

The Effectiveness of Online Learning on the Achievement of Mathematics Learning Outcomes of Madinatul Ulum Tembelang High School Students

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ABSTRACT

The Covid-19 pandemic has hit all countries in the world, including Indonesia. Information from WHO that many have contracted and died. One way to break the chain of the spread of Covid-19 is to limit public interaction, which applies the term physical distancing. The government's decision to dismiss students, move the teaching and learning process at school to be at home by implementing the Work From Home (WFH) policy. As ASN teachers, teachers in an effort to carry out the learning process need to be done online (online). In improving the level of education, the government asks that all learning activities continue to be carried out using online learning. This study aims to determine the effectiveness of online learning on the achievement of mathematics learning outcomes for X grade students of SMA Madinatul Ulum Tembelang. The population in this study was class XA totaling 20 students. Research instruments and data collection used in the form of interviews, observation, questionnaires and tests (pretest and posttest). Based on observations, the research results show that the average value of the pretest learning outcomes test is 65,25, while the posttest score was 77,40. Furthermore, the results of the independent sample t-test show that there is an increase in the average value of the learning outcomes test in using online learning, where the results of the calculation of the $t_{count} > t_{table}$ ($0,000 > 0,5$) which means H_0 is rejected than H_a is accepted, meaning that it indicates the according to researchers, using online learning is effective in improving students mathematics learning outcomes. In this study, there was an increase in mathematics learning outcomes by using online learning in class XA students. So it can be concluded that from the results of research and discussion, there is the effectiveness of online learning on the achievement of mathematics learning outcomes for Madinatul Ulum Tembelang High School Students.

Keywords: Online Learning; Effectiveness; Math Learning Outcomes.

INTRODUCTION

The Covid-19 pandemic has hit all countries in the world, including Indonesia. Information from WHO that many have contracted and died. One way to break the chain of the spread of Covid-19 is to limit public interaction, which applies the term physical distancing. The government's decision to dismiss students, move the teaching and learning process at school to be at home by implementing the Work From Home (WFH) policy has made many parties nervous. The WFH policy is contained in the Circular Letter of the Minister of State Apparatus Empowerment and Bureaucratic Reform (PAN & RB) Number 50/2020 concerning the Second Amendment to the Circular Letter of the Minister of PAN & RB Number 19/2020 concerning Adjustment of the Work System of State Civil Apparatus in Efforts to Prevent the Spread of Covid-19. As ASN, teachers in an effort to carry out the learning process need to be done online (Mustakim, 2020). So that in improving the education level of students, the government asks all learning activities to be carried out using online learning activities. The quality of student human resources is determined by the teacher, so teachers as professional staff are required to improve their professionalism, especially in the delivery of material in online learning (Berliana, 2020).

Mathematics is one of the subjects that has formulas and subject matter that requires an understanding of concepts. Formulas in mathematics when they have been studied are not immediately thrown away or simply forgotten (Umaradiyah & Rohmah, 2021). These formulas will always be used

because in mathematics lessons, between topics are related to one another. The order of presentation of learning material is useful for determining the order in which to learn or teach it (Satiti, 2019). Some learning materials have prerequisite relationships that will make it difficult for students to learn them (Verdianingsih, 2020). The needs to be done especially the delivery of mathematics lessons because most students consider mathematics as a difficult subject. Mastery of mathematics from an early age needs to be instilled so that basic mathematical concepts can be applied appropriately in everyday life. In mathematics, it is very necessary for students to be equipped with the ability to think logically, analytically, systematically, critically and creatively (Depdiknas, 2006).

Based on data from one of the mathematics teachers at SMA Madinatul Ulum Tembelang that many students experience math problems that have an impact on the low achievement of students mathematics learning outcomes. Most students have learning difficulties. Various efforts made by the teacher can not be optimal on the results of learning mathematics in students. Because learning mathematics tends to make students passive in the teaching and learning process, which makes students feel bored so they are no longer interested in participating in the lesson. With this condition, it is better for teachers in the teaching and learning process to need an online learning approach that can directly streamline students in the teaching and learning process provided by the teacher. So that the solution to solving the problems experienced by students is the accuracy in choosing the appropriate online learning method. For this reason, the researcher intends to try out "The Effectiveness of Online Learning on the Achievement of Mathematics Learning Outcomes of Madinatul Ulum Tembelang High School Students".

METHOD

The method part of this research is about research that will be conducted at SMA Madinatul Ulum Tembelang. This approach is a quantitative approach and the type of research used is Quasi Experimental. This research design uses one group design, in this research design there is one experimental group that is given pre-treatment (pretest), then given final treatment (posttest). The population in this study were students of class XA SMA Madinatul Ulum Tembelang totaling 20 students, where class XA was the result of the experimental class test (pretest and posttest). In the number of samples used in this study were all students of class XA SMA Madinatul Ulum Tembelang and sampling using Sampling Purpovise. This research activity was carried out using online learning media. The research instruments used were interviews, observations, questionnaires and written tests (pretest and pottest). In the data collection technique, the first step is interviews conducted before learning, the second step is observation carried out during learning, the third step is giving questionnaires after learning and the fourth step is giving written tests (pretest and posttest) carried out before and after learning (Sugiyono, 2011).

In processing the data analysis of this study using for tests, namely the first validity test to test valid data that has high validity, otherwise an invalid data has low validity. This test uses the help of SPSS 16, both reliability tests are used to measure the same object, it will produce the same data (Arikunto, 2006). This reliability test is a requirement for testing the validity of data analysis and this test uses the SPSS 16 program, the three normality tests are to determine the distribution of the scores of each variable whether the data concerned is normally distributed or not (Sugiyono, 2006). And the fourth t test to test the significance of the research results in the form of the difference from the average value and the purpose of the t test to determine the data of these variables. This test uses the help of the SPSS 16 program (Winarsunu, 2002).

RESULT AND DISCUSSION

This research was conducted at SMA Madinatul Ulum Tembelang by taking a sample of class XA, which consisted of 20 students. This research was carried out with the aim of knowing "The Effectiveness of Online Learning on the Achievement of Mathematics Learning Outcomes of SMA Madinatul Ulum Tembelang High School Students". The research activity was carried out on April 21, 2021. The population in this study was class XA, which consisted of 20 students as the experimental class. Before the experimental class is given treatment, it must be known to have a balanced learning ability. Therefore, in this research activity was carried out with four data examiners.

Result

- Test Research Instruments
 - Validity test

Validity test to find out whether the questionnaire is valid or not. To find the response

questionnaire, the researchers used the help of the SPSS 16 program if $r_{\text{count}} > r_{\text{table}}$ then it was declared valid. The r_{table} value can be seen in the product moment r value table, if the number of respondents is 20 then $r_{\text{table}} = 0.444$. The calculation results are as follows:

Table 1. Instrument Validity Test Results

	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Total Score
Question 1 Pearson Correlation	1	.788**	.809**	.567**	.538*	.366	.356	.886**
Sig. (2-tailed)		.000	.000	.009	.014	.112	.124	.000
N	20	20	20	20	20	20	20	20
Question 2 Pearson Correlation	.788**	1	.612**	.588**	.610**	.272	.248	.840**
Sig. (2-tailed)	.000		.004	.006	.004	.246	.292	.000
N	20	20	20	20	20	20	20	20
Question 3 Pearson Correlation	.809**	.612**	1	.570**	.601**	.290	.201	.809**
Sig. (2-tailed)	.000	.004		.009	.005	.215	.395	.000
N	20	20	20	20	20	20	20	20
Question 4 Pearson Correlation	.567**	.588**	.570**	1	.615**	.165	.036	.720**
Sig. (2-tailed)	.009	.006	.009		.004	.486	.881	.000
N	20	20	20	20	20	20	20	20
Question 5 Pearson Correlation	.538*	.610**	.601**	.615**	1	.284	.232	.774**
Sig. (2-tailed)	.014	.004	.005	.004		.225	.326	.000
N	20	20	20	20	20	20	20	20
Question 6 Pearson Correlation	.366	.272	.290	.165	.284	1	.597**	.526*
Sig. (2-tailed)	.112	.246	.215	.486	.225		.005	.017
N	20	20	20	20	20	20	20	20
Question 7 Pearson Correlation	.356	.248	.201	.036	.232	.597**	1	.499*
Sig. (2-tailed)	.124	.292	.395	.881	.326	.005		.025
N	20	20	20	20	20	20	20	20
Total Score Pearson Correlation	.886**	.840**	.809**	.720**	.774**	.526*	.499*	1
Sig. (2-tailed)	.000	.000	.000	.000	.000	.017	.025	
N	20	20	20	20	20	20	20	20

Based on the validity test with the calculation of the SPSS 16 program, the following results are obtained as tables 1 and 2:

Table 2. Instrument Validity Test Results

Question Number	t_{count}	t_{table}	Information
1	0,886	0,444	Valid
2	0,840	0,444	Valid
3	0,809	0,444	Valid
4	0,720	0,444	Valid
5	0,774	0,444	Valid
6	0,526	0,444	Valid
7	0,499	0,444	Valid

The number of respondents in the questionnaire test was 20 students. From the validity test table using SPSS 16 for windows, it can be seen that the person correlation test value or $r_{count} > r_{table}$ shows that the questionnaire is declared valid.

- Reliability test

The reliability test was carried out to determine whether the questionnaire items presented were reliable in providing the results of measuring student learning. To test the reliability of the instrument in this study using the Alpha-Cronbach method with the help of the SPSS 16 program. The data for the reliability test was taken from the previous validity test data. Questionnaire items are said to be variable if $r_{table} > r_{count}$. The results of the reliability test can be seen in table 3 as follows.

Table 3. Reliability Test Results

Question Number	<i>Cronbach'Alpha</i>	Information
Question 1	0.793	Reliable
Question 2	0.806	Reliable
Question 3	0.813	Reliable
Question 4	0.832	Reliable
Question 5	0.819	Reliable
Question 6	0.852	Reliable
Question 7	0.870	Reliable

From the questionnaire item reliability test table, it can be seen that the value of Cronbach's Alpha (r_{count}) = 0.793 and (r_{table}) = 0.444. So $0.793 > 0.444$, which means that the questionnaire items are reliable.

- Hypothesis Prerequisite Test

- Normality test

This normality test is to determine that the distribution of the study does not deviate significantly from the normal distribution. In testing this normality has criteria if *Asymp. Sig (2-tailed)* > 0.05 then the data is not normally distributed. In this study the data collected in the form of pretest and posttest student learning outcomes. The results of normality are shown in the following table.

Table 4. Normality Test of Learning Outcome Test Values

		Experiment Pretest	Experiment Posttest
N		20	20
Normal Parameters ^a	Mean	65.25	77.40
	Std. Deviation	7.643	6.901
Most Extreme Differences	Absolute	.107	.099
	Positive	.065	.083
	Negative	-.107	-.099
Kolmogorov-Smirnov Z		.477	.443

Asymp. Sig. (2-tailed)	.977	.989
a. Test distribution is Normal.		

Based on the results of the normality test using the One-Sample Kolmogorov-Smirnov Test in table 4 above, it can be seen that the results of the normality test for the experimental pretest class showed a significant value of 0.977 and the experimental posttest class showed a value of 0.989. Based on the criteria for the pretest normality test, namely $0.977 > 0.05$, the test scores were normally distributed and the posttest normality test was $0.989 > 0.05$, meaning that the student learning outcomes test was normally distributed. So based on these results it can be concluded that the two test scores of experimental class students learning outcomes are normally distributed. As well as showing the average value (Mean) of learning outcomes in the experimental pretest, which is 65.25, while the score in the experimental posttest is 77.40. So the two experimental tests an increase in the average value of the learning outcomes test.

• Hypothesis Testing

Hypothesis testing is carried out in research analysis by using the t test. The t-test was used to analyze the effectiveness of online learning on the achievement of mathematics learning outcomes for Madinatul Ulum Tembelang High School students with the help of SPSS 16. Before testing the hypothesis, the hypothesis was first formulated. The hypothesis of this research is as follows:

• Alternative hypothesis (H_a)

There is the effectiveness of online learning on the achievement of mathematics learning outcomes for Madinatul Ulum Tembelang High School students.

• Hypothesis O (H_o)

There is no effectiveness of online learning on the achievement of mathematics learning outcomes for Madinatul Ulum Tembelang High School students.

Testing the hypothesis above is to determine the effectiveness of online learning on the achievement of mathematics learning outcomes for SMA Madinatul Ulum Tembelang students using the independent sample t-test. To facilitate the researchers in their calculations, the researchers conducted an independent sample t-test using the SPSS 16 program with the criteria for testing the hypothesis, namely if the probability (sig) > 0.05 , then H_o was rejected and H_a was accepted. Test independent sample t-test scores of students learning outcomes can be seen in the following table.

Table 5. Test Independent Sample T-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
Learning Outcomes Equal variances assumed	.059	.810	-5.277	38	.000	-12.150	2.302	-16.811	-7.489
Learning Outcomes Equal variances not assumed			-5.277	37.611	.000	-12.150	2.302	-16.813	-7.487

Based on the independent sample t-test in table 5 above, it can be seen that the result is a significant value of 0.000. So based on the criteria in the independent sample t-test test, it shows that $0.000 < 0.05$ then H_o is rejected and H_a is accepted, which means that there is an increase in the average value of student learning outcomes from the experimental pretest and posttest experiments.

Therefore, online learning is effective on the achievement of students mathematics learning outcomes in class XA SMA Madinatul Ulum Tembelang.

Discussion

This section will discuss the results of research that has been carried out at SMA Madinatul Ulum Tembelang. The approach in this study uses quantitative. The type of research used is Quasi Experimental with one group design. The population in this study was class XA with 20 students, where class XA was the result of the experimental class test. The samples taken were all students of class XA SMA Madinatul Ulum Tembelang using Sampling Purpovise. The research instruments used were interviews, observations, questionnaires and written tests (pretest and posttest). In data collection, the first step is interviews conducted before learning, the second step is observations made during learning, the third step is giving questionnaires after learning takes place and the fourth step is giving written tests (pretest and posttest) carried out before and after learning.

Table 6. Research Design

Group	Pretest	Treatment	Posttest
Experiment (E)	O1	X1	O2

Where is the picture of the average value of the pretest and posttest learning outcomes, the image is given as follwos.

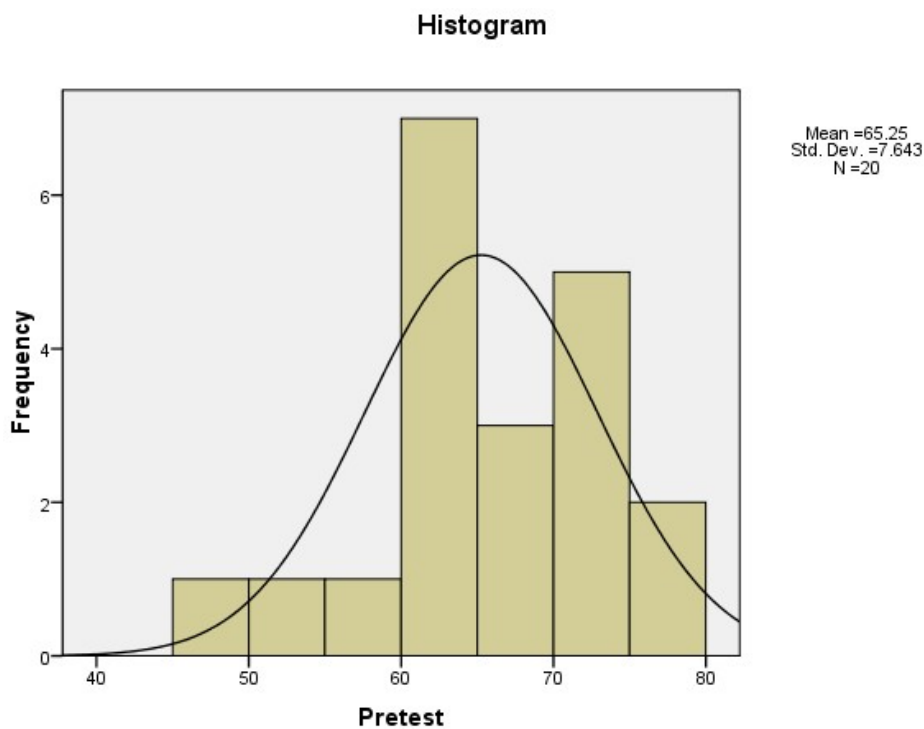


Figure 1. Learning Outcomes Before Treatment (Pretest)

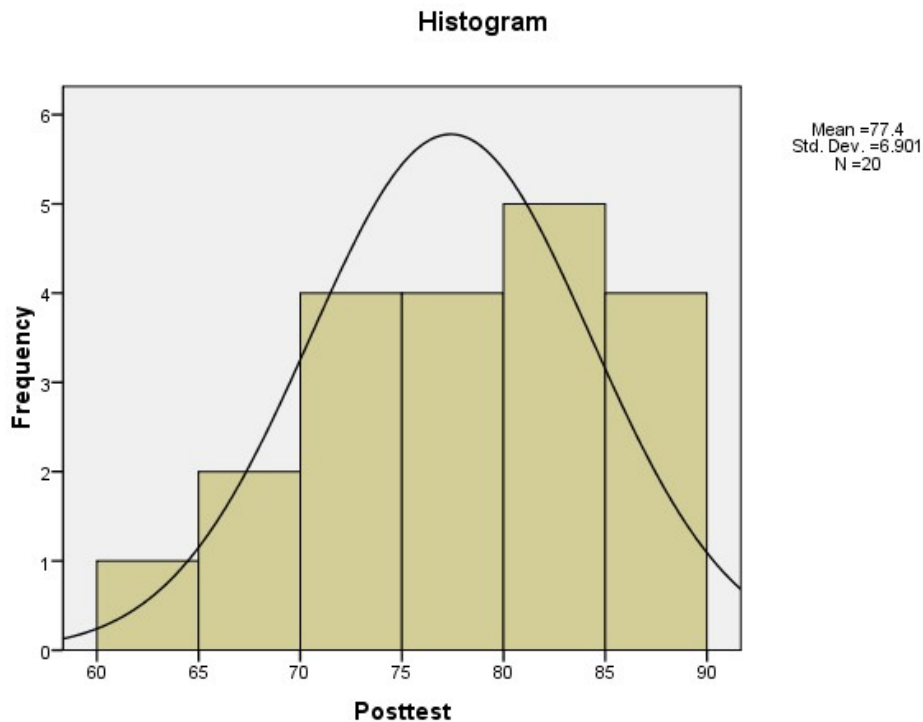


Figure 2. Learning Outcomes After Treatment (Posttest)

Based on the observations on the results of the study, firstly, to test the research instrument using the validity test, it can be seen that the value of table 2 in the questionnaire test is $r_{count} > r_{table}$, where $0.886 > 0.444$ is proven that the questionnaire is declared valid and the research instrument test using the reliability test can be seen in table 3 that Cronbach Alpha value is $r_{count} > r_{table}$, where $0.793 > 0.444$ it is stated that the questionnaire item is reliable. Second, for the hypothesis prerequisite test, using the normality test, in table 4 it can be seen that the results of the normality test using the One Sample Kolmogorov-Smirnov Test, based on the pretest normality test, which is $0.977 > 0.05$, that the experimental pretest value is normally distributed and the posttest normality test is $0.989 > 0.05$ that the experimental posttest value is normally distributed. So the results of the two tests can be concluded that the test scores of the experimental class students learning outcomes are normally distributed. And it shows that there is an increase in the average value of the learning outcomes test on the normality test, where the score on the experimental pretest is 65.25 while the score on the experimental posttest is 77.40. Furthermore, the results of the t-test (independent sample t-test) show that in table 5 there is an increase in the average value of learning outcomes tests in using online learning, where the results of the calculation of the value (sig) > are $0.000 > 0,05$ which means H_0 is rejected and H_a is accepted, meaning that the results of the t-test indicate that using online learning is effective according to the researchers in improving mathematics learning outcomes for Madinatul Ulum Tembelang High School students.

This study obtained the results that there was an increase in the average score of the mathematics learning outcomes test using online learning on the mathematics learning outcomes of students in class XA SMA Madinatul Ulum Tembelang. Based on the results of the researchers and this discussion, the authors conclude that there is an effectiveness of online learning on the achievement of mathematics learning outcomes for Madinatul Ulum Tembelang High School students.

CONCLUSION

Based on the results of the research and discussion, it was found that before students were given treatment (pretest) and after being given treatment (posttest), there was an increase in the average score of students mathematics learning outcomes tests that had been carried out in class XA SMA Madinatul Ulum Tembelang. In the average value of the experimental class student learning outcomes test, it was obtained that the student's experimental pretest score was 65.25 while the student's experimental posttest score was 77.40. And the results of the independent sample t-test test show a value of $0.000 > 0.05$ that there is an increase in the average value of the mathematics learning outcomes test in using online learning, where the calculation results show that H_0 is rejected and H_a is accepted, meaning that it shows

that using online learning is effective. According to researchers in improving student's mathematics learning outcomes tests. So that it can be obtained that there is an increase in the average score of students mathematics learning outcomes before being given treatment and after being given treatment.

So it can be concluded that in this study there was an increase in the average score of the mathematics learning outcomes test using online learning mathematics for class XA students at SMA Madinatul Ulum Tembelang. So that in the results of this research and discussion, there is the effectiveness of online learning on the achievement of mathematics learning outcomes for Madinatul Ulum Tembelang High School students.

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