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THE INFLUENCE OF THE PROJECT-BASED LEARNING MODEL ON THE LEARNING OUTCOMES OF FIFTH GRADE STUDENTS IN SCIENCE AT ELEMENTARY SCHOOL 01 BARU CIJANTUNG, EAST JAKARTA

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ABSTRACT

This study aims to analyze the effect of the Project-Based Learning (PjBL) model on the learning outcomes of fifth-grade students in science subjects at Elementary School 01 Baru Cijantung, East Jakarta. The research involved two groups: a control class receiving conventional instruction and an experimental class taught using the PjBL model. The results indicate that students in the experimental group achieved higher scores and demonstrated better engagement compared to those in the control group. Statistical tests confirmed a significant influence of PjBL on student learning outcomes. These findings suggest that the PjBL method enhances not only academic achievement but also critical thinking and problem-solving skills in science subjects. The study encourages the integration of PjBL in the elementary school curriculum to improve student learning experiences.

KEYWORDS *Project-Based Learning (PjBL), Learning Outcomes, Elementary Education, Critical Thinking, Academic Achievement.*

INTRODUCTION

Education is an important aspect of human life that affects a person's intellectual ability and competitiveness in the era of globalization. Apart from shaping children's character, education also plays a role in children's psychological and social health, making them individuals ready to face the world with good communication skills and broad knowledge (Handika et al., 2021).

Education aims to assist the holistic development of students' souls, directing them towards a more advanced human civilization. Good quality education plays an important role in creating smart and competent individuals to face the globalization era. High-quality education is needed to achieve an optimal quality of

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life in the future, which can be achieved through an effective learning process (Anwar et al., 2021).

Education in Indonesia needs to be improved to compete with other countries. Teacher-centered learning and low graduate skills indicate the need for comprehensive improvements, including in the curriculum, learning methods, facilities, and teaching staff. Thus, the gap with other countries can be reduced and Indonesia can become a developed and highly competitive country in the global arena (Taupik et al., 2021).

Science education in elementary schools plays an important role in shaping students' early understanding of natural phenomena, science, and technology. The Project Based Learning (PjBL) learning method helps students learn through real projects relevant to the subject matter, developing scientific thinking, problem solving and critical thinking skills. PjBL also helps students understand basic science concepts and prepares them for more complex science subjects at the next level of education (Abdullah, A. F., & Fathi, 2022).

Although Merdeka Curriculum is being implemented in Indonesia, many students still cannot follow it well, especially in science learning. Limited resources, lack of involvement, and difficulty understanding abstract concepts are challenges in learning science. The Project Based Learning (PjBL) model offers a solution by providing a more meaningful learning experience and involving student activities, so that learning outcomes can be improved as evidenced by various studies (Pratama, 2022; Yusrizal & Pulungan, 2021).

Based on the observations of researchers, it was found that many students could not follow learning with conventional methods, making it difficult for students to achieve KKM. In the ongoing learning there are still many students who do not pay attention, are bored, do not understand because the teacher only keeps talking, are confused about what to ask and do not want to pay attention to the teacher's teaching. And of the 60 learners in class V, only 35% of the learners passed the science subject and even then with mediocre scores ranging from 71-80. And to see how Projecct Based Learning (PjBL) can change the learning outcomes of Learners, researchers conducted this research.

Based on the background described, some of the problems identified by researchers are the low achievement of student learning outcomes, their lack of activeness in the learning process, and the number of students who are not focused and tend to chat or sleepy when learning takes place. In addition, the implementation of the Project Based Learning (PjBL) learning model as an alternative to improve the effectiveness and quality of learning is one of the main problems. This research is limited to exploring the effect of PjBL on student learning outcomes with an emphasis on the cognitive domain, especially in science subjects at Elementary School 01 Baru Cijantung East Jakarta.

The formulation of problems in this study includes the effect of PjBL on student learning outcomes and supporting factors in the PjBL model. This research is expected to provide theoretical benefits in determining the effectiveness of the PjBL model and become a useful reference for the development of science. Practically, this research is useful for researchers as a reference for further research,

for teachers as a teaching reference, and for students to improve their understanding and development of thinking through the PjBL method.

This study aims to examine the effect of PjBL on the learning outcomes of fifth grade students in science subjects at Elementary School 01 Baru Cijantung East Jakarta, with the hope of contributing to the development of effective learning methods to improve students' understanding and science skills. Based on the problems that researchers find, researchers are interested in researching related to "The Effect of *Project-based learning* Model on the Learning outcomes of Class V Students in Science Subjects at Elementary School 01 Baru Cijantung East Jakarta".

Previous research shows that the Project Based Learning (PjBL) learning model has a positive effect on student learning outcomes. Restuti (2022) found that PjBL improved learning outcomes of grade IV students at SD Negeri 1 Sidomulyo, while research by Nurhadiyati et al., (2021) showed a positive response from grade V students to PjBL. Annisa (2020) found that PjBL in integrated thematic learning improved learning outcomes better than conventional methods, and Khairina (2020) noted that students' science learning outcomes in experimental classes using PjBL were higher than control classes. Research by Taupik (2021) also concluded that PjBL has a significant effect on the achievement of science learning outcomes at the elementary school level. Consistently, these studies show that PjBL improves learning outcomes across different learning contexts (Azmiati, 2019).

The framework of this research is based on the importance of problem-solving skills to produce superior human resources in the AEC era, which is also one of the 21st century education competencies (Nurhadiyati et al., 2021). Given the low problem-solving ability of students in Indonesia, the PjBL learning model is seen as an effective solution. PjBL requires learners to be active, creative, seek information, and solve problems through projects and inquiry (Mulyono & Agustin, 2020). Improving problem-solving skills is very relevant to be applied in science subjects, because one of the objectives is to solve the problems of the environment around students (Sukmana & Amalia, 2021). Therefore, PjBL is expected to improve students' problem-solving skills in science lessons.

Research Hypothesis

In the theoretical study and framework of thinking, the hypothesis of this research action is that there is a positive influence between the Project learning model and student learning outcomes. Based on the formulation of research problems, the hypotheses in this study are:

H0 = There is no difference in student learning outcomes when applying project-based learning and when not applying project-based learning.

H1 = There is a difference in student learning outcomes when applying project-based learning and when not applying project-based learning.

RESEARCH METHOD

This study aims to determine the effect of the Project Based Learning model on the learning outcomes of grade V students in science subjects at Elementary School 01 Baru Cijantung, East Jakarta. This research was conducted for three months, from November to January. The method used was a pre-experiment

approach with two classes, where one class was given conventional learning and the other class used the Project Based Learning model (Abdullah et al., 2021). The learning outcomes of both classes were then compared through pretest and post-test.

The study population included all students of class VA and VB, totalling 60 people, with cluster random sampling technique. The learning material used was Chapter 4 about the earth and simple experiments to facilitate concept understanding. This study measured learning outcomes through multiple choice tests and questionnaires containing students' opinions about the learning model applied. Data collection techniques include tests and questionnaires, where data are analyzed by normality, homogeneity, hypothesis testing, and N-Gain.

Data analysis techniques include classical assumption tests, such as normality, heteroscedasticity, multicollinearity, and autocorrelation tests, as well as multiple linear regression analysis to see the relationship between the independent and dependent variables. The results of the study are expected to provide an overview of the effectiveness of the Project Based Learning model in improving student learning outcomes in science subjects.

RESULT AND DISCUSSION

Data Description

This research uses descriptive quantitative methods by involving fifth grade students in Science Subjects at Elementary School 01 Baru Cijantung East Jakarta as samples. The research instrument used is a questionnaire which aims to identify the effect of the Project Based Learning model on the learning outcomes of fifth grade students in Science Subjects at Elementary School 01 Baru Cijantung East Jakarta.

After the data was collected, validity and reliability testing of the instrument was conducted on 30 students using SPSS software to ensure the validity of the data obtained. The next step involved statistical calculations and reporting of the results.

The data obtained from the questionnaire is tabulated in tabular form to describe all existing values, so as to facilitate further statistical calculations to determine the trend of values. The results of the calculations that have been analyzed are then presented in the discussion section of the study.

The following is data from the control and experimental classes regarding the scores and grades of fifth grade students at Elementary School 01 Baru Cijantung, East Jakarta:

Table 4.1 Scores and Values of Fifth Grade Students of Elementary School 01 Baru Cijantung East Jakarta

5A Control Class		
Absentee Number	Score	Value
Andrien Moviena	72	80
Yulia Dwi P	75	75
Azzam Alfaroh	79	80
Anggun Fadiah Kholik	83	85

5B Experiment Class		
Absentee Number	Score	Value
Revelation	75	80
Andika	78	85
Farizal Hafiz	85	92
Riski A	87	90

Rezki Aditya	85	82		Frananda Aditya	85	95
Muhammad Malik	85	85		Dicky	85	90
M Azra Zhuri	80	80		Wahyu Nur M	82	85
Akbar Maulana Surya	75	75		Silva Anindya	75	80
Dwi Puspita Sari	80	82		Nazwa Mutia	78	85
Clara Daniela	80	77		Assyifa Salwa	78	85
Marjono	92	87		Ayra Putri	90	90
Lita Yuniasih	85	87		Dinda Sri R	80	87
Intan Pebrianti	85	85		Birbix	80	85
Assyifa Yasmin	82	80		Zikri malik	80	80
Riana Septiani	75	80		Ramadan's son	75	80
Gilang Arden Anggoro	95	87		Arya	90	95
Nurul Badrih	75	77		Ghio Vano	75	85
Rhaes Tri Apsari	75	75		M fadli	80	85
Kahfi Andra Shofi	85	82		M fadlan	87	90
Tri Pandawa Avandy	78	75		Ahcham Ramadan	80	87
Aulia Putri	78	77		Athiaah	78	80
Haikal Darma Putera	80	80		Andika Riski	85	87
Riski Adittya	75	80		Raka	92	92
Eman Safria Mukdi	90	85		Irwan	80	86
Ilmira Nur Kanaya	75	80		M Fathur	70	80
Alfath Arrofi	77	82		M Fathir	80	80
Muhammad Ifthar Nizzam	82	80		Khoirunnisa	78	85
Galiban Kaliki	70	77		Melfi Julia princess	85	90
Bilal Putra El Fadz Riza	65	90		Jihan khaizaran	75	85
Ziya Riski Ramadhan	80	95		Naila	77	80

1. Frequency, Histogram, and Box Plot of student 5A Control class

Table 4.2 Statistical Frequency of students 5A Control class

Statistics

		SKOR_SISWA_5AKONTROL	NILAI_SISWA_5AKONTROL
N	Valid	30	30
	Missing	0	0
Mean		79.77	81.40
Median		80.00	80.00
Std. Deviation		6.409	4.789
Variance		41.082	22.938
Minimum		65	75
Maximum		95	95
Sum		2393	2442

Table 4.3 Frequency of Score of student 5A of Control class

SKOR_SISWA_5AKONTROL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	65	1	3.3	3.3	3.3
	70	1	3.3	3.3	6.7
	72	1	3.3	3.3	10.0
	75	7	23.3	23.3	33.3
	77	1	3.3	3.3	36.7
	78	2	6.7	6.7	43.3
	79	1	3.3	3.3	46.7
	80	5	16.7	16.7	63.3
	82	2	6.7	6.7	70.0
	83	1	3.3	3.3	73.3
	85	5	16.7	16.7	90.0
	90	1	3.3	3.3	93.3
	92	1	3.3	3.3	96.7
	95	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

Table 4.4 Frequency of student scores 5A Control class

NILAI_SISWA_5AKONTROL

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	75	4	13.3	13.3	13.3
	77	4	13.3	13.3	26.7
	80	9	30.0	30.0	56.7
	82	4	13.3	13.3	70.0
	85	4	13.3	13.3	83.3
	87	3	10.0	10.0	93.3
	90	1	3.3	3.3	96.7
	95	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

Table 4.5 Histogram of student scores 5A Control class

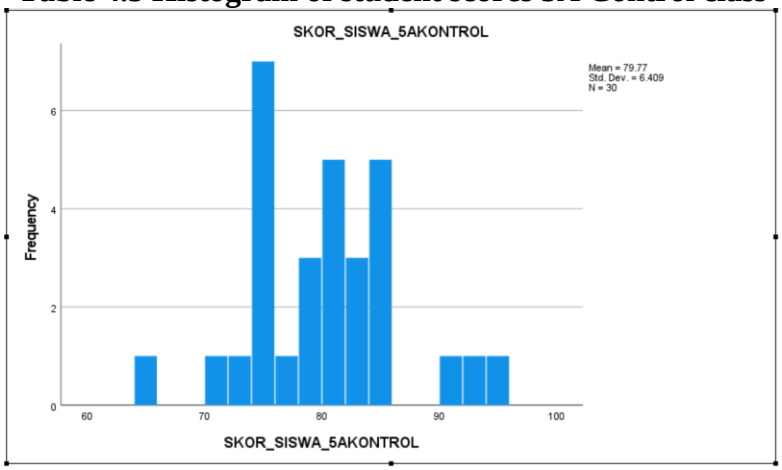


Table 4.6 Histogram of student scores 5A Control class

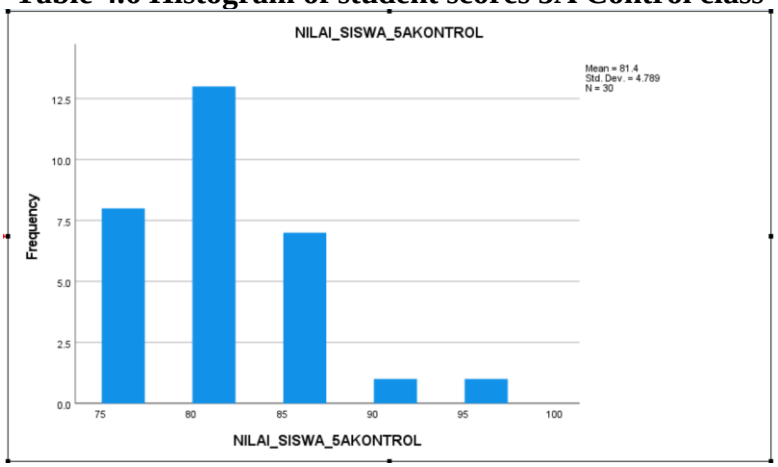


Table 4.7 Box Plot of Control class 5A students' scores

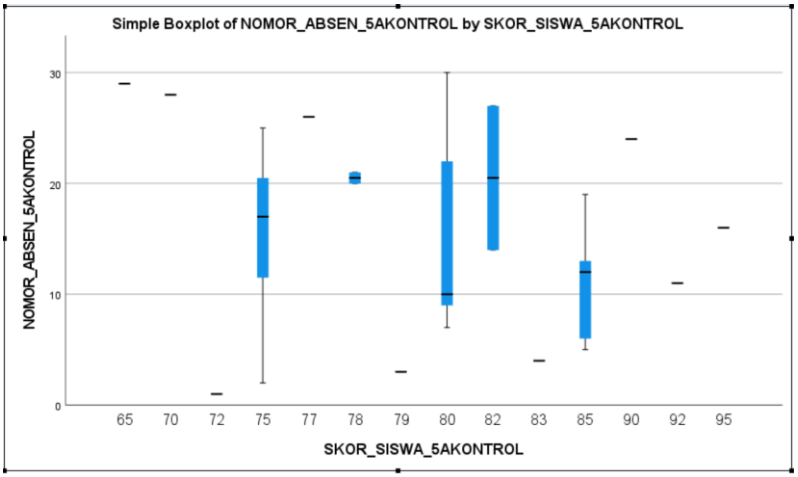
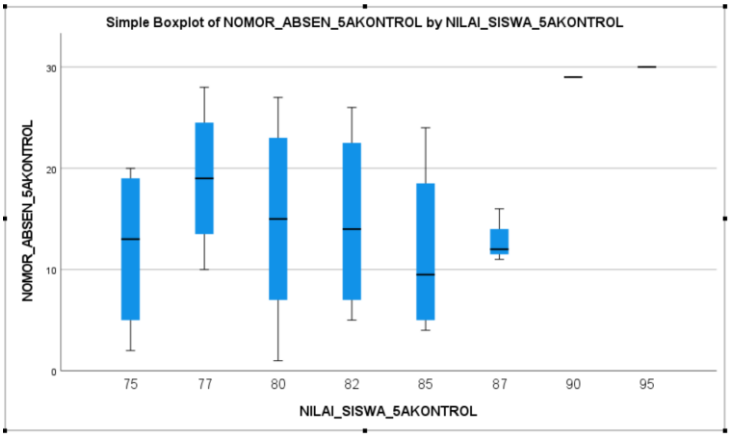


Table 4.8 Box Plot of student scores 5A Control class



Data interpretation of student 5A of Control class:

It is known based on the Frequency Table, a total of 30 students were tested with a Minimum Score obtained of 65, Maximum Score obtained of 95, Minimum Score obtained of 75, and Maximum Score obtained of 95 with an average Score obtained of 79.77 and an average Value of 81.40. In Table 4.3, it is known that the Frequency Score of 30 students which is the highest score is 75 with 7 students with a percentage of 23.3%. While in Table 4.4, the score frequency of 30 students which is the highest score is 80 with a total of 9 students with a percentage of 30.0%. In Table 4.5, attached Histogram diagram of student scores with an average of 79.77 and a standard deviation of 6.409 and in Table 4.6, attached Histogram diagram of student scores with an average of 81.40 and a standard deviation of 4.789. Furthermore, in Tables 4.7 and 4.8, a *Box Plot of* students' attendance numbers with the scores and grades they obtained is attached.

2. Frequency, Histogram, and Box Plot of students' scores in class 5B Experiment class

Table 4.9 Statistical frequency of students 5B Experiment class

Statistics

		SKOR_SISWA_5BEKSPERIMEN	NILAI_SISWA_5BEKSPERIMEN
N	Valid	30	30
	Missing	0	0
Mean		80.83	85.87
Median		80.00	85.00
Std. Deviation		5.266	4.599
Variance		27.730	21.154
Range		22	15
Minimum		70	80
Maximum		92	95
Sum		2425	2576

Table 4.10 Frequency Score of students 5B Experiment class

SKOR_SISWA_5BEKSPERIMEN

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	70	1	3.3	3.3	3.3
	75	5	16.7	16.7	20.0
	77	1	3.3	3.3	23.3
	78	5	16.7	16.7	40.0
	80	7	23.3	23.3	63.3
	82	1	3.3	3.3	66.7
	85	5	16.7	16.7	83.3
	87	2	6.7	6.7	90.0
	90	2	6.7	6.7	96.7
	92	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

Table 4.11 Frequency of student scores 5B Experiment class

NILAI_SISWA_5BEKSPERIMEN

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	80	8	26.7	26.7	26.7
	85	9	30.0	30.0	56.7
	86	1	3.3	3.3	60.0
	87	3	10.0	10.0	70.0
	90	5	16.7	16.7	86.7
	92	2	6.7	6.7	93.3
	95	2	6.7	6.7	100.0
	Total	30	100.0	100.0	

Table 4.12 Histogram of student scores 5B Experiment class

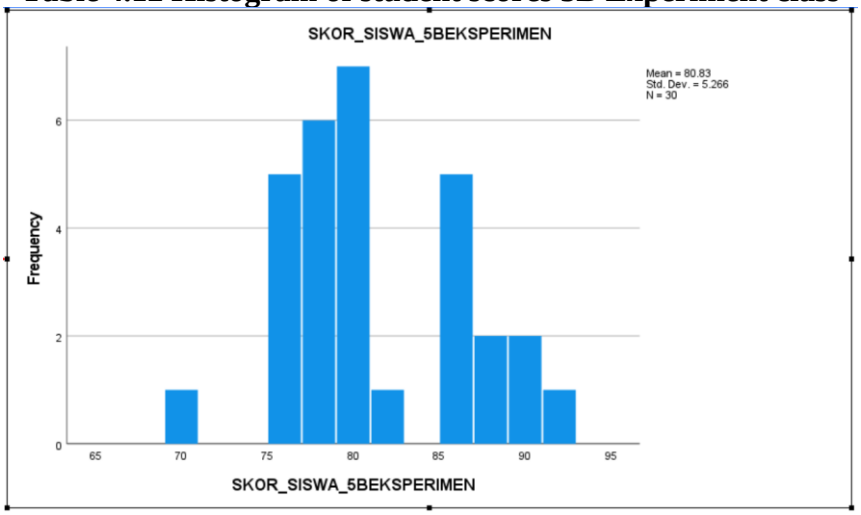


Table 4.13 Histogram of student scores 5B Experiment class

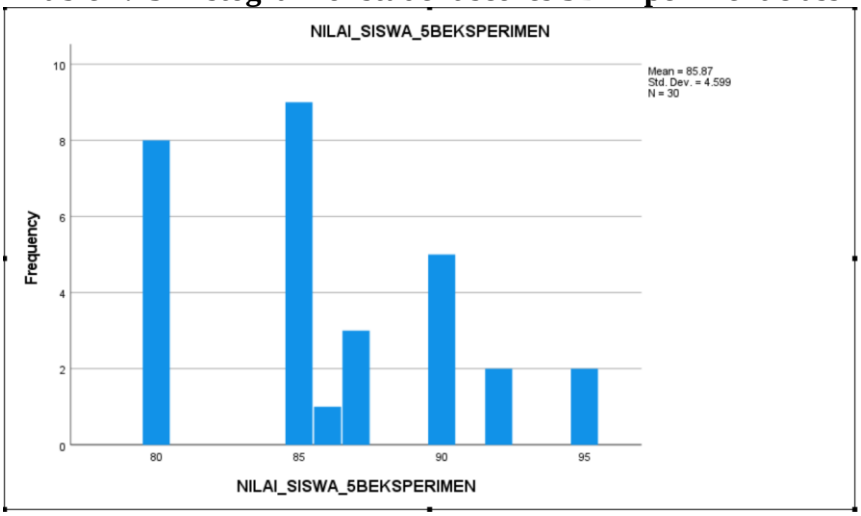
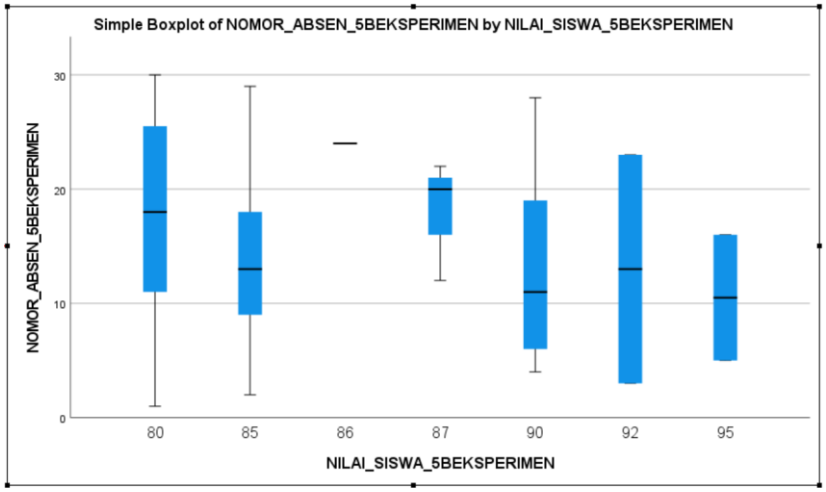


Table 4.14 Box Plot of Student Score 5B Experimental class

Table 4.15 Box Plot of Student scores 5B Experimental class



Data interpretation of student 5B of Experiment class:

It is known in Table 4.9 that a total of 30 students were tested with a Minimum Score obtained of 70, Maximum Score obtained of 92, Minimum Score obtained of 80, and Maximum Score obtained of 95 with an average Score obtained of 80.83 and an average Value of 85.87. In Table 4.10, it is known that the Frequency Score of 30 students which is the highest score is 80 with 7 students with a percentage of 23.3%. While in Table 4.11, the score frequency of 30 students which is the highest score is 85 with a total of 9 students with a percentage of 30%. In Table 4.12, attached Histogram diagram of student scores with an average of 80.83 and a standard deviation of 5.266 and in Table 4.13, attached Histogram diagram of student scores with an average of 85.87 and a standard deviation of 4.599. Furthermore, in Tables 4.14 and 4.15, the *Box Plot of* students' attendance numbers with the scores and values they obtained is attached.

Analysis Requirements Testing

1. **Normality Test**
   a. **5A students in Control class**

Table 4.16 Normality Test of students 5A Control class

One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			30
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		5.15649474
Most Extreme Differences	Absolute		.178
	Positive		.178
	Negative		-.096
Test Statistic			.178
Asymp. Sig. (2-tailed)[c]			.178
Monte Carlo Sig. (2-tailed)[d]	Sig.		.019
	99% Confidence Interval	Lower Bound	.015
		Upper Bound	.022

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 926214481.

Interpretation:

Basis for Decision Making

- If the Significance Value> 0.05 then the data distribution is Normal
- Conversely, if the Significance Value <0.05 then the data distribution is not normal.

It is known that the Significance Value in Table 4.16 is 0.178> 0.05, so it can be concluded that the distribution of data in class 5A control class students is Normal.

b. Student 5B of Experiment class

Table 4.17 Normality test of students 5B Experiment class

One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			30
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		2.61944461
Most Extreme Differences	Absolute		.135
	Positive		.106
	Negative		-.135
Test Statistic			.135
Asymp. Sig. (2-tailed)[c]			.170
Monte Carlo Sig. (2-tailed)[d]	Sig.		.169
	99% Confidence Interval	Lower Bound	.159
		Upper Bound	.179

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 1314643744.

Interpretation:

Basis for Decision Making

- If the Significance Value> 0.05 then the data distribution is Normal
- Conversely, if the Significance Value <0.05, the data distribution is not normal.

It is known that the Significance Value in Table 4.17 is 0.170> 0.05, it can be concluded that the distribution of data in class 5B students in the Experimental class is Normal.

2. Simple Linear Regression Test

Table 4.18 Simple Linear Regression Test of student 5A Control class

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	49.100	12.165		4.036	<,001		
	SKOR_SISWA_5AKONTROL	.423	.152	.465	2.782	.010	1.000	1.000

a. Dependent Variable: NILAI_SISWA_5AKONTROL

Based on the SPSS output above, the regression equation model can be formulated as follows:

Y = 49.100 (a) + 0.423 (X) + e

The regression equation model is meaningful:

- **Constanta (a)** = 49.100, meaning that if the score is constant, the value is 49.100.
- **Regression Direction Coefficient** = 0.423 is positive, meaning that if the score increases, the value will also increase by 0.423.

Table 4.19 Simple Linear Regression Test of student 5B Experiment class

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	27.834	7.614		3.655	.001		
	SKOR_SISWA_5BEKSPERIMEN	.718	.094	.822	7.637	<,001	1.000	1.000

a. Dependent Variable: NILAI_SISWA_5BEKSPERIMEN

Based on the SPSS output above, the regression equation model can be formulated as follows:

Y = 27.834 (a) + 0.718 (X) + e

The regression equation model is meaningful:

- **Constanta (a)** = 27.834, meaning that if the score is constant, the value is 27.834.
- **Regression Direction Coefficient** = 0.718 is positive, meaning that if the score increases, the value will also increase by 0.718.

Hypothesis Testing

1. **T test**

Table 4.20 Hypothesis Testing T test of variable X on Y control class

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	49.100	12.165		4.036	<,001		
	SKOR_SISWA_5AKONTROL	.423	.152	.465	2.782	.010	1.000	1.000

a. Dependent Variable: NILAI_SISWA_5AKONTROL

Interpretation:

Basis for Decision Making

Significance Value < 0.05

T value > T table

T Table = t (a/2; n - k - 1)

a = 5% = t (0.05/2; 30 - 2 - 1)

= 0,025 ; 27

= 2,051

Unknown:

From the output in Table 4.20, the Significance Value is 0.010 <0.05 and the T Count Value is 2.782> 2.051 then Ho1 is Rejected and Ha1 is Accepted. Which means there is a significant effect of Score on Control class value.

Table 4.21 Hypothesis Testing T test of variable X on Y Experiment class

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	27.834	7.614		3.655	.001		
	SKOR_SISWA_5BEKSPERIMEN	.718	.094	.822	7.637	<,001	1.000	1.000

a. Dependent Variable: NILAI_SISWA_5BEKSPERIMEN

Interpretation:

Basis for Decision Making

Significance Value < 0.05

T value > T table

T Table = t (a/2; n - k - 1)

a = 5% = t (0.05/2; 30 - 2 - 1)

= 0,025 ; 27

= 2,051

Unknown:

From the output in Table 4.21, the significance value is <0.001 (0.000) <0.05 and the calculated T value is 7.637> 2.051 then Ho1 is rejected and Ha1 is accepted. Which means that there is a significant effect of the Score on the Experimental class value.

2. F test

Table 4.22 Hypothesis Testing F test of variable X on Y control class

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	213.073	1	213.073	7.737	.010[b]
	Residual	771.094	28	27.539		
	Total	984.167	29			

a. Dependent Variable: NILAI_SISWA_5AKONTROL

b. Predictors: (Constant), SKOR_SISWA_5AKONTROL

Interpretation:

Basis for Decision Making

Significance Value < 0.05

F value > F table

F table value = 3.35

Unknown:

From the output of Table 4.22, it can be seen that the Significance Value is 0.010 <0.05 and the F Count Value is 7.737> 3.52. This proves that there is a significant influence on X on Y in the Control class.

Table 4.23 Hypothesis Testing Test F variable X on Y Experiment class

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	414.483	1	414.483	58.324	<,001[b]
	Residual	198.983	28	7.107		
	Total	613.467	29			

a. Dependent Variable: NILAI_SISWA_5BEKSPERIMEN

b. Predictors: (Constant), SKOR_SISWA_5BEKSPERIMEN

Interpretation:

Basis for Decision Making

Significance Value < 0.05

F value > F table

F table value = 3.35

Unknown:

From the output of Table 4.23, it can be seen that the significance value is <0.001 (0.000) <0.05 and the calculated F value is 58.324> 3.35. This proves that there is a significant influence on X on Y in the Experiment class.

Discussion of Research Results

Based on the analysis that has been done, there are several results that can be concluded from this research. First, from the data description, it can be seen that the use of the Project Based Learning (PjBL) method has a positive impact on student learning outcomes in science subjects at Elementary School 01 Baru Cijantung East Jakarta. This can be seen from the comparison of scores and values between the control class (5A) and the experimental class (5B).

The average student scores and grades of the experimental class were higher than those of the control class. Furthermore, from testing the requirements of the analysis, it can be concluded that the distribution of data in both classes (control class and experimental class) is normal. This indicates that the data used for analysis has characteristics that meet the required statistical assumptions. When the hypothesis was tested, the results showed that there was a significant influence between the score (X) and the value (Y) in both the control and experimental classes. This is consistent with the theory that there is a positive relationship between participation in active learning methods, such as PjBL, and improved student learning outcomes.

From a theoretical perspective, previous research has also supported that project-based learning methods can improve students' understanding of learning materials and increase students' engagement in the learning process. The results of this study are consistent with these findings.

Thus, it can be concluded that the results of this study support the theory that the application of the Project Based Learning method has a positive impact on student learning outcomes in science subjects at Elementary School 01 Baru Cijantung East Jakarta. This shows that an active and project-oriented learning

approach can be an effective alternative in improving students' academic achievement.

Research Limitations

One of the limitations of this study lies in its limited focus on one specific primary school, namely Sekolah Dasar 01 Baru Cijantung East Jakarta. As such, the generalizability of the research findings to apply to student populations from different educational backgrounds or contexts is limited. In addition, the factors of students' social and economic environment, as well as the level of parental support in the learning process, may also influence students' learning outcomes but are difficult to control or measure precisely within the framework of this study.

In addition, there are other variables that also have the potential to influence student learning outcomes, such as students' motivation levels, individual learning styles, or previous experiences in science learning. However, due to limited scope and resources, these variables may not be fully included in the analysis of this study.

Not only that, internal school factors, such as teacher quality, curriculum, or other teaching methods, can also have a significant effect on student learning outcomes. However, in this study, the influence of these internal school factors cannot be studied in depth because the focus of the research is limited to the effect of the Project Based Learning method on student learning outcomes.

Given these limitations, it is important for researchers to carefully consider the interpretation of the findings of this study and be aware of the limitations in generalizing the results to a wider context.

CONCLUSION

This study concluded that the Project Based Learning (PjBL) method improved the learning achievement of science students at SD 01 Baru Cijantung, East Jakarta. A comparison between the control class (5A) and the experimental class (5B) showed that students involved in the PjBL method had higher average scores and grades. Data analysis showed a normal distribution which supported the statistical assumptions of the study. Hypothesis testing showed a significant relationship between scores and grades, supporting the theory that active learning methods such as PjBL improve learning achievement. However, these results should be interpreted with caution given the limitations of the study such as the generalizability of the findings and other factors that influence student learning outcomes.

The implications of this study show the relevance of using PjBL in improving science learning achievement in primary schools. The results encourage teachers and policy makers to consider the integration of PjBL in the curriculum, as it not only increases student engagement, but also prepares them to be independent and skilled learners. The findings also highlight the importance of diverse learning approaches and teacher professional development to support the effective implementation of PjBL. Thus, schools and stakeholders can create a dynamic and inclusive learning environment to help students reach their full potential.

Based on these findings, several suggestions are proposed to improve the effectiveness of PjBL implementation at SD 01 Baru Cijantung. First, schools need to provide continuous training for teachers to understand PjBL concepts and

strategies. Second, enriching learning resources with teaching materials that support PjBL through collaboration with other educational institutions and the community.

Third, the integration of PjBL in the elementary school curriculum requires strong support from the school. Fourth, increasing the involvement of parents and communities in supporting the implementation of PjBL through information sessions and training. Finally, it is important to continuously evaluate and monitor the implementation of PjBL based on feedback from teachers, students and parents. By implementing these suggestions, SD 01 Baru Cijantung can strengthen the implementation of PjBL and improve students' learning outcomes in science subjects, as well as prepare them for the future.

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