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## THE INFLUENCE OF THE PROBLEM BASED LEARNING MODEL ON THE CRITICAL THINKING ABILITY OF CLASS V STUDENTS

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### Abstract

In learning, educators play a very important role in helping students solve problems, therefore teachers must encourage students to actively participate in learning by using the Problem Based Learning learning model. This study aims to answer the hypothesis of a significant influence on students' critical thinking skills by using learning models other than lecture methods, such as the problem based learning (PBL) learning model in grade V of the Social Sciences subject and the material 'Technology in Life' SDN 190 Pekanbaru. This study applies a quantitative model with a research design used is one group only pretest-posttest. In this study, the population was all grade V at SDN 190 Pekanbaru in the 2024/2025 academic year. The sample selection used total sampling by collecting a sample of 50 students from grade V. The method used in this study is the data collection method, with the action test and documentation method. The data analysis technique in this study used a hypothesis test with the Independent Sample T-test. Based on the findings, the Sig. value was obtained. (2-tailed) of  $<0.001 < 0.05$ , it can be concluded that there is an influence of the problem based learning model on critical thinking skills in technology material in class V life. It can also be seen that there is an average or mean value in the control class posttest of 66.23 and in the experimental class of 86.21.

**Keywords:** problem based learning, critical thinking skills, technology in life.

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## INTRODUCTION

Students' thinking skills in learning IPAS (Natural and Social Sciences) are one of the important aspects in the education process, because they are related to how students understand, analyze, and solve problems that are relevant to everyday life. In learning IPAS, students are not only required to memorize concepts, but also to develop critical, creative, and logical thinking skills. However, several challenges often arise, such as limited learning media, minimal opportunities for discussion or experimentation, and learning approaches that still focus on lecture methods. To improve students' thinking skills, teachers need to apply interactive and problem-solving-based methods, such as project-based learning (PBL), which can encourage students to be actively involved in the learning process. Thus, students can connect IPAS concepts with real situations, improve their understanding, and hone high-level thinking skills.

According to (Meilasari et al., 2020), The Problem Based Learning (PBL) learning model is more of an instrument designed by the teacher that is nuanced with problems in everyday life, especially problems that are close to the lives of the students themselves. Because in this way it can foster students' interest and hobbies in interpreting the problems that are actualized in student worksheets and evaluation questions. According to (Sari, 2021) As educators, teachers need to choose the right model to convey a concept to their students, namely with the Problem Based Learning (PBL) learning model or problem-based learning.

Critical thinking is a mentality to analyze or evaluate information. Critical thinking is also an investigation that is needed to explore a situation, phenomenon, question or problem to form a hypothesis or conclusion, which combines all possible information and can be believed to be true. Students' critical thinking skills affect learning outcomes. Critical thinking is part of the learning process because all students need to be critical thinkers to succeed in learning (Zakaria & Yulianto, 2021). Where critical thinking is a very useful way to help someone make decisions. To determine the appropriate evidence, situations, conceptualizations, rules, and benchmarks, this process provides many reasons. Useful experiences can also help students think critically. Opportunities to speak orally or in writing can be included in the category of meaningful experiences (Risnawati et al., 2022).

However, in reality it is still seen that students' critical thinking skills are still relatively low. This can be seen from the lack of students' ability to analyze information, formulate solutions to a problem, and evaluate and organize arguments logically. One of the causes is that the learning approach used in schools is still conventional and teacher-centered, so that students tend to be passive and not trained to think critically. In addition, learning is often less contextual, so that students are not used to facing real problems that are relevant to their lives. Therefore, an innovative learning model is needed, such as Problem-Based Learning (PBL), which is able to actively involve students, provide real problem-based learning experiences, and encourage the development of their critical thinking skills.

The reason the researcher chose PBL was because based on an interview conducted at SDN 190 Pekanbaru with Mrs. F as the homeroom teacher for class 5B, she said that students' critical thinking skills were very low, especially in the subject of science where previously there were problems encountered during learning, including: (1) students only listened to the teacher's explanation, so that students lacked critical thinking and the information they received was also limited (2) students were also rarely given difficult questions such as groups C4, C5, and C6, so that students were not good at solving problems or thinking critically (3) the learning environment was less stimulating or did not provide enough challenges for students to think critically.

Researchers use the Problem-Based Learning (PBL) model to develop students' critical thinking skills because this model is effective in involving students in real situations that require creative and analytical solutions. PBL encourages students to analyze problems, formulate hypotheses, search for relevant information, and evaluate solutions systematically. This is in line with research conducted by (Sinaga & Fuadiah, 2022) who choose the Problem Based Learning (PBL) learning model because it can improve student learning outcomes and make it easier for students to understand the contents of the lesson. The use of the Problem Based Learning (PBL) learning model can obtain new knowledge and skills in learning. This statement is also reinforced by what has been mentioned by (Satwika et al., 2018) that one of the methods that can be used to improve critical thinking skills in students is the Problem Based Learning (PBL) method because the PBL model is considered appropriate for developing students' critical thinking skills in finding and solving problems. This PBL model develops how the problems discussed relate to the real world in everyday life.

Critical thinking skills are needed in the learning process in the classroom so that students are not accustomed to simply memorizing information, learning that only emphasizes knowledge and understanding of the material so that a collection of concepts that must be memorized by students has an impact on low cognitive abilities. Steps that can be taken are to hone critical thinking skills through the problem-based learning model, Problem-based learning is one that presents problems at the beginning of learning, students are required to think more about solving a problem until drawing conclusions at the end of learning according to (Sarimuddin et al., 2021).

This research is in line with that conducted by (Rauf et al., 2022), The results of the study showed significant development in students' critical thinking skills in the research class. In addition, (Mariskhantari et al., 2022) also conducted a similar study. In his study, it was found that the increase in students' critical thinking skills, it was concluded that the problem-based learning (PBL) model has a positive influence on students' critical thinking skills in science learning, in accordance with the research hypothesis. The results of the study (Prihono & Khasanah, 2020) shows that the level of implementation of the PBL stages by students reached

94.39%, the activity was reviewed from the results of observations by observers during the learning process. So that it can provide a significant influence on critical thinking skills. The more complete the PBL stages that are carried out, the better the results obtained. Based on previous research, the novelty of this study lies in the material used. This study focuses on the role of Technology in Life. Although chosen because of the relevance of its concepts in life, many students find it difficult to understand.

This study aims to see whether there is a significant influence on students' critical thinking skills by using learning models other than lecture methods, such as the problem based learning (PBL) learning model in class V of the science subject and the material 'Technology in Life' SDN 190 Pekanbaru. It is hoped that this can provide insight, interpretation, and knowledge regarding the impact of the problem-based learning (PBL) model on students' critical thinking skills in science, and its application in class V of SDN 190 Pekanbaru.

## METHODS

This study applies a quantitative model. Quantitative research uses numerical data analysis and collection techniques to test hypotheses, draw conclusions, and determine the relationship between the variables studied (Susanto et al., 2024). The research design used is one group only pretest-posttest. This research was conducted in two stages, namely data collection before and after the experiment was carried out. Measurements were carried out with a pre-test before the treatment was given and a post-test after the treatment was completed.

In this study, the population is all V at SDN 190 Pekanbaru in the 2024/2025 academic year. Sample selection is an important step in quantitative research design. Various sampling approaches, including basic random sampling, stratified sampling, and cluster sampling, can be used. This means that the sample is a representation or representation of the population. The purpose of this study was to use total sampling which is a sampling technique with the same number of samples and populations. So that the sample in this study amounted to 50 students from 26 class VA students and 24 class VB students. The method used in this study is the data collection method, with the action of the test method and documentation. While the data analysis technique in this study uses a hypothesis test using the independent sample t-test.

Before conducting the research, the researcher conducted a trial of the instrument. To evaluate the test instrument, a validity and reliability test was conducted. The validity and reliability test will be carried out by giving the test to 10 students in grade V at SDN 190 Pekanbaru as a trial of the instrument.

Based on the results of the instrument trial through validity and reliability tests, it shows that for the test question instrument with a calculated  $r$  value between 0.672 and 0.959, it is greater than the  $r$  table value of 0.632, so the test question instrument is declared "valid". For the reliability test of the test question instrument, the Cronbach's Alpha value is 0.942, which is greater than 0.60, so the test question instrument is declared "reliable". Therefore, based on the

results of the validity and reliability tests, the test question instrument with 15 questions is declared to be usable for this study.

After the instrument is declared valid and reliable, the researcher then conducts a prerequisite analysis test by conducting a normality and homogeneity test. After being declared normal and homogeneous, the researcher conducts a hypothesis test using an independent sample t-test. The purpose of using the independent sample t-test is to test whether there is a significant difference in students' critical thinking skills between the group using the problem-based learning (PBL) model and the control group using conventional learning methods. This test helps determine whether the PBL model has a real influence on improving students' critical thinking skills compared to other methods.

## RESULTS AND DISCUSSION

### Pretest Normality Results

The normality test aims to test whether the variables in the regression model are normally distributed or not. The data normality test in this study uses the Kolmogorov Smirnov test with SPSS 29. Data is said to be normal if the significance value of the calculation results is  $>0.05$ , then the data is said to be normally distributed. However, conversely, if the value is  $<0.05$ , then the distribution is not normal. The following are the results of the normality test for all research variables.

**Table 2. Results of Normality Pretest of Control and Experimental Classes**

Class	Sig (p)	Information
Pretest control class	0.083 > 0.05	Data is normally distributed
Pretest Experimental Class	0.123 > 0.05	Data is normally distributed
Posttest control class	0.064 > 0.05	Data is normally distributed
Posttest of experimental class	0.110 > 0.05	Data is normally distributed

Source: Results of research data processing

From the table above, it shows that the significance value for the pretest in the control class has a sig. of 0.083, while for the experimental class it shows a sig. of 0.123. This shows that both classes have a sig. value  $> 0.05$ , which means that the data from the control class and the experimental class are normally distributed. In addition, the table above also shows that the significance value for the posttest in the control class has a sig. of 0.064, while for the experimental class it shows a sig. of 0.110. This shows that both classes have a sig. value  $> 0.05$ , which means that the data from the control class and the experimental class in the posttest are normally distributed.

### Pretest Homogeneity Results

Homogeneity testing is carried out to determine whether the sample comes from a homogeneous variation or not. To test homogeneity, the application is carried out with the

Levene Statistic test at a significance level of 0.05. The criteria for testing homogeneity used are if the Sig. If the p-value is less than  $\alpha$  ( $\alpha = 0.05$ ), then the data is not homogeneously distributed. However, if the Sig. If the p-value is more than  $\alpha$  ( $\alpha = 0.05$ ), then the data is homogeneously distributed.

**Table 4. Results of Homogeneity of Control and Experimental Classes**

Class	Sig (p)	Information
Pretest	0.568 > 0.05	Data is distributed homogeneously
Posttest	0.390 > 0.05	Data is distributed homogeneously

Source: Results of research data processing

From the table above, it shows that the significance value for the pretest in the control and experimental classes has a sig. of 0.568, while for the posttest of the control and experimental classes shows a sig. of 0.390. This shows that both classes have a sig. value > 0.05, which means that the data from the control class and the experimental class in the pretest and posttest are distributed homogeneously.

## Uji Hipotesis

The independent sample t-test in this study was used to answer the problem formulation "is there an influence of the problem-based learning model on critical thinking skills in technology material in class V life". To answer the problem formulation, the independent sample t-test was conducted on the Post-test data of the experimental class (problem-based learning model method) with the Post-test data of the control class (Conventional model). The following are the results of data processing from SPSS version 29 that the researcher used.

**Table 5. Results of the Independent Sample T-Test**

Posttest Results	F	Sig.	t	df	Sig (2-tailed)	Mean	Std Error	Lower	Upper
Variances Assumed	0.752	0.390	-8.722	48	<0.001	-19.978	2.290	-24.583	-15.372
Variances Not Assumed	-	-	-8.661	45.116	<0.001	-19.978	2.307	-24.623	-15.372

Source: Results of research data processing

Based on the results of the independent sample t-test, the Sig. (2-tailed) value was obtained as <0.001, which is smaller than the significance level of 0.05 ( $p < 0.05$ ). This shows that there is a significant difference in the average critical thinking ability between the control group and the experimental group. The average or mean value on the posttest of the control group was 66.23, while in the experimental group it was 86.21, indicating that the critical

thinking ability of students in the experimental group was higher than that of the control group. Thus, the alternative hypothesis ( $H_a$ ) which states that the problem-based learning (PBL) model has an effect on critical thinking ability is accepted, while the null hypothesis ( $H_0$ ) is rejected. This decision is based on the p-value which shows a significant effect.

## DISCUSSION

According to (Mazidah & Sartika, 2023) Science learning aims to provide direct experience to develop exploration skills and understanding of the natural environment. The goal of science in the independent curriculum is to develop interest, curiosity, active participation, and can develop knowledge and skills (Agustina et al., 2022). Most students consider science as a fun learning experience, while a small number of students consider science as a boring learning experience because students do not understand the material. With this, teachers are required to increase students' enthusiasm for learning by linking it to real-world experiences (Anggita et al., 2023).

In the learning of science, there are scientific skills of students that must be developed. One aspect of learning science is scientific thinking skills that are relevant to 21st century skills (Adiilah & Haryanti, 2023). Critical thinking ability is one of the high-level thinking abilities in solving problems. states that critical thinking ability is an essential thinking ability and functions for all aspects of life (Safitri & Mediatati, 2021).

Critical thinking skills are thinking skills that students need to face learning in the 21st century (Meryastiti & Ridlo, 2022). Students' critical thinking skills can be identified when students understand a problem in depth and are not easily influenced by other people's opinions, and can solve problems appropriately and systematically and then draw conclusions from information that is accurate or less accurate, (Agustiana & Imami, 2021). According to (Paramitha et al., 2021). Critical thinking skills enable students to process information logically and prepare themselves for independent learning. Students with critical thinking skills are able to determine and solve problems that will be faced (Febrianti et al., 2021). Thus, students with critical thinking skills are able to determine important, relevant, and useful information. pi in science teaching is often related to low levels of student understanding and involvement. Overcoming this problem requires teacher innovation to package science learning (Afandi et al., 2024). One of the right innovations to overcome this problem is by using a learning model that can improve students' science learning outcomes. One of them is a problem-based learning model or Problem Based Learning (PBL). The learning model is a strategy created by teachers to allow students to participate more actively in the learning process (Rahmi et al., 2023).

Problem-based learning motivates students to train their critical thinking skills and how students learn to find out how to find the problem, interpret the problem, analyze the factors and causes of the problem, analyze information and find the right strategy to solve the problem. Until the next stage where students will be directed to evaluate the suitability of the answers and solutions found and present their conclusions (Sibagariang et al., 2024). The PBL model is based on constructivism theory which emphasizes the importance of active learning where students

are directly involved in the process of discovering knowledge through solving real problems (Mayudin & Rahmi, 2024).

From the results of the study in class V SDN 190 Pekanbaru, it can be seen that the teacher's efforts in improving critical thinking skills can be improved by using the problem based learning model, it can be seen that before using the PBL model, the critical thinking skills that students must have in science learning were still not visible. After using the PBL model, students' critical thinking skills were more visible. This proves that the PBL model is very helpful for teachers in improving critical thinking skills. This is also in line with what is explained (Saputri, 2020) by that the use of the Problem Based Learning (PBL) learning model is effective in improving students' critical thinking, because this model is problem-based by explaining and providing motivation to solve problems, then organizing students in learning tasks related to the problem, in addition to motivating also provides encouragement for students to collect information so that they can carry out experiments by preparing appropriate work which can ultimately be evaluated by the teacher to get an assessment or additional from the teacher. In addition, (Maqbullah et al., 2018) also said something similar, that increasing critical thinking skills by implementing the problem based learning model showed very satisfying success because it experienced quite good improvement in each cycle.

## CONCLUSION

Based on the results of the study at SDN 190 Pekanbaru in class V, it is known that the Sig. (2-tailed) value is  $<0.001 <0.05$ , so it can be concluded that  $H_a$  is accepted and  $H_0$  is rejected, which means that there is an influence of the problem-based learning model on the critical thinking skills of technology material in class V life. The implications of this study provide guidance for teachers to apply more innovative and effective learning models, such as PBL, in the learning process. Teachers can design problem-based learning that is relevant to students' lives so as to encourage active participation and the development of critical thinking skills. For further researchers, it is hoped that they can use research samples on a larger scale in order to obtain more comprehensive research results.

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