitive conflicts in solving problems. If the student's difficulties in solving the problem are left then the student will lose interest in thinking and effort to build the atmosphere of thinking since the beginning of learning to be in vain. As a result arise feelings of discomfort, anxiety, anxiety, saturation and feel unable to solve the problems encountered.

The ability to think critically is very important in everyday life because it is used to develop the ability to make decisions and solve problems. Critical thinking skills is a skill that must be developed and trained, since, primary education because with the training of student's critical thinking skills from the primary school level will provide a good effect and feel the benefits at higher levels of education. The ability to think critically will foster student independence early and prepare students to learn to solve the problems faced in society. Students with critical thinking skills are able to make careful consideration in deciding whether to accept or reject a statement that is true or false.

In the era of globalization filled with challenges and competition among individuals, everyone is required to have quality and skills, one of which is critical thinking skills. The thinking skill has been increasingly emphasized in education, especially with the globalization that requires workers to adapt to be more productive. The ability to think critically becomes an indispensable ability for students to be able to cope with changing circumstances or challenges in the ever-evolving era of globalization. Critical thinking allows students to discover the truth amid the events and information that surrounds them every day. It is necessary to think carefully about the decision to be taken. We must think critically not to make wrong decisions or harm others.

The students "critical thinking skills can be trained with learning that requires students to explore, inquiry, discovery and problem solving as well as through learning in small groups by applying scaffold approaches and tasks that require students" cognitive and meta-cognitive strategies (Sunaryo, 2014). To improve the critical thinking skills of students required a model of learning. The Learning Model chosen is model problem based learning. Problem Based Learning Model is a learning model designed in such a way that aims to teach students to solve problems, think high level and find their own information through a series of observation and or experimental activities (Ibrahim, 2012). Problem based learning encourages the development of strategies Self-learning, increasing student's critical thinking and

making it easier for students to retain and apply knowledge to new situations. The formulation of the problem in this research are: how is the activity of the 5th grade students of the elementary school during the applied problem based Learning Model? how is critical thinking ability of 5th graders of elementary school during applied model of problem based learning?. The specific purpose of the research is to improve student's critical thinking skills through problem based Learning Model. In general, the results of this study are expected to change the old paradigm and create a new paradigm that the delivery of knowledge to students should be oriented to the development of critical thinking skills and problem-solving skills and at the same time develop the ability of learners to actively build their own knowledge.

Conceptual framework

Critical thinking: Thinking skills have been increasingly emphasized in education, especially with the presence of globalization that requires a person to be more productive. Hatcher and Spencer, 2005 (Duron *et al.*, 2006) critical thinking is an important and necessary skill at work, can help with mental questions and spiritual and can be used to evaluate people, policies and institutions, thus avoiding social problems. Due to the rapid development, some people are able to follow it and others fail. For those who are able, rapid development is considered as an opportunity that can be utilized to spur themselves. Usually, this group are people who have adequate knowledge and life skills. Conversely for those who cannot afford this era is considered a disaster because it does not provide opportunities to him, Even get rid of it. Thus, being a smart person is not enough to be able to cope with the rapid development of the times and able to compete it needs someone who is able to think critically and creatively (Nurizzati, 2016). The quality of life and learning depends on the quality of our thinking (Fisher, 2009). To do this, the student must be able to think critically, the school should prepare the students to be able to learn and think.

Gunawan (2003) states that critical thinking skills are the ability to think at a complex level and use the process of analysis and evaluation. Critical thinking involves inductive thinking skills such as recognizing relationships, analyzing open issues, determining causation and making conclusions and taking into account relevant data. Critical thinking implies an open-minded tendency to analyze, synthesizes and evaluate information in order to solve problems and make resolutions. The ability to think critically includes cognitive and characteristic abilities (Facione, 2007).

Montesori methods: The problem-based Learning Model transforms students from passive recipients into active,

independent learners and problem solvers. The purpose of this Learning Model is to obtain factual information. PBL is a Learning Model that uses the problem as a starting point for acquiring new knowledge (Ibrahim, 2012).

Problem based learning is one of the most innovative teaching methods in the history of education in which an authentic or poorly structured problem is presented to students to instill it into the learning process by building new knowledge into the prior knowledge of the problem itself (Birgili, 2015). The problem-based Learning Model is not designed to help teachers provide as much information as possible to students but problem-based learning is developed to help students develop thinking skills, problem solving and intellectual skills and become independent learners (Kurniasih and Sani, 2015).

Characteristics of problem based learning: Problem based learning has several key features that distinguish it from other Learning Model. The problem-based teaching model has the common characteristics of presenting problems to students about authentic and meaningful issues that will make it easier for students to conduct inquiry and inquiry. The model also has some special features such as asking questions or problems, focusing on interdisciplinary linkages, authentic investigation, producing products/works and exhibiting the product and cooperation (Suryanti *et al.*, 2009). Ibrahim (2012) explains that the characteristics of PBL are as follows:

- Orienting students to authentic issues
- Focuses on interdisciplinary linkages
- Authentic inquiry
- Produce the product/work and show it off

MATERIALS AND METHODS

Research design: The research conducted in this research is classroom action research. Classroom action research is an activity undertaken to observe events in the classroom to improve practice in learning to be more qualified in the process, so that, the learning outcomes get better (Bahri, 2012). Researcher as implementing action plan that is teaching and guiding student in learning using model of problem based learning whereas observer do observation in activity of study by researcher and student in class to find problem which happened when learning take place.

Data collection techniques: Data collection techniques used in the study are tests and observations.

Observation: Observations are made of teacher activity, student activity during the lesson and observation of the constraints that arise during the learning process. Observation of students is used to observe student's

Table 1: Table of success level criteria

Quantitative value	Criteria
80-100	Very critical
66-79	Critical
56-65	Quite critical
40-55	Less critical
<40	Not critical

(Arikunto, 2013)

behavior in carrying out activities provided by teachers. Observation of teachers used to determine whether the teacher is using the model of problem based learning.

Test: The test is used to measure student's critical thinking ability after implementing the learning using Problem Based Learning Model. This test is a written test that contains questions that require critical thinking skills in completion. The tests are done at the end of each cycle. The student's critical thinking ability in this study is viewed from the number of scores obtained then analyzed using the following formula:

$$\text{Final score} = \frac{\text{obtained score}}{\text{maximum score}} \times 100$$

The percentage of scores is included in the criteria of critical thinking assessment presented in the following Table 1.

RESULTS AND DISCUSSION

Implementation in cycle 1: The student's critical thinking ability is measured by using the critical thinking skills test done in writing. The test is used to determine student learning outcomes during the learning process takes place. In this study, the form of questions given in the form of five questions that require students to think critically. Problem given about interrupted natural balance that occurred around the student environment. The essays are five points with different weight scores in each number, adjusted to the difficulty level of the problem. Here is the average score of tests of each indicator of student's critical thinking skills in cycle 1 (Table 2).

Analysis of the average value of each indicator critical thinking skills test cycle 1. Based on these tables, the indicators determines the idea of the value of the average student is 83. From these results it is on this indicator can be categorized as very critical. Student's ability in making excuse categorized quite critical. This is shown by the average value of this indicator gets an average rating 57. Student's ability in the conclusions of the existing problems are categorized less critical. This is shown by the average score on this indicator reached 54. Tindakan-actions that have been made by each student can be categorized as very critical. This can be demonstrated by the acquisition of the average value 90.

Table 2: Analysis of critical thinking skills test cycle 1

Indicators	Average	Criteria
Finding idea	83	Very critical
Making reason	57	Quite critical
Making conclusion	54	Less critical
Making action	90	Very critical
Giving explanation	43	Less critical
Average	65	Quite critical

Table 3: Percentage of completion of critical thinking ability test

Criteria	Interval	Amount of students	Percentage
Very critical	80-100	5	18.52
Critical	66-79	10	37.04
Quite critical	56-65	2	7.41
Less critical	40-55	9	33.33
Not critical	<40	1	3.70
Percentage of = critical students		15	55.56

Analyzed data

Kesulitan students in the first cycle is to make the explanation of the solutions that have been made. Some students are not able to make annotations with a minimal amount sentence. It can be from the average value obtained that is 43 that fall into the category less critical. The average value is the lowest among other indicators. Judging from the percentage of mastery of students who have criteria more than or equal to critical can be seen in Table 3.

Based on the table, the number of students who received criteria is very critical as many as 5 students, while the number of students who get critical criteria are 10 students. Judging from the percentage, students who get criteria very critical 18.52% and students who get critical criteria 37.04%. Related to that, the percentage of students who get criteria = critical is 55,56%, so that has not reached success criteria for classical completeness that is = 75%.

Data of the students critical thinking in cycle 2: The student's critical thinking ability is measured by using the tests that are carried out at the end of the cycle. The form of questions given are the ones that require a critical solution in solving them. In addition, the given questions demand an explanatory answer. Here is the average table of test results for measuring student's critical thinking skills are viewed from every critical thinking indicator (Table 4). Based on the table, the indicator determines the idea of the average value of students is 94. From these results, then in this indicator can be categorized very critical. Student's ability in making the reasons categorized quite critical. It is shown from the average value on this indicator gets average score 63. Student's ability to draw conclusions from existing issues is categorized as critical. This is indicated by the average score on this indicator reaching 65. The actions that have been made by each student can be categorized as very critical. Shown by the acquisition of the average value 89.

Table 4: Analysis of critical thinking skills test cycle 2

Indicators	Average	Criteria
Finding Idea	94	Very critical
Making reason	63	Quite critical
Making conclusion	65	Quite critical
Making action	89	Very critical
Giving explanation	72	Critical
Average	74	Critical

Table 5: Percentage of completion of critical thinking ability test

Criteria	Interval	Amount of students	Percentage
Very critical	80-100	13	48.15
Critical	66-79	6	22.22
Quite critical	56-65	3	11.11
Less critical	40-55	5	18.52
Not critical	<40	0	00.00
Percentage of = critical students		19	70.37

Analyzed data

Student difficulty in this cycle II is in making an explanation of the solution that has been made. Most students are able to make an explanation with a minimal number of sentences. This can be from the average value obtained is 75 fall into the critical category. The lowest average value among the other indicators is an indicator making a reason.

Based on the results of the observation of critical thinking skills cycle II described above, indicates that there are two indicators that have reached the criterion is very critical, one critical criterion and two criteria quite critical. The average ability of critical thinking as a whole can be said to work because the average critical thinking ability reaches 74 which is included in critical category.

Judging from the percentage of mastery of students who have criteria more than or equal to critical can be seen in Table 5.

The table above shows about the percentage of students in terms of criteria of critical thinking skills. Based on the table, the number of students who received criteria is very critical as many as 13 students while the number of students who received criteria critically as many as 6 students. Judging from the percentage, students who get criteria very critical 48.15% and students who get critical criteria 22.22%. Related to that, the percentage of students who get criteria = critical is 70.37%.

Student's critical thinking skills in the final cycle: The student's critical thinking ability is measured by using the tests that are carried out at the end of the cycle. The form of questions given are the ones that require a critical solution in solving them. In addition, the given questions demand an explanatory answer. Here is the average table of test results for measuring student's critical thinking skills are viewed from every critical thinking indicator (Table 6).

The table above is the result of the analysis of the average value of each indicator of the critical thinking

Table 6: Analysis of critical thinking skills test cycle 3

Indicators	Average	Criteria
Finding idea	94	Very critical
Making reason	75	Critical
Making conclusion	86	Very critical
Making action	93	Very critical
Giving explanation	81	Very critical
Average	84	Very critical

Table 7: Percentage of completion of critical thinking ability test

Criteria	Interval	Amount of students	Percentage
Very critical	80-100	22	81.48
Critical	66-79	1	3.71
Quite critical	56-65	3	11.11
Less critical	40-55	1	3.71
Not critical	< 40	0	00.00
Percentage of = critical students		23	85.19

Analyzed data

ability test cycle III. Based on the table, the indicator determines the idea of the average value of students is 94. From these results then in this indicator can be categorized very critical. Students ability in making the reasons categorized critical. This is shown from the average value on this indicator gets an average score of 75. Kemampuan students in making the conclusions of the existing problems are categorized very critical. It is shown from the average score on this indicator reached 86. These actions that have been made by each student can be categorized as very critical. This can be demonstrated by the acquisition of an average score of 93. Student's ability in making an explanation scores 81, so it can be categorized as very critical.

Based on the observation of critical thinking ability of cycle III which has been described above, indicates that all the indicators that have reached the criteria are very critical and critical. The average ability of critical thinking as a whole can be said successful because the average ability of critical thinking reaches 84 which is included in category is very critical. Judging from the percentage of mastery of students who have criteria more than or equal to critical can be seen in the Table 7.

Table 7 shows about the percentage of students in terms of criteria of critical thinking skills. Based on the Table 7, the number of students who received criteria is very critical as many as 22 students while the number of students who received criteria critically as much as 1 student. Judging from the percentage, students who get criteria are very critical 81.48% and students who get critical criterion 3.71%. Related to that, the percentage of students who get criteria = critical is 85.19%. From the percentage can be said that the classical critical thinking thoroughness has not reached 85.19%, so that in the third cycle it can be said successful because the average critical thinking ability has reached >75%.

Student activity in learning by using problem based learning model: Increased teacher activity in each cycle,

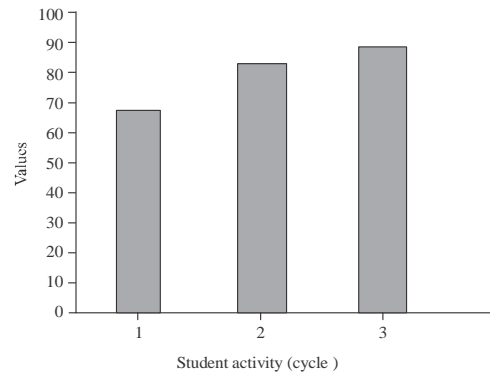


Fig. 1: Increasing of the students activity on learning using PBL Model in cycle 1-3

accompanied by increased student activity in science learning using problem based Learning Model. Activity of students in following learning has increased in each cycle. Based on observation, student activity seems to increase from every cycle that has been implemented. Student activity in science learning by using problem based learning model in cycle I, II and III is described in the following diagram (Fig. 1).

Based on the Fig. 1 above can be seen that the percentage of student activity in the first cycle of 66.50% increased to 83.75% in cycle II and then on the third cycle has increased again to 88.75%. Increased student activity can't be separated from teacher activity this is because the teacher provides various kinds of assistance to students.

Critical thinking skills of students using problem based learning model: The indicator of critical thinking refers to Ennis's opinion which describes six critical thinking indicators which include identifying the core elements of the problem proposing the reason for reason-based facts/evidence reasonably makes a reasonable conclusion, designs a series of actions makes explanations both written and orally and conducts a review. These six indicators form the basis for measuring student's critical thinking skills (Fig. 2).

Based on the results of research that has been implemented, student's critical thinking skills always experience an increase both in terms of the average value of each indicator or from classical mastery. The following diagram shows the student's critical thinking ability in terms of each indicator.

The classical completeness of the learning that has been implemented has increased in each cycle. Here is a picture of classical completeness improvement of critical thinking skills on science learning by using Problem Based Learning Model (Fig. 3).

Based on the figure 3 above, it is apparent that the average increase in the classical skills of critical thinking

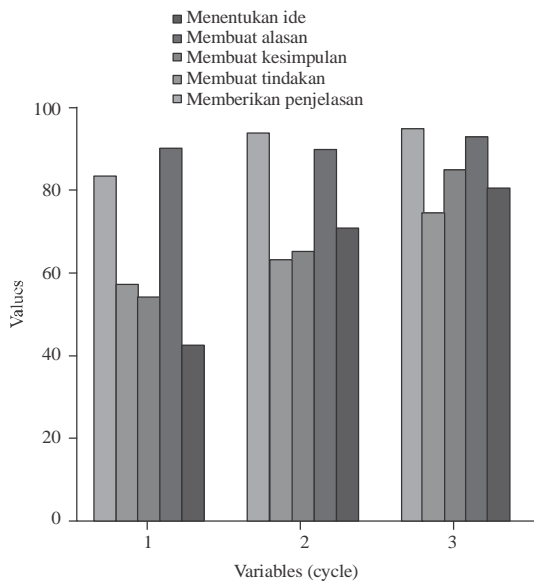


Fig. 2: Increasing of the students critical thinking skill from each indicator in each cycle

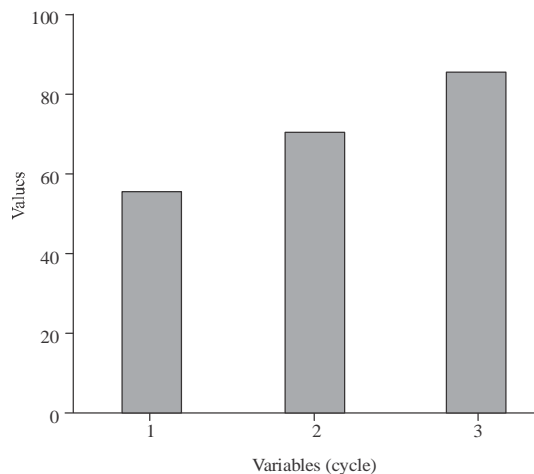


Fig. 3: Critical thinking skills

cycle I is 55.56% while in cycle II to 70.37% and in cycle III to 85.19%. The increasing of students "critical thinking ability in this research, supported by students" attitude in critical thinking. The attitudes are attention to attentive explanation, group cooperation ability, hesitancy, enthusiasm to investigate, mutual respect and careful attitude.

Behavioral support has a great contribution in developing critical thinking skills. Improved critical thinking skills are also accompanied by increased ability to answer test items. It can be proved by the increase of average value of calsal cycle I is 55.56% while in cycle II become 70.37% and in cycle III become 85.19%.

Based on these results, the implementation of learning using Problem Based Learning Model can improve the critical thinking skills of 5th grade students. This is in line with the opinion of El-Shaer and Gaber stating that problem based learning encourages the development of self-learning strategies and make it easier for students to retain and apply knowledge to new situations.

Students must first understand the focus of the problems presented. In addition, students are also required to provide the reasons and determine the exact conclusions of the problems presented. This activity can take place smoothly with the provision of stimulus and guidance regularly, both individually and in groups. Student activity can increase because of teacher activity in managing learning very well. Teachers in carrying out learning in accordance with the plan that has been made and able to become a facilitator for students in learning activities.

Model problem based learning is implemented by looking at the reality that is around the students. Learning by inviting students to see the phenomena that exist around the students. The process of looking at the phenomena that exist around the students is done by interviewing directly and experimenting. The problem exists then solved by the students through the discussion activities in the class. Researchers do this because referring to the opinion of Dewey (Ibrahim, 2012) which illustrates that the classroom is a laboratory for real life investigation and problem solving.

Based on the description, the model of problem based learning has advantages that can improve student's critical thinking skills. This is in line with research conducted Christiana Suniasih and Suadnyana which states that the model of problem based learning can improve student's critical thinking skills. Students better understand the learning materials when students themselves find and solve problems encountered so as to provide experience and meaningful for students.

CONCLUSION

Student activity in learning using Problem Based Learning Model on matter disturbed natural balance to improve critical thinking ability of 5th graders of elementary school. Students have followed the learning process in accordance with the learning steps. This is evidenced from student activity data in learning. The result of observation in cycle I shows that the activity of student reaches the percentage of 66,50% while in cycle II reach 83,75% and in cycle III reach 88,75%. This shows that in learning cycle II there is an increase of student activity. The improvement of student's critical thinking ability using Problem Based Learning Model can be seen from the data of each cycle. In cycle I the

percentage of students who get criteria = critical reached 55.56% while in the second cycle reached 70.37% and in the third cycle reached 85.29%. This means that the use of Problem Based Learning Model can improve student's critical thinking ability on the material of natural balance in grade 5 of elementary school. For teachers who want to increase student activity in learning it is recommended to use Problem Based Learning Model because Problem Based Learning Model proved to increase student activity in learning.

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