

The Effect of Problem Based Learning (Pbl) Models Motivation Toward Students' Learning outcomes and critical Thinking on material conductur and Isolatorat Sd Jenderal Sudirman medan

Maria Barus¹, Hasruddin^{2*}, Anita Yus³

¹*Postgraduate Student, State University Of Medan, Unimed. Jln. Willem Iskandar Psr V Medan Estate, 20221, Indonesia*

²*Department Of Biology, Faculty Of Mathematics And Natural Sciences, State University Of Medan, Unimed. Jln. Willem Iskandar Psr V Medan Estate, 20221, Indonesia*

³*Department Of Early Childhood Education, Faculty Of Science Education, State University Of Medan, Unimed. Jln. Willem Iskandar Psr V Medan Estate, 20221, Indonesia*

Corresponding Author: Maria Barus

Abstract: *This research is conducted on grade 6 students of SD Jenderal Sudirman Medan which aims to know: (1) The influence of Problem Based Learning (PBL) model to students' science learning outcomes; (2) The influence of learning motivation on the students' science learning outcomes; (3) The influence of learning motivation on students' critical thinking ability; (4) The influence of PBL model to students' critical thinking ability; (5) The influence of PBL model interaction and learning motivation on students' science learning outcomes; (6) The influence of PBL model interaction and learning motivation on students' critical thinking ability. The sample technique in this research is cluster random sampling which is consisted of two classes. They are class VII, 30 students, as control class which is taught by PBL model and class VI2 as control class as many as 30 students which is taught by conventional learning model. Instrument data collection by using: (1) Questionnaire motivation in the form of a statement of 30 items; (2) The test of learning result in the form of multiple choice and description of 25 items; and (3) critical thinking test in the form of a description of 15 items. This research method is quasi experiment with data analysis technique using two path Anova test with significant level $\alpha = 0,05$. The results of this study obtained that: (1) There is influence of learning model on student learning outcomes ($\alpha = 0,05, p = 0,000$); (2) There is influence of learning motivation toward students' science learning result; ($\alpha = 0.05, p = 0.001$); (3) There is influence of learning motivation toward student's critical thinking; ($\alpha = 0.05, p = 0,000$); (4) There is influence of learning model to student's critical thinking; ($\alpha = 0.05, p = 0.003$); (5) There is an interaction between learning model and learning motivation toward student learning outcomes; ($\alpha = 0.05, p = 0,000$); (6) There is an interaction between learning model and learning motivation to critical thinking; ($\alpha = 0.05, p = 0.007$)*

Keywords: *Problem Based Learning, Conventional Learning, Motivation, Learning Outcomes of Science, Critical Thinking*

Date of Submission: 03-01-2018

Date of acceptance: 19-02-2018

I. Introduction

Education is a conscious and planned effort to create an atmosphere of learning process so that students actively develop their potential to become skilled and character human beings (Manullang, 2005: 36). Other words, it emphasizes that life is education. In achieving the goal of education, some problems appear. One of them is the weakness of the learning process which leads to changes in behavior. Thus, it is widely viewed that a living and developing human is an ever-changing human being and that change is the result of learning. Just keep in mind that not all learning outcomes are more likely to change behavior according to the point of destination. Therefore, these possibilities need to be systematically directed, designed and guided. Students't learning outcomes will be seen through behavioral changes after learning. Sudijono (2012: 32) reveals the results of learning is an evaluation action that can reveal aspects of the process of thinking (cognitive domain) can also reveal other psychological aspects, namely aspects of values or attitudes (affective domain) and skill aspects (psychomotor domain) in each individual learner. This means that through learning results can be revealed after through learning. The real manifestation of the students' learning outcomes can be known from SDN 2 Salungkaenu which shows that the science subjects have become the top rating of other lessons. It is known from the value of Minimum completion criteria which always shows improvement from year to year.

In contrast to Students' learning outcomes of science at SD Jendral Sudirman Medan, especially the class VI science lesson seen in the results of the Mid Semester of the academic year 2016/2017 which still shows the results of learning that has not been satisfactory. From the results of interviews with science teachers it is known that only 55% of students who achieve the minimum criterion score is 70, while 45% has not reached the value of criterion..The fact above proves that the learning outcomes of science class VI SD Sudirman Medan has not given satisfactory results. This is not only known through the value of minimum criterion score but also from the observation where it is known that the critical thinking ability of elementary school students of Jenderal Sudirman is still low. In addition to the results of student observations, the ability of students to think low is also known from the monthly test results are always given in the form of problems analysis, synthesis and evaluation, there are still many students have not shown satisfactory results. Duron, Limbach, and Waugh (2006: 161) categorize critical thinking as an ability that includes analytical ability, synthesis and evaluation on Bloom's taxonomy, so critical thinking belongs to high-order thinking. This explains that critical thinking activates the ability to perform evidence analysis and evaluation. Thus it can be concluded that the ability to think critically critical students need to address the problems in learning that must be supported by student learning motivation. Critical thinking is to think reasonably and reflectively with emphasis on making decisions about what to believe or do. In critical thinking, students will be able to formulate points of interest, uncover the facts needed in solving a problem, choose a logical, relevant, and accurate argument, detect biases from different perspectives, and determine the effect of a statement taken as a decision. The learning model used by teachers at SD Jenderal Sudirman Medan is still using conventional model. Learning model is dominated by many teachers and less involving students so that students are not active in learning. In science learning in the classroom, teachers serve as a source of information for students, where students only record and do the exercises given by teachers. Learning models do not contribute much to student learning outcomes. This fact can be known from the observations made in class VI when the science materials are taught in the classroom. When the teacher gives information about the heat conductor and insulator, most students feel bored which is visible from the student's stuttering attitude, telling their classmates, and looking passive. The atmosphere of the class is uncomfortable and filled with the noise of the commotion so that the teaching and learning process is not orderly. Based on the fact that there is a need to apply a model of learning that is able to make students active, independent, and can develop knowledge of learning outcomes in the classroom is a model of learning problem based learning (PBL). PBL is a learning model that focuses more on the students as a learner as well as on authentic and relevant issues to solve by using all the knowledge it has or from other sources. In PBL, students are required to be able to work in groups to achieve a shared outcome. Starting from the definition of the problem, then the students conduct a discussion to equalize the perception of the problem and set goals and targets to be achieved. In this case the learning model with PBL offers students the freedom to be active in the learning process. Harvest (2001: 85) says that in learning with PBL, students are expected to be involved in a research process that requires them to identify problems, collect data, and use that data for problem solving.

The low motivation of student learning certainly gives a real impact for student learning outcomes. From the results of interviews with science teachers at SD Jendral Sudirman is known that the results of science learning is still far below the minimum criterion value is 70. This fact is also found in Umulatiptun (2013) that the results of science learning in SD Negeri 01 Munggur Learning Year 2012/2013 is still far from expected. This is evident from the results of the Mid Semester examination even shows that only 18 students whose value has met the minimum criterion value, while 22 other students have not. The low motivation of students to learn is one factor of the cause of less successful learning process in students. This ultimately affects the low learning outcomes of students. Motivation to learn is a very important component in determining the success of student learning. The low motivation of the students is caused by several factors, among others, due to the lack of students' understanding of a concept, the lack of active attitude of the students to the subjects studied, the lack of interpretation of the tasks of each subject being studied. By using PBL, teachers not only need to design a learning that can generate potential students in using their thinking skills, but also must be able to generate student motivation to be active in solving problems. High student motivation will improve students' ability to solve problems with all knowledge and skills possessed by students. Conversely, the teaching process with the PBL model will fail if the student does not have motivation because the PBL model needs student's activeness in learning, students' understanding of a lesson concept, and interpretation of lesson tasks. Therefore, PBL model and motivation are so related that the success of teaching with PBL model is determined by student motivation. Various problems found in SD Jenderal Sudirman make reference to conduct research that will answer the problems that occur. This research is aimed to improve the learning outcomes and critical thinking ability of grade 6 students of SD Jenderal Sudirman Medan based on learning model and student's learning motivation.

II. Research Methodology

This research is conducted at SD Swasta Jenderal Sudirman Medan, Acedemic Year 2017/2018. The researcher chooses the school as the location of the research for various considerations, namely: (1) The number of elementary students of Jenderal Sudirman Medan is sufficient to obtain valid data to be sampled in the research and (2) The school has not done the same research. The process of teaching and learning activities is in the semester of 2017/2018, precisely from July to December 2017. The research population is the sixth grade students of SD Jenderal Sudirman Medan, 60 students. The sample is part of the students who are included in the study. Sudjana (2002: 33) says that the sample is the selected part of the population so that all the characteristics of the population are reflected from the samples taken. From two classes of VI at the school are taken two research samples of class VII and class VI2. Sampling is done directly. After the selection of the class by not paying attention to the purpose of the study then selected class VII as an experimental class taught by PBL model with the number of students 30 students. While for the control class is taught with direct learning model chosen class VI2 with 30 students. In this research, the experiment is used by using quasi experimental design with 2 x 2 factorial design. With this design can know the influence of PBL learning model and lecture with different learning motivation to science learning outcomes and critical thinking ability in experiment and control class. These variables will then be reviewed in research with the design as follows:

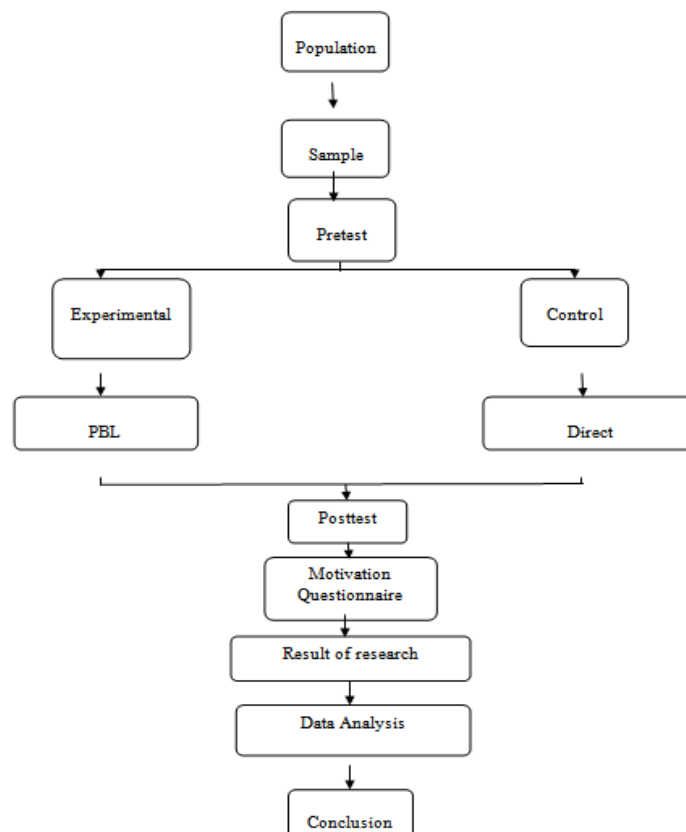
Table 3.2 Design Factorial 2 x 2

Model \ Learning Motivation (B)	PBL (A ₁)	Direct (A ₂)
High (B ₁)	A ₁ B ₁	A ₂ B ₁
Low (B ₂)	A ₁ B ₂	A ₂ B ₂

Description:

- A₁B₁ =group of students taught by using PBL with high learning motivation
- A₁B₂ =group of students taught by using PBL with low learning motivation
- A₂B₁ =group of students taught by using direct method and high learning motivation
- A₂B₂ =group of students taught by using direct method and low learning motivation

The procedure used in this study, can be seen as the chart in Figure 3.1 below



Gambar 3.1 Research Procedure

III. Research Results And Discussion

A. Research Results

3.1. The Effect of Learning Model to Students' learning outcomes of science at Elementary School of Jendral Sudirman Medan Academic Year 2017/2018:

Based on hypothesis test results obtained that there is influence of learning model on science learning outcomes of elementary school students Jendral Sudirman Medan Academic year 2017/2018 (Significance = 0,000; $\alpha = 0,05$).

3.2. The Effect of Motivation Learning to Students' Learning Outcomes of Science at Elementary School Jendral Sudirman Medan Academic Year 2017/2018:

Based on hypothesis test results obtained that there is influence of learning motivation toward science learning result of elementary school student of Jendral Sudirman Medan Academic Year 2017/2018 (Significance = 0,001; $\alpha = 0,05$).

3.3. The Effect of Motivation Learning to Critical Thinking Ability of Elementary School Students Jendral Sudirman Medan Academic Year 2017/2018:

Based on the result of hypothesis test, it is found that there is influence of learning motivation toward critical thinking of elementary school student of Jendral Sudirman Medan Academic Year 2017/2018 (Significance = 0,000; $\alpha = 0,05$).

3.4. The Effect of Learning Model to Critical Thinking of Elementary School Students Jendral Sudirman Medan Academic Year 2017/2018.

Based on result of hypothesis test, it is found that there is influence of learning model to critical thinking of elementary school student of Jendral Sudirman Medan Academic Year 2017/2018 (Significance = 0,003; $\alpha = 0,05$).

3.5. The Effect of Learning Model Interaction and Learning Motivation to Student Learning Outcomes of SD Jendral Sudirman Medan Academic Year 2017/2018:

Based on the result of hypothesis test (two path anova) there is interaction between learning model and motivation of student to result of student learning of SD Sudirman (Significance = 0,000; $\alpha = 0,05$). This is proved by significance value of motivation interaction equal to 0,000 and significance value of learning model interaction amounting to 0,000 towards the science learning outcomes. Based on the test of correlation (multiple regressions) to the learning result of science lesson, the contribution of motivation variable was 29% and the learning model variable was 29.7% with R-Square 0.588. This shows that the learning model gives more dominant influence than the learning motivation toward the students' cognitive learning outcomes.

3.6. The Effect of Interaction Learning Model and Learning Motivation toward Critical Thinking of Elementary School Students Jendral Sudirman Medan Academic Year 2017/2018:

Based on the result of hypothesis test (two path anova) there is interaction between the learning model and the learning motivation toward the learning result of elementary student of Jendral Sudirman (Significance = 0,007; $\alpha = 0,05$). This is proved by significance value of motivation interaction equal to 0,000 and significance value of learning model interaction of 0.001 toward students' critical thinking ability. Based on the test of relationship (multiple regression) on students' critical thinking ability, the contribution of motivation variable is 14,8% and learning model variable 13,9% with R-Square 0,287. This shows the motivation to learn to give more dominant influence than the model of learning to students' critical thinking skills.

IV. Discussion Of Research Results

(1) Students' Learning Outcomes of Science Taught Using Problem Based Learning (PBL) is Better Than Conventional Model at SD Jendral Sudirman academic year 2017/2018. In addition to the results of variance analysis, the results of the study can also be seen from the difference of posttest average in both classes. The mean of student posttest in PBL class is 85,50 while in conventional class equal to 75,8. From the data it appears that there is a mean of student learning outcomes taught with problem-based learning is higher than the average of student learning outcomes taught by conventional learning. The average difference, which is the strength of this study, is caused by several things, namely: 1) Research conducted on high grade, elementary school VI, meaning students' thinking ability has reached the level of maturity is sufficient compared if done in low grade;

(2) statements that often appear to be organized with various activities such as experimentation, data processing, and presentation so that learning is more innovative and fun; 3) learning is made in groups, this makes students able to get information from peer opinions. The classes taught by PBL, students are also given the opportunity to

investigate and solve problems themselves or groups to produce conclusions that can be presented to others. In this process of implementation, learning results is higher level. This is due to the strength of the model that can train and stimulate tudents' curiosity and social interaction in the learning process.

(2) Students' Learning Outcomes of Sceicne Who Have Higher Learning Motivation are Better than Students Who Have Low Learning Motivation at SD Jendral Sudirman Medan Acedemic Year 2017/2018

The findings prove that the average learning outcomes for students who have high learning motivation (85.5) higher than the results of students who have low learning motivation (75.8). It can be understood that students who have high learning motivation, of course more diligent to do the exercises and practice science lesson at home and then they feel that knowledge and skills about science subjects is a need and not a compulsion, while students who have motivation to learn are less passionate about learning, less daring to ask questions and tend to be less active in the learning process. Learning motivation is very influential in improving student learning outcomes on science subjects. It is evident from the findings that reinforce those students who have high motivation to learn more have the impetus to make something related to science subjects. In addition, students who have motivation high learning actively play a role in class. While for students who have low learning motivation tend to be more waiting, passive and less innovative. Based on the results of research, in the process of learning science is necessary to consider the level of student's motivation to learn.

(3) The Ability of Students' Critical Thinking Who Have Higher Learning Motivation is Better than Students Who Have Low Learning Motivation at SD Jendral Sudirman Medan academic year 2017/2018 The result of the research shows that students 'learning motivation has an effect on students' critical thinking ability. The result data shows that students who have high learning motivation get higher average score of critical thinking ability (84,5) than students with low learning motivation (76,5). This shows that the motivation of learning affects the students' critical thinking ability. From the results of the study also found that the critical thinking skills of students who have the highest learning motivation is found in the score 72, while the critical thinking skills of students who have the lowest learning motivation in 66 scores.

(4) Critical Thinking Capability of Students Taught Using Problem Based Learning (PBL) is Better than Conventional Model at SD Jendral Sudirman Academic Year 2017/2018 The result of the research shows that there is a difference of students' critical thinking ability which is taught by PBL learning model with students' critical thinking ability which is taught by conventional learning model, where the average score of students' critical thinking ability which is taught by PBL learning model is higher (83,3) than the average score of students' critical thinking skills taught by conventional learning models (77,73). This shows that PBL learning model is better in improving students' critical thinking ability. From the research result also found that students' critical thinking ability which is taught by PBL learning model mostly on score 85 while the critical thinking ability of students which is taught by conventional learning model is in score 80.

(5) Interaction between Learning Model and Learning Motivation to Students' Learning Outcomes at SD Jendral Sudirman Medan Academic year 2017/2018 This study finds that there is interaction between learning model with learning motivation in influencing student learning outcomes in science subjects. This gives an indication that treatment with PBL model and students who have motivation to learn to give influence to the results of science learning. This study finds the results of Science lesson learning that varied between PBL model and conventional learning model with high learning motivation and low learning motivation, meaning that one of the two groups will produce better learning outcomes when taught using PBL I model.

(6) Interaction between Learning Model and Learning Motivation to Critical Thinking Ability of Elementary School Students at SD jendral Sudirman Medan Academic Year 2017/2018 The research findings show that there is an interaction between learning model and motivation to students' critical thinking ability. Students who have high learning motivation that is learned by PBL learning is higher critical thinking ability than students who have high learning motivation that is taught by conventional learning. Similarly, students who have low learning motivation learned by PBL learning have higher critical thinking ability when compared with students who have low learning motivation that taught by conventional learning. This indicates the interaction between learning models and motivation to learn students' critical thinking skills.

V. Conclusions, Implications And Suggestions

5.1. Conclusion

Based on the results of research and discussion that have been stated before, it can be drawn some conclusions in accordance with the problems that have been formulated, namely:

1. There is influence of science learning outcomes of students who were taught using Problem Based Learning (PBL) is better than the conventional model at SD Jenderal Sudirman Medan Academic Year 2017/2018.
2. Students' learning outcomes of Science who have high learning motivation is better than students who have low learning motivation at SD Jenderal Sudirman Medan Academic Year 2017/2018.
3. Critical thinking ability of students who have high learning motivation is better than students who have low learning motivation at SD Jenderal Sudirman Medan Academic Year 2017/2018.
4. There is an influence of the ability Critical thinking of students who are taught using Problem Based Learning (PBL) is better than the conventional model at SD Jenderal Sudirman Medan Academic Year 2017/2018.
5. There is an interaction between learning model and learning motivation toward science learning outcomes of elementary school students Jenderal Sudirman Medan, 2017/2018. The interaction is seen from the significant difference between the average of students' learning outcomes taught by PBL model with low motivation and conventional learning model with high motivation; PBL model with low motivation and conventional learning model with high motivation.
6. There is an interaction between the learning model and the motivation to learn about the critical thinking ability of elementary school students Jenderal Sudirman Medan, 2017/2018. The interaction can be seen from the significant difference between the mean of students' critical thinking ability taught by PBL model with low motivation and conventional learning model with high motivation; PBL model with low motivation and conventional learning model with high motivation.

5.2. Implications:

Based on the first and second conclusions from the results of this study note that the ability of critical thinking and students' learning outcomes of science are taught by PBL is higher than the ability of critical thinking of students that are taught by conventional learning. This suggests that student-centered learning can provide students with the opportunity to engage directly, physically, emotionally and mentally to discover their own knowledge and can encourage critical thinking and learning outcomes so that the effectiveness of learning is achieved. This can be considered for teachers who teach on science subjects to use PBL model in improving students' critical thinking skills. Based on the third and fourth conclusions, it is known that the students' learning motivation as one of the characteristics of students also gives a meaningful influence in the acquisition of critical thinking ability and students' learning outcomes. Student motivation varied, based on the results of the study note that the ability to think critically and student learning outcomes that have higher learning motivation higher than students who have low learning motivation. The existence of these individual differences can affect the learning process, thus it is necessary to get the teacher's attention when planning and implementing the learning activities. Learning based on the characteristics of students proves to give influence to the acquisition of critical thinking skills and student learning outcomes. Based on the fifth conclusion of the research results shows there is an interaction effect between PBL model and learning motivation on student learning outcomes. Similarly, based on the sixth conclusion, the results show that there is an interaction effect between PBL model and learning motivation on students' critical thinking ability. The results of this study indicate that to improve the ability of critical thinking and student learning outcomes are influenced by teachers through the learning model used and student learning motivation. In this case between teachers and students have the same role and means in improving the ability of critical thinking and maximum learning outcomes then the two variables need to get attention at once.

5.3. Suggestions

The researcher proposes some suggestions as follows:

1. To improve the ability of critical thinking and students' learning outcomes of science, as well as improving the ability of students in solving problems, it is necessary to apply Problem Based Learning (PBL) model.
2. Motivation to learn has a very significant influence on the results of learning, it is advised to students to further improve the motivation of learning through various ways, for instance, to enjoy each subject presented, have the desire to gain knowledge.

3. The populations and samples involved in this study are small (<100), so it is advisable for other researchers to carry out further research that the population and sample are larger.
4. For further research in addition to teachers who become partners of researchers, need to be socialized also to students how the mechanism of PBL model, what is necessary and unnecessary so that when the learning takes place, the awkwardness and rigidity in the learning process can be minimized.

References

- [1] Arends, R. Learning To Teach. (Yogyakarta: Pustaka Pelajar, 2013)
- [2] Corebima .. Empower Thinking Skills During SCIENCE Lesson For Our Future. (Surabaya: UNESA University Press, 2009)
- [3] Liu, Oon-zinc. Problem Based Learning Innovation: Using Problem to Power Learning in 21st Century, Thompson Learning. (London: Boughton, 2009)
- [4] Ormrod, F. Holistic Critical Thinking Scoring Rubric. (California: Academia Press, 2008)
- [5] Winaputra. Model-Model of Teaching and Learning. (Malang: Pustaka Pelajar, 2015)

Maria Barus" The Effect of Problem Based Learning (Pbl) Models Motivation Toward Students' Learning outcomes and critical Thinking on material conductur and Isolatorat Sd Jenderal Sudirman medan." IOSR Journal of Research & Method in Education (IOSR-JRME) , vol. 8, no. 1, 2018, pp. 47-53.