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The Effect Of The Project Based Learning Model On Students' Critical Thinking Skills In Economics In Grade X

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Abstract

This experimental study aimed to determine the effect of the project-based learning model on students' critical thinking skills in Economics in tenth-grade students at SMA Indonesia Membangun Medan. The research method used was quantitative with a quasi-experimental design. The sample consisted of 62 tenth-grade students divided into two groups: an experimental class (X-2, 32 students) using the project-based learning model and a control class (X-1, 30 students) using the conventional learning model. The instrument used was a critical thinking skills questionnaire referring to six indicators according to Mardiana (2024). The results showed a difference between the critical thinking skills of students in the experimental and control classes. The t-test showed that t_(count)14.067 > t_(tabel)3, thus accepting the alternative hypothesis. Therefore, it can be concluded that the project-based learning model has a positive and significant effect on students' critical thinking skills in economics.

Keywords: *Project Based Learning, Critical Thinking Skills, Influence, Economics Learning*

INTRODUCTION

In the national education system, it has an important role in enlightening the nation's life and improving the quality of human resources. (Wahyudi & Winanto, 2018) . Based on Law Number 20 of 2003, it states that national education aims to develop the potential of students to become people who are faithful, pious, and have noble morals, and have the knowledge, skills, and attitudes needed to face the challenges of life. (Maharani & Yohandri, 2020) . Article 3 also emphasizes that national education is a conscious and planned effort to create a learning atmosphere and process that allows students to actively develop critical, creative, and innovative thinking skills, as well as the ability to solve problems and take responsibility for making appropriate decisions. Therefore, an effective learning model is needed to develop critical thinking and problem-solving skills, such as project-based learning.

One of the main keys to creating a generation capable of competing in the era of globalization is quality education. Teaching and learning activities involve several components: students, educators, educational objectives, learning materials, and evaluation. (Kultsum, Defianty, & Nadrah, 2022) . Teachers are the primary determinants in achieving educational goals. Therefore, teachers must be able to determine teaching and learning strategies so that students can learn effectively and efficiently. By implementing learning models, teachers can create active teaching and learning activities so that learning runs effectively (Tambunan, Parhusip, & Pasaribu, 2021) .

Based on observations in August 2024 at SMA Indonesia Membangun Medan, it shows that the average grade of class X students in the 2022/2023 – 2024/2025 academic year obtained a different average grade for economics subjects each year (appendix 10). This can be seen from the final grades obtained by students, from the average grade it can be concluded that student learning outcomes in the subject of economics for class X for the 2022/2023 – 2024/2025 period have decreased. The following table summarizes the average grades of class X SMA Indonesia Membangun Medan for the 2022/2023 – 2024/2025 academic year.

Based on the data obtained, the average student grades in the last three years have experienced a significant decline. (Maudi, 2016) . In 2022/2023, the average student scores still showed good results, but began to decline in 2023 and continued until 2024. (Tyas, Fuady, & Faradiba, 2022) . The project-based learning model is designed to connect learning to students' real-life situations, thereby improving conceptual understanding. However, the decline in students' average scores may indicate challenges in using the project-based learning model. (Nurfadillah, Yulisma, & Hardi, 2023) Several factors that can influence the implementation of the project-based learning model include limited supporting facilities and infrastructure and varying student involvement in learning. Furthermore, external factors can influence the learning environment at home, lack of parental support, and students' lack of readiness to accept project-based learning (Himmi, Armanto, & Amry, 2025) .

Based on the background of the problem above, the researcher emphasized that efforts are needed to evaluate the application of the project-based learning model in improving critical thinking skills. (Mardhani, Haryanto, & Hakim, 2022) . Although project-based learning is designed to connect material to real-life situations for ease of understanding, the decline in average scores from 2022 to 2024 indicates that its implementation may be suboptimal. Therefore, this study aims to analyze the impact of using the project-based learning model and find solutions to improve students' critical thinking skills. (Aldabbus, 2018) . Thus, this research is expected to contribute to the development of more effective learning strategies, thereby optimally improving students' critical thinking skills. (Emily Williamson, 2023)

METHOD

This study uses quantitative research with an experimental method. The purpose of this study is to measure and test how one variable (the Project Based Learning model) affects another variable (students' critical thinking skills in economics) (Kurniaman, Noviana, & Marwan, 2021) . Sugiyono PD (Farokhah, Herman, & Jupri, 2019) explains that there are four types of experimental research designs: pre-experimental, true experimental, factorial, and quasi-experimental design. In this study, the researchers used a quasi-experimental design (Nadhiroh & Anshori, 2023) .

This research will be conducted at SMA Indonesia Membangun Medan located on Jl, Air Bersih, Sudirejo I, Kec. Medan Kota, Medan City, North Sumatra 20218, in semester 1 (one) of the 2025/2026 academic year. The research implementation time is for 2 months, starting from July to August 2025. The research schedule will be adjusted to the school academic calendar. The main focus of this research is the population (Leniati & Indarini, 2021) . The population used includes all grade X students at SMA Indonesia Membangun Medan for the 2025/2026 Academic Year, totaling 2 classes with a total of 62 students. The sample is a subset of the population used as a data source in the research (Inggriyani & Fazriyah, 2018) . In this study, the sample was taken using a total sampling technique of all students studied as many as 62 students (Pranata, Lyesmaya, & Maula, 2024) . The experimental group was class X-2 consisting of 32 students (using project-based learning) and the control group was class X-1 consisting of 30 students (using conventional learning) (HN Saputra, 2019) .

An operational definition is a concrete or specific explanation of how a variable is measured, observed, or implemented in a study. This definition outlines the indicators or aspects prioritized for identifying the variable in a measurable and objective manner (Budi, R., & Lestari, 2024) .

The independent variable is a variable that causes changes in other variables. In this study, the independent variable is the Project Based Learning (X) learning model. The dependent variable is a variable that is influenced or that is the result of the independent variable. In this study, the dependent variable is Students' Critical Thinking Skills (X). Data analysis techniques in a study are to process the data that has been obtained. The following is the formula used to process the data that has been obtained in the study (Lestari, Nindiasari, & Fatah, 2019) :

The t-test was used in this study to test the hypothesis in accordance with the problem formulation used to examine the data. To determine the level of variance between the results, a t-test was used with the formula:

$$t = \frac{X_1 - X_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

RESULTS AND DISCUSSION

Description of Research Results

This research was conducted on August 13 – August 20, 2025/2026 academic year. From 2 classes, both classes were taken as samples consisting of 62 students, where the experimental class of class X-2 consisted of 32 students and the control class of class X-1 consisted of 30 students. This research involved 2 classes that were implemented differently, where the experimental class in the learning process used the *project based learning model* while the control class used the conventional learning model (Kurniawan, Elmunsyah, & Muladi, 2018) . The data collected included the results using an initial survey and a final survey of students' critical thinking using a questionnaire (Kubilinskiene, 2020) .

To find out the summary of research variable data, here is a basic statistical analysis, namely in the following table:

Table 1. Basic Descriptive Statistics

Descriptive Statistics						
		Awal_eks	**End_ex**	**Awal_kon**	**End_con**	**Valid N (listwise)**
N	Statistics	32	32	30	30	30
Range	Statistics	48	30	24	22	
Minimum	Statistics	50	90	32	52	
Maximum	Statistics	98	120	56	74	
Sum	Statistics	2231	3383	1208	1839	
Mean	Statistics	66.03	88.13	40.67	74.33	
Standard Deviation	Statistics	11,939	6,757	5,713	9,573	
Many classes		6	6	6	6	
Class length		8	6	4	4	

Number of classes = 1+3.3 log 32 = 1+ 3.3 (1.505) =1+4.9665 = 1+5 = 6
Class length = 48:6 = 8
Number of classes = 1+3.3 log 32 = 1+3.3 (1.505)= 1+4.9665 =1+5 = 6
Class length = 30:6 = 6
Number of classes =1+3.3 log 30 = 1+3.3 (1.477) = 1+4.87=5.87=6
Class length = 24:6= 4
Number of classes =1+3.3 log 30 =1+3.3 (1.477) = 1+4.87=5.87=6
Class length = 22:6=3,6=4

Hypothesis Testing

With the fulfillment of the prerequisite tests, namely the normality and homogeneity tests with the results of normally distributed and homogeneous data, the next step is to test the hypothesis (Usmaidar, Rani Febriyanni, Siti Darmawani, 2023) . The hypothesis in this study will be tested using a t-test which aims to see whether there is an effect of the *project-*

based learning model on students' critical thinking skills between the classes given treatment and the classes that were not given treatment. Table 4.8 shows the results of the t-test calculation as follows:

Table 2. t-Test Results

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Standard Error Difference	Lower	Upper
Equal variances assumed	,309	,580	14,067	60	,000	22,825	1,623	19,579	26,071
Equal variances not assumed			14,125	59,787	,000	22,825	1,616	19,592	26,058

After the calculation was carried out using the t-test, the value obtained t_{hitung} was 14.067. For α =0.05 and *df* =62-2 =60, then 3 $t_{0,05.60}$ =was obtained t_{tabel} = . By comparing the values t_{hitung} and t_{tabel} obtained $t_{hitung} > t_{tabel}$, this means H_0 rejected and $H_a$accepted (H. Saputra, 2020) .

With the help of *SPSS 25 for windows, the output of the sig. (2- tailed)* value from the *independent* sample t-test is shown at 0.00. Because the significance is <0.05, it can be concluded that "reject"H_0 "This means that there is an influence of the *project-based learning model* on students' critical thinking skills between the average final survey of students in the experimental class and the control class on the material on economic activities and economic actors in Class X SMA Indonesia Membangun Medan, Academic Year 2025/2026.

CONCLUSION

Based on the research results, it can be concluded that the *project-based learning model* has a significant influence on students' critical thinking skills in economics subjects in Grade X of SMA Indonesia Membangun Medan. This is proven by the results of the hypothesis test t_{hitung} = 14.067, t_{tabel} =3, and Sig. 0.00 < 0.05, and $t_{hitung} > t_{tabel}$ which shows a significant difference between the experimental class using the *project-based learning model* and the control class (conventional).

Suggestion

Based on the conclusions obtained from this research, the researcher provides several suggestions as follows:

1. In implementing economics learning, teachers are expected to encourage students to be more active and motivated in learning, with a more student-centered focus.
2. Teachers at schools are expected to be able to use the *project-based learning model* in teaching, especially in economics, as an alternative to improving students' critical thinking skills.
3. Students are expected to be more active in understanding problems, clarifying problems, expressing opinions, solving problems, and drawing conclusions in problem solutions

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