

Effectiveness of Project Based Learning in New Normal Era in Term of Math Literacy

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ABSTRACT

This research aims to find out the difference in students' mathematical literacy improvement skills by applying learning using Project Based Learning and conventional learning models. Jenins' research is quantitative research. Quantitative research can be defined as a process of finding knowledge by using data in the form of numbers as a tool to analyze information about what you want to know. The subjects in this study were the entire viib class of SMPN 2 Sumobito Jombang. The sample in this study was class VIIB SMPN 2 Sumobito Jombang consisting of 32 students. The instruments used in this study are pre-tests and post tests. Based on the results of the independent test sample t test obtained a significant value of $0.018 < 0.05$ with a confidence level of 95% which means H_0 was rejected and H_a was accepted. With the sake of the effect of the Project Based Learning learning model on students' mathematical literacy skills on the results of students' mathematical learning in the statistika material of presentation of class VII data SMPN 2 Sumobito Jombang.

Keywords: *PjBL; Kemampuan Literasi Matematis; Mathematics.*

INTRODUCTION

Humans in general can not be separated from the name of education. According to (Yayan Alpian et al, 2019) Education is the most important thing in human life, this means that every Indonesian human being deserves it and is expected to always develop in it, education will never end, education in general has the meaning of a life process in developing each individual to be able to live and live life. The purpose of education its elfis to achieve a better life for the individual as well as for society (Prihatiningtyas et al., 2020). Efforts to achieve these educational goals are the duty of parents in the family at home, teachers in schools, and the community. To realize the national educational objectives, in schools, learning is carried out in various fields of study, including Mathematics (Sholihah & Pertiwi, 2019). Student achievement is student success in mastering the subject matter of mathematics which is manifested by numbers that are often called value. So with embodiment of these values, achievement among students one with the other students can be seen. Achievement of one student with another student usually different (Nasrulloh, 2019).

Mathematics is one of the fields of study that is taught in the School. Both elementary school, first intermediate school and public high school. According to Rahmah (2018) that Mathematics emphasizes activity in the world of ratios (reasoning), rather than emphasizing the results of experiments or mathematical observations formed because human thoughts, which relate to ideas, processes, and reasoning (Meishanti & Maknun, 2022). Along with the development of Information and Communication Technology (ICT), media or learning models are now increasingly diverse. Therefore, teachers must be smart to choose the right media or learning model such as project based learning model. According to (Meishanti & Ma'arif, 2019) Project Based Learning is a learning model that involves students in an activity (project) that produces a product. Student involvement starts from planning, making plans, implementing, and implementing the results of activities in the form of products and implementation reports. The steps of the Project Based Learning learning model according to Meishanti & Ma'arif (2019) are:

Table 1. Stages PjBL

No.	Stages	Indicators
1.	Determination of fundamental / essential questions (Essential questions).	Questions should be able to encourage participants to be investigated in carrying out an activity / project, for example related to the concept in KD-KI adapted to the real world.
2.	Designing Project Plan.	Planning is done collaboratively between learners, and learners with teachers. Thus, students are expected to feel they have the project.Planning contains about activities, tools, and materials that are useful for the completion of the project.
3.	Create a schedule (Creating Schedule)	Learners arrange a schedule of activities in completing the project. Activities at this stage include: 1) Create a timeline to complete the project. 2) Set a project completion deadline. 3) Bringing students to plan a new way. 4) Guide learners when they create ways that are unrelated to the project. 5) Ask the learners to make a settlement (reason) about the selection of a way.
4.	Monitoring/monitoring the progress of the project (Monitor the progress).	Monitoring the development of the project is the activity of teachers and learners.The teacher is responsible for monitoring the activities of learners during the implementation of the project.Teachers play a role in the role of monitoring the activities of learners.Student perform checks on their own work in accordance with the stage of development of the project, thus allowing them to continue to make improvements and activities.
5.	Assessment of project results (Assess the outcome)	Test results can be done through presentation or presentation of the project.In this activity, teachers can measure the competence of learners and learners can see where the shortcomings or advantages of the project they produce based on input from learners / other groups or input from teachers.
6.	Evaluate the experiment.	Test results can be done through presentation or presentation of the project.In this activity, teachers can measure the competence of learners and learners can see where the shortcomings or advantages of the project they produce based on input from learners / other groups or input from teachers.

This research uses *the Project Based Learning* learning model as an intermediary to improve students' mathematical literacy skills. According to (OECD, 2003) that The ability of mathematical literacy is the ability of individuals to formulate, use, and interpret mathematics in a variety of contexts, including the ability to perform mathematical reasoning and use concepts, procedures, facts as tools to describe, explain, predict a phenomenon or event(Utami & Nirawati, 2018).Based on the results of interviews with subject teachers and one of the students of class VII SMPN 2 SumobitoJombang that students are less creative in working on problems because during the learning process students do not understand the instructions described by teachers and most learners tend to be passive.From the description above, researchers tried to solve the problem using the "Project Based Learning Method (PjBL) on the Achievement of Mathematical Literacy Skills".

METHOD

This study uses this type of quantitative research. The subject of this study is class VII B SMPN 2 Sumobito Jombang with a total of 32 students. The study used experimental classes and control classes. The instruments used in this research are test instruments (pre-test and post-test). The data analysis technique used in this study is through the score rubric. The test instrument used is a test instrument in the form of a description question consisting of 5 problem items each. Data analysis techniques from pre-test and post test data are with descriptive analysis, normality tests, and homogeneity tests.Descriptive analysis

is used to determine the average value of pre-test and post-test scores in both experimental and control classes. The normality test is used to show that the sample data used comes from normal distributed data. The formula used to test normality in this study was Shapiro-Wilk with the help of the SPSS 16.0 software program.

In this study the normality test was conducted on the results of pre tests and post tests in control classes and experimental classes. Once known normal distribution data then continued with the paired sample t test. This test aims to find out whether the influence of the PjBL model on the mathematical literacy ability. Homogeneity testing is used to determine whether or not homogenous covariance variants are present in the experimental class. This homogeneity test is performed on post test results in experimental classes and control classes. This homogeneity test is done with the help of SPSS 16.0 Software, which uses the Oneaway-Anova formula. Setelah is known homogoen data is then conducted independent sample t test. This test aims to find out whether there is a difference in student learning outcomes between experimental classes and control classes.

RESULT AND DISCUSSION

Result

- **Descriptive Analysis**

From the results of pre-test and post-test given to students of class VII B SMPN 2 SumobitoJombang tested using SPSS 16.0 software in the experimental class obtained an increase in the average score which was initially 60.69 to 72.97. In the control class also obtained an average increase score that initially 56.81 to 73.75. The following results of SPSS output descriptive analysis can be seen in table 2 descriptive analysts.

Table 2. Descriptive Analysis

Statistics					
		Pretest	Posttest	Precontrol	Postcontrol
N	Valid	32	32	32	32
	Missing	0	0	0	0
Mean		60.69	72.97	56.81	73.75
Median		61.00	71.00	58.00	75.00
Mode		46 ^a	70 ^a	75	70
Sum		1942	2335	1818	2360
a. Multiple modes exist. The smallest value is shown					

- **Normality Test**

The next data analysis is the analysis of normality test data using SPSS 16.0 software. It can be seen in the table that the here value is proportional to the normality test by using the Shapiro-Wilk formula with a significant value of >0.05 . Based on the table above the significant values in the PreEksp class, PostEksp, Precontrol, Postconntrol are said to be valid, because the significant value is > 0.05 . It can be concluded that the data is normal distribution. Because it is known that the data is normally distributed, then the paired sample t test is carried out.

Table 3. Normality Test

Tests of Normality							
	Class	Kolmogorov-Smirnov ^a			Shapiro Wilk		
		Statistics	Df	Sig.	Statistics	Df	Sig.
Result	Pre Experiment	.100	32	.200*	.941	32	0.080
	Post Experiment	.124	32	.200*	.972	32	0.545
	Pre Experiment	.107	32	.200*	.967	32	0.426
	Post Experiment	.105	32	.200*	.987	32	0.959
a. Lilliefors Significance Correction							
*. This is a lower bound of the true significance.							

• **Paired Sample T Test**

The paired sample t test is performed when the data is normally distributed. This test aims to find out whether the effect of the PjBL model on students' mathematical literacy abilities on student learning outcomes. The paired sample t test is used to measure the difference in the average value of the paired data. From the calculation using SPSS 16.0 software with sig category. (2-tailed) obtained a significant value of *pair 1* of 0.000 and also on *pair 2* obtained a significant value of 0.000. Between *pair 1* and *pair 2*, significant values are obtained $< 0,05$ Which means that the PjBL learning model affects the mathematical literacy ability of students. Here are the results of the SPSS Output Paired Sample T Test. Based on the results of the 2 tables above it can be concluded that there is an influence of the PjBL learning model on students' mathematical literacy abilities. Next, a homogeneity test is performed.

Table 4. Paired Sample Test T Test 1(Pair 1)

Paired Samples Test									
		Paired Differences					t	Df	Sig. 2 tailed
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre Experiment	-12.281	16.256	2.874	-18.142	-6.420	-4.274	31	0.000

Table 5. Test Paired Sample T Test (Pair 2)

Paired Samples Test									
		Paired Differences					t	Df	Sig. 2 tailed
		Mean	Std. Deviation	Std. Error Mean					
						Upper			
Pair 2	Pre Control	-16.938	11.722	2.072	0.000	-12.711	-8.173	31	0.000

• **Homogeneity Test**

This homogeneity test is used to determine whether or not there are homogeneous covariance variants in the experimental class. This homogeneity test is performed on post test results in experimental classes and control classes. With the help of SPSS 16.0 software using the formula Oneaway-Anova obtained a significant value of 0.812 which means $0,812 > 0,05$ Data is homogeneous. Here are the results of the homogeneity test. Based on the table above it can be concluded that valid data is homogeneous. Because the data is homogeneous, the Independent Test T Test is carried out.

Table 6. Test Homogeneity

ANOVA					
RESULT	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	9.766	1	9.766	.057	0.812
Within Groups	10628.969	62	171.435		
Total	10638.734	63			

• **Independent Test Sample T Test**

This test is done when the data is homogeneous. This test aims to find out whether there is a difference in student learning outcomes between experimental classes and control classes. This test is said to be valid if the value is significant. $< 0,05$. Based on the results of calculations using SPSS Software 16.0 and using

lavene's formula of significant value 0.018 where $0,018 < 0,05$ This means that there is a difference in learning outcomes between experimental classes and control classes. Here are the results of the Independent Sample T Test output. Based on the table above can be concluded significant values $0,018 < 0,05$ Which means H_0 is rejected and H_a is accepted.

Table 7. Independent Test Sample T Test

		Independent Samples Test									
		Levene's test		t-test for Equality of Means							
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
RESULT	Equal variances assumed	5.858	0.182	-.239	62	.812	-.781	3.273	-7.325	5.762	
	Equal variances not assumed			-.239	53.109	.812	-.781	3.273	-7.346	5.784	

Discussion

Based on the results of research and data analysis on the Normality Test and Homogeneity Test that the PjBl learning model affects students' mathematical literacy skills. This is in line with research (Utami & Nirawati, 2018) which states that the PjBL model with a realistic scientific approach succeeds in improving students' PISA-based mathematical literacy skills in geometric materials (cubes and beams), although not all students achieve KKM. Based on the results of the Paired Sample T Test and the Independent Test of T Test Samples stated that the value is significant $< 0,05$ Which means that the PjBL learning model is effectively used to improve students' mathematical literacy skills. This is in line with research (Ayuningtyas et al., 2019) which states that PjBL learning has a positive influence on mathematical literacy skills compared to control classes that use conventional learning.

CONCLUSION

Based on the results of data analysis and discussion of the application of PjBL learning model effective for use in learning. Because based on the independent sample t test in the lavense column states that the significant value < 0.05 which means there is a difference in student learning outcomes in experimental classes and control classes. Thus it can be concluded that H_0 was rejected and H_a was accepted which means the PjBL learning model affects the mathematical literacy ability of students.

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