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The Project Based Learning Model on Students' Critical Thinking Skills

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Abstract

This research is motivated by the lack of students' critical thinking skills, students tend to be passive in the learning process, and teachers are less precise in implementing learning models that can train students' critical thinking skills. This research aims to determine students' critical thinking skills. This research method is a quantitative research method. The population is class IV students at SD Negeri 173642 Hasahatan which consists of one class. Sampling was carried out with saturated samples. The independent variable is the Project Based Learning learning model, the dependent variable is students' critical thinking skills. Hypothesis testing uses Paired sample T-Test which is preceded by a validity test and a reliability test. The results of this research using hypothesis testing obtained a significance value of .000. Means 0.000 < 0.05, then Ha is accepted. It can be concluded that there is an influence of the application of the Project Based Learning model on the Critical Thinking Skills of Class IV Students at SD Negeri 173642 Hasahatan".

Keywords: Project Based Learning Model, Critical Thinking Skills

1. INTRODUCTION

Law Number 20 of 2003 concerning education means that education is a basic and planned effort to realize and produce human beings as students in a learning atmosphere so that students actively develop their potential so that they have religious spiritual strength, personality, intelligence, skills, and noble morals beneficial to society, nation and state. Learning is a process that will cause changes in a person's personal self. Learning changes in a person's personality can be in the form of character caused through training or experience. Education gives students the possibility to gain opportunities, hope and knowledge in order to live a better life. The amount of opportunity and hope really depends on the quality of education pursued.

Education can also be a force to make changes so that conditions become better. According to Sani (2019:1) quality education certainly involves students being active in learning and directing the formation of the values that students need in life. Apart from that, students must also be equipped with adequate knowledge, attitudes and skills to face future challenges.

The following are some of the skills that students need to have according to SCANS in Sani (2019:9) namely 1) basic skills, including reading, writing, listening, speaking, basic arithmetic; 2) thinking skills, including creative thinking, solving problems, making decisions,

seeing ideas, knowing how to learn, reasoning; 3) personality skills, namely responsibility, self-confidence, social behavior, self-management, integrity/honesty, 4) management skills including identifying, managing and allocating; 5) interpersonal skills include participating, sharing knowledge and skills, practicing leadership, negotiating, working in diversity; 6) skills in obtaining and using information; 7) system understanding skills, and; 8) skills in mastering and using technology. Some of the skills above can lead to students' thinking abilities. The thinking abilities that are directed through learning in elementary school are high-level thinking abilities. One of the abilities to think at a higher order (*higher order thinking*) is the ability to think critically (*critical thinking*).

According to Yaumi in Wijayanti (2015), critical thinking is the cognitive ability to draw conclusions based on logical reasons and empirical evidence. In principle, people who are able to think critically are people who do not simply accept or reject something, they will examine, analyze and evaluate before determining whether they accept or reject the information. From the various expert opinions above, it can be concluded that critical thinking ability is everyone's ability to solve problems and make decisions (conclusions) from various aspects and points of view. The ability to think critically is an important intellectual capital for students to have when dealing with problems in their daily lives.

By conducting this research, it is hoped that students will have good critical thinking skills in learning. The aim of this research is to improve students' critical thinking skills regarding learning, especially science learning. Through a learning method, students can improve critical thinking. To overcome this problem, a learning method is needed that can activate students and change the way students view science learning.

The focus of learning lies on the core principles and concepts of a scientific discipline, involves students in problem solving and other meaningful tasks, gives students the opportunity to work independently or in groups in constructing their own knowledge, and reaches the peak of generating new ideas. This learning model is very suitable for improving students' thinking skills so that students' interest in learning increases and learning outcomes are maximized. Apart from that, this project-based model can make the class atmosphere fun and students will be enthusiastic about learning because this learning model requires students to generate new ideas.

The Project Based Learning model has been used in various studies in elementary schools including:

1. Endah Sriyani Ningsih 2015 with the title "Application of the Project Based Learning Learning Model Using Experimental Methods to Improve Students' Science Process Skills on the Subject of Reflection of Light" The results of this research showed that by using the Project Based Learning learning model with the experimental method students' science process skills on the subject of reflection light greatly increased and there were many changes before the learning model was implemented after the learning model was implemented;
2. Abdi Rizka 2016 with the title "Application of the Project Based Learning Model to Increase Creativity and Science Learning Outcomes in Grade 5 Elementary School Students" The results of this research can be seen that by using this learning model it can increase students' creativity in learning science;
3. Hafizhah Lukitasari 2015 with the title "Application of Project Based Learning Assisted by Mind Maps to Improve the Quality of Learning for Class IV Students at Sdn 01 Pekalongan, Bojongsari District, Purbalingga Regency."

Thus, based on these problems, the research carried out was conducting research on **"The effect of implementing the *Project Based Learning model* on the critical thinking skills".**

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2. METHODOLOGY

Data collection techniques used in research activities, namely the instruments used in this research are test instruments (*Pre-Test and Post-test)* .

In this research, the author used the *Pre-Experimental Designs research type* in the form of *One-Group Pretest-Posttest Design* . In this design there is a pretest, before being given treatment. In this way, the results of the treatment can be known more accurately, because it can be compared with the situation before the treatment was given. This design can be described as follows:

$$O_1 \; X \; O_2$$

Description:

O_1 = Pre-test score (before being given PjBL)

O_2 = Post-test score (after being given PjBL)

Effect of PjBL on critical thinking skills = $(O_2 - O_1)$

Time This research was carried out in the even semester of the 2022/2023 academic year between February and April 2023.

A. Population

According to Sugiyono (2020:80) Population is a generalized area consisting of: objects/subjects that have certain qualities and characteristics determined by researchers to be studied and then conclusions drawn. So the population in this study were 26 students at SD Negeri 173642 Hasahatan, Parmaksian District.

B. Sample

The sampling technique in this research is saturated sampling. Saturated sampling is a sample determination technique when all members of the population are used as samples. This is done because the population is relatively small, less than 30 people or research that wants to make generalizations with very small errors. Another term for a saturated sample is a census, where all members of the population are sampled (Sugiono, 2020:85). So the number of samples in this study was all 26 students in class I V.

The data analysis used is:

1) Validity test

empirical validity technique usually uses statistical techniques, namely correlation analysis. This is due to *empirical validity* looking for a relationship between test scores and a certain criterion which is a benchmark outside the test in question. However, the criteria must be relevant to what is being measured. This validity test uses SPSS version 25.0 *for Windows* .

2) Reliability Test

According to Sugiyono (2018:174) that instrument reliability is a requirement for instrument validation testing. An instrument can be said to be reliable if the instrument is

consistent or steady in its measurement results so that it can be trusted. In this research, researchers used Internal Reliability which was obtained by analyzing data from only one test result. This reliability test uses the SPSS application version 25.0 *for Windows .*

The data analysis technique in looking for influence is quantitative. Quantitative data in the form of numbers obtained from expert validation scores and practicality scores by teachers and students, which are used as a measure of the effectiveness of the influence that has been produced.

1) Hypothesis testing

Hypothesis testing is carried out to find out or prove whether the truth is acceptable or not. By carrying out a hypothesis test, it can be seen whether there is an influence of the independent variable on the dependent variable. In this research, the author used *Paired sample T-Test* . In the *Paired sample T-Test* test, it begins by formulating a statistical hypothesis, namely:

a) Ha: There is a difference in the average grades of fourth grade students at SD Negeri 173642 Hasahatan, Parmaksian District when researchers use the *Project Based Learning model.*

b) H_0 : There is no difference in the average grade IV grade of SD Negeri 173642 Hasahatan, Parmaksian District when researchers use the *Project Based Learning model.*

This hypothesis testing uses the SPSS version 25.0 *for Windows application*

Basis for decision making according to the Paired test T-Test samples are:

- The significance value is 5%
- If α < 0.05 then Ha is accepted
- If α ≥ 0.05 then Ha is rejected

The results of hypothesis testing are as follows:

Table 1. Hypothesis Test Results

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Hasil	Equal variances assumed	18,276	,000	-5,265	50	,000	-21,538	4,091	-29,755	-13,322
	Equal variances not assumed			-5,265	33,463	,000	-21,538	4,091	-29,857	-13,220

It means :

1. If the significance value is <0.05 thitung< ttabelthen there is an influence application of the Project Based Learning model to thinking skills critical of fourth grade students at SD Negeri 173642 Hasahatan.
2. If the significance value is > 0.05 or tcount > ttable, then there is no influence application of the Project Based Learning model to thinking skills

critical of fourth grade students at SD Negeri 173642 Hasahatan.

3. RESULT

This research was carried out at SD Negeri 173642 Hasahatan, Parmaksian District, Toba Regency, North Sumatra, with 26 students in class I V. This research aims to determine students' critical thinking skills through the application of the *Project based Learning model*. After the data is collected, the next step is to analyze the data to find out whether or not there is an influence of implementing the *Project Based Learning model* on students' critical thinking skills.

The data obtained in this research was taken from the results of students' *pre-test* and *post-test* which were tested in class. The first step taken is to provide a *pre-test sheet* to the students who will be tested. Then, after getting the results from *the pre-test* , the researcher provided *treatment* in the form of teaching carried out with
implementing the *Project Based Learning* learning model . After that, at the end of the lesson, the researcher gave a *post-test sheet* to find out the extent of students' critical thinking skills.

Data collection was carried out using test sheets. Before conducting the research, the researcher had first tested the validity of the instrument which was tested at SD Negeri 173642 Hasahatan on class V students, which was one level higher than the 20 students to be tested. After carrying out the validity test, then proceed with the *reliability test* , and then hypothesis testing.

A. Validity test

The results of the validity test consist of 20 multiple choice questions in the test sheet, each item has the highest value, namely 5 and the lowest value, namely 0. This test sheet was tested on 20 class V students at SD Negeri 173642 Hasahatan. Then, as for the results of the validity test which was carried out based on the results of the validity test *output* , it can be seen that there were 18 valid questions, while 2 questions were invalid. Next, the researcher chose 10 valid questions to be questions in the research instrument.

B. Reliability Test

The results of the reliability test questions that have been carried out are as follows:

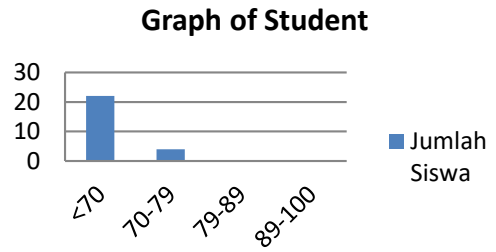
Table 2.
"Reliability Statistics" Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
,923	18

From the data table, it can be seen that the value
Cronbach's Alpha is 0.923. This shows that *the Cronbach's Alpha value* is > 0.50. With this, it is stated that the overall matter is said to be reliable or consistent.

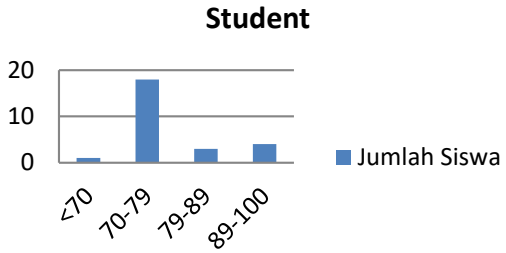
C. Results of Research Data Collection

The following are the results of research data collection:



The data presented above shows the results of students' critical thinking before using the *Project Based Learning Model* in science learning. The total number of students is 26 people, it is known that the students who did not complete science learning based on the pre-test above were 22 students with a percentage of 84.6%. This shows the low level of students' way of thinking in understanding the material provided by the teacher and the lack of effective use of teaching materials for students. Only 4 students completed the pre-test with a percentage score of 15.3%. The student who answers the questions lowest on the given test gets 20 points from the total number of questions with a predetermined value weight.

Thus, it is necessary to develop learning models and teaching materials in the form of mind mapping to support and support students' abilities in critical thinking, especially in science learning. In improving students' abilities, *the Project Based Learning model* is one of the interesting and innovative learning strategies for elementary school students. After implementing the use of the *PJBL* model , the researcher carried out another test, namely a post-test which aims to determine and measure the improvement in students' understanding of learning. In this case, critical thinking is the main indicator that researchers will analyze in the questions in the post-test given.



Based on the data above, it can be seen that the post test results of students who completed science learning using the *Project Based Learning learning model* were 25 students. There were 21 students who got scores in the range 61-80 with a percentage score of 80.7% and there were 5 students who got scores in the 81-100 range with a percentage of 19.2%. There were only a few students' difficulties in answering questions, this was because the students did not concentrate on listening to the material presented by the teacher in front of the class.

Thus, based on the comparison and difference in students' completeness scores in science learning using *the Project Based Learning model* , it can be said that the use of *the PJBL model* in student learning is said to be good and effective.

4. DISCUSSION

This research aims to determine the effect of *implementing the Project model Based Learning* on students' critical thinking skills. In this research, The first researcher makes

observations first, then the researcher find problems and raise the problem as a topic of discussion in this research. Before conducting research, researchers conducted a validity test 49 and *test reliability* first. Of the 20 questions, there are 18 valid questions and these questions can be said to be reliable because of *the Cronbach's value Alpha* is 0.923. This shows that the *Cronbach's Alpha* value > 0.50. This means that the overall problem is said to be reliable or consistent.

The data obtained in this research were taken from the results of the *pre-test* and *post-test* which was tested by fourth grade students at SD Negeri 173642 Hasahatan. On the *pre-test* results and *post-test* there was an increase or increase in students' scores. Then, for calculate the hypothesis in this research by looking at its significance value. From the data from the T Test results using *Paired sample T-Test*, the results obtained are: *The Project Based Learning model* has an influence on skills critical thinking in fourth grade students at SD Negeri 173642 Hasahatan. It said influential because the significance value is 0.000, where 0.000 <0.05.

This research successfully implemented *the Project Based learning model Learning* based on Trianto's studies. Additionally, this research was successful because researchers are able to design and implement model *steps Project Based Learning learning*. This research was also successful because para students who are enthusiastic about following a series of learning processes, easily adapt to the learning model used, and students pay attention explanations from teachers and peers.

This research is also influential because of *the Project learning model Based Learning* has advantages such as making students active, involve students in problem solving, increase collaboration and can develop students' communication skills. So, the conclusion from this research is that there is an influence on implementation *Project Based Learning* learning model for critical thinking skills Grade IV students at SD Negeri 173642 Hasahatan.

5. CONCLUSION

Provide Based on the results of research conducted by researchers, it can be concluded that the critical thinking abilities of class I V students at SD Negeri 173642 Hasahatan before implementing *the Project Based Learning learning model* were still relatively low. This is proven by the average *pre-test score* for class I V students which is 48.8 or if rounded up the average student score is 49.

Then, after implementing the *Project Based Learning learning model,* the critical thinking skills of class I V students at SD Negeri 173642 Hasahatan experienced an improvement. This is evident from the results of *the post-test* conducted by researchers on class I V students at SD Negeri 173642 Hasahatan after implementing the *Project Based Learning learning model* and the average *post-test score for class* I V students was 73.8 or if rounded up the average The student's score is 74 so it has increased.

Therefore, it can be seen from the results of the hypothesis test in this study that the significance value is 0.000, where 0.000 <0.05. So the results of the hypothesis test in this research are that there is an influence of the application of the *Project Based Learning* learning model on the critical thinking skills of class I V students at SD Negeri 173642 Hasahatan.

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