

## The Effect of Problem-Project Based Learning on Critical and Collaborative Thinking Skills of Students of SD Negeri 2 Darmayasa

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### ABSTRACT

*This study aims to determine the effect of Problem-Project Based Learning on Critical and Collaborative Thinking Skills of Students of SD Negeri 2 Darmayasa in the 2023/2024 academic year. This study uses a quantitative research approach, with an associative research type (relationship), and uses quantitative analysis methods (data in the form of numbers). Data on critical and collaborative thinking skills were collected through observation using an assessment instrument in the form of a rubric. The sample in this study totalled 16 students. The results of statistical testing between the IPAS Learning indicator and the prob-probl learning model approach to the Critical Thinking Ability variable have  $t_{count}$  (3.854) and  $t_{table}$  (2.776), meaning  $t_{count} > t_{table}$ . For the effect of the prob-probl learning model approach on the collaboration ability variable,  $t_{count} =$  (3.559) and  $t_{table}$  (2.776), meaning  $t_{count} > t_{table}$ . Based on the results of this study, it shows that there is an effect of the influence of Problem-Project Based Learning on the ability to think critically and collaboratively of fifth grade students of SD Negeri 2 Darmayasa in the 2023/2024 academic year.*

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## 1. INTRODUCTION

Entering the era of the industrial revolution 4.0 in the 21st century, all human activities are dominated by high-tech products, as if every human being cannot live without technology. The 21st century is a silent witness to the rapid development and changes in technology in human life. 21st century skills are the skills needed to be successful in life and work in today's digital era. Some 21st century skills include creativity, critical thinking, communication, collaboration, problem solving, independence, decision making, systematic thinking, digital literacy, and social and cultural skills.

These 21st century skills include critical thinking, problem solving, creativity and innovation, collaboration, communication, information literacy, media literacy, technology literacy, flexibility and adaptability, leadership and responsibility, initiative, productivity, accountability, and social and cross-cultural interaction. (Archambault et.al, 2010; Fajri et.al, 2020; Kendra & Vihar, 2020; Laar et.al, 2020; Rayna & Striukova, 2020). Meanwhile, according to Tony Wagner, Co-Director of the Change Leadership Group at the Harvard Graduate School of Education, identified 7 key skills for the 21st century, namely problem solving skills

and creativity, collaboration and communication skills, entrepreneurial skills, reliability and accountability skills, adaptability and flexibility skills, skills to access and analyse information, and critical thinking skills. These skills are very likely to be intentionally empowered through the education process.

Based on several survey results conducted by the Programme for International Student Assessment (PISA) in 2018, Indonesia ranked 74th or 6th from the bottom. Indonesian students' reading ability with a score of 371 is in 74th position, mathematics ability gets 379 is in 73rd position, and science ability with a score of 396 is in 71st position (Hewi & Shaleh, 2020). Meanwhile, according to the results of a survey by The Trends in International Mathematics and Science Study (TIMSS) in 2015, Indonesia received an average score of 397 below the low standard (400), which ranked Indonesia 44th lowest out of 49 participating countries. (Mullis, I V.S., Martin, M O., Foy, P., and Hooper, M, 2016). Some of these survey results are strong evidence that Indonesian students' critical thinking skills are still quite low.

Problem Based Learning (PBL) is one of the learning strategies where students solve problems through the stages of the scientific method for students to learn. The strength of PBL is that it challenges students to discover new knowledge, helps students to understand real problems, and develops students' critical thinking skills (Tal et al., 2021; Mann et al., 2021; Seibert, 2021; Dita, 2021). PBL implementation can be very effective in improving academic achievement, critical thinking skills, learning motivation, higher-order thinking skills, self-confidence, and problem-solving ability. (Hursen, 2021; Festiawan et al., 2021; Suparman et al., 2021).

In applying the Problem Based Learning and Project Based Learning (Prob-ProBL) learning model, students will learn to identify and solve problems, work together in teams, collect and analyse data, and develop creative and innovative solutions. The Prob-ProBL learning model also allows students to learn through direct experience and real-world situations, so as to improve students' social and emotional skills. In addition, the Prob-ProBL learning model can also help students to prepare for future jobs and careers, as critical and creative thinking skills are becoming increasingly important in today's digital and globalised era. Therefore, the implementation of the ProbProBL learning model is ideal in realising the goals of 21st century education because it is contextual, so it can empower creative thinking skills.

Based on the results of observations made by researchers in class V SD Negeri 2 Darmayasa, the results showed that the critical thinking and reasoning skills of students were still low. Where some children are still difficult to understand reasoning questions about digestive system material. In addition, students have low collaboration skills, they tend to work individually. Seeing the condition of students, learning is needed that can help students improve critical thinking and collaborative skills.

## 2. METHODS

This research uses a quantitative approach. According to Sugiyono (2019), quantitative research is a type of research that produces quantitative data processed with statistical techniques. The type of research used in this study is regression analysis research. Regression analysis is a statistical technique used to determine how much influence one or more independent variables have on the dependent variable, and measure how significant that influence is. The samples taken in this study were class V students of SD Negeri 2 Darmayasa as many as 16 students, consisting of 8 boys and 8 girls.

In this study, researchers used several research instruments in the form of questionnaires and written tests. The questionnaire provided is a questionnaire to measure collaboration skills and a written test to measure critical thinking skills.

## 3. RESULTS AND DISCUSSION

This study uses simple linear regression hypothesis analysis which shows the effect of the independent variable on the dependent variable with the following equation  $Y = a + bx$ . The criteria for accepting the hypothesis is if  $t_{\text{tabel}} < t_{\text{count}}$ , or  $\text{significant} \leq 0.05$  then the null hypothesis ( $H_0$ ) is rejected and the alternative hypothesis ( $H_a$ ) is accepted. This means that there is a significant influence between one independent variable on the dependent variable.

Hypothesis 1 in this study is

$H_0: \mu_1 = \mu_2$  There is no effect of IPAS Learning with Prob-ProBL Learning Model Approach on Critical Thinking Ability of Grade V Students of SD Negeri 2 Darmayasa.

$H_a: \mu_1 \neq \mu_2$  There is a significant effect of IPAS Learning with the Prob-ProBL Learning Model Approach to Critical Thinking Ability of Grade V Students of SD Negeri 2 Darmayasa.

Through a simple linear test, the results obtained are as presented in the table

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.717 <sup>a</sup>	0,515	0,480	4,34138

a. Predictors: (Constant), Prob-ProBL

The table above explains that the correlation / relationship value is 0.717 and also obtained a coefficient of determination of 0.515 which implies that the effect of the independent variable (Prob-ProBL) on the dependent variable (critical thinking skills) is 51.5%.

Coefficients <sup>a</sup>					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	37,731	15,063		2,505	0,025
Prob-ProBL	0,613	0,159	0,717	3,854	0,002

a. Dependent Variable: Berfikir Kritis

Based on the significance value of the Coefficients table, the significance value is 0.002 < 0.05 so it can be concluded that there is an effect of prob-probl learning on critical thinking skills.

Hypothesis 2 analysis

H<sub>0</sub>:  $\mu_1 = \mu_2$  There is no effect of IPAS Learning with Prob-ProBL Learning Model Approach on Collaboration Skills of Grade V Students of SD Negeri 2 Darmayasa

H<sub>a</sub>:  $\mu_1 \neq \mu_2$  There is a significant effect of IPAS Learning with the Prob-ProBL Learning Model Approach on the Collaboration Skills of Grade V Students of SD Negeri 2 Darmayasa.

Through a simple linear test, the results obtained are as presented in the table

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.689 <sup>a</sup>	0,475	0,438	3,99204

a. Predictors: (Constant), Prob-ProBL

Coefficients <sup>a</sup>					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	37,080	13,851		2,677	0,018
Prob-ProBL	0,521	0,146	0,689	3,559	0,003

a. Dependent Variable: Kolaborasi

The table above explains that the correlation / relationship value is 0.689 and also obtained a coefficient of determination of 0.475 which means that the influence of the independent variable (Prob-ProBL) on the dependent variable (collaboration skills) is 47.5%.

Based on the significance value of the Coefficients table, the significance value is  $0.003 < 0.05$  so it can be concluded that there is an effect of prob-probl learning on collaboration skills.

#### 1. The Effect of IPAS Learning with the Prob-probl Learning Model Approach on Critical Thinking Ability

The results of statistical testing between the IPAS Learning indicator with a prob-probl learning model approach (X) on the Critical Thinking Ability variable (Y1) have a regression of 0.717 (Strong), while the magnitude of the influence is 51.5%. From the data also obtained  $t_{count} (3,854) \geq t_{table} (2,776)$ . So that the results of the hypothesis test that has been carried out can be known that  $H_0$  is rejected and  $H_a$  is accepted, meaning that there is a significant influence of the prob-probl variable (X) on the Critical Thinking variable (Y1).

The influence of IPAS learning with the prob-probl learning model approach (X) on Critical Thinking Ability (Y1) at SD Negeri 2 Darmayasa with the implementation of prob-probl learning syntax as a whole.

#### 2. The Effect of IPAS Learning with a prob-probl Learning Model Approach on Collaboration Skills

The results of statistical testing between the Learning indicators with the prob-probl learning model approach (X) on the Collaboration Skills variable (Y2) have a regression of 0.689 (Strong), while the magnitude of the influence is 47.5%. From the data also obtained  $t_{count} (3.559) > t_{table} (2.776)$ . So that the results of the hypothesis test that has been carried out can be known that  $H_0$  is rejected and  $H_a$  is accepted, meaning that there is a significant influence of the prob-probl variable (X) on the Collaboration variable (Y2).

The influence of IPAS learning with the prob-probl learning model approach (X) on collaboration skills (Y2) at SD Negeri 2 Darmayasa with the implementation of prob-probl learning syntax as a whole.

### 4. CONCLUSION

Learning with a problem-project based learning approach has a positive impact on students' critical and collaborative thinking skills. Research shows that this approach helps students develop critical thinking skills, such as providing simple explanations, building basic skills, and making inferences. In addition, problem-project based learning also improves collaborative skills, as students work in teams to complete projects, share ideas and communicate effectively.

The enhancement of the problem-project based learning model is proven to be effective in improving 21st century skills, including critical thinking, problem solving, creativity and innovation, collaboration, communication, information literacy, media literacy, technology literacy, flexibility and adaptability, leadership and responsibility, initiative, productivity, accountability, and social and cross-cultural interaction. Teachers play an important role in guiding students and providing direction, providing relevant resources, and encouraging discussion and independent problem solving. Overall, the problem-project based learning approach can be an effective strategy in improving the quality of learning and preparing students for real-world challenges.

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