

The Effect of *Picture and Picture* as the Cooperative Learning Model towards the Learning Outcomes of the Fraction Subject at Sdn Curahmalang 1 Jombang

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Abstract: This present study aims to determine the effect of the cooperative learning model implementation namely picture and picture on the learning outcomes of the fraction subject in Grade IV at Public Elementary School Curahmalang 1 Jombang, with a total of 54 students divided into class IV A and IV B. This study is a quasi-experimental research with non-equivalent control group designs. The results of the analysis of the difference in the average pre-test and post-test scores in the control class increased by 29.26 and in the experimental class increased by 49.63. Data analysis was then carried out through t-test by using the SPSS 24 program. The calculations on SPSS 24 showed that the t-count was 6.003. T-value was then compared with t table with $df = 52$, showing the value of t table = 2,000. The results of the comparison showed the value of $t_{count} > t_{table}$ ($6.003 > 2,000$) so that it can be concluded that the cooperative learning model implementation of picture and picture type has an effect on the learning outcomes of the Grade IV of Public Elementary School Curahmalang 1 Jombang.

Keywords: Cooperative learning, picture and picture type, fractions, learning outcomes.

1. INTRODUCTION

Education is a human effort in developing thinking, science, attitude, and behavior in social life. Mathematics education is an important education for daily life, so it needs to be learned at all levels of school. Mathematics education in schools is known as school mathematics. Elementary school is the beginning of formal education in Indonesia. Mathematics lessons in elementary schools are inseparable from the operations of arithmetic, addition, subtraction, multiplication and division. Samin, (2018: 64) stated that mathematics is a subject that is difficult to be understood by students. Students find it difficult when the teacher asks students to memorize mathematical facts, such as multiplication and division.

Anisah (in Indriani, 2018: 1) assumed that the difficulty of learning mathematics in elementary school students is due to the abstract mathematical characteristics. Piaget (in Sunardi, 2002: 72) stated that the intellectual level of elementary school students aged 7-12 years belongs to a period of concrete operational development, making it difficult to think abstractly. According to the explanation of the fourth grade teacher of Public Elementary School Curahmalang 1 Jombang, many students still do not understand so that they find it wrong when working on math problems. One of the materials that is difficult for students to teach and to understand is fraction. Fraction is a difficult material because there are no tools to support the optimal

learning process. This is in line with the statement of the Ministry of Education and Culture (1999) explaining that one of the topics in mathematics that is difficult to teach is fraction.

Observations in Grade IV of Public Elementary School Curahmalang 1 Jombang reveal that learning activities are dominated by lectures from teachers, group discussions, and questions work from student books. The teacher also explains that learning is dominated by using student books as learning resources. Learning is more oriented to the achievement of material in student books and rarely uses other tools, so that learning is less varied, less attractive to students, and the learning outcomes obtained are less than optimal.

Purwadi (in Kusumawati and Maruti 2019: 17) explained that the teacher must pay attention on a number of things so that the lecture method can occur effectively; one of which is a teaching aid to stimulate vision and learning enthusiasm for students. According to Sitanggang (in Indriani 2018: 12), aid or prop is a set or a series or tools that are made, designed, and arranged intentionally so that learning materials can be delivered optimally.

Another factor that causes learning to be less than optimal is due to the presentation of material that is abstract without supporting learning models. By investigating several factors from these observations, it can be assumed that there needs to be an update related to the learning approach to foster students' learning enthusiasm. The renewal

intended is an update related to media and learning models that are tailored to the subject matter or material. One of the learning models that can be applied is the cooperative learning model namely *picture and picture*.

Lefudin, (2014: 186) described cooperative learning as a group learning activity. This learning needs cooperation between students and good communication to achieve learning objectives, while *picture and picture* is a learning model supported by *picture media*. *Picture* is a good media in the process of remembering and developing students' imagination, through pictures, students can see, examine, and think about the subject matter more critically. According to Ngalimun (in Pradina and Hastuti 2017: 146), it is a process of delivering information, presentation, and display of pictures according to the material, students identify the pictures systematically, the teacher asks and justifies the order of pictures, the teacher provides understanding of concepts, conclusions, evaluations and reflections.

Several previous studies regarding to the implementation of *picture and picture* learning model that have been done by Samin (2018); Altafzani (2018); Septaningsih (2018); Kharis (2019) concluded that the *picture and picture* learning model can facilitate students' understanding of the material concept and enhance student learning activities, so that the *picture and picture* learning model has an effect on improving learning outcomes.

Based on the explanation above, the research was conducted with the research problems consisting: (1) How are the steps in implementing the cooperative learning model of the *picture and picture* type to the learning outcomes of the fraction subject of grade IV at Public Elementary School Curahmalang 1 Jombang? (2) Is there an effect of the implementation of the *picture and picture* type of cooperative learning model to the learning outcomes of the fraction subject of grade IV students at Public Elementary School Curahmalang 1 Jombang?

2. RESEARCH METHOD

This study uses a quasi-experimental method of non-equivalent control group design and t-test. Masyhud, (2016: 379) claimed t-test to be one of the tests that is used to investigate the significant effects between two variables being compared. To calculate the t-test between 2 variables, it is necessary to test the assumption of homogeneity of the various respondents first using the f-test. Method of non-equivalent control group design described by Sugiyono, (2018) which is as follows.

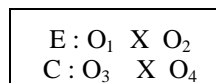


Figure 1. Method of non-equivalent control group design

Remarks:

E : Experimental class

C : Control class

*O*₁ : Pre-test of experimental group

*O*₂ : Post-test of experimental group

*O*₃ : Pre-test of control group

*O*₄ : Post-test of control group

X : Treatment

This research was conducted in the Grade IV at Public Elementary School Curahmalang 1 Jombang, with 54 students as subjects. Before determining the control class and the experimental class, homogeneity test was firstly performed by using SPSS 24. Homogeneity test results showed an Sig of 0.460. These results were then compared to significance 5%. The results indicated that (0.460 > 0.05), so the research sample was declared homogeneous. Class determination was done randomly which set class IV B as the experimental class and class IV A as the control class. The two classes were given different treatments, where class IV B as an experimental class applied a cooperative learning model of the *picture and picture* type and class IV A as a control class applied conventional learning.

In conventional learning, the teacher plays a more active role than students in which students only listen to the teacher's explanation, conduct discussions and do practice questions when assigned by the teacher. The teacher as a facilitator does not facilitate students to carry out various activities in finding concepts of a material independently, so the learning process is monotonous and less optimal. Data collection in this study was carried out with test techniques (pre-test and post-test). Research instruments in the form of essay tests consisted of 12 items. The instrument was validated by three expert validators namely one lecturer in Mathematics Education Department at the Faculty of Mathematics and Natural Sciences, Jember University and two teachers at the fourth grade teachers of Public Elementary School Curahmalang 1 in Jombang. The result of the question validation calculation was of 92.59%, so that it is very feasible to use. The question was then tested for its reliability with SPSS 24. The reliability test result showed that there were two invalid questions, so that the test instrument only used 10 questions. After the question was tested, different values of pretest and posttest were calculated in the two classes.

The difference results were then analyzed by t-test on SPSS 24. Furthermore, hypothesis testing was performed. The hypothesis of this study is H_a : There is an effect of the cooperative learning model implementation namely picture and picture to the learning outcomes of the fraction subject of Grade IV students at Public Elementary School Curahmalang 1 Jombang in the academic year of 2019/2020.

3. RESULTS AND DISCUSSION

The research began by giving pre-tests in both classes to measure students' initial abilities. The learning at the first meeting was started by dividing students into small groups consisting of 5-6 students, so there were five small groups. The first material was about the definition of a fraction, how to determine the value of a fraction, and how to write the value of a fraction. Each group was given two circle pictures; students were invited to fold the picture into several sections with equal size, then, students were assigned to thicken the fold lines, as well as shading several sections. After shading the picture, students were assigned to write the fractional value of the picture. Each group was free to fold the picture that had been presented by the teacher with the condition that the fold shows the equal size. Next, the teacher confirmed the answers from each group. The learning was continued to discuss about equivalent fraction material. The teacher gave introductory material about equivalent fractions in the form of the definition of equivalent fractions and how to count it. The teacher presented several rectangular images. Students were assigned to divide the rectangle into two equal parts, while shading one part so that it showed the fraction $\frac{1}{2}$. Other students were assigned to divide a rectangle into four equal parts and shade a few parts of the rectangle to show the equivalent fractions. After the students shaded the picture, the teacher asked the students why shading several parts on the rectangle. The teacher asked questions with students related to equivalent fraction $\frac{1}{2}$. After the students understood, they were assigned to calculate the equivalent fractions of the circle image that was shaded during the first material.

Learning at the first meeting was ended with a review, conclusions about the definition of fractions, how to determine fractions, which part was called the numerator and denominator, the definition of equivalent fractions, and how to count equivalent fractions. In the learning process at the second meeting, the teacher explained about the forms of signs in comparing fractions, including the

signs of ">" (more than), "=" (equal to) or "<" (less than). After the teacher's explanation, students were presented three pictures on the board, group representatives were assigned to divide the pictures into several equal portions while shading several sections. After that, students jointly guessed the value of fractions and practice marking ">" (more than), "=" (equal to) or "<" (less than). The students sorted the images from the largest fraction value into the smallest fraction value. The teacher then instilled the concept in sorting the fraction values. The next material was to know fraction forms (ordinary, mixed, decimal, and percent) and change the shape of a fraction into another form of fraction. The teacher explained the various forms of fractions as the introductory material. The teacher presented the picture and provided an example by turning one of the pictures into the form of fractions of a percent, the students were assigned to change the other picture into fractions of a group. After all groups were finished, the teacher and the students discussed and determined the most appropriate answer. The lesson continued with changing the shape of a fraction into a decimal fraction. The teacher gave an example of changing fractions to decimals; then students were asked to change the other images into decimal form in groups. The group representative wrote down the answer and discussed the most appropriate answer; the teacher confirmed the answer and instilled the concept of various kinds of fractions. The students were then assigned to work on questions in groups. Learning at the second meeting was completed with a review, conclusion making about the types of fractions and mentioning its examples.

The third meeting discussed the material about the problems of daily life related to fractions. The learning process was started with the teacher presenting a picture of pizza. The teacher divided the pizza into six equal portions. The students were assigned to cut the pizza picture and gave it to one of the students. The teacher explained the concept of subtraction by giving three slices of pizza to students. Furthermore, students were given questions as exercises that were done in groups. The results of student work were discussed together; the teacher asked the reasons for the results of students' reasons related to the answers they presented, and confirmed the most appropriate answers. The students (group representatives) who were brave to present their work were rewarded. Learning at the third meeting was ended with a review, things that were not understood by students, and question and answer about the problem of fraction counting operations verbally. After being given different treatments, both

classes were given a post-test to determine the students' final abilities. This study utilized the difference of pre-test and post-test scores under the same test. The followings are the pre-test and post-test questions.



Figure 2. pre-test and post-test questions.

The analysis results of the different pre-test and post-test mean values using the t-test on SPSS 24 are presented as a t-test summary table.

Table 1. T-test Summary

Group Statistics				
	Group_Class	N	Mean	Std. Deviation
Skor	Eksperimental Class	27	49.6296	11.2596
	Control Class	27	29.6296	13.1504

Based on the analysis results of the test scores of the two classes, it is known that the difference in the mean value of the pre-test and post-test control class was 29,26 and the experimental class was 49,62. The t-test results are in Group Statistics which are more fully presented in the Independent Samples Test.

Table 2. 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
Equal assumed	varian	.416	.522	6.003	52	.000	20.000	3.331	13.314	26.685
Equal variances not assumed				6.003	50.795	.000	20.000	3.331	13.310	26.689

The t-test results showed that the tcount was 6.003. The results were then compared to t table with df = 52 showing t-table = 2,000. The result of t-test showed t-count is greater than t-table (6.003 >

2,000), then Ha was accepted and H0 was rejected. The difference between the pretest-posttest mean value also showed the value of the experimental class > control class (49.62 > 29.26), so that there were differences between the classes taught by using the picture and picture type learning model and conventional learning in Grade IV students at Public Elementary School Curahmalang 1 Jombang. Compared to conventional learning, the picture and picture learning model has more advantages.

In conventional learning, the teacher plays a more active role than students in which students only listen to the teacher's explanation, conduct discussions and do practice questions when assigned by the teacher. The teacher as a facilitator does not facilitate students to carry out various activities in finding concepts of a material independently, so the learning process is monotonous and less optimal.

Different from picture and picture type learning, the learning centers and learning activities are on the students, teachers are only facilitators. In learning picture and picture, especially in the subject of fraction, many activities carried out by students such as arranging, folding and shading the pictures which make learning more interesting and enjoyable. Students are directed to develop and find concepts, the teacher then asks the opinions or reasons both individually and in groups.

When there are different opinions, students share with one another so that they also practice the students' ability to talk or have an opinion. As for the visualization when learning in the experimental class using the cooperative learning model type picture and picture can be presented in Figure 3 as follows.



Figure 3. Learning in the experimental class

The characteristics of elementary school students who enjoy learning while playing are very much in accordance with the picture and picture learning model, where this learning model uses pictures as a learning tool while playing either arranging pictures, folding images, shading pictures, or so forth. In addition to understanding learning

material, students also learn social skills such as tolerance between friends, helping one another when a group of friends does not understand the material, and respecting the opinions of other students when discussing.

The cooperative learning model namely picture and picture have various advantages on the success of student learning. The results of this study indicate an increase in learning outcomes that are greater in the classroom applying the picture and picture cooperative learning model. This is in line with previous research conducted by Samin (2018), Altafzani (2018), Septaningsih (2018), and Kharis (2019) stating the type of picture and picture cooperative learning model affects student learning outcomes.

4. CONCLUSION

Based on the data analysis, the following conclusions are obtained (1) The application of the picture and picture learning model consists of 7 stages of learning. The stage begins with the delivery of introductory material by the teacher such as understanding and types, then the presentation of the picture, students arrange the picture (folding the picture, the student shades the picture, the student pairs the picture), the teacher asks the reason for thinking of an answer, the teacher and finds the most answers right, as well as making conclusions. The most successful step in contributing is the stage of the student arranging the picture. (2) There is an effect from the picture and picture type cooperative learning model implementation on the fraction subject in Grade IV at Public Elementary School Curahmalang 1 Jombang.

5. REFERENCES

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