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The Effect of Implementing the Project Based Learning Model on the Collaborative Skills of Students at Al Padang Private Islamic Senior High School

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Abstract

This research is motivated by the importance of collaboration skills in today's globally integrated world and the findings that the collaboration skills of students at the Al Falah Private Islamic Senior High School (MAS) in Padang are still suboptimal, with many students tending to work alone and passively in group discussions. One proposed solution is the implementation of the Project-Based Learning (PjBL) model, which emphasizes student involvement in challenging, real-world projects to enhance collaboration skills. This study aims to (1) describe students' collaboration skills, (2) describe the implementation of Project-Based Learning, and (3) determine the effect of the Project-Based Learning model on students' collaboration skills at the Al Falah Private Islamic Senior High School in Padang.This study used quantitative methods with statistical analysis techniques. The study population was 64 students with a sample size of 48. Data collection was conducted through questionnaires and observations. Data analysis techniques included normality tests, homogeneity tests, and hypothesis testing using simple linear regression analysis. The results of the study show that (1) the average Project Based Learning learning at MAS Al Falah Padang is in the fairly good category (mean interval 25.51 – 30), and (2) the average collaboration skills of students are also in the fairly good category (mean interval 36.5 – 42.9). (3) There is a significant influence of the application of the learning model. Project-Based Learning's impact on students' collaboration skills is demonstrated by a significance value of 0.00 (<0.05) in the ANOVA test. The effect of Project-Based Learning on collaboration skills was 30.7% (r-square value of 0.307), while the remaining 69.3% was influenced by other factors. The implications of this study recommend that teachers continue to develop the implementation of Project-Based Learning with a more structured approach, increase interaction and collaboration among students, and conduct regular evaluations of the effectiveness of this learning model. Furthermore, it is important to identify and support other factors that contribute to collaboration skills, such as the learning environment, student motivation, and supporting facilities.

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INTRODUCTION

cognitive aspects, but also essential skills such as communication, critical thinking, creativity, and collaboration (Trilling & Fadel, 2009). Collaboration skills are crucial in today's increasingly globally integrated world, where individuals are required to work in teams, share ideas, and solve problems together (Griffin, 2015). These skills are part of the four pillars of 21st-century skills (4Cs), which are crucial for facing global challenges and supporting learning activities. They are expected to encourage students to actively participate in problem-solving and understand diverse perspectives (Hartina et al., 2022; Erdoğan, 2019). Therefore, the current education system focuses on developing social skills through innovative learning models (Saefuddin & Berdiati, 2014).

One learning model proven effective in enhancing collaboration skills is Project-Based Learning (PjBL) (Hamidah et al., 2020). This model emphasizes project-based learning, where students engage in challenging, real-world-oriented, and collaborative activities (Hamidah et al., 2020). Through Project-Based Learning (PjBL), students learn to design, strategize, and communicate with team members to solve specific problems (Fathurrohman, 2016), in line with the principles of student-centered learning where the teacher acts as a facilitator (Hamidah et al., 2020). This approach also aligns with the Independent Curriculum and the Pancasila Student Profile Strengthening Project (P5) introduced by the Ministry of Education, Culture, Research, and Technology, which aims to develop students' social and collaborative skills through team-based projects that solve real-life problems (Salhuteru et al., n.d.; Satria et al., 2022). The Buck Institute, as quoted by Hasanatul Hamidah, states that Project-Based Learning (PjBL) can lead students to achieve 21st-century skills, including collaboration, critical thinking, and problem-solving (Hamidah et al., 2020). Griffin added that PjBL effectively facilitates the development of collaborative skills through project-based activities that integrate active participation, shared responsibility, and shared decision-making, creating opportunities to hone social and cognitive skills (Griffin, 2015). Research by Indrawati (2023) even shows that implementing PjBL can improve students' collaborative skills by up to 78% (Indrawati, 2023).

However, based on the author's initial observations at the Al Falah Private Islamic Senior High School (MAS) in Padang, it was found that students' collaborative skills were still suboptimal. Many students preferred working individually rather than in groups, and there was a lack of active interaction during class discussions. This was reinforced by a statement from one teacher who stated that students often had difficulty working together and tended to be passive in group assignments (Situmorang, 2025). This phenomenon underscores the urgency of research to scientifically examine the impact of implementing the PjBL learning model in addressing collaboration issues in this context.

This research contributes to the development of educational theory and practice by providing empirical evidence regarding the effectiveness of the PjBL model in improving students' collaboration skills at the Al Falah Private Islamic Senior High School in Padang, a field that has not been widely studied. Unlike previous research, which generally focused on literature studies (Rahmadhani & Ardi, 2024), classroom action research (Indarwati et al., 2023; Efriyana, 2023), or used a qualitative approach (Fatiati, 2021), and was conducted at different educational levels or subject matter (Efriyana, 2023; Nurfitriyanti, 2016), this study employed a quantitative method with an ex-post facto approach to analyze causal relationships based on existing data, and was conducted in the context of the Islamic Senior High School. Based on this background, this study aims to determine the description of students' collaboration skills at Al Falah Padang Private Islamic Senior High School, examine the description of the implementation of Project Based Learning at Al Falah Padang Private Islamic Senior High School, and analyze the effect of the implementation of the Project Based Learning learning model on students' collaboration skills at Al Falah Padang Private Islamic Senior High School.

METHODS

This research used a quantitative method with an ex post facto approach. Quantitative methods are based on the philosophy of positivism to study specific populations or samples, collect data using research instruments, analyze it quantitatively or statistically, and test predetermined hypotheses (Sugiyono, 2013). Ex post facto research is a non-experimental method that seeks causal relationships from data that has already occurred without manipulating the independent variable (Suharsimi Arikunto, 2013). This method is also known as causal-comparative research, with the primary goal of identifying the causal factors of a phenomenon that has already occurred (Suharsimi Arikunto, 2013). According to Sugiyono, in ex post facto research, researchers simply observe past events without intervention, with data obtained through documentation, interviews, or observations of current conditions (Sugiyono, 2017).

This research was conducted at the Al-Falah Private Islamic High School (MAS) in Padang, located on Jl. Mecca, RT.03/RW.06, Koto Panjang Ikua Koto, Koto Tangah District, Padang City, West Sumatra 25175 (Shine Alfalah Foundation, tt). The location was selected based on initial observations indicating that students' collaboration skills were suboptimal, with a tendency to work individually and be passive in group discussions. Furthermore, there had been no similar research conducted in this location.

The research population was all 48 tenth-grade students at MAS Al-Falah. A population is the entire object or subject with specific characteristics that are studied and conclusions drawn from (Sugiyono, 2012; Sinaga, 2014). According to Suharsimi Arikunto (2006), if the number of research subjects is less than 100, it is better to take all of them, so the research can be considered a population study. With a population of 48 students, the entire population was used as the sample in this study (Suharsimi Arikunto, 2006).

The research instrument used was a questionnaire. The scale used is the Likert Scale, which measures an individual's or group's attitudes, opinions, and perceptions about social phenomena (Suharsimi Arikunto, 2006; Sugiyono, 2016). The measured variables are broken down into indicators, which then serve as the starting point for developing instrument items. Scoring using the Likert Scale is as follows:

FINDINGS AND DISCUSSION

Table 1 Overview of Project Based Learning

Likert Scale	Nature of the Question	
	Positif	Negatif
Strongly agree	4	1
Agree	3	2
Disagree	2	3
Don't agree	1	4

The research instrument has undergone validity testing. Validity is a measure that indicates the level of validity or authenticity of an instrument (Suharsimi Arikunto, 2006). The instrument was developed by breaking down variables into sub-variables and indicators, then creating questionnaire items. After construction, the instrument was consulted with experts (judgment experts) (Sugiyono, 2017), namely Dr. Hamdani Abdi, M.Pd. and Dr. Wilrahmi Izati, M.A. They reviewed the questionnaire items and the instrument's suitability to the research's theoretical framework, and provided suggestions for improvement. The validity of the instrument's item scores was tested using the Pearson Product Moment formula (Suharsimi Arikunto, 2006):

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{\{N\sum X^2 - (\sum X)^2\}\{N\sum Y^2 - (\sum Y)^2\}}}$$

Information:

rxy = Correlation coefficient
N = Number of respondents
X = Question item scores
Y = Total question score
∑X = Total question scores

An item is considered valid if the calculated r > the table r. In this validity test, 20 samples were used with a 5% significance level (df = 18), resulting in a table r value of 0.444. Next, a reliability test was conducted to determine the consistency of the measurement results. Instrument reliability testing was conducted using the Cronbach's Alpha method, where an instrument is considered reliable if the Cronbach's Alpha value is > 0.60 (Sugiyono, 2012). The calculation steps include determining the variance value for each statement item and the total variance value, then determining the instrument's reliability. The reliability test results indicated that both instruments were reliable.

Data collection techniques in this study included questionnaires and observation. Questionnaires were distributed to respondents, each with questions or statements using an interval or Likert scale. Questionnaires are practical, save time, effort, and money (Sugiyono, 2012), and are used to measure attitudes, opinions, and perceptions (Sugiyono, 2016). Meanwhile, observations were conducted by the researcher to collect data related to human behavior, natural phenomena, and respondents (Sukardi, 2015). Observation targets included phenomena related to the research topic, environmental conditions such as time and location, and ethical considerations such as obtaining subject consent and respecting privacy (Sukardi, 2015).

Data analysis techniques in this quantitative study included data grouping, presentation, and calculations to test the problem formulation and hypotheses (Sugiyono, 2017). The researcher used descriptive analysis techniques, namely statistics used to describe an object of research through sample or population data (Sugiyono, 2017). Prior to hypothesis testing, the data were first tested using assumption tests (normality and homogeneity tests) and hypothesis testing (simple linear regression). The analytical tool used was simple linear regression to determine the relationship between two variables.

Normality testing was performed using the Kolmogorov-Smirnov test using SPSS 25 to determine whether the data were normally distributed. Data were considered normally distributed if the p-value was > 0.05. A homogeneity test was performed to determine the similarity of sample variances. Homogeneity testing is based on the assumption that if the variances of the samples are not significantly different, then the samples are relatively homogeneous (Suharsimi Arikunto, 2013). Using SPSS version 25, data were considered homogeneous if the significance value (sig) obtained was greater than alpha 0.05 (sig > 0.05).

Hypothesis testing was performed using Simple Linear Regression Analysis to determine the effect of the independent variable (X: implementation of the Project-Based Learning model) on the dependent variable (Y: student collaboration skills). The basis for decision making for hypothesis testing is: if the significance value (sig) < 0.05, or if the calculated t value > t table, then there is an influence of variable X on variable Y.

This research was conducted at the Al-Falah Private Islamic Senior High School (MAS) in Padang. Of the initial population of 64, only 48 respondents participated and returned the questionnaire due to attendance and time constraints. All data analysis in this study is based on these 48 respondents.

1. Overview of the Implementation of the Project-Based Learning (PjBL) Model

The overview of the implementation of the Project-Based Learning (PjBL) model at MAS Al-Falah Padang shows that the majority of respondents were in the "fair" category. Twenty-five respondents (52.1%) were classified as "fair." The average (mean) PjBL score was 29.44, which fell within the range of 25.51–30.00, confirming this "fair" category.

Table 2 Overview of Project Based Learning

No	Interval Kelas	Frekuensi	Persentase (%)	Classification
1	34,51 – 38,00	8	16,7	Excellent
2	30,01 – 34,50	7	14,6	Good
3	25,51 – 30,00	25	52,1	Fair
4	21,00 – 25,50	8	16,7	Poor
Jumlah		48	100%	

2. Overview of Student Collaboration Skills

The overview of student collaboration skills at MAS Al Falah Padang also shows similar results, namely in the fairly good category. Seventeen respondents (35.42%) were classified as fairly good. The average (mean) collaborative skills score was 42.52, which falls within the range of 36.5–42.9, confirming the fairly good classification.

Table 3 Overview of Students' Collaboration Skills

No	Interval Kelas	Frekuensi	Persentase	Klasifikasi
1	49,5 – 55,0	9	18,75%	Sangat Baik
2	43,0 – 49,4	14	29,17%	Baik
3	36,5 – 42,9	17	35,42%	Cukup Baik
4	30,0 – 36,4	8	16,67%	Kurang
Jumlah		48	100%	

3. The Effect of Implementing the Project-Based Learning Model on Students' Collaboration Skills

Before testing the hypotheses, a classical assumption test was conducted. The Kolmogorov-Smirnov normality test showed a significance value of 0.200 (>0.05), indicating a normal distribution of the residual values. Furthermore, Levene's Homogeneity Test yielded a significance value of 0.221 (>0.05), indicating that the data had homogeneous variance. Both assumption tests met the requirements for regression analysis.

Table 4 Correlation test results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	17,791	5,538		3,213	002
	Project Based Learning	840	186	554	4,512	000

Dependent Variable: Collaboration Skills

Hypothesis testing using simple linear regression analysis yielded a significance value of 0.000 (<0.05) and a t-test of 4.512 (>1.679 t-table). Based on the decision-making criteria, Ho is rejected and Ha is accepted, indicating a significant effect of the implementation of the Project-Based Learning model on the collaboration skills of students at Al Falah Padang Private Islamic Senior High School.

The magnitude of the effect of variable X (Project-Based Learning) on variable Y (Collaboration Skills) is measured by the r-square value of 0.307. This indicates that Project-Based Learning has a 30.7% influence on students' collaboration skills, while the remaining 69.3% is influenced by other factors.

CONCLUSION

This study concludes that the implementation of the Project Based Learning (PjBL) learning model and the collaborative skills of students at the Al Falah Padang Private Islamic Senior High School (MAS) are both in the fairly good category, as evidenced by the average PjBL score in the interval of 25.51–30 and the average collaboration skills in the interval of 36.5–42.9. Significantly, it was found that the implementation of PjBL had a positive effect on the collaboration skills of students at MAS Al Falah Padang, with a significance value of the ANOVA test of 0.00 (<0.05). The PjBL model contributed 30.7% to the influence of

collaboration skills (r square value of 0.307), while the remaining 69.3% was influenced by other factors outside this learning model.

For the next step, it is recommended that teachers continue to improve the quality of PjBL implementation by enriching project variations, integrating technology, and providing more optimal guidance. It is also important to strengthen students' collaboration skills through group assignments that encourage active interaction, in-depth discussions, and reflection on the collaborative process. The PjBL approach needs to be more structured from planning to evaluation to ensure students are more focused. Madrasahs are advised to facilitate teacher training and professional development in PjBL implementation. Given the significant influence of other factors, schools must identify and support external and internal factors such as the learning environment, motivation, and facilities. Finally, regular evaluation of the effectiveness of PjBL is essential for continuous improvement, and it is recommended that future researchers explore other factors that influence collaboration skills in different contexts using more complex methodologies.

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