Proceeding the 1st International Conference on Education Innovation (ICEI) **Page483-489**
ISBN : 978-602-50898-0-0

The Influence Of Problem Posing Learning By Using Buttons Media To Increase Fractional Arithmatic Operation Capability In Grade IV Elementary School Students

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ABSTRACT: The research aimed is to describe and analyze: (1) increase the ability of students fractional arithmetic operation, (2) problem posing ability students, (3) students responses, and (4) implementing of teacher in the learning activity, when the learning problem posing by using buttons media on material fractional arithmetic operations in grade 4 elementary school. The research was using Quasi Eksperimental design pattern with The Nonequivalent Pretest-Posttest Control Group Design. Data collection techniques were using test and non test techniques. Data obtained through the technique of statistical test were analyzed by Independent T-test trials using aid SPSS 24.0 for Windows. The research result show that: (1) n-gain score fractional arithmetic operation ability of students of two classes gain significancy value 0,000 > 0,05, than the hypothesis of fractional arithmetic operation capability experimental class students who apply problem posing learning by using buttons media better than the fractional arithmetic operation capability control class that implements conventional learning be accepted, (2) the average score of students posttest problem posing ability experimental class students at 14,87 with medium qualifying better than the average score of posttest problem posing ability control class at 10,10 with low qualifications, (3) the percentage of students response to the learning reached 88.27% categorized as very positive, (4) the percentage of teacher implementing in the learning activity reached 97.1% with very good categories.Based on data analysis can be concluded that the Problem Posing Learning by Using Buttons Media can improve students fractional arithmetic operations and effectively applied to the material fractional arithmetic operations in the 4th grade of primary school.

1. INTRODUCTION

Mathematics becomes an integral part of the national education system that plays an important role in the process of science and technology development.Through learning mathematics students are expected to get experiences that can help them in building concepts and principles of mathematics with his own ability. Studying mathematics is not easy, because the facts show that students always find it difficult to learn. Many factors that cause students less master mathematics subjects, such as children less interest in math lessons. Russeffendi (in Mulyadi, 2007: 8) states "Mathematics (exact science) for children in general is a subject that is unpopular, if not the most hated lesson". Usually in spite of the many attempts made to make improvements, but the reality shows that the value of mathematics subjects is still not satisfactory. Teachers as the primary key in improving the quality of education have an obligation as stated in the Undang-undang Guru Nomor 14 Tahun 2005 Pasal 8 states that "Teachers must have academic

qualifications, competence, certification of educators, physically and mentally healthy, and have the ability to realize educational goals national". One of the obligations of teachers mentioned is having a qualification of professional competence. From the demands of the law as well as this obligation, teachers are required to create an active, creative and innovative learning in accordance with the development and growth of learners. Teachers must create learning that involves students actively, encouraging them to perform a process through various activities that support the achievement of competencies so that students get a meaningful learning experience.

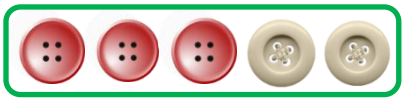
But the reality in the field, rarely do teachers who carry out the development of learning materials actively, creatively and innovatively and the low utilization of potential existing environment contextually. As in the school where the author is on duty, the teacher does not actively involve students in the learning process and does not utilize relevant instructional media especially in teaching the sum and fractional counting operation, this is a form of teacher's non-creativity in the development of learning materials and the low utilization of environmental potential.

One of the lessons that can actively involve students and give students the opportunity to reason is by the problem posing learning. Problem posing is an important activity in mathematics learning because problem posing is the basis for the establishment of reasoning and thinking processes. Even one of the mathematicians of NCTM (National Council of Teacher of Mathematics) strongly recommends that the students be given the greatest opportunity to experience making their own inquiries, NCTM (in As'ari,2003: 42). According to Nasoetion (in Siswono, 2008: 49), problem posing is an activity task that leads to a critical and creative attitude. Irwan (2011) also argues that problem posing is a form of approach in learning that emphasizes the formulation of the problem and solve it based on the situation given to the students. Because the problem and its completion are designed by the students themselves, it is possible that the problem posing can develop students' thinking ability. While the results of research Siswono (1999) states that there is a positive correlation between the problem posing ability and student achievement. According to Silver and Cai (in Siswono, 2008: 40), the application of the problem posing was applied to three different forms of mathematical cognitive activity, namely: presolution posing, within solution posing and postsolution posing. The problem posing in this study refers to the notion of problem posing as a task to the students to make the problem based on the available situation and solve the problem because not all students can solve the problems made either individually or in groups to themselves or even to Other friends. Situations can be stories, pictures or information related to the subject matter.

Besides to creating active learning, teachers are also required to create creative and innovative learning that is able to bring students to optimal learning outcomes. The use of instructional media is one of the innovative ways that can be used to improve student learning outcomes. The use of media, especially on the material of fractional counting operations will greatly assist students in learning, because this material is abstract and tend not to attract so difficult to be understood by students. Learning media can bridge students to be able to think abstractly. With the use of learning media abstract things can be concretized and complex things can be simplified. The use of learning media can also make the learning activities more interesting mathematics for children so that children will be interested and happy in learning mathematics. It can help the success of teachers in implementing mathematics learning optimally. Winarni (1994: 37) explained, the primary school of mathematics learning media is concrete objects that can be observed, touched, and mobilized that teachers use to instill concepts or math skills at the time of teaching. While Sudjana (2001) argued that, teaching media can enhance the learning process of students in teaching which in turn is expected to enhance the learning achievement. This is in line with the results of research conducted by Kusumadewi (2010), that the use of concrete objects media can improve the learning outcomes of mathematics and improve student activeness during learning mathematics. One of the learning media that can be utilized in the

ISBN : 978-602-50898-0-0

material of counting operation and addition of fractional reduction is the buttons media. In this research using a set of buttons that symbolize the value of a certain fraction consisting of two different button colors are red and white. The buttons media is shown in the following figure:



The set above represents fractions $\frac{3}{5}$

Figure 2.1 Buttons Media Fractioned

The research aimed is to describe and analyze increase the ability of students fractional arithmetic operation, problem posing ability students, students responses, and implementing of teacher in the learning activity, when the learning problem posing by using buttons media on material fractional arithmetic operations in grade IV elementary school.

2. METHOD

The design used in this research is The Nonequivalent Pretest-Posttest Control Group Design, where the samples in the experimental and control groups were not randomly selected. A non-equivalent pretest-posttest design is usually used in experiments that use existing classes as a group (Darmadi, 2011: 202). First class as experiment class and second class as control class. Both classes were given the same pretest. The experimental class is the class given treatment in the form of exploration of the issue of media-aided issue, while the control class implements the learning that is usually done at the time of learning by using the lecture method (conventional learning). After a while, both classes were tested with the same test as the final test (posttest). The pretest and posttest results in each class were compared (tested the difference). Differences in n-gain values in the two classes showed the effect of treatment on increased treatment outcomes. The design used in this study can be illustrated in the table below :

O_1 × O_2	
O_3	O_4

(Sugiyono, 2015: 118)

Data collection techniques used in this study are test and non test techniques. The test technique is used to measure the improvement of fractional counting ability and the problem posing ability students with the pretest and posttest sheet. While the non-test techniques used to determine the response of students with the instrument in the form of a questionnaire and to find out the activity of teachers in implementing the learning with the instrument in the form of a sheet of observation. The data obtained through the test technique then analyzed statistically with Independent Sample t test using SPSS 24.0 for windows. From the test, it will get pretest-posttest score of both groups which will then be compared so it is known how the effect of treatment applied to the experimental group on the student's fractional counting.

Data analysis was done by calculating the score of n-gain calculation ability of fractional counting operation from both classes. Analysis of n-gain data was used to see an improvement in student counting ability after treatment. This can be done using the n-gain test formula as follows:

$$\text{n-gain} = \frac{\text{Skor Posttest} - \text{Skor Pretest}}{\text{Skor Maksimum} - \text{Skor Pretest}}$$

The n-gain data of the control class and the experimental class were then tested for normality and homogeneity as a requirement for hypothesis testing of the difference of two n-gain average of the two classes. Assuming that the n-gain score data of both classes is normally distributed and homogeneous, then the test is used to test the difference of two averages by using the *Independent Sample T test*.

3.RESULT AND DISCUSSION

Further statistical analysis was performed on the score of the enhancement ability of fractional counting operations (n-gain score) obtained from the pretest and posttest score data of the students of the two classes using the n-gain formula. From the n-gain score data, it is known that the score of n-gain of the experimental class with the low criterion is 4 people (15.38%), the medium criterion is 14

people (53,85%) and high criterion 8 people (30,77%) With a mean score of 0.54 n-gain which have medium criterion. While the score of n-gain of control class students with low criterion as much as 17 people (65,38%) and who get medium criterion as much as 9 people (34,62%) with mean score of n-gain equal to 0,23 which have low criterion. With the help of SPSS 24.0, obtained a summary of normality test results and homogeneity test of n-gain score data of student fractional counting ability as follows:

Tabel 1.1 The Result Normality of n-gain Score Ability of Fractional Arithmatic Operation

n-gain	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Kontrol	,110	26	,200*	,965	26	,491
eksperimen	,099	26	,200*	,973	26	,713

Based on the value of significance obtained it can be concluded that the n-gain score data of both classes normally distributed, because the significance value of both classes is greater than 0.05.

Tabel 1.2 The Result Homogeneity of n-gain Score Ability of Fractional Arithmatic Operation

		Levene Statistic	df1	df2	Sig.
n-gain kemampuan operasi hitung	Based on Mean	1,401	1	50	,242
	Based on Median	1,324	1	50	,255
	Based on Median and with adjusted df	1,324	1	49,421	,255
	Based on trimmed mean	1,390	1	50	,244

Based on the results of the above output it is known that the significance value of 0.242 > 0.05, it can be concluded that the n-gain of the student's fractional operation ability of the control class with the variant experimental class is the same. This means that the data comes from a homogeneous population.

The Independent sample t-test was used to measure whether there was a difference in the improvement of the student's fractional operation ability between the control group and the experimental group. For the test sample Independent sample t-test is also using the help of SPSS 24.0. The basis of decision making in the test Independent sample t-test is:

If the significance value is < 0,05, then reject H_0
If the significance value is > 0,05, then accept H_0

Based on the data analysis, then obtained a result as presented in the following table:

Tabel 1.3 The Result Independent Sample T test of n-gain Score Ability of Fractional Arithmatic Operation

			Levene's Test for Equality of Variances		t-test for Equality of Means						
										95% Confidence Interval of the Difference	
			F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
n-gain kemampuan operasi hitung	Equal variances assumed		1,401	,242	-4,522	50	,000	-,31154	,06889	-,44990	-,17317
	Equal variances not assumed				-4,522	47,986	,000	-,31154	,06889	-,45005	-,17303

Based on the results of hypothesis testing obtained value significance Sig (2 tailed) of 0.000. The value of significance is less than 0.05 (0.000 < 0.05) then this meansH_0 rejected. With rejectionH_0 then this means that there is a significant difference between the average n-gain of

ISBN : 978-602-50898-0-0

the fractional operation ability of the control class students and the experimental class.So it can be concluded that the improvement of students' fractional arithmetical experimental counting ability to apply the instruction of the media-assisted problem is better than the improvement of the student's control class operating ability that apply conventional learning. This is also supported by Wahyu et al (2013), that the use of problem posing model can improve the fractional student operation skills so that the learning with problem posing model can be used as an alternative for teachers in mathematics learning in order to improve the fractional operation skills students.

Problem Posing Ability Students

Description of student's problem posing ability is obtained through descriptive analysis of pretest-posttest score of problem posing ability.Based on the results of the analysis is known that the average pretest score of problem posing ability the students' experimental class of 8.32 are included in the low qualification. While the average score of the pretest score of problem posing ability the students control class problems of 7,33 are included in the low qualification. Then the posttest result of problem posing ability of the students experimental class and the control class obtained the data that the average posttest score of problem posing ability students' experimental class is 14.87 which is included in the medium qualification.While the mean score of the posttest score of problem posing students' ability the students control class is 10.10 which is included in the low qualification. It can be concluded that the effective problem posing learning is seen from the result of the score of the problem posing ability of the students in the experimental class that has increased. This is also supported by the research of Siswono (1999) that the method of assigning tasks with problem posing effective to applied because it shows there is a relationship between the problem posing ability with the student's learning achievement.

Students Responses

This is shown from the data analysis of student responses to the problem posing learning by using buttons media shows that the percentage of students who agree with learning responses reached 88.27% compared with 11.73% of students who disagree. This suggests that students' responses are positive to learning and fall into very positive categories. This is also supported by Andayani (2002) study with problem posing learning effective to applied because students' positive responses to learning so that learning with problem posing can be used as an alternative for teachers in learning mathematics.

Teacher Activity in Implementing of Problem Posing Learning by Using Buttons Media

The observation of the implementation of problem posing learning by using buttons media was done by two observers. Observations were made using teacher activity observation sheets on three lessons.

Based on the information, it can be concluded that the teacher activity in managing the problem posing learning by using buttons media is on average up to 97,1%, which is included in very good category. This is also supported by Syarbin (2014) study that learning with practical and effective problem posing is applied because teacher activity in implementing good categorized learning.

4.CONCLUSION

Based on the results of data analysis and discussion of research results, the influence of problem posing learning by using buttons media to increase fractional arithmatic operation capability in grade IV elementary school students obtained some conclusions. (1)

Increasing the ability of fractional counting operation of students applying the problem posing learning by using buttons media is bigger and significantly different with the improvement of student counting ability which apply conventional learning. (2) problem posing ability students at the time of problem posing learning by using buttons media on the fractional arithmatic operation obtained an average posttest score of 14.87 with medium qualification. (3) Students' responses to the application of problem posing learning by using buttons media on material fractional arithmatic operation reached 88.27% with very positive category. (4) The activity of teachers in implementing of problem posing learning by using buttons media on the fractional arithmatic operation reaches 97,1% with very good category.

Based on several conclusions of the research results that have been disclosed above, it can be concluded problem posing learning by using buttons media has a better effect on the improvement of the student's fractional arithmatic operation ability and effectively applied to the counting and fraction reduction subjects in grade IV of elementary school.

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