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The Implementation of Problem Based Learning Model to Improve Student's Motivation and Critical Thinking

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Abstract: The research aims to analyze the quality of the learning process using the Problem-Based Learning (PBL) model to find out the improvement of student's motivation and critical thinking skills. It is a classroom action research conducted in two cycles, cycle I consist of 4 meetings, and cycles II consists of 3 meetings, with the topics of Temperature, Expansion, and Heat. The subjects of the research were 34 students on grade VII in one of the junior high schools in Malang. Instruments used to measure the implementation of learning PBL model using the form of implementation sheet following the lesson plan, tools to measure motivation using a poll and to measure the critical thinking skill, and researchers use essay questions. The implementation of the PBL model in the cycle, I was 72.9% and was classified as a good qualification; while in cycle II, it was 91.2% and was classified as a very good qualification. The analysis of student's learning motivation in pre-cycle was 56%, was classified as a quite good qualification, cycle I was 67.2%. I was classified as a quite good qualification, while in Cycle II, it was 87.2% and was classified as good qualification. The analysis of student's average critical thinking skills in pre-cycle was 44.12% and was classified lack of good qualification, cycle I was 76.4% and was classified as a quite good qualification; while in cycle II it was 88.4% and was classified as good qualification. The results showed that the PBL model successfully improved motivation and critical thinking skills of students beginning the pre-cycle, cycle I, and cycle II.

Keyword: Problem based learning, motivation, critical thinking skill

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INTRODUCTION

Technology and information develop rapidly in many aspects of life, and it includes the educational field. It is an effort to connect to the future with our world today by introducing efficient and effective innovation. Based on this transitional era, teachers have to be able to be more critical and more innovative in implementing the learning process in class. The thinking skill needed in the globalization era is related to the thinking process which includes concrete

(factual) thinking too highly abstract thinking known as metacognition in the learning system likewise (Erwinsyah, 2015).

The learning system is an integral part of an educational activity system that is a phenomenon that should be fixed and developed by many connected parties. It includes curriculum, methods, learning media, teaching subjects, teachers' quality, and so on; thus, it creates a great and future-oriented learning system. Today's learning system no longer concentrates on the institution or the teachers, but it concentrates on the students as the learning center. It also gives students the opportunity to behave critically and to develop them based on their intellectual potential, while teachers are demanded to act as the manager of the learning process (Husen, 2015).

Based on an interview with two science teachers, the researchers found a problem that appeared during learning Science. As it happened in the class of VII in one of the state Junior high school in Malang, student's skill to answer questions completed with reasons was still low. Based on the instruments used, from 34 questions, there were only eight students who were able to answer the questions completed with reasons, or it was 16.68% of students were able to answer correctly.

Based on data of mid-term semester examination gained by science teachers of class VII in one of the state Junior high school in Malang, the average score of mid-term semester examination was 72.8. Based on all 34 students. There were only 15 students could achieve the standard of a minimum score, which is 75. One of the causes of the student's low score was their lack of critical thinking skills. It is also the same as previous research that states that low learning achievements are due to the ability of critical thinking that is less sharpened (Wartono, Hudha, & Batlolona, 2018). Teachers need to use new innovative and critical learning model to minimize the problem, and it is Problem-Based Learning (PBL) Model (Pratiwi, Winarko, & Ayu, 2018).

PBL model is a learning model which uses problem in real-world as the main topic for students to learn how to critical thinking skills and to be competent in solving problems, and to gain essential knowledge and concept from the subjects (English & Kitsantas, 2013). Students are demanded to be creative and to be able to develop their critical thinking skills in learning and solving problems nowadays. The critical thinking skills are needed in the learning process because students are encouraged to seek and find new knowledge which involves student's activeness in the learning process (Loyens, Jones, Mikkers, & van Gog, 2015). It is in accordance with the 21st-century demands that students must master the ability of critical thinking, creative, communication and collaboration skills (Junanto & Afriani, 2016).

The skills of critical thinking and motivation are closely related to the concept of understanding if this ability is as early as possible will impact on increased learning performance (Markawi, 2015). Critical thinking in problem-based learning is a stimulus that students use to construct a concept of understanding. The results of previous research contributed that the PBL model has an advantage in improving learning performance and training student's critical thinking (Singh, 2009).

Other studies reveal that the PBL model can assist students in processing existing information and help students to construct knowledge that is owned (Loyens et al., 2015). Slavin also mentions the purpose of teaching using the PBL model can systematically improve the ability of high-level thinking, motivation, and also means of deepening understanding of concepts and

helping students to apply concepts and principles to Various issues (Slavin, 2010).

Based on the analysis above, PBL model is as one of the learning models which will be implemented in topics of temperature, expansion, and heat which surely will be precise and effective to improve student's motivation and critical thinking skill. In addition to the implementation of the PBL learning model will provide a reference to the teacher on the learning model that can improve the motivation and critical thinking skills of the students.

The PBL model in this study is centered on solving problems in groups and peer tutorials; high-skilled students will work with low-skilled students. During the presentation stage of the work, students individually presentation. Starting from the outline explained above, thus the purpose of the research are: (1) to analyze quality of PBL Model implementation process in improving student's motivation and critical thinking; (2) To find out the improvement of student's motivation using PBL Model; (3) To find out the improvement of student's critical thinking skill using PBL Model.

METHOD

The research was conducted using the study of class action, used Kemmis Taggart's research of the action model, which consists of one cycle to the next cycle. Each cycle contains: planning is to determine the objectives of learning and drafting the design or action to be applied, the action stage is adjusted to the planning of action that has been applied, observations conducted to observe and documenting all indicators of a good process of results resulting from a treatment of actions performed, analysis and reflection is analysis of the action given, the results of reflection. It is a classroom action research conducted in two cycles, cycle I consists of 4 meetings and cycles II consists of 3 meetings.

The researchers' presence during research was needed because they had important roles during the observation process. The research was conducted in one of State Junior High School in Malang. The subjects of the research were VII-E students of State Junior High School, and data used in the research were teachers, students, colleagues, and researchers as teachers and action implementers.

Cycle Planning Phase 1, researchers prepare learning tools in the form of the lesson plan, teaching materials, and worksheets, prepare the problem, arrange the assessment guidelines of student learning implementation, and prepare the aspect observation format critical thinking skill. The learning process implementation of the PBL model consists of five levels of teaching based on the problem, among others: (1) orienting students on the issue; (2) organizing students to study; (3) guiding individual investigations as well as group; (4) develop and present the works; (5) analyze and evaluate the problem solving process. The researcher's observation phase was assisted by two observers to observe the suitability between the learning plan and the classroom implementation and assess the student's motivation.

In the reflection stage, researchers, together with the observer conducted a discussion to discuss observations on the implementation of cycle action 1, analyze the data obtained from observation, field records, and student worksheets. Researchers with observers reviewed the outcome of the action at cycle I as a matter of consideration whether the cycle had reached the criteria or not. It is as a reference whether a cycle needs to be continued or not, seen from the achievement of

criteria on each prescribed action and success process the learning performed.

Action Instruments as syllabus, lesson plan, and student worksheet. Data are collecting Instruments as an observation sheet of implemented learning model, field note, the test of student's critical thinking skill and motivational poll. Test of student's critical thinking skill consists of 20 questions, In accordance with the indicators of critical thinking skill. Furthermore, to measure motivation using the instruments of learning motivation rubric students arranged in accordance with the motivation indicators is (1) interest; (2) full participation; (3) attention; (4) happiness; (5) subject understanding; (6) diligent. The data retrieval in this study was assisted by two observers. An observer in charge of observing the learning process according to the implementation sheet PBL model and observe the motivation of students according to the rubric. For data, critical thinking skills gained through tests at each end of the cycle.

Data analysis of the research was conducted at the end of each action implementation. The rubric of motivation and Test students, critical thinking skills are used to know the students' motivation and critical thinking skills performed at the end of the cycle. The scoring can be seen by the number of questions answered correctly by students in every aspect.

Tabel 1 Criteria of Critical Thinking Skill and Motivation

Presentase (%)	Criteria
92 – 100	Excellent
75 – 91	Good
50 – 74	Quite good
25 – 49	Lack of good
00 – 24	Not good

Generally, there are two stages of data analysis: data reduction and data presentation. Data reduction is this research that was planned in two alternative actions; they are Cycle I and Cycle II. Data presentation that is already classified and simplified, described, in the form of meaningful words. The motivation and critical thinking skill to learn students at Cycle I and cycle II is presented in a narrative in the form of exposure to data.

RESULT AND DISCUSSION

Data on the implementation of learning collected in cycle I and II can be seen in the following figure 1.

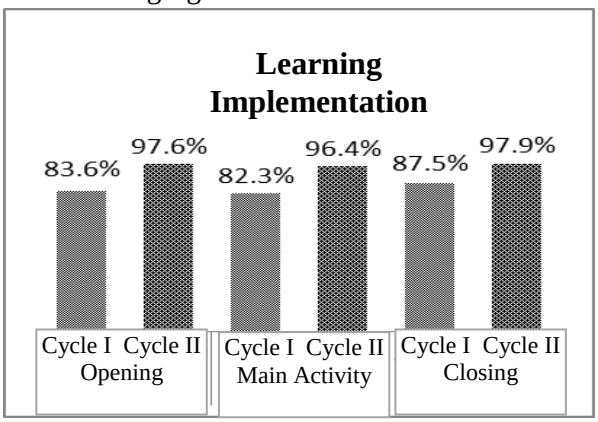

Figure 1. Learning Implementation

Based on figure 1, they were action and implementation instruments. The implementation of the PBL model in the cycle I average was 72.9% and was classified as good qualification; while in cycle II, it was 91.2% and was classified as a very good qualification. Based on the standard of teacher's success in learning implementation, it is classified as a very good qualification.

It can be seen in the result of the research that the learning implementation has improved in cycle II compared to it in cycle I; that it was a good qualification in cycle I, and it was a very good qualification in cycle II. This increase occurs due to the preliminary stages of improvement in cycle II, as researchers provide appropriate appositions and are more associated with the student's life,

involving students in conveying the objectives of the learning topic, students are given opportunities to predict the purpose of such learning.

Convey the right model and method of targeting (learning steps are included in the lesson plan and worksheet) and implement the preliminary stages according to the time allocation. Every step of the PBL model always involves student activity. So that students get used to active, creative, and capable of higher thinking skills (Loyens et al., 2015).

The quality of PBL implementation in cycle II has improved due to many of the learning improvements that the teacher had done from a deficiency in the I cycle. In the I cycle, there are issues of problem-solving that students are less concerned with teachers, and when selecting tools and materials, there are still less precise students. In directing and guiding the students in conducting experiments, there are still students who are confused about doing the practicum so that many students still ask the group. Teachers make improvements to cycle II by giving students the opportunity to read the test steps and inquire when a student is not familiar. This turned out to be very effective so that students have no trouble experimenting with learning.

The aspect of guiding and directing students in problems and data collection, as well as developing and analyzing the results of practicum, teachers are less guiding students and providing instruction to students without explaining to the students who are not yet understood. This is due to the fact that the Teacher's worksheet division only shares the group so that some students do not concentrate. Time constraints teachers do not guide and direct students thoroughly. Teachers make improvements to the II cycle by distributing each student's worksheet, organizing, developing, and presenting their work so as not to get out of learning so that it runs effectively. The aspect draws conclusions by involving students but not thorough, this is because at the time of class percentage, there are various opinions of students that are delivered, until the time takes a long period, so that when the indifferent teachers and students conclude Outline only. Teachers make improvements to cycle II by making conclusions by involving students thoroughly. Implement each stage of learning on time.

Student's Learning Motivation

The improvement of student's learning motivation based on motivation aspects collected from observation sheets of student's learning motivation by both researchers. Based on the result of the research, the average percentage data of learning motivation has changed or has improved in Cycle II compared to it in Cycle I. Each aspect has also improved in Cycle II, and they were also in good qualification.

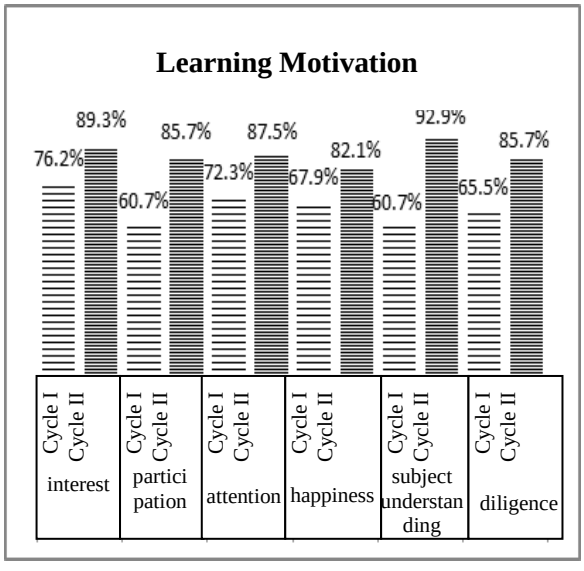

Figure 2 Learning Motivation

Based on figure 2, the analysis of student's learning motivation in the pre-cycle was 56%, was classified as a quite

good qualification, cycle I was 67.2%, and was classified as a quite good qualification, while in Cycle II it was 87.2% and was classified as a good qualification. Based on the data, it is concluded that student's learning motivation in Cycle II has improved compared to it in Cycle I. Increased motivation is significantly influenced by the selection of the PBL model. In the orientation phase of the problem, students presented problems in the form of video then invited them to solve the problem systematically.

This is in accordance with the research of (Gök & Sýlay, 2010) stating that attention is one of the important things in improving student's learning motivation. Attention is a very important action in increasing student's motivation to be better. Based on the data on the graphic above, it can be concluded that student's learning motivation has improved in Cycle II. While (Wikanso, 2013) said that motivation is the power of pushing or pulling which causes the behavior to achieve a purpose. (Lidinillah, 2013) stated that learning models that hone thinking skills such as problem-based learning can increase motivation. High learning motivation will affect learning outcomes. Another study stated that 77.78% of students were attracted to a problem-based worksheet; this suggests that students are motivated so that students will get used to and trained to develop their skills (Kahar & Layn, 2018).

Student's Critical Thinking Skill

Student's critical thinking skills can be seen based on the result of critical thinking skill tests in each cycle. The test was implemented to measure the student's analysis to kill the subject given. The result of the critical thinking skill test in Cycle I and Cycle II is presented in figure 3.

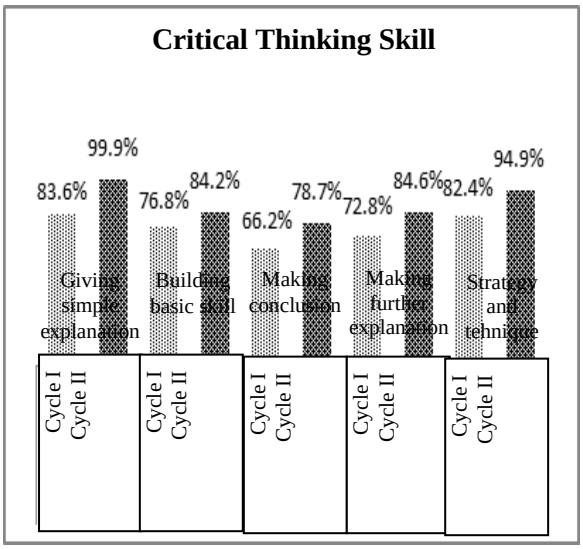

Figure 3 Critical Thinking Skill

The analysis of student's average critical thinking skill in pre cycle was 44.12% and was classified lack of good qualification, cycle I was 76.4% and was classified as quite good qualification; while in cycle II it was 88.4% and was classified as good qualification. It means the student's critical thinking skill was classified as good qualification. Based on the result, the critical thinking skill has the same aim as the definition of critical thinking that is one's skill in solving problem to delve information about the problem had (Kek & Huijser, 2011).

Based on the figure 3 above, it can be concluded that the student's critical thinking skill has improved in Cycle II. stated that critical thinking is a skill which is possessed by individual to see and to face problems which can be seen from the characteristics and critical talent; it is have high curiosity and be brave to take a risk, and have characteristics of always respect other's right, instruction, and suggestion (Mayasari, Kadarohman, Rusdiana, & Kaniawati, 2016).

This research also has some disadvantages including motivation

score obtained through group assessments. So the motivation value of each individual does not seem prominent. This is due to time constraints and lack of observers. The next deficiency is that researchers have yet to calculate the value of validity and reliability, researchers only validate the contents of the instrument. The research is expected to contribute to the development of the PBL model, adding knowledge of how to improve the motivation and thinking skills of students in the 21st century.

CONCLUSION

Based on the data explanation and the research finding gained from the result of the research, the conclusion is as the following: (1) The quality of PBL model implementation conducted has improved; (2) The implementation of PBL model can improve the student's learning motivation; (3) The implementation of PBL model can improve the student's critical thinking skill.

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