THE EFFECT OF PROBLEM BASED LEARNING MODEL ON STUDENT'S ACHIEVEMENT AT LIGHT TOPIC IN 8TH GRADE JUNIOR HIGH SCHOOL

Avolen Berly Indah Siahaan and Derlina
Physics Department, Faculty of Mathematics and Natural Science
avolensiahaan@yahoo.co.id, derlina.nst@gmail.com

ABSTRACT

The purpose of this study was to know the effect of Problem Based Learning Model on student's achievement at Light topic in one of 8th grade Junior High School students. This study is a quasi experiment which involved two classes as sample. First the both of classes were given pretest then the experiment class was given PBL Model and control class was given Direct Instruction Model and after the both classes were given a different treatment they were given posttest and the result showed that the mean of experiment class was higher than control class. Based on result research there was an effect of PBL on student's achievement.

Keywords: problem based learning, achievement

INTRODUCTION

Result of initial observation and interview with Physics teacher showed that mean of student's achievement was under minimum competency of passing grade, is 75. The mean achievement of students was about 55. Teacher who does not use interesting model learning causing the students be bored, passive and not creative. The best teachers not only a charismatic and persuasive presenter. But, the best teachers are they involve the students in cognitive and social assignment, and teach them how to do the assignment productively (Joyce, 2011:7).One of alternatives to overcome the problem is by using PBL Model which designed to help students develop thinking ability in problem-solving in daily life. According to Arends (1997), PBL is an learning approach which students do the authentic problem to organize the knowledge of them-self, grow up higher inquiry and thinking skill, grow up autonomy and self-confidence. He also described the phases of PBL Model they are, (1) Give orientation about the problem to the students, (2) Organize the students to investigate, (3) Helps autonomy and group investigation, (4) Develop and present artifact and exhibit, (5) Analyze and evaluate problem solving process.

The problems of this study are: (1) How is student's achievement whom are taught by using Direct Instruction Model at topic Light of class VIII SMP Negeri 1 Tebing Tinggi? (2) How is student's achievement whom are taught by using Problem Based Learning Model at topic Light of class VIII SMP Negeri 1 Tebing Tinggi? (3) Is there any effect Problem Based Learning Model on student's achievement at Light topic?

The purposes of this study to know: (1) Student's achievement by using Direct Instruction Model. (2) Student's achievement by using Problem Based Learning Model. (3) The effect of Problem Based Learning Model on student's achievement at Light topic.

METHOD

The type of this study is a quasi experiment and the subject of this research are 8th-grade students in SMP Negeri 1 Tebing Tinggi academic year 2012/2013. By using cluster random sampling, sample selected from the population as much two classes. One class is 8-8 as an experiment class which be taught by using PBL Model

and another one is 8-9 as control class which be taught by using Direct Instruction Model. This research was implemented for 3 weeks from April 30th until Mei 15th in 2013. Knowing the student's achievement in physics, the both of classes are tested before and after. The instrument was used to get data is a test which contains of ten questions and had been validated by some Physics Expert. The technical steps in this research are: (a) Give pretest to experiment class and control class to k now student's achievement before treatment. (b) After analyze the data of pretest namely normality test, homogeneity test and test t in experiment class and control class. (c) Give treatment by using PBL Model in experiment class and using Conventional Model in control class. (d) Implement the posttest to know student's final ability in experiment class and control class. (e) Implement the analysis of data posttest namely normality test, homogeneity test, and test t in experiment class and control class. Based on hypothesis test will be known whether there is or not influence of PBL Model.

RESULT AND DISCUSSION

The phases in PBL Model are: (1) Give orientation about the problem to the students. Teacher discusses the goal of subject, describes kinds of important logistic need, and motivates students to involved in problem solving activity. (2) Organize the students to investigate. Teacher helps students to define and organize the assessment relates to the problem. (3) Helps autonomy and group investigation. Teacher encourages students to find right information, implement experiment, and find explanation and solution. (4) Develop and present artifact and exhibit. Teacher helps students in designing and preparing artifact like a report, video recording, and models and helps them to share it to others people. (5) Analyze and evaluate problem solving process. Teacher helps students to do reflection to their investigation and the process they use. Based on Smith (Amir, 2010:27), states benefits of PBL that students will: increase their capability and problem solving skill, it is easier to remember, increase their understanding, increase their knowledge which related to practice, encourage them in thinking, builds leadership and teamwork, capability learning, and motivate students. In learning activity there are two positions of subjects, they are teacher and students. Learning is changing of behavior or potential behavior which relative permanent comes from experience and can not be related to temporary body states like a condition that caused by sick, weariness or medicines (Hergenhahn, 2009:8). In Sardiman (2010:37) stated that according to theory of constructivism , learning is active process from the learning subject to construct the meaning of something whether it is text, dialogue activity, experience and the others.

Based on the data of research result obtained the mean value of the pre-test in experiment class before given treatment by using Problem Based Learning model is 36.64 and the standard deviation is 12.60. In the mean while, the mean value of pre-test obtained in control class is 36.72 and the standard deviation is 12.11.

To observe the result of pre-test detailed of two classes can be seen in the following bar chart :

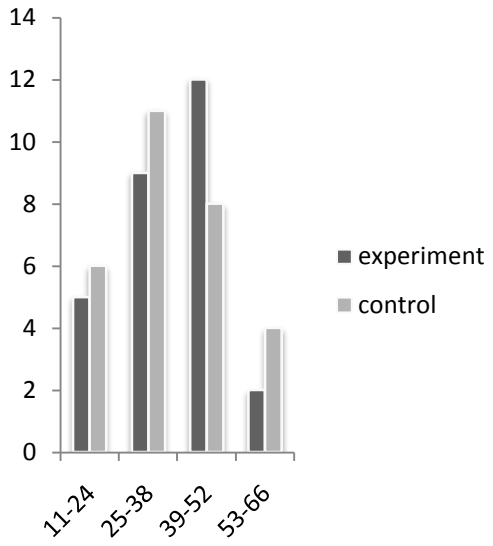

Figure 1. Bar Chart of Pre-test Data in Experiment and Control Class

After the both of classes are given a different treatment, then both classes are given post-test that problems are same with pre-test. Based on the data of research result on appendix 11 and 12, the mean value after applied Problem Based Learning model is 82.68 and the standard deviation is 16.72. In the mean while, in control class obtained the mean value of student's post-test is 49.62 and standard deviation is 15.83. To observe the post-test results of both classes detailed can be seen on the following bar chart :

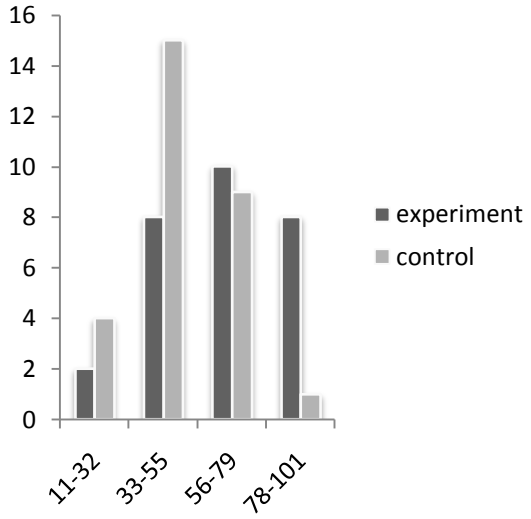

Figure 2. Bar Chart of Post-test Data in Experiment and Control Class

The result of research shows that there was an effect of student's achievement by using Problem Based Learning model with Direct Instruction Model at Light topic in 8th grade SMP Negeri 1 Tebing Tinggi. The mean pretest in experiment class is 36.64 with standard deviation is 12.60 and control class is 36.72 with standard deviation is 12.11. It is known that the ability of student for experiment class did not differ significantly. So, it can be stated that both groups have the same initial ability. Then the mean posttest in experiment class is 82.68 with standard deviation is 16.72 and control class is 49.62 with standard deviation is 15.83. Based on data above, mean posttest value of experiment class is bigger than control class. The increasing of posttest value is caused by after pretest done, student were given the treatment. In experiment class were given the treatment using Problem Based Learning model and control class were given the treatment using Direct Instruction model.

The increasing of achievement by using Problem Based Learning is better because it has several overplus, they are: 1) students learn to get knowledge and practice their skill thinking; 2) stimulates the curiosity and motivates the student's ability; 3) students are encouraged to be autonomous, learn actively in mastering concepts and principles; 4) teaches the students to understand the content and process in same time; 5) students learn to solve the problem, evaluate the solution, and think logically, it can be seen when the students work in group and convey their hypothesis and when they asked the teacher or share what they had have in learning process; 6) students are also demanded learn and acting so they more remember what they had learn. Then Problem Based Learning directs the students to be more active, creative and critical thinking so they are motivated to understand the subject. For example in

solving the problem, students are divided in group whom has five or six member. Then share their result discussion to others.

Discussion group in Problem Based Learning is an advantage because the lower ability students and upper ability students can be a team work to do the academic assignment, because the upper ability students can help the lower ability students and the lower ability students can get knowledge from the upper ability students. This learning also involves the students to more investigate the subject, so the students can solve the problem. When presenting result discussion, they were trained to be more self confidence and brave to convey their opinion.

Theoretically Problem Based Learning Model is better than Direct Instruction because in model the students are demanded to solve the problem creatively. This result research is appropriate to past result researches they are, Saut (2011) researched students in senior high school, Hasibuan (2010) researched students in senior high school, and Sanny (2012) researched students in junior high school and stated that there was an increasing achievement by using Problem Based Learning Model. It means Problem Based Learning Model is better than Direct Instruction.

Usage of Problem Based Learning Model can increase student achievement but there were still obstacles in this research such as allocation time. As special in phase four while student developed and presented their result discussion in project, it made they were not all out in presenting and discuss their project because limited time. Another obstacle is the author's conduction in class was less. The next researcher should conduct the class well so the learning activity so the phase in Problem Based Learning Model can be done well and the purpose is reached.

CONCLUSION AND SUGGESTION

Based on the research result, data analysis, and discussion so can be concluded that : (1) The mean of student's achievement at Light topic in 8th grade SMP Negeri 1 Tebing Tinggi academic year 2012/2013 by using Direct Instruction Model is 49.62. (2) The mean of student's achievement at Light topic in 8th grade SMP Negeri 1 Tebing Tinggi academic year 2012/2013 by using Problem Based Learning Model is 82.68. (3) There is an effect of Problem Based Learning Model on student's achievement at Light Topic in 8th grade SMP Negeri 1 Tebing Tinggi academic year 2012/2013.

Based on the result and conclusion in this research, so the researcher gives some suggestions: (1) For university student or aspirant teacher should more understand Problem Based Learning Model as one of efforts to make student learn actively, increase creativity and learning motivation, and increase student's achievement. (2) For university student or aspirant who wants to do the same research should more understand clearly the problem which given to the students and more mastering the steps in problem based learning model. (3) For the next researcher who wants to research Problem Based Learning Model suggested to more pay attention the efficiency time in phase "develop and present artifact and exhibit", because in this phase there were many students had questions for the displaying group. (4) Based on the guide for Problem Based Learning, suggested for the researcher to select the sample who has standard is more than standard.

REFERENCES

Amir, Muh. Taufik. 2010. *Inovasi Pendidikan Melalui Problem Based Learning: Bagaimana Pendidi Memberdayakan Pemelajar di Era Pengetahuan.* Jakarta: Kencana Prenada Media group

Arends, Richard I 2008. *Learning to Teach Belajar Untuk Mengajar Edisi Ketujuh/Buku Dua*. Yogyakarta: Pustaka Belajar

Joyce, Bruce, Marsha Weil, and Emily Calhoun. 2011. *Models of Teaching edisi kedelapan*. Yogyakarta: Pustaka Belajar.

Hasibuan, Yustina. 2009. *Pengaruh Model Pembelajaran Berdasarkan Masalah Terhadap Hasil Belajar Fisika Siswa Pada Materi Pokok Gerak Lurus Di Kelas X Semester 1 SMAN 3 Medan T.A 2009/2010*. Skripsi, FMIPA : Universitas Negeri Medan.

Hergenhahn & Olson, Matthew H. 2009. *Theories of Learning (teori belajar)*. Jakarta : Kencana Prenada Media group.

Sardiman. 2010. *Interaksi dan motivasi Belajar Mengajar*. Jakarta : Rajawali Pers.

Sibarani, Juni Lastri. 2011. *Pengaruh Metode Pembelajaran Berbasis Masalah Terhadap Kemampuan Berpikir Kritis Siswa Pada Materi Usaha dan Energi Kelas XI SMA Negeri 1 Doloksanggul T.P. 2011/2012*. Skripsi, FMIPA : Universitas Negeri Medan.

Siregar, Saut Dohot. 2011. *Pengaruh Model Pembelajaran Berdasarkan Masalah dalam Meningkakan Aktivitas Belajar dan Pemahaman Konsep Siswa pada Materi Pokok Kinematika Gerak Lurus di Sekolah .Menengah Atas Kelas X*. Skripsi, FMIPA : Universitas Negeri Medan