



The Effectiveness of Cooperative Model And Problem Based Learning (Pbl) Assisted By Pop Up Books Media Toward Critical Thinking Skill of Elementary School Students

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Abstract

This study aimed to determine the effect and differences in the use of the cooperative model Think Talk Write and Problem Based Learning aided by Pop Up Books media on the critical thinking skills of elementary school students. This research used a quantitative research method of quasi experiment. The research design used in the study was the pretest-posttest control group design. The sample of this research was SD 1 Rahtawu and SD 2 Rahtawu as the control class and SD 1 Menawan as the experimental class. The control class consisted of 39 students and the experimental class consisted of 40 students. The independent variable was the cooperative model Think Talk Write and Problem Based Learning aided by Pop Up Books media. While the dependent variable was students' critical thinking. The data collection technique was a test of students' critical thinking results. With the results of the average value obtained by the control class 79.1, while in the experimental class the average value is 82.6. With an average N-gain in the experimental class is 0.51 in the medium category, while the average N-gain in the control class is 0.31 in the medium category. Which means there was an influence of the application of the cooperative model Think Talk Write and Problem Based Learning aided by Pop Up Books media on students' critical thinking skills. And there were differences in results in the use of learning models which means that by applying the Problem Based Learning model aided by Pop Up Books media students' critical thinking skills were better than the Cooperative Think Talk Write model aided by Pop Up Books media.

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INTRODUCTION

The 2013 curriculum provides learning opportunities for students to gain overall knowledge by linking one lesson with another lesson into a theme that leads to a scientific approach so that the learning becomes active, holistic, and more meaningful for students. The example of learning that must be taken by students and related each other are Science and Indonesian language lessons.

Facts in the field show that critical thinking skills especially for elementary school students are still low (Fachruruzi, 2011). Most tests given in schools are in the cognitive realm at levels C1 to C3 (Application) not yet at the C4 (Analysis), C5 (Evaluation), and C6 (Creating) levels. It can be seen from the worksheets that are distributed in schools, most of the material is only in the form of summaries so that when students work on the exercises see from the summary, and the exercises given are mostly in the form of multiple choice that overrides the analysis.

Based on the results of observations, the average evaluation of the end of semester 1 in the school year of 2018/2019 grade IV students in Indonesian Language and Science subject in Gebog District, Kudus Regency, from 55 elementary schools there were 15 elementary schools with 2013 Curriculum. The average evaluation score of the end of semester 1 in the school year of 2018/ 2019 contained 11 elementary schools that received good criteria and 4 elementary schools that received sufficient criteria. From 4 elementary schools that obtained the lowest average score, namely SD 1 Rahtawu with an average in Indonesian Language and Science of 78.2 with sufficient criteria. From these data it showed that there were still low critical thinking skills of students in the Science and Indonesian Language subject.

While the results of interviews with grade IV teachers at SD 1 Rahtawu, 2 Rahtawu and 1 Menawan about 2013 curriculum learning that critical thinking of class IV students is still relatively weak.

Based on these problems, researchers need to apply learning models as an alternative, by applying precise and appropriate learning models to facilitate students in improving students' critical thinking. Learning models that can be used, one of which is the use of cooperative learning models. According to Isjoni (2011: 12) Cooperative Learning is a learning strategy with a number of students as members of small groups with different levels of ability. This is useful for training students to accept differences and work with friends with different backgrounds. With a cooperative model can be applied to motivate students to express their opinions, respect the opinions of friends and give each other opinions. The cooperative learning model that can be applied in improving students' critical thinking is the cooperative learning model Think Talk Write (TTW) type.

In addition to the learning model above, the learning model that can improve critical thinking is the Problem Based Learning (PBL) model. By applying the Problem Based Learning (PBL) model, students can compile their own knowledge, independent, and increase students' confidence. Through Problem Based Learning (PBL) students can build more efficient knowledge because the problems presented can stimulate cognitive processes, so students' critical thinking skills increase. Providing solutions by applying the Think Talk Write (TTW) and Problem Based Learning (PBL) models assisted by Pop Up Books media can improve the critical thinking of grade IV elementary school students relevant to Herliani's (2013) research on the effect of Think Talk Write (TTW) learning models on the ability students' critical thinking which shows that there is an increase in learning outcomes and students' critical thinking skills in Biology subjects. Zulkarnaini (2011) also conducted research on the Think Talk Write (TTW) model that can improve students' critical thinking skills. Research conducted by Hadi (2013) states that the Problem Based Learning (PBL) learning model can improve critical thinking skills and understanding Biology concepts in high school

students. The formulation of the problems in this study are: 1) How is the influence of the Think Talk Write Cooperative Model aided by Pop Up Books media on students' critical thinking? 2) How is the influence of Cooperative Model Problem Based Learning aided by Pop Up Books media on students' critical thinking? 3) How is the difference in the use of the Think Talk Write Cooperative learning model and Problem Based Learning aided by Pop Up Books media on students' critical thinking?

METHOD

The type of this research is quasi-experimental research (quasi-experimental). The research design used in the study was the pretest-posttest control group design. In this study there were two groups, then both groups were given a pretest to find out the initial state whether there were differences between the experimental group and the control group. The determination of the experimental group and the control group was carried out randomly through the draw. The experimental group was a group that was given treatment using the Problem Based Learning learning model with the media assisted by Pop Up Books, while the control group was the group given treatment using the Cooperative Think Think Write learning model that was assisted by the Pop Up Books media.

The population of this research was the fourth grade students of 2013 curriculum in Gebog District, Kudus Regency. The selected samples were SD 1 and SD 2 Rahtawu and 1 Menawan. The independent variable in this study was the treatment given to the experimental class that was the Problem Based Learning model assisted by Pop Up Books media and the treatment given to the control class was the Cooperative Think Talk Write model assisted by the Pop Up Book media. The dependent variable in this study was students' critical thinking. Data collection instruments and techniques in this study consisted of primary data and secondary data.

Primary data in this study were student learning outcomes. By using the instrument to

measure the variables studied, including the student activity sheet instrument Problem Based Learning model and students' Think Talk Write. For critical thinking in the form of written questions in the form of description with questions C4, C5 and C6.

The indicators of critical thinking used in this study were: 1) Provide a simple explanation; 2) Building basic skills; 3) Summing up; 4) Provide further explanation; 5) Set the strategy and tactics.

Secondary data in this study were documentation and interviews with teachers. Analysis of Research Instruments namely analysis of device validation and analysis of content validation and empirical validity in this study using the product moment correlation formula with rough numbers. According to Arikunto (2016)

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

Note:

r_{xy} : correlation coefficient between variables X and variables Y;

N : the number of test subjects;

$\sum Y$: number of item scores;

$\sum X$: total score;

$\sum X^2$: sum of the squares of the total score

$\sum Y^2$: sum of the squares of the total score

$\sum XY$: total multiplication of item scores and total scores

Furthermore, the results of the calculation of the validity of the questions (r_{xy}) obtained are then compared with the prices r_n in the product moment table with $\alpha = 5\%$. If

$r_{xy} > r_{tabel}$ then the test items that are tested

are said to be valid. If $r_{xy} \leq r_{tabel}$, the test

items that are tested are said to be invalid or invalid (Arikunto, 2016).

The formula used to calculate reliability was the Cronbach alpha formula as follows.

$$r_{11} = \left(\frac{n}{n-1} \right) \left(1 - \frac{\sum \sigma_i^2}{\sigma^2} \right) \text{ with}$$

$$\sigma^2 = \frac{\sum Y^2 - \frac{(\sum Y)^2}{N}}{N} \text{ or } \sigma_1^2 = \frac{\sum x_i^2 - \frac{(\sum x_i)^2}{N}}{N}$$

Note:

r_{11} : reliability sought;

n : the number of items;

$\sum \sigma_i^2$: the sum of the variance scores for each item

σ^2 : total variance

The results of the calculation of the reliability of the questions (r_{11}) or r_{hitung} .

If $r_{hitung} > r_{tabel}$ then the critical thinking ability test instrument tested was reliable.

If $r_{hitung} \leq r_{tabel}$ then the critical thinking ability test instrument that was tested was not reliable (Lestari, et.al, 2017).

The formula that can be used to determine the difficulty index of subjective type test instruments, namely:

$$IK = \frac{\bar{x}}{SMI}$$

Note:

IK : Item difficulty index

\bar{x} : the average score of student answers on an item

SMI : Ideal Maximum Score, which is the maximum score a student will get if he answers the item correctly

An item is said to have a good difficulty index if the problem is not too easy and too difficult (Lestari, et al., 2015: 224)

The formula used to determine the discriminant index in the item description was:

$$DP = \frac{(\bar{X}_A - \bar{X}_B)}{SMI}$$

Note:

DP : Distinguishing Power Index

\bar{x}_A : the average of the upper group

group

\bar{x}_B : average of the lower group

SMI : Ideal maximum score,

In this research, the normality test was conducted on students' critical thinking skills achieved by all members of the sample using the Liliefors test at a significant level of 5%. Data processing using SPSS version 24 with Liliefors test. Data processing was done by looking at the column values in Kolmogrof-Smirnov. Data was said to be normal if the value indicated in the Kolmogrof-Smirnov value column showed a value greater than 0.05. Priyatno (2010: 71). Hypothesis:

H_0 = the data is normally distributed

H_a = the data is not normally distributed

Hypothesis testing regarding homogeneity of variations was done by independent sample t-test, which used SPSS version 24 and by making decisions and drawing conclusions on the hypothesis test carried out at a significant level of 5%. If the significance was more than 0.05 then it is concluded that the variance was the same (homogeneous), but if the significance was less than 0.05 then the variance was different Priyatno (2010: 76). Hypothesis:

H_0 = equal variance (both classes are homogeneous)

H_a = different variances (both classes are not homogeneous)

Calculate the gain index (normalized gain) with the formula proposed by Hake (in Sundayana, 2015: 151) as follows:

$$N-gain = \frac{skor\ posttest - skor\ pretest}{skor\ maksimum - skor\ pretest}$$

RESULTS AND DISCUSSION

Based on the description that has been explained in the results of the study, researchers used test instruments in the form of pretest and posttest sheets given to all students in accordance with procedures that have been made. Before conducting the research, a validation test and a reliability test were conducted with the aim of knowing that the research instrument that was made was trustworthy and could be used repeatedly as a data collection tool because the instrument was already good.

From the content validity test, it was found that all the test instruments stated that of the 10 questions that had been validated to students, 5 were valid questions and 4 were invalid questions. The validity of the items with low, enough and high categories.

Reliability test was obtained 0.46 with r table of 0.361 which means $r_{hitung} > r_{tabel}$ then the critical thinking ability test instrument tested was reliable.

Pre-test normality test results of critical thinking students in the experimental class and the control class can be seen in table 1.

Table 1. Pretest Normality Test Results

Tests of Normality							
	class	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Test result	1	.155	40	.016	.941	40	.037
	2	.151	39	.026	.962	39	.208

a. Lilliefors Significance Correction

Based on the table it can be seen that the significance of the experimental class data was 0.016. > 0.05, so it can be concluded that the pretest value data in the experimental class was normally distributed. The significance of control class data was 0.026 > 0.05 so it can be concluded that the pretest value data in the control class was normally distributed. So it can be concluded that the pretest data results of

both experimental and control classes were normally distributed.

Homogeneity test results of critical thinking of students in the experimental class and the control class can be seen in table 2.

Table 2. Pretest Homogeneity Test Results

Test of Homogeneity of Variances			
Test result			
Levene Statistic	df1	df2	Sig.
8.016	1	77	.675

Based on the results of homogeneity test results in the column sig 0.675, where 0.675 > 0.05, it can be stated that the pretest student data both the experimental class and the control class were homogeneous.

The results of the posttest normality test of students' critical thinking of the experimental class and the control class can be seen in table 3.

Table 3. Posttest Normality Test Results

Tests of Normality							
	class	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Test result	1	.233	40	.052	.918	40	.087
	2	.199	39	.094	.944	39	.129

Based on the table of critical thinking normality test results, experimental class students with the Problem Based Learning model aided by Pop Up Books media obtained sig. 0.52 and the control class using the Cooperative Think Talk Write aided by Pop Up Books media obtained sig. 0.94. Because the significance of the experimental class and control class > 0.05 so the data were normally distributed.

Homogeneity test results of critical thinking of students in the experimental class and the control class can be seen in table 4.

Table 4. Posttest Homogeneity Test Results

Test of Homogeneity of Variances

Test result			
Levene Statistic	df1	df2	Sig.
7.152	1	77	.191

Based on the homogeneity test table results with SPSS version 24, the results of the value in column sig 0.191, where $0.191 > 0.05$, it can be stated that the posttest data of students both the experimental class and the control class can be said to be homogeneous.

The value of pretest and posttest Problem Based Learning models assisted by pop up books can be seen in Table 5.

Table 5. Results of Pretest and Posttest Values

	N	Minimum Scores	Maximum Scores	Mean
Pretest	39	44	72	61.45
Posttest	39	76	90	82.6

Based on the average table, the pretest value in the experimental class was 61.45 and the posttest value in the experimental class was 82.6. Student learning outcomes can be declared complete if the value obtained by students was able to reach $KKM \geq 75$.

Based on the difference test of two average values, calculated $sig\ 4,671 > 1,997$ and the significance $< \alpha = 5\%$ or 0.05 ($0.000 < 0.05$) this indicates that the significance value obtained was greater than 0.05. So that means that according to the basis of decision making in the t-test that H_0 is rejected and H_a was accepted. Furthermore, the results of the N gain score test data can be seen in table 6 below.

Table 6. N-Gain Test Results

Research Class	Skor N-Gain	Interpretation (category)
Experimental Class	0.51	Medium
Control Class	0.31	Medium

It can be seen that the average N-gain in the experimental class was 0.51 in the medium category, while the average N-gain in the control class was 0.31 in the moderate category.

1. The Effect of Think Talk Write Cooperative Model with Media Pop Up Books on students' critical thinking skills

Based on the data obtained an average value of 79.13 with a t_{count} of 4,687 and a significance level of 5% in the amount of 1,997. This means that $t_{count} > t_{table}$ or $4.687 > 1.997$ at a significant level of 5% while the value of sig (2-tailed) was equal to $0,000 < 0.05$, this shows that the significance value obtained was greater than 0.05. This means that there was a direct positive effect of the Cooperative Think Talk Write model assisted by the Pop Up Books media on students' critical thinking skills, so that H_a was accepted and H_0 was rejected. So the hypothesis which stated that there was an influence of the Think Talk Write Cooperative model assisted by Pop Up Books media on the critical thinking abilities of students was accepted.

Based on research that was submitted by Wahyu Hidayat (2012: 9) the Think Talk Write method shows a significant effect. The influence of the Think Talk Write Cooperative model assisted by Pop Up Books media on students 'critical thinking abilities is strengthened by the study of Median et al (2012) which explains that there is an influence of the ability to think critically with the use of Think Talk Write models on students' cognitive learning achievement.

2. The effect of Problem Based Learning Model assisted by Pop Up Books Media on students' critical thinking skills

Based on the data obtained an average value of 82.60 with a value of 4.671, a significance level of 5%, amounting to 1.997. This means that $t_{count} > t_{table}$ or $4,671 > 1,997$ at a significant level of 5% while the sig (2-tailed) value was $0,000 < 0.05$, this showed that the significance value obtained was greater than 0.05. This means that there was a direct positive effect of the Problem Based Learning model assisted by Pop Up Books media on students' critical thinking skills, so that H_a was accepted

and H0 was rejected. So the hypothesis that there was an influence of the Problem Based Learning model aided by Pop Up Books media on the critical thinking abilities of students was accepted.

The Problem Based Learning model can improve students' critical thinking due to learning models that are oriented to constructivism learning. Trianto (2010: 74) states that constructivism learning theory is a learning theory in which students truly understand and can apply knowledge, solve problems, find something for themselves, and can devote all their ideas. Therefore, the Problem Based Learning model includes constructivism learning, in the learning process students learn to find problems, apply the knowledge gained through the process of finding information, and can devote their ideas, so students do the learning process more meaningfully.

3. Differences in the Effect of Think Talk Write Cooperative Models and Problem Based Learning aided by Pop Up Books Media on students' critical thinking skills

The critical thinking skills of students in the control class obtained an average value of 79.1, while in the experimental class the average value was 82.6. With an average N-gain in the experimental class that is 0.51 in the medium category, while the average N-gain in the control class was 0.31 in the medium category.

Learning using the Problem Based Learning model assisted by Pop Up Books media that was applied in the experimental class results in students' critical thinking skills better than in the control class. This shows that the learning tool by applying the Problem Based Learning model assisted by Pop Up Books media is more effective in improving students' critical thinking. This is in accordance with research conducted by Wynn (2010); Wynn Sr et al. (2014) where the characteristics of students' cognitive development are suitable when given a learning model that stimulates thinking models with problems, cases, and problem solving discussions as contained in the Problem Based Learning model. The use of Pop

Up Books media in the learning process can stimulate the imagination and increase knowledge in the depiction of the shape of an object that can improve students' critical thinking, this is in line with the research of Jannah and Nikatul (2015) which explains that the Development of Pop Up Books Learning Media makes the concept of learning material plant more firmly in the minds of students because what they are doing is building understanding not just memorizing the material.

CONCLUSION

Based on the results of research and discussion in the previous chapter, the following conclusions can be drawn.

There was a direct positive effect of the Cooperative Think Talk Write model aided by Pop Up Books media on students' critical thinking abilities, so the hypothesis that there was an influence of the Pop Up Books Cooperative model assisted by Pop Up Books media on students' critical thinking abilities was accepted.

There was a direct positive effect of the Problem Based Learning model assisted by Pop Up Books media on students' critical thinking abilities, so the hypothesis that there was an influence of the Problem Based Learning model assisted by Pop Up Books media on students' critical thinking abilities was accepted.

There were differences in the results in the use of learning models which means that by applying the Problem Based Learning model aided by Pop Up Books media students' critical thinking skills were better than the Cooperative Think Talk Write model aided by Pop Up Books media.

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