

The Effect of Project Based Learning Implementation Toward Students' Motivation and Learning Result at Elementary School

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ABSTRACT

Keywords:

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The Merdeka Curriculum emphasizes deep learning, making Project-Based Learning (PjBL) a promising method to enhance students' motivation and learning outcomes. However, at SDN 01 Demangan, diagnostic assessment revealed that only 16.67% of sixth-grade students were in the skilled category, while 72.22% remained in the less skilled category, indicating persistent challenges in motivation and learning achievement. This study aims to analyze the effect of Project-Based Learning implementation on students' motivation and learning outcomes in the Integrated Science (IPAS) subject. Using a quantitative approach with a one-group pretest-posttest design, this research involved 18 sixth-grade students who participated in a PjBL project themed "Indonesia Global Expo," creating three-dimensional cultural envelopes. Data were collected through motivation questionnaires and learning outcome assessments covering cognitive, affective, and psychomotor aspects, then analyzed using descriptive statistics, paired sample t-tests, and Wilcoxon signed-rank tests. The findings reveal significant improvements across all measured aspects. Motivation scores increased from a mean of 82.39 to 85.44, while learning outcomes improved from 85.28 to 88.22, with a statistically significant difference (Sig. 0.006 < 0.05). The psychomotor aspect showed the most substantial gain, with a significance value of 0.000, confirming the effectiveness of PjBL in developing students' skills. Additionally, regression analysis demonstrated that learning motivation significantly influences learning outcomes (Sig. 0.044). This research contributes empirical evidence that Project-Based Learning effectively enhances both motivation and learning outcomes in elementary education, supporting the implementation of Merdeka Curriculum's deep learning approach and reinforcing constructivist principles of active, experience-based learning.

INTRODUCTION

Education is a process of learning, knowledge, skill, and the habits of a group of people inherited from one to the next generation by teaching and learning, workshop and coaching including research. Another said the definition of education is a basic effort which systematically done in order to create teaching and learning environment for the students to improve their potencies (Syakrani et al., 2025). Education takes basic role and strategy to create superior human resource. It reflects ideal point of view that the goal of education is to improve the human potency maximally by developing their cognitive, affective and psychomotor skills holistically (Abd Majid et al., 2018; AlAfnan, 2025; Barkley, 2017; Nuraida et al., 2022).

Nowadays, in Merdeka Curriculum, both social and science are merged altogether. The purpose of social and science subject is to help students developed based on the character in *Profil Pelajar Pancasila*, including awakening students' interest and curiosity so that they can be more enthusiastic to learn many phenomena happened around human. (Sastra, et, all., 2025). The philosophical purpose of social science education is to develop students understanding about themselves in correlation with neighborhood, society, and universe by developing students understanding about the social science concepts to conserve environment, growing critical thinking, and create character and social obligation to be the person who contributes in positive way to the society. The philosophy is related to progressivism philosophy in education terminology explaining the process of study more collaboratively and interactively among teachers and students with famous kinds of approach and activities also considered on individual development as an active creative and independent personality emphasize on experience based learning and authentic problem solver. (Mones & Irawati, 2023)

One model brought by the experts to gain overrated result in studying several subjects is Project Based Learning. According to (Thomas, et, all,1990) in the book of (Made Wena, 2009) in (Hasanah, 2021), Project Based Learning is learning model giving the opportunity to the teacher to manage the teaching and learning process in the classroom by involving project work. Project-Based Learning is a method or innovative approach of study. The focus of study is the concepts and principles from one discipline to the other, involving students directly into investigation to solve the problem and another meaningful tasks, giving the opportunity to the students working independently to create their own knowledge and creating real product as the result.

Motivation is a series of an efforts to fulfill the certain conditions so that a person eager to do something and when he or she reluctant to do it, she or he will try his or her best to omit the feeling. In teaching and learning activity, motivation is an engine inside the students to get involved in learning activity in occasion to gain the goal of learning (Sardiman, 2018). According to Hamzah B. Uno (2011:27) in (Zaeriyah, 2022) the role of motivation in studying the materials are a) Determining the learning booster b) Clarify the goal of study c) Determining the learning persistency. Someone who has been motivated to learn something, will take an effort to learn it well and persistently hoping to get the best result (Gregory & Kaufeldt, 2015; Henry et al., 2015; Roberson, 2020).

Generally, the definition of learning results is the changing of behavior in cognitive, affect the psychomotor obtained by the students after doing the systematic teaching and learning process (Sari & Mulyati, 2023). Motivation to study is positively and significantly gives effects toward the result of study. The level of students' responsibility to finish their tasks is mostly influenced by the motivation quality they received from the neighborhood. The positive stimulants such as academic appreciation, mentality enforcement, and solution above their learning obstacles from family and school has linear correlation with the Improvement of the passion and the active intervention in the teaching and learning process (Rosmiati et al., 2024).

Learning is a process of change that shapes and guides a person's personality. This change manifests itself in improvements in a person's quality and quantity. (Rochmania &

Restian, 2022). It means that we must put learning as an object that led the doers develop dan express their skill to make breakthrough overcoming their obstacles across their life journey.

Learning result brings the promising thing for the serious learners and it needs several methods which is suitable to be implemented to get the goals. The most effective alternative teaching method to increase students' learning motivation is a constructive learning (Fitri et al., 2023). The constructivist theory of learning stresses that knowledge is actively constructed by learners through experience, reflection, and social interaction. Figures such as Piaget, Vygotsky, Bruner, and Dewey believe that learning is an active process that involves real-world contexts and collaboration. In constructivist learning, teachers act as facilitators, while students are at the center of the learning process. (Rizki et al., 2025).

Based on the contents explained, the author considers, Project Based Learning has become one of the promising methods to build students' critical thinking. Project-Based Learning (PjBL) gives students the opportunity to work collaboratively in teams. Through collaboration, students can share ideas, provide feedback to one another, and learn from each other's perspectives. This collaboration not only helps students develop social skills but also enriches their understanding as they must articulate their thoughts and consider other points of view. (Putri et al., 2024). The study found that project-based learning (PjBL) can enhance students' creativity, healthy and hygienic lifestyle habits, critical and creative thinking skills, visual-spatial intelligence, and social skills. PjBL can also help students develop collaboration skills, initiative, independence, and critical thinking, which is in line with the implementation of the Merdeka Curriculum (Zulkarnaen et al., 2023). Those ideas brought the author uses the model to know the influence of the PjBL model toward students' motivation and learning results using "Indonesia Global Expo" as the theme of subject. The goal of this study is to encourage students to create their products (three dimensional envelopes)

Novelty of this research compared with the previous ones is most previous research's focused on only the effects of Project Based Learning model towards learning results and another research focus on the effect of Project Based Learning model toward learning result. Those previous researches motivated the author combining both motivation and learning results correlated with the usage of Project Based Learning Model. This research has specifically used both motivation and learning results as Dependent Variables and Project Based Learning as an Independent Variable. In addition, the author involving three aspects (cognitive, affective and psychomotor) to be measured on the pretest and posttest to know the results of study. This comprehensive research has become the novelty which is hoped giving the complex and scientific data about the positive correlation among project-based learning, motivation, and learning results. It is hoped there will be more advanced researches to accomplish this research in the future for example by research and development. As stated by (Riviana, 2024) that research and development is a process to improve and validate the products of education. The product are workshop materials, modules, assessments, and learning management system. As a result, the education breakthrough in Indonesia will be better time after time.

METHOD

This research was a quantitative research. Quantitative research is a research approach that uses numerical data to answer research questions. This approach emphasizes objective

measurement, standardized data collection, and the use of statistical analysis to test hypotheses or explain a phenomenon (Waruwu et al., 2025). So, basically, it is a research using data analyzes based on the exact statistics to know the results of study. Whereas the design, the author using before - after (one group pretest – posttest) design by comparing the results of pretest in the beginning to measure the first gained score with the result of post test in the last gained score using statistic parametric application (SPSS) to get the validity, realibility, normality and significancy including descriptive narrative data paraphrasing as data analyzes.

One group pretest posttest design is a form of simple experiment design to observe how effective the action or implementation of the model toward the object of experiment. This design involves only one group. The author will measure the ability or the condition of the group on pretest before implementing the model and comparing it with the result after the implementation takes part in action to know the result of study. (Al-ifrah et al., 2025). Still in (Al-ifrah et al., 2025), Here are the picture of the formula of before – after (one group pretest – posttest)

Picture 1. The Formula of One Group Pretest Posttest Design

$$O_1 \times O_2$$

Source : (Sugiyono., 2020)

Informations:

O_1 = pretest scores

X = Implementation

O_2 = posttest scores

The author also maintaining the implementation using teaching and learning process in spite of only gaining the data from the questionnaires, asesments, and interview as data collection techniques to get the anecdotal record along the process of research. to enable the reader to understand what was done, and important questions to which the methods section should provide brief answers. This section has to tell research methodology; and research formulation.

RESULTS AND DISCUSSION

After conducting the teaching and learning process in project-based learning toward the students of SDN 01 Demangan the District of Taman Madiun Town, the analysis shows the data base of pre-test and the post-test with some strategies as below:

At first, to know the reliability of the motivation instruments based on Likert Scale which is consists of 13 items, the author used Cronbach’s Alpha reliability test and the table following is the result:

Table 1/Motivation Reliability Statistics with Cronbach’s Alpha

Reliability Statistics	
Cronbach's Alpha	N of Items
0,845	13

Source: Authors' calculation based on questionnaire data analysis using SPSS (2026)

The table shows us that the instruments are fulfilling the reliability criteria if the Cronbach's Alpha > 0,60. Since the result of the measurement is 0,845, it is valid to state that the instruments are reliable.

Table 2. Motivation Normality Test with Shapiro - Wilk Statistics

Variable	Statistic Shapiro-Wilk	df	Sig. (p-value)
Motivation	0.958	18	0.551

Source: Authors' calculation based on questionnaire data analysis using SPSS (2026)

The table shows us that the value of significancy from the motivation instruments is 0,551 whereas the default is 0,05. It indicates that 0,551 is larger than 0,05, so the data distribution is normal.

After conducting the test of students' motivation including the statistical efforts, the author summarized the comparison of the motivation as follow:

Table 3. Motivation Comparison

Condition	A	Min Scores	Max Scores	Averages
Pre Test	18	68	99	80,56
Post Test	18	75	98	86,32

Source: Authors' calculation based on questionnaire data analysis (2026)

Based on the data above, we can conclude that from 18 students, the motivation comparison between pretest and posttest using Likert Scale instruments are in the pretest score average is 80,56 while in the posttest, the score average is 86,56. It showed us that there is a positive escalation of students' motivation for about 5,76.

The research going on to discuss the issues of learning results as the 2nd dependent variable. The learning results involved all aspects (cognitive, affective and psychomotor). The same way as in the 1st variable (Students' Motivation). The author used reliability statistics on three aspects. Here are the results:

Table 4. Cognitive, Affective and Psychomotor Reliability Statistics of Pre Test and Post Test with Cronbach's Alpha

Reliability Statistics		
Conditions	Cronbach's Alpha	N of Items
Pre Test	0,549	16
Post Test	0,630	18

Source: Authors' calculation based on learning outcome assessment data using SPSS (2026)

Based on reliability test up on the table above we can get the value of Cronbach's Alpha for the pretest instruments amounts 0,549 (N=16) with showed us fed the level of reliability lessons because it's under 0,60. But after the treatment given during the teaching and learning process, the value of Cronbach's Alpha in posttest has raised significantly become 0,630 (N=18). These results stated that the instrument in the past has already fulfilled the

defaults of the reliability ($> 0,60$). Where this is improvement has been influenced by the increase of students understanding and take effect to their answers consistently.

Table 5. Cognitive and Affective Normality Test of Pre Test with Shapiro – Wilk Statistics

Tests of Normality			
Aspects	Shapiro – Wilk Statistic	df	Sig.
Cognitive	0,934	18	0,226
Affective	0,921	18	0,133

Source: Authors' calculation based on learning outcome assessment data using SPSS (2026)

Based on the table above, data analyzes and interpretations of the normality test can be delivered as follow:

1. Cognitive Aspect : The significant score (sig.) gained from Shapiro-Wilk test is 0,226. This amount of score is larger than 0,05 ($0,226 > 0,05$), so that we can conclude that the results of cognitive score is normally distributed.
2. Affective Aspect : The significant score (sig.) gained from Shapiro-Wilk test is 0,133. this amount of score is larger than 0,05 ($0,133 > 0,05$), so that we can conclude that the results of affective score is normally distributed. because the data has shown that the data for both cognitive and affective have already fulfilled the normality test, we can continue the measurement by using paired sample T - Test or regression.

Table 6. Cognitive, Affective Normality Test of Post Test with Shapiro – Wilk Statistics

Tests of Normality			
Aspects	Shapiro – Wilk Statistic	df	Sig.
Cognitive	0,908	18	0,080
Affective	0,945	18	0,353

Source: Authors' calculation based on learning outcome assessment data using SPSS (2026)

Based on the test of normality toward the table above, the score of significancy using Shapiro-Wilk test, cognitive aspect has gained 0,080 and affective aspects has gained 0,353. Because of the value of significance from three aspects it's more than 0,05 ($\text{Sig.} > 0,05$), we can conclude that the data of learning results of the students is statistically normal. Therefore, the conditions of normality are valid.

Psychomotor as the third and the most significant aspect is calculated statistically using Wilcoxon Signed Rank Test. The reason why we should use this test is because in the pretest, the model has not applied yet. As a consequence, the author must use the data from the diagnostic test (pretest) to gather the scores and compare it with the data in the post test. After conducting Project Based Learning implementation and gaining the data based on the students' score, here are the data gained from the pretest to post test:

Table 7. Psychomotor Normality Test of Pre Test and Post Test with Wilcoxon Signed Rank Test.

Test Statistics ^a						
	P2 - P1	P4 - P3	P1 - N	P3 - P2	P5 - P4	N -P6
Z	-1.890 ^b	-.447 ^b	-3.600 ^b	.000 ^c	-2.310 ^b	-3.734 ^d
Asymp. Sig. (2-tailed)	0,059	0,655	0,000	1,000	0,021	0,000

Source: Authors' calculation based on psychomotor assessment data using SPSS (2026)

Based on the non-parametric statistic test using Wilcoxon Signed-Rank Test on psychomotor aspect toward students of grade six SDN 01 Demangan, we can get Z score for about -3,734 with symp. Sig. (2-tailed) value 0,000. remembering the value of significance which is gained (0,000) less than the default (alpha = 0,05), so the decision of the statistic test is H0 has rejected and H1 is accepted. it proved that empirically, there is a different between the result of pretest and the post test. it has positive improvements in order to maintain the third aspect (psychomotor).

The data collection above stated that there are significant differences between the pretest and posttest for both dependent variables (motivation and learning results) with the increased of numbers. The implementation of Project Based Learning model has genuinely gave positive effect in order to improve the learning results of students' at SDN 01 Demangan Sub district of Taman Madiun City in all aspects. The most significant improvement happened on psychomotor aspect (skills) with perfect value of significant (0,000) proving that Project Based Learning Model is able to activate, train, and boost the students' psychomotor skills optimally compared with the pre implementation condition.

To know the correlation between Project Based Learning model as independent variable (X) and Students' Motivation as the 1st dependent variable, the author uses T test and the following is the summary of result:

Table 8. Data of T Test Result of Students' Motivation (Pre Test – Post Test)

Variables	(Mean)	SD	Sig. (2-tailed)
Pre Test Motivation	82,39	10,70	0,152
Post Test Motivation	85,44	7,12	

Source: Authors' calculation based on questionnaire data analysis using SPSS (2026)

The result of Paired Samples T-Test analyzes shows that the average score of students' motivation before the implementation of Project Based Learning Model is 82,39. After the implementation conducted, the score averages of students' motivation is 85,44. Numerically, there is escalation for about 3,05 and the Sig. (2-tailed) is 0,152. Because the significance value is more than 0,05, we can conclude that there is no significant difference from pre test to post test. The reason of this phenomenon can be explained as Ceiling Effect Phenomenon. Where the students at first have already gained high score (82,39). This matter causes the gain is limited. It means that the model itself become sustainer to keep the stability of students'

motivation. Secondly, the limited sample which is statistically downgraded the statistical power to detect the changes in small scale. Otherwise, in pedagogical point of view, the average improvement shows positive effect from the teacher efforts to burn the students' spirit by using meaningful and joyful learning using Project Based Learning model.

Table 9. Data Results of T Test of Students' Learning Results (Pre Test – Post Test)

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Average Pre	85.28	18	11.421	2.692
	Average Post	88.22	18	8.987	2.118

Source: Authors' calculation based on learning outcome assessment data using SPSS (2026)

According to the results of the Paired Samples T-Test analysis, an increase in the average student learning outcomes was found after implementing the project-based learning (PjBL) model. The average score of student learning outcomes before the pre-test was 85.28, and it increased to 88.22 after the PjBL intervention. Statistically, the test results showed a Sig. (2-tailed) value of 0.006. Since this significance value is smaller than the significance level of 0.05 ($0.006 < 0.05$), it can be concluded that there is a statistically significant effect on student learning outcomes through the implementation of the PjBL model. Therefore, the research stating that there is a positive effect of the PjBL model on student learning outcomes at SDN 01 Demangan has been validated.

Next, we go to the discussion of correlation between motivation as the first dependent variable and learning result as the second dependent variable. This discussion using the linear regression. This method is divided into simple linear regression and double linear regression in which each has different application depends on the data complexity. simple linear regression is suitable for the situation where there is only one factor affecting the result, while double linear regression is used when some factors are considered take parts. It gives deeper flexibility and accuracy to analyze the data (Egistin et al., 2025).

In this research, the author uses simple linear regression to know the correlation between students' motivation and learning results and here are the following results:

Table 10. Simple Linear Regression of Students' Motivation (Y1) and Learning Results (Y2)

Variables Entered/Removed ^a		
Variables Entered	Variables Removed	Method
motivation_pra ^b	.	Enter

a. Dependent Variable: learning_results_post

a. All requested variables entered.

ANOVA ^a						
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	316.213	1	316.213	4.787	.044 ^b
	Residual	1056.898	16	66.056		
	Total	1373.111	17			

a. Dependent Variable: learning_result_post						
b. Predictors: (Constant), motivation_pre						
Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	36.484	23.724		1.538	.144
	motivation_pre	.606	.277	.480	2.188	.044

a. Dependent Variable: learning_result_post

Source: Authors' calculation based on regression analysis using SPSS (2026)

The ANOVA table for the data shows a significance value (Sig.): 0.044 and an F-statistic: 4.787. Since 0.044 is less than 0.05, this regression model is considered significant. This means that, statistically, learning motivation (pre-treatment) has been proven to have a significant effect on student learning outcomes (post-treatment). A simple linear regression analysis was conducted to test the contribution of learning motivation to student learning outcomes. Based on the ANOVA table, an F-value of 4.787 was obtained with a significance level of 0.044. Since the significance level is < 0.05 , it can be concluded that there is a significant effect of learning motivation on student learning outcomes. This model indicates that variations in student learning outcomes can be significantly explained by the level of learning motivation students possessed before starting the project. In other words, students with higher learning motivation tend to achieve more optimal learning outcomes after participating in the PjBL learning model.

CONCLUSION

Based on the discussion regarding the effect of the Project-Based Learning (PjBL) model on the motivation and learning results in Integrated Science (IPAS) of sixth-grade students at SDN 01 Demangan, it can be concluded that the implementation of the Project-Based Learning model in the IPAS subject through a project themed “Indonesia Global Expo,” with the main procedure of creating a three-dimensional cultural envelope, was proven to significantly improve students’ cognitive, affective, and psychomotor learning outcomes. This is gained by the results of from 18 students, the motivation comparison between pretest and posttest using Likert Scale instruments are in the pretest score average is 82,39 and in the posttest is 85,44. While in the learning results point, the increasing of the average student learning outcomes was found after implementing the project-based learning (PjBL) model. The average score of student learning outcomes before the pre-test was 85.28, and it increased to 88.22 after the PjBL intervention. The findings of this study have strategic implications for teaching practices in elementary schools, especially at Phase C of Grade 6. This study reinforces Constructivism and the concept of “Learning by Doing,” which lead the teaching and learning process to meaningful learning can be achieved when the affective and psychomotor aspects are engaged simultaneously to build long-lasting cognitive understanding. The PjBL model can serve as an adaptive solution for teachers to integrate the objectives of the Merdeka Curriculum with the Deep Learning approach that is fostering meaningful and deep learning so that students truly understand the concepts, rather than only memorizing or rushing through meaningful material

by utilizing the four principles that students must master today: the ability to analyze and solve problems (critical thinking), the ability to generate new ideas or innovations (creativity), the ability to collaborate and work synergistically (collaboration), and the ability to communicate ideas effectively (communication). The usage of theme to deliver the model, should be necessarily put altogether with the teaching and learning process because Thematic learning is an approach that allows children to thoroughly explore various concepts. Integrated thematic learning is considered an effective teaching approach because it addresses all aspects of students' physical, emotional, social, and academic development, both in the classroom and within the school environment. The integration of three aspects takes effect on students' competencies. The integrated synergy among the three main aspects of learning namely the cognitive (knowledge), affective (attitudes), and psychomotor (skills) aspects significantly contributes to transforming and strengthening students' holistic competencies. The process of integrating these three domains is not merely about accumulating learning materials in pieces, but rather about creating a comprehensive way of thinking and acting. When educational institutions are able to align theoretical understanding with the internalization of character values and the development of practical skills, students not only achieve academic proficiency, but also develop the adaptability needed to face real-world challenges in the workplace and society.

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