The effect of interactive learning on learning outcomes of division for fourth grade students of SD Negeri 9 Bireuen

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Abstract

Background:Teachers nowadays can design applications for subject matter through google sites.Designing interactive learning activities with interesting presentations and fun material can focus students' attention on teaching and learning activities, so that they become more motivated.To design interactive learning, teachers require the readiness of material sources, design forms, and time.Usually, teachers did not design interactive teaching and learning activities. Therefore, the teaching and learning activities that occur in the classroom on the distribution do not get a positive response from students.Designing interactive learning activities with interesting presentations and fun material can focus students' attention on teaching and learning activities so that the students do not get bored.Interactive learning designed through Google sites can be converted into an application that can be accessed by both teachers and students via laptops or Android smartphones.

Materials and Methods:This experimental study was conducted on fourth-grade students of SD Negeri 9 Bireuen.The research treatment was divided into two groups. The experimental group is class IV/A with 21 students using interactive learning, and class the control group is class IV/B with 20 students using conventional learning.The researcher was taking the pre-test score before the treatment and the post-test after the treatment.This study employed a Pretest-Posttest Control Group Design.The experimental group was given interactive learning treatment compared to the conventional learning in the control group.

Results:The paired sample t-test examined whether a difference in the results of the pre-test and post-test of students from the experimental group and the control group exist.With the provision that if the significance value of 2-tailed <0.05, based on the output of pair 1 obtained a significant value (2-tailed) of 0.000 <0.05, then there is a difference in the average value of student learning outcomes between the pre-test and post-test of the experimental group.

Independent sample test with a value of = 0.05 in the critical area means that H0 is rejected if the p-value (Sig.(2-tailed)) < 0,05.Based on the result, a significant (2-tailed) value obtained 0.004 < 0.005, there was a difference in student achievement between interactive and conventional learning in fourth-grade students of SD Negeri 9 Bireuen.

Conclusion:Interactive-learning affects the learning outcomes of the distribution of materials for the fourth-grade students of SD Negeri 9 Bireuen.There are differences in the results between interactive learning and conventional distribution of material for the fourth-grade students of SD N 9 Bireuen

Keywords: *learning; interactive.*

I. Introduction

The learning is not interesting and not fun if the lesson presentation was not responded to by the students.Whether or not students respond to the subject matter depends on the way the teacher conducts teaching and learning activities.Learning methods or models are carried out as a teacher's effort in presenting the material so that the students can learn the lessons optimally. However, these efforts are in vain if they do not get a response from students.In grade IV SD Negeri 9 Bireuen in 2021, there was a failure to construct materials as a result of the limited ability to obtain information conveyed by the teacher. Therefore the students were only trying to memorize the material and did not understand the explanation of the material. In consequence, the students failed to answer the exam questions.Teaching and learning activities occurring in the classroom do not get a positive response from students. Of 21 students, only 35% of students understand the material presented by the teacher, while the other 65% do not. They appear to have less interest in paying attention to the teachers' explanations. Generally, the students are not interested and less motivated towards the lesson, and it causes students' low achievement.The students quickly forgot the teachers' oral delivery of material due to the limited memory of students. Even though the teachers thought that they had taught optimally, student achievement was

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not. As a result, the teaching and learning activities do not get maximum response from students, so their achievement is also not desirable.

II. Material And Methods

The researcher chose appropriate teaching methods, so that the learning objectives could be achieved.According to Wiyarto (2016:3) "educators do not only convey how the material is presented but there must be an interesting learning media to convey material".Interactive learning of distribution materials that is designed through Google sites can be converted into a material application attached to the school WAB and accessed by both teachers and students via laptops or androids smartphones.The application of distribution material designed to be interesting and fun to carry out learning activities aims to motivate the students.The experimental group was given an interactive learning treatment that relied on the distribution material applicaton designed by the researcher.The control group was treated with conventional methods.

This experiment was carried out on fourth-grade students of SD Negeri 9 Bireuen in the even semester of the 2021/2022 Academic Year.Interactive learning treatment was given to 21 students in class IV/A and conventional learning was given to 20 students in class IV/B.

Study Design is interactive learning on the distribution of materials.Study Location is in the SD Negeri 9 Bireuen located in the district town of Bireuen.The study was conducted in February 2022, with a Sample size of 41 students.

The sample size calculation consists of two parallel fourth-grade elementary schools, namely class IV/A with 21 students and class IV/B with 20 students.The confidence interval for the hypothesis is 95%.The subjects consisted of two fourth-graders at the elementary school with a population of 41 students.Sampling was determined by assigning 21 students in class IV/A as the experimental group and 20 students in class IV/B as the control group.The two fourth graders, both in the experimental and the control group, were pre-tested to determine the students' initial abilities before being given treatment. The pre-test consisted of 10 questions.The treatment was given to the interactive learning experimental group, while the learning control group used conventional methods.

Inclusion criteria:
1. Students who have studied division
2. The minimum completeness criteria for mathematics at the school is 70.
3. The pre-test scores were compared with the post-test scores to see the effect of the learning method.
4. The post-test scores of both the experimental group and the control group were compared to see the difference.

Exclusion criteria:
1. Students who never learn division
2. Students who never get interactive learning about division
3. Students who did not take one of the division tests, either pre-test or post-test.

Procedures:

After obtaining written approval, the pre-test questions on the distribution material were used to collect test score data. It was done before treating both the experimental group and the control group.The test questions were taken from student textbooks on the distribution material.The pre-test and post-test questions were ten questions.The experimental group, which consisted of 21 students, was given interactive learning treatment with distribution material. On the other hand, the control group was given learning treatment using conventional methods with distribution material.The design of interactive learning is in the form of a student-centered approach.Interactive learning treatment in the experimental group in the form of the interesting application and fun material can focus students' attention on teaching and learning activities.Interactive learning designed by using Google sites which can be changed into an application for sharing materials was attached to the school WAB and can be accessed by both teachers and students via laptops or android smartphones.The control group was treated by using conventional learning methods.

After a series of learning activities, the post-test was carried out in both the experimental group and the control group.The post-test questions were the same as the pre-test questions consisting 10 essay questions.

Statistical analysis

The data was analyzed using SPSS. This study is a Pretest-Posttest Control Group Design with the following design.Analyzing research data began with descriptive analysis. Descriptive statistical analysis is used for describing the data including the amount of data, maximum value, a minimum value of average, and others.The normality test is a condition for the parametric test of the residual value normally distributed or not,

the normality test used by Kolmogorov Smirnov. The basis for making the decision was (1) if the significance value > 0.05, then the residual value is normally distributed, (2) if the significance value < 0, 05 then the residual value is not normally distributed.Paired sample t-test was used when the data is normally distributed. When the data is not normally distributed, another test will be used. Paired sample t-test aims to see whether there is a difference in the results of the pre-test and post-test of students in both groups. If the 2-tailed significance value is <0.05, the average value between the pre-test scores and the post-test scores was different.The homogeneity test was carried out in the two groups before the independent sample t-test.By using the homogeneity of variance test, it is declared homogeneous if the significant value is based on the mean > 0.05. Independent sample test. It is employed to see whether there is a difference in the post-test results of students from the experimental group and students from the control group with = 0.05 critical region. H0 is rejected if the p-value (Sig.(2-tailed)) < 0,05.

III. Result

This study is a Pretest-Posttest Control Group Design by using the following steps:

Tabe l:*Pretest-Post-test Control Group Design*

Group	Pretest	Treatment	Post-test
Experimental	O_1	X_1	O_2
Control	O_3	X_2	O_4

Note :O_1 and O_3 = Pretest, O_2 and O_4 = Post-test

X_1 = Interactive learning on sharing material

X_2 = Conventional learning on remediation material.

Data analysis begins with descriptive analysis. Descriptive statistical analysis is used for describing research data including the amount of data, maximum value, a minimum value of average, and others.This descriptive analysis was carried out with the help of the SPSS application.The results of the descriptive analysis are as follows.

Table 2:Descriptive Statistics

	N	Minimum	Maximum	Mean	Std.Deviation
pre-test experimental	21	20	60	44.29	12.677
pre-test experimental	21	55	100	77.14	15.457
pretest control	20	10	60	40.75	14.444
post-test control	20	40	90	62.50	14.734
Valid N (listwise)	20				

The normality test is a parametric test requirement aiming at determining whether the residual value is normally distributed or not. The normality test used was the Kolmogorov Smirnov residual with SPSS. A good regression model is a residual value that is normally distributed. The basis for making the decision is whether the significance value is > 0.05 or not.
1.   If the significance value shows > 0.05, the residual value is normally distributed.
2.   However, if the significance value is < 0.05, the residual value is not normally distributed.
The results of the normality test can be seen in the following table.

Table 3: Normality Test

Class		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Learning result	pretest experimental	0.134	21	0.200*	0.928	21	0.123
	post-test experimental	0.165	21	0.140	0.898	21	0.033
	pretest control	0.139	20	0.200*	0.947	20	0.322
	post-test control	0.102	20	0,200*	0.962	20	0.579

*.This is a lower bound of the true significance.

a.Lilliefors Significance Correction

The test results obtained a significance value of > 0.05 for all pre-test significance values of the experimental group which was 0.200.The significant value of the post-test of the experimental group was 0.140.The significance value of the pre-test and post-test of the control group was 0.200, therefore the pre-test and post-test scores of both groups were normally distributed.

Based on the normality test, the data in both groups were normally distributed. Therefore a paired sample t-test was carried out aiming at seeing whether or not there are differences in the results of the pre-test and post-test of students from both groups.The use of the paired sample t-test was to answer the hypothesis.

H_0: $\mu 1 = \mu 2$ means there is no difference in students' achievement before and after implementing interactive learning on distribution materials for fourth-grade students of SD Negeri 9 Bireuen.

H_a: $\mu 1 \neq \mu 2$ means there is a difference in students' achievement before and after implementing interactive learning on distribution materials for fourth-grade students of SD Negeri 9 Bireuen.

Provided that if the 2-tailed significance value is <0.05, then the average value between the pre-test and post-test scores is different.The test results acquired can be seen in the following table.

Table 4: Paired Samples Test

		Paired Differences							Sig.(2-tailed)
		Mean	Std.Deviation	Std.Error Mean	95% Confidence Interval of the Difference		t	df	
					Lower	Upper			
Pair 1	pretest experimental - post-test experimental	-32.857	9.692	2.115	-37.269	-28.446	-15.536	20	0.000
Pair 2	pretest control - post-test control	-21.750	20.149	4.505	-31.180	-12.320	-4.827	19	0.000

1. Based on the output of pair 1 obtained a significant value (2-tailed) of 0.000 <0.05, then there is a difference in the average value of student learning outcomes between the pre-test and post-test of the experimental group.

2. Based on the output of pair 1 obtained a significant value (2-tailed) of 0.000 <0.05, then there is a difference in the average value of student learning outcomes between the pre-test and post-test of the control group.

The effect of interactive learning on learning outcomes of division for fourth-grade students of SD Negeri 9 Bireuen.For more details, the average learning outcomes before and after interactive learning can be seen in the following table.

Table 5:Paired Samples Statistics

		Mean	N	Std.Deviation	Std.Error Mean
Pair 1	pretest experimental	44.29	21	12.677	2.766
	post-test experimental	77.14	21	15.457	3.373
Pair 2	pretest control	40.75	20	14.444	3.230
	post-test control	62.50	20	14.734	3.295

Based on the Paired Samples Statistics table, the average pre-test of the experimental group is 44.29, and the post-test average is 77.14. Meanwhile, the control group has an average pre-test score of 40.75 and an average post-test score of 62.50.

Homogeneity test. Before the independent sample t-test was carried out in the two groups, there was a condition to be carried out, to find the homogeneity value.In this study, the homogeneity test value was obtained by using the homogeneity of variance test.This sample is homogeneous if the significant value is based on the mean > 0.05.The results of the homogeneity test of the two groups of research samples can be seen in the following table.

Table 6: Homogeneity of Variance Test

		Levene Statistic	df1	df2	Sig.
Learning result	Based on Mean	0.533	1	39	0.470
	Based on Median	0.438	1	39	0.512
	Based on Median and with adjusted df	0.438	1	38.339	0.512
	Based on trimmed mean	0.531	1	39	0.471

Based on the table above, the sig Based on Mean value is 0.470 > 0.05. Therefore it means the data variants of the experimental post-test and control post-test classes are the same or homogeneous.

Independent sample test. The independent t-test is to see whether there is a difference in the results of the post-test results of students from both groups

H0: $\mu 1 = \mu 2$ means there is no difference in students' achievement on fourth-grade students of taught by suing conventional distribution learning in SD Negeri 9 Bireuen.

H1: $\mu1\neq \mu2$ means there is a difference on the students' achievement between interactive learning and conventional on distribution material for the fourth-grade students of SD State 9 Bireuen

The value of $\alpha = 0.05$ in the critical area means that H0 is rejected if the p-value (Sig.(2-tailed)) < 0.05.

The results of the Hypotheses calculation test can be seen in the following table.

Table 7: Independent Samples Test

| | | 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
Learning result	Equal variances assumed	0.533	0.470	3.102	39	0.004	14.643	4.721	5.094	24.192
	Equal variances not assumed			3.105	39.00	0.004	14.643	4.715	5.106	24.180

Based on the table above, it was obtained a significant (2-tailed) value of 0.004 < 0.005. It means the H0 was rejected, and Ha was accepted. Thus, there was a difference in student achievement between interactive and conventional learning in fourth-grade students of SD Negeri 9 Bireuen.For more details, the difference in the average value between the post-test experimental group and the control group can be seen in the following table.

Table 8: Group Statistics

Class		N	Mean	Std.Deviation	Std.Error Mean
Learning result	post-test experimental	21	77.14	15.457	3.373
	post-test control	20	62.50	14.734	3.295

Based on the table above, it can be seen that the post-test average value of the experimental group is 77.14, while the post-test average value of the control group is 62.50. Thus, there is a difference between the experimental group and the control group.

IV. Discussion

Developing interactive learning as a supportive approach for students' learning motivation is to overcome boredom due to the monotonous material delivery.The technique is an approach used by the teacher in implementing a method by paying attention to specific situations and conditions.According to Rahmawati 2011, the learning approach is divided into two forms, the student-centered approach, and the teacher-centered approach.The design of interactive learning is in the form of a student-centered approach.Designing interactive learning activities is a technique of constructing teaching and learning activities aiming at making interesting presentations and fun materials to focus students' attention on teaching and learning activities.According to Rusman (2018), the learning approach is the first stage of forming an idea in viewing and determining the object of study.Constructing an appropriate method was to achieve the learning objectives.According to Wiyarto (2016:3) "educators do not only convey how the material is presented but there must be an interesting learning media to convey material".

The learning approach is an idea designed by the teacher to fulfill a learning activity.Syawaluddin (2019) , in his study, stated that the use of technology-based learning media is one of the best and most efficient media to be applied in the learning process.

In addition, Marzuki (2021) stated ICT-based interactive learning made students more motivated to learn. On the other hand, students who are taught without interactive learning are proven to have less motivation to learn.Comparison of student achievement with ICT-based interactive learning is better than student achievement without interactive learning.

Yuniati et.al. (2011), presented Interactive Natural Sciences at SDN Kroyo 1 Sragen School is conveniently learned by children and is more interesting.In their study Wigita Rezky Widjayanti dkk that animation-based interactive learning suitsthe mathematics learning on statistics material for 7th-grade junior high school students.

V. Conclusion

Based on the result of data description and analysis, the conclusion is presented as follows

1. interactive learning affects the learning outcomes of the distribution of materials for the fourth-grade students of SD Negeri 9 Bireuen.

2. There are differences in the results between interactive learning and conventional distribution of material for the fourth-grade students of SD Negeri 9 Bireuen

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