Research Article

Differences in the Effectiveness of Utilizing Whatsapp Group in Synchronous and Asynchronous Class III Online Learning at SDN Ardimulyo 01

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Abstract.

This study aims to describe: (1) Whether the use of *WhatsApp groups* in online learning can improve student learning outcomes. (2) What is the level of effectiveness of online learning by utilizing the *WhatsApp group* conducted at SDN Ardimulyo 01? This research was conducted using an experimental method. Data were collected through test, questionnaire, and documentation. The population in this study were students of class III SDN Ardimulyo 01 and the sample of this study were the students of class III A. The sampling technique used was *purposive sampling technique*. The experimental results showed (1) an increase in intermediate learning outcomes. *The pre-test* and *post-test* after being given the treatment with the *gain score* data for the experimental class was 54.5%, while the control class was 45.5%, so it can be said that the *gain score for* the experimental class was higher than the control class. (2) The average overall data in the student questionnaire was 74.5 which is included in the category of the effectiveness level interpretation value in the range 61-80, which is effective.

Keywords: E- learning effectiveness, Learning outcomes, Whatsapp group, Online learning

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1. INTRODUCTION

The development of digitalization in the world is getting more and more rapid day by day, information technology is getting bigger, causing waves of changes to start leading to the use of the internet network. Changes need to be made, especially in the field of education to keep up with these developments. Education to welcome these changes is increasingly important when it realizes the echo of the 4th industrial revolution which focuses on preparing ideal human resources for the nation. It is important to need an educational forum that also implements character and of course with learning that is

oriented towards higher-order thinking skills to produce the potential of the nation's children.

Developing the potential that exists in students, of course, requires a process. This process is said to be a learning process. Learning according to [1] is "an activity or process of acquiring knowledge, improving skills, increasing behavior, attitudes, and enhancing personality. This learning process is obtained through learning". So that through learning, later students will get learning results. Learning outcomes are the changes that occur in students, both regarding aspects of knowledge, skills and attitudes as a result of the learning process. Given the current conditions, Indonesia is one of the many countries affected by the Coronavirus Disease (Covid-19) outbreak so that the impact in the world of education causes a shift from face-to-face learning in schools to online and offline learning. This online learning directly assigns the teacher to remain maximal in carrying out effective learning using online media even though one of the problems with online learning is that not all material can be delivered online.

The initial observation activity was carried out by researchers on January 27, 2021 at SDN Ardimulyo 01 which is located in Ardimulyo Village, Singosari District, Malang Regency. Based on these activities, data was obtained from the Principal of SDN Ardimulyo 01 that the online learning activities carried out at SDN Ardimulyo 01 were very fulfilled in terms of internet access accessibility via smartphones. One of the applications chosen by the teacher as an online learning medium is the Whatsapp Messenger application. Because through the Whatsapp application , teachers can take advantage of the group chat feature so that the learning process that takes place online can still produce good learning outcomes for students. This study aims to describe: (1) whether the use of WhatsApp groups in online learning can improve student learning outcomes. (2) what is the level of effectiveness of online learning by utilizing the WhatsApp group conducted by SDN Ardimulyo 01 . The reason why the researchers chose SDN Ardimulyo 01 to be the research location was because the location was accessible to the researchers, and learning at SDN Ardimulyo 01 was appropriate to meet the needs in the purpose of this study.

Previous research conducted by [2] showed that the results of learning carried out by mathematics teachers through the use of online media (interactive multimedia) helped students undergo online learning during the Covid-19 pandemic, indicated by the percentage results that used online media very effectively (23.3%), most of them rated it as effective (46.7%), and rated it as normal (20%). The difference between this study and previous research is that in research, the variety of digital learning used in learning media is mobile learning, while the research that will be carried out focuses

on learning media through social media, namely analyzing the effectiveness of the use of whatsapp group media as online media in online learning at SDN Ardimulyo 01. The reason the researcher chose the whatsapp group media for this study is because the whatsapp group media is a unique medium because it dominates in the pandemic learning solution in elementary school education.

2. METHOD

The research approach used in this research is a quantitative approach because the data used is in the form of numbers and the analysis uses statistics to make it easier for researchers to analyze data before and after the study. A quantitative approach is a method used to study a specific population or sample. The sampling technique is usually carried out randomly. Data collection using research instruments, and quantitative data analysis which aims to test the predetermined hypothesis [3]. The research instruments used in this study were tests, questionnaires, and documentation. The research stages began with data analysis through the prerequisite test, then continued with the t test to answer the first problem formulation, statistical tests to answer the second problem formulation, and hypothesis testing was also carried out.

The type of research is an experimental research. According to [3] ”the experimental research method is a research method used to find the effect of certain treatments on others under controlled conditions”. In addition, this experimental method is carried out with the aim that the hypothesis that has been formulated in Chapter I can be proven. According to [4] ”this form of experiment is a development of true experimental design, which is difficult to implement. This form has a control group, but it cannot fully function to control external variables that affect the experiment ”.

3. RESULTS AND DISCUSSION

Research activities were carried out starting from observation activities in January 2021 until this research activity was completed in March 2021. Before the research is carried out, first research instruments in the form of tests and questionnaires were tested to find the validity and reliability of instruments as a condition of a study because valid and reliable instruments can be used in research. The instrument trial was carried out at SD Negeri Ardimulyo 02 Singosari. The selection of SD Negeri Ardimulyo 02 as the place for instrument trials was because SDN Ardimulyo 02 also implemented *whatsapp groups* in online learning at this time and also the quality of schools between SD Negeri Ardimulyo

02 and SD Negeri Ardimulyo 01 were the same, namely both public elementary schools that were linear and had accreditation A. Instrument trials were carried out in class III with a sample of 20 students. The trial data of the research instrument were processed using the help of SPSS 24 with the first step, which is to calculate the validity.

3.1. Validity Test

Validity is carried out to find valid test items and questionnaires so that they can be used in research. Based on statistical calculations, there are 25 valid questions with a significance level of 5% calculated through SPSS 24. Statement items in the questionnaire were also calculated through SPSS 24 and obtained data on 20 valid statement items used. Each of the question items and statement items on the questionnaire has a calculated r greater than r table 0.444. The data on the validity of each instrument were then analyzed with the help of SPSS 24 to find reliability.

3.2. Reliability Test

Reliability is calculated to measure the extent of a research instrument's consistency in measuring what it measures. The reliability of the test in this study was analyzed using the *Cronbach Alpa* formula with the help of SPSS 24 from the calculation obtained an alpha coefficient of 0.887 in 25 question items. The alpha coefficient of 0.887 is included in the high reliability criteria so that it can be used in research. Meanwhile, for the questionnaire instrument, a calculation analysis was also carried out and an alpha coefficient of 0.911 was obtained in 20 statement items and was included in the very high reliability criteria so that it could also be used in research.

3.3. Pre-test-post test data on experimental and control class learning outcomes

Data on learning outcomes Theme 6 Sub Theme 4 in online learning by utilizing *whatsapp groups* are each presented in the form of a frequency distribution table as follows.

Based on the experimental class *pre-test* frequency distribution table above, it can be seen that the most students are in the class interval scores of 55-69 with a total of 15 students. The class score of the interval 70-84 is 12 students, the class score of

Table 1: Experimental Class Pre-test Frequency Distribution Data.

No.	Interval Class	Middle Value	F	Cumulative F
1.	0-39	19.5	0	0
2.	40-54	47	2	2
3.	55-69	62	15	17
4.	70-84	77	12	29
5.	85-100	92.5	1	30

the interval 40-54 is 2 students and the class score is 85-100 with the least number of students' frequency, namely 1 student.

Table 2: Control Class Pre-test Frequency Distribution Data.

No.	Interval Class	Middle Value	F	Cumulative F
1.	0-39	19.5	0	0
2.	40-54	47	3	3
3.	55-69	62	19	22
4.	70-84	77	7	29
5.	85-100	92.5	1	30

Based on the control class *pre-test* frequency distribution table above, it can be seen that the most students are in the class interval scores of 55-69 with a total of 19 students. The class score of the interval 70-84 is 7 students, the class score of the interval 40-54 is 3 students and the class score is 85-100 with the least number of students' frequency, namely 1 student.

Table 3: Experimental Class Post-test Frequency Distribution Data.

No.	Interval Class	Middle Value	F	Cumulative F
1.	0-39	19.5	0	0
2.	40-54	47	0	0
3.	55-69	62	1	1
4.	70-84	77	17	18
5.	85-100	92.5	12	30

Based on the *table of the frequency distribution of the post-test* experimental class above, it can be seen that the most students are in the class interval scores of 70-84 with a total of 17 students. Furthermore, the class score of the interval 85-100 is 12 students and the class score interval is 55-59 with the least number of 1 student.

Based on the control class *post-test* frequency distribution table above, it can be seen that the most students are in the interval class scores of 70-84 with a total of 20 students. Furthermore, the class score of the interval 85-100 is 7 students and the class score interval is 55-59 with the least number of 3 students.

Table 4: Control Class Post-test Frequency Distribution Data.

No.	Interval Class	Middle Value	F	Cumulative F
1.	0-39	19.5	0	0
2.	40-54	47	0	0
3.	55-69	62	3	3
4.	70-84	77	20	23
5.	85-100	92.5	7	30

3.4. Whatsapp group learning questionnaire data.

Data on student questionnaires about the effectiveness of online learning by utilizing *whatsapp groups* Data obtained from the entire population, namely class III SDN Ardimulyo 01 covering classes III A and III B with a total of 60 students. All statement items are summed up so that in the tabulation the data is supplemented with the number of learners' scores. Online learning questionnaire data by utilizing *whatsapp group* is also presented in the form of a recapitulation table of each statement item as follows.

Table 5: Recapitulation of Questionnaire Data and the Interpretation.

No.	Statement	Average	Percentage	Interpretation
1.	P1	4.05	48.3%	Agree
2.	P2	3.67	38.3%	Disagree
3.	P3	3.75	43.3%	Agree
4.	P4	3.62	43.3%	Disagree
5.	P5	3.50	51.7 %	Agree
6.	P6	3.82	53.3%	Agree
7.	P7	3.85	46.7%	Agree
8.	P8	3.00	48.3%	Disagree
9.	P9	3.35	50%	Disagree
10.	P10	3.47	46.7%	Disagree
11.	P11	4.18	46.7%	Agree
12.	P12	3.90	53.3%	Agree
13.	P13	4.00	51.7%	Agree
14.	P14	3.52	58.3%	Agree
15.	P15	3.47	38.3%	Disagree
16.	P16	3.23	53.3%	Disagree
17.	P17	4.02	56.7%	Agree
18.	P18	4.25	61.7%	Agree
19.	P19	3.88	60%	Agree
20.	P20	3.98	48.3%	Agree

Data analysis of the results of the study was carried out starting from the prerequisite test of analysis, namely through the normality test and homogeneity test on the test, then continued with the t test through different mean on the test, hypothesis test and descriptive statistics from the questionnaire data. Data analysis was carried out by means of manual count analysis and several tests were carried out with the help of the SPSS 24 application.

3.5. Normality Test

The normality test is used to measure the normal level of a data in a study. The data that is considered normal is L hitung >L tabel with a significance level of 5%. In this study, the normality test was carried out through SPSS 24 so that the results were normal, as can be seen in the following table of normality test results.

Table 6: Experimental and Control Class Pretest Normality Test Results.

Class	N	L Count	L Table	Information
Experiments (III A)	30	0.187	0.161	Normal
Control (III B)	30	0.170	0.161	Normal

Table 7: Experimental and Control Class Posttest Normality Test Results.

Class	N	L Count	L Table	Information
Experiments (III A)	30	0.171	0.161	Normal
Control (III B)	30	0.174	0.161	Normal

3.6. Homogeneity Test

The homogeneity test is one of the prerequisite tests in addition to the normality test. The homogeneity test is used as a test regarding the same variances of two or more distributions. As for the data that is considered normal, the value of the significance of the calculation is greater than the significance level of 5%. The homogeneity test conducted by the researchers used *lavene statistics* obtained from calculations through the APPLICATION OF SPSS 24 so that the results were homogeneous can be seen in the following homogeneous test results table.

Table 8: Experimental and Control Class Pretest-Postest Homogeneity Test Results.

Data	Significance Level	Significance Value	Information
Pretest	0.05	0.969	Homogeneous
Post	0.05	0.549	Homogeneous

3.7. Test t Difference Mean

After the prerequisite tests were carried out and it was discovered that the experimental class and the control class were normally distributed and homogeneous, then the next test was the t test. The t-test used in this study was through different mean which can be seen in appendix 16 page 130. The t-test was used by researchers to determine the effectiveness of learning from both classes, both experimental and control, respectively. The data from the research results that have been calculated, obtained the mean pre-test value of the experimental class, which is 68.53 and the mean post-test of the experimental class, which is 84.66, while, the mean value of the pre-test of the control class is 65.33 and the mean post-test of the control class is 80.66. Data from both experimental and control classes both produced improved learning outcomes, but in the experimental class it was higher than the control class. This means that the effectiveness of *learning whatsapp group* with synchronous online type is more effective than asynchronous online type *whatsapp group* learning.

3.8. N-Gain Test

Based on the mean value of each class, the *gain score* is calculated according to the data from the study, the gain *score* results can be obtained which can be seen as follows.

Table 9: Gain Score Data.

Data	Experimental Class (3A)		Control Class (3B)	
	Pre-test	Post-test	Pre-test	Post-test
Average Value	68.53	84.66	65.33	80.66
Gain Score	54.52%		45.54%	

The *gain score* of the experimental class is 54.5% while the control class is 45.5%, so it can be said that the *gain score* of the experimental class is higher than the control class. This means that there is an increase in learning outcomes in students after being given treatment in the form of a *synchronus* online communication type *whatsapp group* learning.

3.9. Hypothesis Test

1. Test Proportions one right party

Hypothesis testing is used to answer the first hypothesis, namely calculating the completeness of student learning *outcomes in online syncrhonus* type through *whatsapp group* where the hypothesized proportion value is 55% then a proportion test of one right party is carried out. The results of the calculation of the right-party proportion test are presented in the form of the following table.

TABLE 10: One Party Proportion Test Results Right.

Variable	Z count	From tables
Learning Outcomes	3.8533	1.645

The calculation results of the proportion test showed that z hitung = 3.8533. Then the results are consulted with the table value z using a real level of 5% then obtained ztabel = 1.645. Thus the result is 3.8533 > 1.645 or z hitung > z tabel then it can be concluded that $H_0$is rejected. This means that the learning outcomes of students in online learning by utilizing *synchronus-type Whatsapp groups* that reach KKM (75) are more than 55%.

1. CV Test

This second hypothesis test is used to find out whether there is any influence in online learning that has been carried out.

TABLE 11: CV Test Results.

Uji CV 1 (Pre-test)	CV Test 2 (Post-test)
6.22773	9.76811

From the CV test results, it shows that CV2 > CV 1. Thus H_0 is rejected which means, the learner's learning achievement is better after being given treatment.

3.10. Descriptive Statistical Test

The last test is a descriptive analysis test which is used to determine the level of effectiveness of online learning by utilizing *a Whatsapp group* at SDN Ardimulyo 01 taken from mean or average value data. Here are the results of the descriptive statistical test.

As can be seen in table 4.12, as a resultof a descriptive statistical test, there is an N or the number of valid variable data of 60 students. With a *minimum* value of 40 which

TABLE 12: Descriptive Statistical Test Results.

	N	Maximum	Minimum	Standard Deviation	Average
Total	60	40	100	11.335	74.50
Valid N (Listwise)	60				

indicates the lowest number of values from the questionnaire answer, *a maximum* value of 100 which indicates the highest number of values from the questionnaire answer, and a standard deviation value of 11,335 which shows the diversity of sample data, and there is a difference in *the mean* value of the entire data of 74.50 which states that the use of *whatsapp group* in online learning, the synchronous type of students at SDN Ardimulyo 01 is effective for use, because it is in the effectiveness interpretation range of 61–80. Meanwhile, the use of *whatsapp groups* in asynchronous type online learning of students at SDN Ardimulyo 01 produced data of 25.50 which is classified as less effective, because it is in the range of interpretation of effectiveness 21-40.

Based on research that has been conducted at SDN Ardimulyo 01 in grade III even semester of the 2020/2021 academic year with material on the theme 6 Energy and Its Change, Sub-Theme 4 Energy Saving, Learning 1-6 produces data and data analysis which shows that there is an increase in learning outcomes. Students seen from the increase in learning outcomes between pre-test and post-test after being given treatment in the experimental class, the gain score was higher than the control class and there was effectiveness in online learning that was taught by using WhatsApp group according to the exposure of the research results seen from the mean or average value in the questionnaire data of 74.5 which is in the range of 61-80 values so that it can be said to be effective to use.

The results of the first hypothesis are through the one-party right proportion test, to calculate the completeness of the learning outcomes of students in the syncrhonus type online via WhatsApp group where the hypothesized proportion value is 55% . The KKM value which is determined according to the school's stipulation is 75. The test of the proportion of this first hypothesis results in data that the learning outcomes of students in online learning by using the synchronus type WhatsApp group that exceed the KKM (75) are more than 55%. Furthermore, the second hypothesis test was carried out by means of CV test or coefficient of variance, to calculate the effect of using WhatsApp group in online learning in syncrhonus type of communication. This CV test is carried out by calculating the average value of learning outcomes divided by the standard deviation so as to produce data that there is an effect of using whatsapp group in online learning in syncrhonus type communication . Overall, online learning that is carried out by utilizing

the WhatsApp group in online learning syncrhonus communication type is effectively used and can be applied.

The process of distance learning based on electronic media or also known as E-learning is currently very influential in learning during the pandemic. According to [5] said that the current type of E-learning is generally divided into two categories, namely synchronous (synchronus) and asynchronous (asynchronous). In online learning, whatsapp groups can be a solution other than for communication but also as a medium of education. Teachers can carry out joint learning on the same schedule, wherever they are by using the WhatsApp group as a learning medium. [6] reveal that "the Whatsapp Messenger application is felt to have been able to increase student participation, accelerate the occurrence of study groups in building and developing science".

The effectiveness of learning is an important key to achieving the results of the learning process in accordance with the learning objectives. According to [7] defines "effective is a measure that states how far the target (quantity, quality, and time) has been achieved." The learning outcomes in this study are one of the answers to whether the learning carried out can be said to be effective. In accordance with the opinion that, in forming a model of effective learning there are indicators that underlie the effectiveness of learning elements, namely (1) the quality (quality), (2) the suitability (appreciate), (3) the reward (incentive) and (4) time (time).

4. CONCLUSION

Research on the analysis of the effectiveness of the use of WhatsApp groups in class III online learning at SDN Ardimulyo 01 can get the following conclusions. (1) Online learning carried out by utilizing the WhatsApp group at SDN Ardimulyo 01 can improve student learning outcomes. This conclusion is shown from the increase in learning outcomes between the pre-test and post-test after being given treatment with the gain score data for the experimental class of 54.5% while the control class is 45.5%, so it can be said that the gain score results of the experimental class are higher than the control class. (2) Online learning by utilizing the WhatsApp group at SDN Ardimulyo 01 is effectively applied. This conclusion is shown from the average overall data in the student questionnaire of 74.5 which is included in the category of interpretation value in the range 61-80, which is effective.

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