THE EFFECT OF EXPERIENTIAL LEARNING MODEL IN ELEMENTARY SCHOOL

Nurul Fatmanisa[1] ,**La Ode Amril**[2] , **Ratna Wahyu Wulandari**[3]

[1] *Program Studi Pendidikan Guru Sekolah Dasar, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Djuanda*

Corresponding Author E-mail: : nurul.fatmanisa@unida.ac.id

Abstract: This study aims to understand the impact of learning models *experiential learning* on students' mathematical problem solving abilities. This research was conducted at SDN Banjarwaru 01, Ciawi District, Bogor Regency in 2017/2018. The study used the *Posttest Only Control Group Design.* The subjects involved in the study were 54 students in class V SDN Banjarwaru 01. Data collection is obtained through interviews, observations and tests. Analysis of the data used is descriptive analysis and inferential statistical analysis. The final results of the study used the *t-test* in the ability to solve students' mathematical problems by obtaining a significance of 0.000 <0.05. From the *t-test results* listed can be obtained that the application of experiential learning learning models in mathematics has an effect on the development of problem-solving abilities of students of SDN 01 Banjarwaru Bogor district.

1. INTRODUCTION

The importance of mathematics is evidenced in the world of education where in every range of mathematics education is a subject that is always there. There are many points about the importance of learning mathematics as an arena of thinking that requires logical clarity; a place to solve the problems of daily life; the event of knowing the patterns of relationships also the generalization of experience; a place to develop creativity; and a place to advance awareness of cultural development (Whitacre et al., 2017). Every aspect of life is sometimes related to mathematics. But in reality mathematics is still considered a material that is difficult to understand and become subjects still considered frightening for some students. Some students find it difficult to learn mathematics. According to the results of the TIMSS survey *(Trend in International Mathematic and Science Study)* in 2015 showed that general procedures students in Indonesia have low qualifications in cognitive aspects involving mathematics and science. For the ranking of mathematics lessons Indonesia ranks 45th out of 50 participating countries and ranks for science subjects Indonesia ranks 45th from various participating countries. the quality of education in Indonesia especially for mathematics and science material is still relatively low. Mathematics learning is still far with these minimum criteria caused by various factors, one of which is the difficulty of learning.

Activities carried out when learning that students are still passive learners where students only get material from the teacher, learning models still use models with expository characteristics such as lectures, discussions, and questions and answers so that students look passive

(Nagashibaevna, 2015). Some students also still cannot understand the plan and problem solving so that each question the teacher must provide procedures on how to solve the problem, students cannot understand the material plan and are not independent when solving problems first to solve story problems. Students are not able to master the purpose of the questions that are the story and have not been able to change the story questions into mathematical solutions (Große, 2014; Kelsey & Zaliwski, 2017).

Based on previous preliminary studies on mathematics learning, the results show that students become passive learners where in every teaching and learning process is still practiced by teachers with dominant learning models using expository learning models. Students also appear to be inactive because when learning begins they are only passive and listening to the teacher's explanation. When observing, students are doing the exercises. Almost all students do not understand the plan and problem solving of the questions so each teacher must provide a procedure for how to solve the problem, students do not understand the material plan and are not independent in working on problems first to solve story problems. students cannot understand the purpose of the story type questions and have not been able to turn the story questions into mathematical solutions.

Based on odd semester final examination scores and daily tests on fraction material, 40% of students have not reached mastery learning, and after the student answer sheets have been analyzed, most students have not solved the questions correctly, do not understand the material plan, there are errors in mathematical symbols and only write answers from problems without writing down how the procedure resolves the problem. These problems can be observed in the following figure 1:

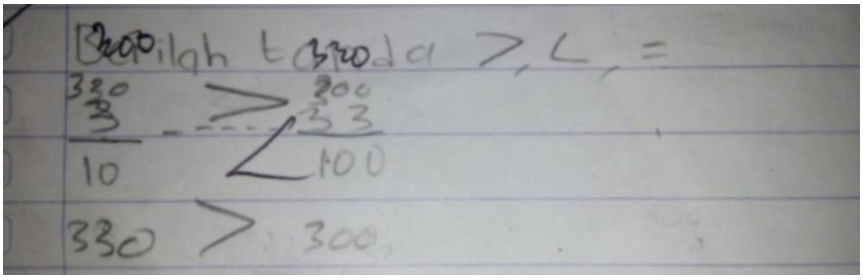

Figure 1 Mistakes in understanding symbols

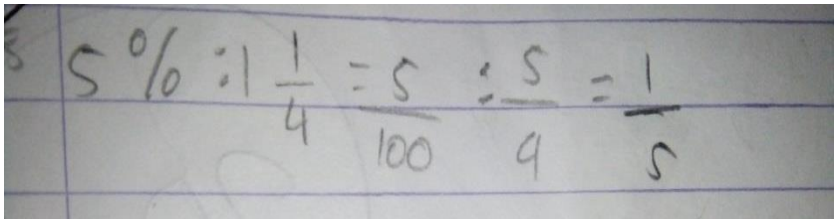

Figure 2 Student mistakes in understanding plans

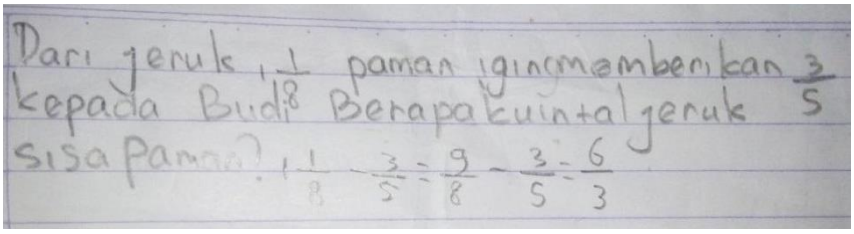

Figure 3. Lack of Ability in Banjarwaru elementary school students in solving problems

Based on the results of the analysis of student answers to figure 1 that students have difficulty reading and understanding symbols in mathematics. For picture 2 it can be seen that students have difficulties in the process of problem solving and in picture 3 students have difficulty understanding the story and calculation plan. Therefore, improvements and changes to the learning process are more appropriate so that students are able to solve mathematical problems. Improvement of the learning process can be done using the application of mathematics learning models using learning models *experiential learning* activities so as to reach the desired learning goals.

This shows that there are still many shortcomings about the learning system, especially mathematics lessons that we must update. The role of the teacher for learning is the most crucial role. Teachers are required to advance the creativity and innovation of learning models so as to advance student interest and motivation to learn. The use of any learning model can provide a deep impression to the student when the process of learning activities to experiential learning as learning model is a solution that can help solve the problem.

The learning model is a plan or format that can be used in order to form a curriculum, compile learning materials, also to foster learning in this class is an understanding of Joyce and well (Heruman 2014) model *Experiental learning* according to David Kolb This theory explains that the knowledge process is created through experience (Mughal & Zafar, 2011). The *experiential learning* model is a learning model that can apply a learning process combined with real experiences in daily life that are directly felt by students so students can build their own knowledge in accordance with what they experience.

Characteristics of models experiential learning (Sukmadinata & Syaodih, 2004) are: 1) Experience-based learning focuses more on processing learning activities rather than learning outcomes. Learning according to the model experiential learning that is intended is a process that must be considered and the goal is not just to see the results of learning alone; 2) Learning is sustainable steps based on experience. Learning for this model is a process that must be synchronized with experience not only directly learn new knowledge; 3) Learning processes for example continuous life procedures; Diverse steps of learning and experience intersect with concrete facts to imaginary plans, from research, experimentation, testing of thoughts, reflective feelings; 4) Learning is steps that start from a comprehensive adaptation to the natural, real and social environment; 5) learning contains an approval process for students with the environment; 6) Learning is a step to develop knowledge, from knowledge that is still easy to difficult and diverse.

The steps of learning model experiential David Kolb's are 1) *Concrete Experience (Feeling)* is learning with detailed experiences, sensitive to the environment. Concrete experience

is the step of learning to use intuition by prioritizing personal experience, experiencing also feeling. 2) *Reflective Observation (Seeing)* is observing before making a decision to observe the environment from a different perspective. 3) *Abstract Conceptualizations (Thinking)* is a real analysis of ideas and applies according to understanding for a condition so that it can bring up new ideas and plans. *Active Experimentation (Doing)* is the ability to be able to do various things with others and carry out actions based on events including taking risks.

Strengths and weaknesses of models experiential learning based (Fathurrohman, 2015), namely a) Teaching and learning activities can take place real and fun procedures. b) Provide memorable and deep learning to students through experience so that plans are firmly embedded. c) Making the character of students who are intelligent and independent, because students are taught to build independent procedures for their knowledge through the experience they have gained. Weaknesses of experiential learning based models (Fathurrohman, 2015).Weaknesses of e*xperiental learning* models namely the learning model is difficult to understand by most teachers, because the notion of *experiential learning is* still too broad. Mathematics learning is a teaching and learning process that is constructed by the teacher to be able to develop students' thinking creativity, as well as to be able to advance the ability to build new knowledge in an effort to advance good understanding of mathematics material (Sammons, 2018).

Problems are problems that are not routine, there are no specific rules and or laws that can be used in order to get a solution (Yildiz & Hacisalihoglu Karadeniz, 2016). The problem is something that is not routine problems that we have never encountered before and and must find a solution. There are several types of problems including: 1) Closed Problem (*closed problem*) A closed problem is a structured problem when the thing being asked is certain and has only one answer that is absolutely correct. 2) Open- (*ended problem open ended problem*) An open problem is an unorganized problem, the problem is the rules are uncertain, so there is information that is not yet complete or absent, giving rise to many procedures performed or solutions produced. Furthermore, the types of problems include: 1) Simple Translation Problems The use of problems in learning is aimed at giving students experience in order to translate conditions from the real world into mathematical experiences. 2) Complex Translation Problems. The problem is similar to the problem of simple translation, but in that it requires more than one translation and there is more than one arithmetic operation included. 3) Process Problems. The use of this problem in learning is intended to open opportunities for students to express the processes that occur in their minds. Students are trained to develop general strategies for understanding, planning, and solving problems, as well as evaluating finally. 4) Implementation Problems. The use of this problem in learning is intended to provide an opportunity for students to issue a variety of skills, processes, plans and facts to solve real problems (contextual). 5) Puzzle Problems. The use of this problem in learning is intended to give challenges to students to get mathematical enrichment that is entertainment (Wardani, 2010).

This definition of problem solving ability is part of a very important mathematics curriculum because in the learning process or its resolution students are allowed to gain experience using knowledge as well as the skills they have acquired to be able to be applied for routine problem solving (Vijayan & Joshith, 2018). Problem solving is a way that is used to understand the problem, plan solutions through calculations, find a way out to solve the problem (Mairing, 2017). Understanding the ability to solve problems according to Islamic views has been explained in the Koran al-Baqarah verse 286. The purpose of the above verse is how we must always believe and believe when we are faced with a problem we can face and solve it. Because behind the difficulties there must be convenience. If it is related to the ability to solve problems in

mathematics that is when we face mathematical problems that are complex and difficult to work on, it is not immediately pessimistic that we cannot solve them. We must try to find it and if it is difficult we can ask the teacher in class.
In the material building space there are 6 building spaces to be discussed namely beams, cubes, prisms, pyramid, cones, and tubes.

2. METHODS

The research model was carried out using quantitative models. The design used is the *posttest only control group design.* The design of this study uses the design detailed in the following table.

Table 1 Research design

Group	Treatment	*Posttest*
KE	X	O_2
KK	Y	O_2

Source: Sugiyono (2009)

In the *PostTest-Only Control Group Design*, one group was put together into an experimental class that was given an experiment using a model experiential learning while the other group was made a control class who are given treatment by using expository learning models. after the two groups were given treatment both the control class and the experimental class, the two classes were given a posttest to find out the differences in the results of students' mathematical problem solving abilities between the experimental class and the control class.

2.1. Research Subjects

Population is a generalization zone which is an object or subject that has certain qualities and characteristics that can be determined by researchers so that they can be analyzed and finally drawn conclusions (Nazir, 2014). The population for this study was all students of class V Banjarwaru State Elementary School 01 in the 2016/2017 academic year, with 3 classes with a total of 80 students. In this study the sampling technique used was *simple random sampling technique*. This sampling technique is used in non-sequential procedures regardless of the class in the population. So the researcher can choose the experimental class and the control class. The sampling technique used was a random procedure, by making 3 papers with class names and random procedures taken both the experimental class and the control class. So the class that is being researched is the VB and VC classes of Primary School Banjarwaru 01, Bogor Regency in the 2017-2018 school year. where VB class students numbering 27 people as an experimental class learning by using learning models *experiential* and VC class students totaling 27 people as control classes who learn by using the learning model as usual by the classroom teacher (expository method).

2.2.Data Collection

Researchers used the instrument in the form of a test in the form of a description, consisting of 3 items. The test held is a test at the end of the action (*posttest*), with the aim of being able to find out the results of improving students' problem solving abilities to the material provided by applying the model *experiential learning*.

The instrument used in this study is a test instrument scale in the form of a test item description. This test is used to measure students' problem solving abilities using the model *experiential learning*.

2.3.Data

2.3.1. Analysis Descriptive Statistics Analysis The

implementation of learning to be carried out in this study consisted of one experimental class totaling 27 students and one control class totaling 27 students selected by random procedure. For the experimental class, the researcher will teach using the model *experiential learning*. As for the control class, the researcher will teach how the teacher teaches normally in the classroom, namely the expository method.

2.3.2. Inferential Statistical Analysis

Normality Test Normality

test is conducted to find out whether a data distribution is normal or not.
Normality test aims to find out whether the data is normally distributed or not. Normality test was held on the values of *pretest* and *posttest* the experimental group and the control group.

H_0 : Data not from normal distribution population

H_a : Data from normal distribution population The

statistics used are *the Kolmogorov-Smirnov one-sample test* in the SPSS computer program. Decision criteria: H_a rejected if the *p value (sig)* $<\alpha$, with $\alpha = 0.05$. If the results are abnormal then the researcher uses another statistical test.

Homogeneity Test Homogeneity

test is a test carried out in order to test the nature of a data that is homogeneous or not. Homogeneity test was held on the scores of *pretest* and *posttest* the experimental group and the control group. The hypothesis used is:

H_0 : $s_1 = s_2$ (experimental and control group data have homogeneous variance)

H_a : $s_1 \neq s_2$ (experimental and control group data have non-homogeneous variance)

Statistics used are *one-way ANOVA homogeneity of variances test* contained in the computer program *IBM SPSS Statistics 22*. Decision criteria: $H_{a\ is}$ rejected if *p value (sig)* $<\alpha$ with $\alpha = 005$.

Statistical Hypothesis Test

After the analysis prerequisite tests are met then the next is to test the hypothesis. The alternative hypothesis (H_a) and the null hypothesis (H_0) proposed in this study are as follows:

Hypothesis testing is performed on the average value of *posttest* the experimental group

and the control group. This test was conducted to determine the effectiveness of models *experiential learning*, then the statistical hypotheses used are as follows:

$H_0 : \mu_{p1} <$KKM 70

$H_a : \mu_{p1} \geq$ KKM 70

Where: μ_{p1} is the average and KKM is a group of students who use the model experiental learning and KKM are minimum completeness criteria with a score of 70. Therefore, the hypothesis test can be carried out using the SPSS program. With the decision criteria is $H_{0\ is}$ rejected if it is significantly smaller than 0.05 and H_a accepted if significantly greater than 0.05. Furthermore, to determine the difference in the scores of *posttest* the experimental group and the *posttest of* the control group, researchers used an *independent simple t-test.* This test is used to determine whether there is an average difference between two unrelated sample groups.

2.4. Research

The research procedure carried out in this study there are 2 stages, namely the preparation, implementation, and preparation of reports as follows: 1) preparation, in that study the researcher prepares whatever is needed in pre-research namely preparing learning devices such as lesson plans, preparing steps the model steps experiential learning, learning media and worksheets both for the experimental class and the control class; 2) implementation, at this implementation stage the researcher conducted 4 meetings with 3 times the treatment by using the experiential learning model in the experimental class and using the expository model in the control class, 3) after conducting teaching and learning activities the researcher gave each posttest the ability to resolve problems in the experimental class and control class where the questions have been tested for validity and reliability in SDN Panaragan 01 Bogor City in class V. The preparation of the report, the final stage of the posttest that has been collected then analyzed in the prerequisite test (normality test and homogeneity test), then continued with a statistical hypothesis test to check whether there is an influence of learning models experiential learning on students' mathematical problem solving abilities.

3. RESULTS AND DISCUSSION

Results

Research data in the form of posttest data are then described in the following table:

Table 2 Posttest results

	Experimental	Class Control class
N (number of learners)	27	27
Total Value	2368	1850
Average Value	87.70	68.51
Value Minimum	74.00	46.00
Maximum Value	96.00	89.00
St. Deviation	7.07	8.81
Variance	49.98	77.72

Based on Table 2, it can be seen that the test problem solving ability of mathematical problems in the posttest in the experimental class increased the average value higher than the control class, because the experimental class get treatment using the learning model experiential, the experimental class experienced a difference from an average value of 87.70 for the experimental class and in the control class with an average of 68.51.

3.1. Prerequisite Test Data Analysis

The prerequisite tests in this study use two kinds, namely normality test and homogeneity test. Normality test in this study used Kolmogorov Smirnov with the help of SPSS 16.0, the hypothesis used was

H_0: data came from populations that were normally distributed

H_1: data did not come from populations that were normally distributed.

With the decision criteria: H_0 accepted if the p-value (sig)> a, with a = 0.05.

3.1.1. Normality Test Normality

test is used to determine whether a data is normal or not. Normality test conducted on the posttest value of the experimental class and the control class using *the Kolmogorov-Smirnov test*. Description of Test Results for Normality Ability to Solve Mathematical Problems

Table 3.

One-Sample Normality Test Kolmogorov-Smirnov Test

	Class Experiment	Control Class
N	27	27
Asymp. Sig. (2-tailed)	.060	.070

a. Test distribution is Normal.

Based on Table 3, it can be seen that the data *posttest* of learning outcomes both the experimental group and the control group have a sig value> 0.05. In the experimental group, the significance value is greater than the minimum significance, which is 0.060> 0.05. while the significance of the count for the control group is 0.070> 0.05. So it can be concluded that the data *posttest* is normally distributed.

3.1.2. Homogeneity Test

Measurement Results Test Value Homogeneity *Posttest Solve* Test Results Ability to Math Problems Experiment Group

Table 4Test

Class Experiment

Levine Statistics	df1	df2	Sig.
1.457[a]	5	11	.280

a. Groups with only one case are ignored in computing the test of homogeneity of variance for the Experiment Class.

Based on Table 4, the significance obtained for the *posttest* problem solving ability is 0.847. The significance value is greater than the minimum significance of 0.847> 0.05, so it can be concluded that the variance of the experimental group and the control group is homogeneous.

3.1.3. Hypothesis

The *posttest* results of the experimental group problem solving ability aims to find out whether there is an increase in the ability to solve problems in students. The conclusion of the study was declared significant if t arithmetic> t table at a significance level of 5% and value *p* <0.05. The summary of-test *posttest* the experimental group obtained an average value of *pretest* the experimental group of 17.7. Also obtained t count> t table at a significance level of 5% and has a value of *p* <0.05 which is 0,000 <0.05 which means it can be concluded there is a significant procedure improvement in the score of the problem solving ability of the experimental group students.

Discussion

This research was conducted at SDN Banjarwaru 01, Bogor Regency. The sample is the VB class as an experimental class and the VC class as a control class. Where the control class is given treatment using the model *experiential learning* and the control class is given treatment with an expository model. The following will be explained regarding the description of research data testing. The use of model of learning *experiential learning* in the experimental class is very influential on the increase math problem solving ability of students it can be evidenced from the average value of the experimental class is 87 and the average value of the control class is 68. From the average value can be proved that their much better difference between the experimental class

and the control class, with an average difference of 19.

The minimum value obtained from the posttest results for the experimental class is 74. then for the control class is 46. Based on these values when linked to indicators of student success then all students in the experimental class can participate in learning with enough focus and conducive while in the control class there are 15 people who have not managed to reach the indicator of the ability to solve the problem with a minimum completeness criteria students should score ≥70.

According to the results of the analysis of researchers there were significant changes against experimental class learning model that uses *experiential learning* to the control class that uses the expository teaching model. If previously the teacher plays an active role and students play a passive role when learning activities take place, then in learning by using the model *experiential learning* students are more active in the learning activities process. By using this model student can search, understand, explore, experiment and conclude their own material that students are learning so that the material students get is not just material but also real experiences that students experience and students feel.

Based on preliminary observations made at SDN Banjarwaru 01 Bogor district it is known that students' problem solving abilities are still very low. This is because the students still feel that mathematics is a difficult problem to solve, but the model of teaching *experiential learning* in the classroom experiment had worked out pretty well. This justifies that the model *experiential learning* can change students' thinking procedures about how to solve mathematical problems easily and can be understood. The use of learning model *experiential learning* is an alternative learning model that is able to have high innovation values so that it can advance students' problem solving abilities.

Applying Models *experiential learning* to mathematics learning is one of the procedures that can be done to advance the ability to solve mathematical problems, foster student curiosity and instill a sense of independence in students. Because in the model of learning *experiential learning* students are required to do everything by himself. And the teacher only acts as a facilitator when learning activities take place.

It can cause learning model of *experiential learning* has a mean and an increase higher than the expository models due to this model involves learners to be more active in learning activities. Although by using the same material, the model *experiential learning* makes students think independently, be creative and reflect on what is experienced in daily activities with the material being studied. Then students conduct the experiment to solve the truth of the research questions and answers that they have formulated before. Through experiments students will solve questions and answers to the questions themselves, so they will have and get memorable experiences, long lasting and can be stored well in their memories. In the learning process, the teacher only acts as a facilitator, where the teacher gives students examples of specific topics and guides students to understand the topic.

Based on the explanations above it can be stated that there are significant differences in the use of models *experiential learning* to the results of increasing problem solving abilities. The difference obtained is significant because the significance results on the measurement of 0,000 <0.05 after the learning process using the model *experiential learning*.

4. CONCLUSION

After going through several stages of research from pre-research observations, making instruments, testing instruments, conducting research, testing data, and compiling the final report,

it can be concluded that there is an influence in the application of learning models experiential learning to the mathematical problem solving ability of fifth grade students of SDN Banjarwaru s01 with the results of the calculation of the T test (One Sample Test) with a significance value of 0,000. Because 0.000 <0.05 then H0 is rejected and H_a accepted. Learning models Experiental learning can be used as a reference as one of the choices of learning models that will be used in learning activities to advance students' mathematical problem solving abilities. So that this model can be applied in primary school education, this model can be adjusted and modified in such a way that learning objectives can be achieved as expected.

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