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The Effect of problem-based learning model on results students of Elementary School learning sciences

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ABSTRACT

This study aimed to determine the effect of learning model Problem Based Learning on learning outcomes fifth grade science students 14 Pasaman, district Pasaman, Pasaman Barat Regency Academic Year 2017/2018. This research is a quasi experimental research with the research design used is Non Equivalent Control Group Design. The sample is determined by Purposive sampling technique. The sample in this research is the students of class V in State Elementary School 14 Pasaman. The results of this study obtained the average value of the experimental class using the problem-based learning model higher 83,36 than the control class using conventional learning 77,12 Based on the calculation of t test obtained that tcount 2.93 is greater than ttable 1,677 indicates that theris a significant effect on students' learning outcomes. Based on the results of this study can be concluded that the model of learning Problem Based Learning influence on the learning outcomes of science class V SDN 14 Pasaman Pasaman District.

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Introduction

Problem Based Learning model is a problem-based learning model that can help students understand the learning material, in this model problems are presented at the beginning of learning. Problem Based Learning model is one of the innovative learning models that can provide active learning conditions to students by directing students to solve

a problem together. Students are expected to be able to find concepts through the problems given, namely by finding the right solution to the problem.

The Problem Based Learning model is a learning model that starts with problems related to students' daily lives and involves students in solving these problems. As according to Hosnan (2014: 298) "Problem Based Learning Model is a learning model that uses everyday problems. day as a context for students to develop problem solving and critical thinking skills as well as build new knowledge. According to Fathurrohman (2015: 112) who said "Problem Based Learning is a learning model that involves students to solve a problem through the stages of the scientific method so that students can learn knowledge related to the problem and at the same time have problem solving skills". This problem is used as a trigger for the student's learning process before knowing the concept of the material being studied. As according to Hosnan (2014: 298) "The Problem Based Learning Model makes everyday problems a trigger for students' learning processes before they know the formal concepts". The Problem Based Learning model also has several advantages. According to Trianto (2011: 96) the advantages of Problem Based Learning are: "(1) Realistic with student life, (2) concepts according to student needs, (3) fostering an attitude of inquiry, (4) retention of concepts so strong, (5) cultivate problem-solving skills".

Through the Problem Based Learning learning model students are trained not to fully depend on learning activities on the teacher, so that student learning independence will emerge. Students will be encouraged to be active in learning, challenge students to think, motivate students to continue to find out, and create a fun learning process. In the end, students are able to apply the knowledge they gain in everyday life. The Problem Based Learning model is suitable for use in science learning, because the science learning process requires direct experience in order to develop competencies to explore and understand the natural surroundings, activate thinking skills, curiosity and students' skills to investigate the natural surroundings. Science education in elementary schools is expected to be a vehicle for students to learn about themselves and their natural surroundings, as well as prospects for further development in applying them in everyday life based on the scientific method.

Therefore, according to Michaels (2008) science education must be returned to its essence and the purpose of science education is to develop students' thinking skills in studying their environment which will provide a basis for them in solving life's problems (Fitria, 2014: 82). But in reality there are still many teachers who use conventional learning models in teaching science. The use of conventional models in science learning is less

effective, because it is too monotonous, thus making students feel bored and not participating in learning activities. This results in students not understanding the material taught by the teacher and resulting in the objectives of science lessons not being able to be achieved optimally. Whereas according to Esler (1996) that science learning must provide many learning experiences and meaning of facts to students so that they can change the way of thinking and shape students' scientific attitudes (Fitria, 2017:30).

Based on the observation data that the researchers obtained in the field on January 2-10, 2017, especially for class V, there are several problems that support this research. When learning takes place, the science learning process that takes place is still conventional. Learning with conventional models tends to make students feel bored. The use of conventional models in science learning is also felt to be less attractive for elementary school students. Students will feel bored quickly because they are less able to participate in learning. In learning activities, this condition is seen when the teacher is in the learning process using only the lecture method, then students take notes what the teacher writes on the blackboard, then the teacher gives some questions, and in the end students work on the questions. From these activities, it can be seen that the teacher still does not provide opportunities for students to build and discover their own knowledge, and students are not given the opportunity to work together in groups. This is what causes students to not understand the material taught by the teacher because learning is only teacher-centered resulting in low science learning outcomes.

Method

The type of research carried out is quantitative research with experimental research methods. According to Sugiyono (2012: 107), experimental research can be interpreted as a research method used to find the effect of certain treatments on others under controlled conditions. This study uses a nonequivalent control group design which is almost the same as the pretest-posttest control group design, only in this design the experimental group and the control group are not chosen randomly. The use of this method in this study is considered appropriate because this study aims to obtain information about the effect of using the Problem Based Learning model on the learning outcomes of fifth grade elementary students in science. Another reason the author chooses this method is because in this study the determination of the sample is not random so that it can facilitate the implementation of research in elementary schools.

This study involved two groups, namely the experimental group and the control group, the experimental activities in this study were carried out on class V students, which consisted of a control class and an experimental class. The experimental class was a group of students who received the Problem Based Learning model. The control class is a group of students who do not get the Problem Based Learning model or who use the lecture method. Both classes have equal or homogeneous abilities.

Table.1 Types of Research Design

group	*Pre-test*	Treatment	*Post-test*
Experiment	O_1	X	O_2
Control	O_3	-	O_4

(Source: Sugiyono*, 2012: 116)*

Description :

X : Use of learning model

Problem Based Learning

O1: Pre-test (test in the form of questions before learning using the Problem Based Learning model)

O2: Post-test (test in the form of questions after learning using the Problem Based Learning model)

O3: Pre-test (test in the form of questions before learning using the lecture method)

O4 : Post-test (test in the form of questions after learning using the lecture method)

The population of this study were all Class V students of SDN 14 Pasaman who were registered in the 2017/2018 academic year. The sample in this study were all fifth grade students at SDN 14 Pasaman. The total number of students in class V is 50 students, with details of class VA totaling 25 students and class VB totaling 25 students. The sampling technique used in this research is purposive sampling technique. According to Sugiyono (2012:124) Purposive sampling is a sampling technique with certain considerations. The considerations made by the researcher in determining the sample for classes VA and VB include: (1) the material that the researcher takes is in the class that is sampled and will be studied at the same time (2) class V has 2 study groups, namely VA and VB, (2) the number of the two classes is the same, (3) the average value of the two classes is the same or homogeneous.

The instrument in this study is a tool that will be used to measure research, in accordance with the opinion of Arikunto (2009:13) "The instrument is a tool used to

measure the observed natural and social phenomena". The instrument used in this study is a test question. The instrument is in the form of a written test in the form of multiple choice questions consisting of 4 alternative answers, namely a, b, c and d in the addition of different denominators.

Instruments that are prepared in advance need to go through a content validity test by the supervisor. After the instrument was deemed to meet the requirements of content validity, the instrument was tested to determine the level of validity, reliability, level of difficulty, and discriminating power of the questions. The instrument was tested in class VI involving 30 students. From the results of the test validity, 30 questions were obtained that were valid from the 40 tests tested. Based on the results of the test reliability test, the test reliability coefficient was 0.78. This means that the test is included in the high reliability criteria. So, the science learning outcome test is considered feasible to be used in research.

Furthermore, the test was analyzed for the level of difficulty, based on the calculation of the difficulty level of the test test items, it can be concluded that there are 24 questions with easy criteria, 14 items for medium criteria, and 3. The differentiating power of the test test items can be concluded that the number of questions for the unfavorable (bad) criteria is 8 items, for the sufficient criteria as many as 23 items, and for the good criteria as many as 6 items and for the very good criteria as many as 3 questions. Based on the test results of the instrument, there were 30 questions that met the requirements to be included as pre-test and post-test questions in the study.

The data on science learning outcomes that have been collected are then analyzed using t-test statistics. Before analyzing the data, prerequisite analysis tests are carried out, namely the normality test of the data distribution and the homogeneity test of variance. variance was tested using the F test. If F count F table then the two populations have different variances (not homogeneous), If F count < F table then both populations have homogeneous variance. Tests were carried out at a significance level of 5% with degrees of freedom for the numerator n1-1, the degrees of freedom for the denominator n2-1.

After testing the normality and homogeneity of the data, the test results from the normality and homogeneity of the data are used in determining the selection of test statistics used in testing the research hypothesis. The average score in learning outcomes between classes taught using the problem-based learning model and classes taught using conventional learning was tested using t-test statistics. The statistical hypothesis in this study can be explained as follows:

Ho = There is no significant effect in the use of the Problem-Based Learning model on the science learning outcomes of fifth graders at SDN 14 Pasaman.

H1 = There is a significant influence in the use of the Problem Based Learning model on the science learning outcomes of fifth graders at SDN 14 Pasaman

Results and Discussions

To draw conclusions from the results of the study, a hypothesis test was conducted using the t-test. Before conducting the t test, the normality test and homogeneity test were first carried out on the research results. Based on the normality test for the experimental class and the control class, the values of L0 and Lt were obtained at a significant level of 0.05 for N = 25 as shown in the following table:

Table 2. Calculation Results of the Liliefors Posttest experimental class and control class

Sample class	N	L_t	L_0	Conclusion	Description
Experiment	25	0,10649	0,1730	$L_{count} < L_{table}$	Normal Data
Control	25	0,0943083	0,1730	$L_{count} < L_{table}$	Normal Data

Based on table 2, it can be seen that the experimental class value Lcount 0.10649 is smaller than Ltable 0.1730 for 0.05. Thus the value of the experimental class comes from data that is normally distributed. For the control class, it was obtained that Lcount 0.0943083 was smaller than Ltable 0.1730 for 0.05. This means that the control group data comes from data that is normally distributed. The second test of requirements is the homogeneity test using the F test. This test aims to determine whether the data comes from a homogeneous group, between the experimental class and the control class. If F count < F table then the two populations have homogeneous variance. After calculating, the data obtained from the two sample classes are as follows:

$$F = \frac{biggest\ variant}{smallest\ variant}$$

The calculation of the price of F with a significant level of a = 0.05 from the distribution table F, it turns out that the price obtained is Fcount < Ftable 1.554 < 1.98. It can be concluded that the data from the final test of the two sample classes has a homogeneous variance.

Table 3. Calculation Results of the Posttest Homogeneity Test for the experimental class and the control class

Sample class	Fcount	F_{table}	Description
Experiment	1,167	1,98	Homogeneous
Control	1,554	1,98	Homogeneous

From Table 3 it can be seen that the experimental class and control class are smaller than Ftable (Fcount <Ftable), meaning that the experimental class and control class have homogeneous variance. After the normality test and homogeneity test, it is known that the two sample classes are normally distributed and have homogeneous variance. Then it can be continued with hypothesis testing using the t-test technique.

The results of the t-test showed that at the real level = 0.05, it was found that ttable = 1.677 while tcount = 2.93. This means that tcount> ttable 2.93>1.677. Thus the hypothesis can be accepted. (H0 is rejected and Ha is accepted). It can be concluded that there is a significant effect of the Problem Based Learning model on the science learning outcomes of fifth grade students of SDN 14 Pasaman, West Pasaman Regency.

Discussion

Based on the results of the pre-test students in the experimental class and the control class in the pre-test, the average number of the experimental class was 65.88. The average score for the control class is 68.4. Based on the results of data analysis that has been carried out that tcount is -1.13 compared to 0.05 (ttable=1.677) with degrees of freedom dk(N1-1)+(N2-1)=48. Thus tcount < t table, which is -1.13 < 1.677, it can be said that the hypothesis Ha is rejected or H0 is accepted. So it can be concluded that there is no significant effect between the science learning outcomes of the experimental class and control class students. Then, based on the results of students' science learning in the experimental class and the control class in the post-test, the average number of the experimental class was 83.36 and the average number of the control class was 77.12.

Based on the results of data analysis that has been carried out, tcount is 2.93 compared to 0.05 (ttable = 1.677) with degrees of freedom dk (N1-1)+(N2-1)=48. Thus, tcount > ttable, which is 2.93 > 1.677, it can be said that the hypothesis Ha is accepted or H0 is rejected. It can be concluded that there is a significant effect of the use of the Problem

Based Learning model on the science learning outcomes of fifth graders at SDN 14 Pasaman. For more details, see the following graph:

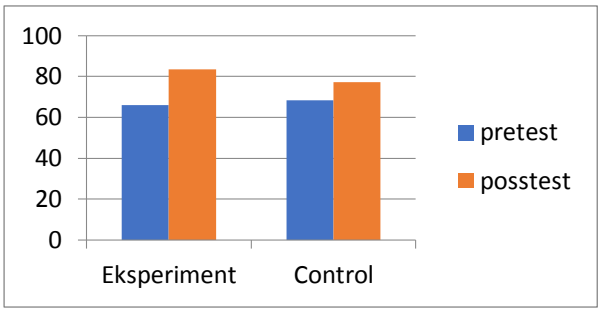

Diagram 1. Comparative Data of Pre-Test and Post-Test Learning Outcomes for Students in Experimental Class and Control Class

Based on the graph above, it is clear that the comparison of the pretest scores of students' science learning outcomes before being given treatment with the posttest scores of students after being given treatment. In this study, the use of the Problem Based Learning model in the student learning process at SDN 14 Pasaman is a new thing so that a different learning atmosphere is created than usual. The stages of the learning process using the Problem Based Learning model are different from the stages of the learning process using the conventional learning model. The learning carried out in the experimental class taught using the Problem Based Learning model was initially not familiar with the model, but after being given an explanation and steps about the Problem Based Learning model, students could understand it.

At the first meeting, students were not used to learning to solve problems, with the motivation and encouragement given by the teacher to work more independently and confidently in carrying out learning using the Problem Based Learning model so that at the second meeting to the third meeting students showed interest in the learning process using the Problem Based Learning model with reinforcement. and also the guidance provided by the teacher in the learning process in the form of touch, thumbs up and words of encouragement that provide many benefits for students.

The learning process carried out by the teacher using the Problem Based Learning model can encourage student activity so that activity tends to increase at each meeting, this is evident by the number of students who ask questions, express opinions to the teacher or their friends in group work. Each group must master the material given after solving

problems with the help of a discussion guide. The use of Problem Based Learning in science learning can provide space for students to optimize their abilities. This is because Problem Based Learning is in accordance with the characteristics of elementary school students stated by Rita (208: 104) namely physical, cognitive, language, moral, emotional, and social development. In addition, the effect of Problem Based Learning can be seen based on the posttest results of the experimental group which is higher than the experimental group. control. This also proves the opinion of Taufik (2009: 49) who also states that by using Problem Based Learning, students will get several benefits, including: increasing problem-solving skills, building leadership and cooperative abilities, learning skills, and motivating students in learning.

In the control class, learning using the lecture and question and answer method does not provide opportunities for students to optimize their abilities. Based on the results of the posttest, it shows that the control class has lower results than the experimental class. This is because teaching in the control class is still dominated by the lecture and question and answer method which makes students not interested in the material being taught. These methods are not appropriate for learning that aims to solve problems that exist in the lives of students because their delivery that prioritizes oral communication makes students tend to be passive and less suitable for the formation of skills and attitudes.

CONCLUSION

Based on the results of research and discussion, it shows that there is a significant influence in the use of the Problem Based Learning model on the science learning outcomes of fifth grade students of SDN 14 Pasaman, West Pasaman Regency. This is evidenced from the results of the t-test (independent sample-test) with a significance level of 5% obtained tcount 2.93 > t table 1.677. Science learning outcomes obtained by the experimental class were higher than the control class, as indicated by the mean 83.36 and the mean obtained by the control group of 77.12. Thus it can be seen that the posttest results of the experimental class tcount > ttable, it can be concluded that Ha is accepted, meaning that there is a significant influence in the use of the Problem Based Learning model on the science learning outcomes of fifth graders at SDN 14 Pasaman, West Pasaman Regency in the 2017/2018 academic year.

SUGGESTION

Based on the results of the research, the researcher can give suggestions that can be used as consideration and at the same time material for the description of the closing of this thesis: 1) For teachers to pay more attention to the needs of their students. Teachers can use the Problem Based Learning model as an alternative model in learning activities. Preferably, but. The use of the PBL model in science lessons requires more preparation so that teachers must carefully plan the stages in the learning process. 2) The selection of problems in PBL must be clear and adapted to the subject matter of science and the environment around students. 3) Problem Based Learning model is considered able to improve student learning outcomes. 4) The results of the study can be used as a reference for doing the same in different learning.

REFERENCES

Arikunto, Suharsimi. (2006). *Prosedur Penelitian Suatu Pendekatan Praktik*.Jakarta: PT Rineka Cipta

Azmiyawati, Choiril, dkk. 2008. *IPA Salingtemas Untuk Kelas V SD/MI*. Jakarta: Pusat Perbukuan, Depdiknas.

BSNP.(2006). *Panduan Penyusunan Kurikulumtindakan Satuan Pendidikan Jenjang Pendidikan Dasar dan Menengah*. Jakarta: Depdiknas

Fathurrohman, Muhammad. (2015). *Model-Model Pembelajaran Inovatif.*Yogyakarta: Ar-Ruzz Media.

Fitria, Yanti.(2017). *Pembelajaran Literasi Lintas Disiplin Ilmu Ke SD-an*. Makalah di sajikan dalam Seminar Nasional Pendidikan Guru Sekolah Dasar, Bukittinggi, 4 -6 Sept,Jurusan Pendidikan PGSD FIP UNP\

Fitria, Yanti.(2014). *Refleksi Pemetaan Pemahaman Calon Guru SD Tentang Integrated Sains Learning*. PEDAGOGI Jurnal Ilmiah Ilmu PendidikanVol XIV No 2 (2014), h- 82

Hamalik, Oemar. (2008). *Kurikulum Dan Pembelajaran*. Jakarta: Bumi Aksara.

Lahimi, Ismi Kurnia.(2016). *Pengaruh Model Based Learning Terhadap Hasil Belajar Kognitif IPA siswa kelas V SDN 16 Simpang haru.*Padang:Universitas Negeri Padang

Sani, Ridwan Abdullah. (2014). *Pembelajaran Saintifik untuk Implementasi Kurikulum 2013.* Jakarta: PT Bumi Aksara

Sudjana.Nana.(2010). *Penilaian Hasil Proses Belajar Mengajar*. Bandung: PT Remaja Rosdakarya

Sugiyono. (2012).*Metode Penelitian Pendidikan*.Bandung: Alfabeta.

Susanto, Ahmad. (2013). *Teori Belajar Dan Pembelajaran Di Sekolah Dasar*. Jakarta: Prenadamedia Group..

Trianto.(2009).*Mendesain Model Pembelajaran Inovatif-Progresif*.Jakarta:Prenada