APPLICATION: Applied science in Learning Research
Vol. 1 No. 3 February 2022, Page. 113- 117
E-ISSN: 2797-0655

The Effect of Online Learning on Mathematics Comprehension Ability in 10th Grade Senior High School

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ABSTRACT
The situation in Indonesia is currently being hit by the spread of COVID-19. A number of policies were immediately taken by the government to break the chain of the spread of COVID-19. One of the policies in the education sector taken by the government related to the COVID-19 case is Online Learning for students. Furthermore, the ability to understand mathematics is also important for students to have, because this ability is a prerequisite for someone to have mathematical problem solving abilities. This study aims to make readers aware of the effect of online learning on students' mathematical understanding abilities. This study uses a survey method directly to students in schools with quantitative descriptive research. Data collection techniques used are test and non-test techniques. The instrument used in this study was a test of the mathematical understanding ability of 10th grade high school students and a questionnaire questionnaire. The subjects of this study were the 10th grade students of MA Al-I'dadiyyah Bahrul Ulum as many as 27 students. Based on the results of hypothesis testing, the effect of online learning on mathematical understanding ability shows a significance value of 0.000 < 0.05, then o is rejected and is accepted, and the study concludes that online learning affects the mathematical understanding ability of 10th grade students of MA Al-I'dadiyyah Bahrul Ulum on matrix addition and subtraction operations.

***Keywords**: Online Learning*; *Mathematical Comprehension Ability.*

INTRODUCTION
Since President Joko Widodo announced the first case of COVID-19 on March 2, 2020, Indonesia has automatically become one of the countries affected by the Corona virus. A number of policies were immediately taken by the government to break the chain of the spread of COVID-19. One of the policies in the education sector taken by the government regarding the COVID-19 case is online learning for students. The use of online media or multimedia-based media is one solution to make students able to understand the subject matter well (Nur & Afidah, 2019) . The term e-Learning contains a very broad meaning, so many experts describe the definition of e-Learning from various points of view (Sholihah & Anantyarta, 2021). One definition that is quite acceptable to many parties, for example from Darin E. Hartley [Hartley, 2001] which states: "e-Learning is a type of teaching and learning that allows the delivery of teaching materials to students using the Internet, Intranet or computer network media. other." From the above definition it can be concluded that an educational system or concept that utilizes information technology in the teaching and learning process can be referred to as an e-Learning or online learning. This is like the research conducted by Sutini (2020), based on the results of the analysis and findings Researchers show that learning using Islamic school e-learning is quite effective to implement.This is because many parties support this learning, but there are several factors that can hinder learning so that it must be considered so that learning can run smoothly ().

Furthermore, the ability to understand mathematics is important for students to have, because this ability is a prerequisite for someone to have mathematical problem solving abilities. This is in accordance with the opinion of Sumarmo (2003) which states that mathematical understanding is important for students because it is needed to solve mathematical problems, problems in other disciplines, and problems

in everyday life, which is the vision of developing mathematics learning to meet today's needs. The ability to understand mathematics is one of the important goals in learning, providing an understanding that the material taught to students is not only memorised, but more than that with understanding students can better understand the concept of the subject matter itself. In general, indicators of mathematical understanding include: recognizing, understanding, and applying mathematical concepts, procedures, principles, and ideas. (Sumarmo, 2010:4).

Our research is research that focuses on online learning and mathematics. Thus, the purpose of this study was to determine the effect of online learning on students' mathematical understanding abilities. The formulation of the problem in this study is whether there is an effect of online learning on the mathematical understanding ability of grade 10 high school students.

METHOD

This study uses a pre-experimental quantitative research design with the design used is a one-shot case study. The form of this research design is that a group is given treatment, and then the results are observed. (Treatment is as the independent variable and the outcome as the dependent variable). This research was conducted on June 3, 2021 with the number of respondents being 27 students of class X. The subjects of this study were students. Researchers conducted research on all male students of class X. The data was obtained through the technique of understanding students' mathematical ability tests and questionnaires. This test is carried out by giving several math questions to measure the level of students' mathematical understanding abilities during online learning. While the questionnaire is done by making questions that are distributed to all respondents which aims to find complete information.

Furthermore, the collected data is analyzed for description. The respondent's sampling technique was carried out using the Simple Random Sampling technique. Simple Random Sampling technique is a technique of taking sample members from the population which is done randomly without regard to the strata that exist in the population (Sugiyono, 2012).

Data analysis is used to obtain conclusions about the effect of online learning on students' mathematical understanding abilities by using normality tests and hypothesis testing. Data analysis in this study was tested using the help of IBM SPSS Statistics 21.

RESULT AND DISCUSSION

At this stage the description is divided into two parts, the first part is the results of the research and the second is the discussion.

Result

The results of this study contain a description of the data from the test results of students' mathematical understanding abilities and the results of the questionnaire. The description of this data is intended to provide an overview of students' mathematical understanding abilities. General description of research data will be presented as follows.

- Results of Students' Mathematical Comprehension Ability Test

  Data on students' mathematical understanding abilities were obtained from the results of the description test (posttest) on the matrix addition and subtraction operation material. This test is given to students after being given treatment. Descriptive analysis of the scores of students' mathematical understanding ability test scores after online learning in grade 10 high school can be seen that the number of students who scored above the KKM was 27 with an average test of 87.22.

- Student Questionnaire Results

  The results of the calculation of the percentage of students' mathematical understanding ability questionnaires are presented in the following table:

Table 1. Percentage Results of Mathematical Understanding Ability Questionnaire

No	Value Interval	Category	N	F	Percentage
1	32 – 40	Good	27	25	92,6 %
2	23 – 31	Enough		2	7,4 %
3	14 – 22	Less		0	0 %
4	5 – 13	Not good		0	0 %
Amount			27	27	100 %

Based on the table above, it can be seen that the highest percentage of students' mathematical understanding abilities is 92,6%. Then the highest percentage results must be consulted with the percentage interpretation as follows.

Table 2. Categorization of Mathematical Comprehension Ability Data

Score Percentage	Category
$80{,}00\% \leq P \leq 100\%$	High
$60{,}00\% \leq P \leq 79{,}99\%$	Medium
$40{,}00\% \leq P \leq 59{,}99\%$	Less
$20{,}00\% \leq P \leq 39{,}99\%$	Low
$0\% \leq P \leq 19{,}99\%$	Very low

Based on the results of the highest percentage obtained, namely 92,6%, the percentage is found at the interval of 80.00%≤ P ≤100% which means high. So the value of students' mathematical understanding abilities is high.

After the description of the data from the results of the mathematical understanding ability test and the results of the questionnaire, the researchers then conducted a prerequisite test, namely the data normality test.

- Normality Test Students' Mathematical Comprehension Ability Test

The results of the normality test of mathematical understanding abilities in the form of a description test based on calculations assisted by IBM SPSS Statistics 21, can be seen in the following table.

Table 3. Normality Test Mathematical Understanding Ability Test

One-Sample Kolmogorov-Smirnov Test	
	TEST VALUE
N	27
Kolmogorov-Smirnov Z	1,218
Asymp. Sig. (2-tailed)	,103
a. Test distribution is Normal.	
b. Calculated from data.	

Based on the table above, it shows that the significance value of the Kolmogorof-Smirnov test from the description test of mathematical understanding ability is 0,103 > 0,05 level of significance, so it can be concluded that the data of students' mathematical understanding ability is normally distributed.

- Normality Test Student Questionnaire

The results of the normality test of students' mathematical understanding abilities in the form of a questionnaire based on calculations assisted by IBM SPSS Statistics 21, can be seen in the following table.

Table 4. Normality Test for Student Questionnaires

One-Sample Kolmogorov-Smirnov Test	
	QUESTIONNAIRE VALUE
N	27
Kolmogorov-Smirnov Z	,759
Asymp. Sig. (2-tailed)	,612
a. Test distribution is Normal.	
b. Calculated from data.	

Based on the table above, it shows that the significance value of the Kolmogorof-Smirnov test from the questionnaire is 0.612 > 0.05 level of significance, so it can be concluded that the students' mathematical understanding ability data is normally distributed.

The next test is hypothesis testing. The hypothesis test used in this study is a parametric statistical test, namely one sample t-test. The hypothesis used is as follows.

Ho : There is no significant effect of online learning on the mathematical understanding ability of Grade 10 Senior High School.

Ha : There is a significant effect of online learning on the mathematical understanding ability of Grade 10 Senior High School.

The results of hypothesis testing can be seen as follows.

- Hypothesis Testing Students' Mathematical Comprehension Test

The results of the hypothesis test of the description test with the one sample t-test on the mathematical understanding ability based on calculations with the help of IBM SPSS Statistics 21 can be seen in the following table.

Table 5. Hypothesis Testing Results of Mathematical Understanding Ability Test

One-Sample Test					
	Test Value = 0				
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference
					Lower
TEST RESULT	38,970	26	,000	87,22222	82,6216

Based on the table above shows that the value of t count is 38,870 with a significance of 0,000. The significance value shows 0,000 < 0,05, then o is rejected accepted, meaning that there is a significant effect of online learning on the mathematical understanding ability of Grade 10 Senior High School.

- Hypothesis Testing Student Questionnaire

The results of the questionnaire hypothesis test with one sample t-test on mathematical understanding abilities based on calculations with the help of IBM SPSS Statistics 21 can be seen in the following table.

Table 6. Hypothesis Testing Questionnaire Results

One-Sample Test					
	Test Value = 0				
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference
					Lower
QUESTIONNAIRE RESULTS	84,152	26	,000	34,88889	34,0367

Based on the table above, it shows that the value of t count is 84,152 with a significance of 0,000. The significance value shows 0,000 < 0,05, then o is rejected accepted, meaning that there is a significant effect of online learning on the mathematical understanding ability of Grade 10 Senior High School.

Discussion

In this discussion, the results of research data that have been carried out will be described, namely in the form of prerequisite test data and hypothesis test results data which will be explained below:

- Prerequisite Test Result Data

Analysis of the prerequisite test data before testing the hypothesis is the normality test. The results of the test for normality of the data distribution were tested using the Kolmogorov Smirnov technique using the help of IBM SPSS Statistics 21, which had a significant number greater than 0.05. This is shown from the data value of the mathematical understanding ability test result of 0.103. Meanwhile, from the questionnaire data, the mathematical understanding ability is 0.612. Both test and questionnaire data are normally distributed because the significance value is > 0.05.

- Hypothesis Test Results Data

The results of the research sample at MA Al-I'dadiyyah Bahrul Ulum whose learning uses an online system show significant results. This is in accordance with the average results of the description test scores (post-test) that were tested on students. The results of data analysis showed that the effect of online learning on the mathematical understanding ability of 10th grade high school students, both in the form of essay tests and questionnaires, was 0,000 < 0,05. It is clear that the average student description test results are 87,22 and the highest percentage of student questionnaire results is 92,6%.

The implementation of the online learning process cannot be separated from the understanding ability of students. Learning that goes well will have a good impact on students' understanding abilities, especially on mathematical understanding, and vice versa if learning does not go well it will have an impact on students' low understanding abilities. The ability to understand mathematics is one of the important goals in learning, providing an understanding that the materials taught to students are not only memorised, but more than that with understanding students can better understand the concept of the subject matter itself, especially in learning mathematics that is often considered difficult for students. The same thing has also been studied by Sobron Adi Nugraha, Titik Sudiatmi & Meidawati Suswandari from

Veteran Bangun Nusantara University Sukoharjo (2020), with the research title "Study of The Influence of Online Learning on Mathematics Learning Outcomes Class IV" which shows that there is an effect of using online learning media on the mathematics learning outcomes of fourth graders at the State Elementary School 01 Gentan Bendosari Sukoharjo in the discussion of fractions. And this research has several similarities with research by Sobron (2020) both in terms of online learning and learning mathematics.

Based on the description of the explanation and analysis of the research data, it can be stated that online learning can affect students' mathematical understanding abilities in the mathematics learning process, so it can directly be said that the hypothesis states that "There is a significant effect of online learning on the ability of class mathematical understanding 10 High School" is accepted.

CONCLUSION

Based on the results of research and discussion that have been described in the previous chapter, the researchers can conclude as follows. "Online learning has an effect on the mathematical understanding ability of 10th grade senior high school students. This is indicated by the results of the calculation of the one sample t-test formula that the t-count values in the description test and questionnaire are 38,870 and 84,152, respectively, with a significance of 0,000. The significance value shows 0,000 < 0,05, then o is rejected and is accepted, meaning that there is a significant effect of online learning on the mathematical understanding ability of Grade 10 Senior High School.

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