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Schoology-Based E-Learning: The Impact on Concept Understanding and Mathematical Communication Abilities

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Abstract

The purpose of this study (1) To find out the effect of schoology-based e-learning media on concepts understanding and mathematical communication abilities. (2) Knowing the effect of schoology-based e-learning media on the ability to understand concepts. (3) Knowing the effect of schoology-based e-learning media on mathematical communication ability. The study used a quasi-experimental design with Posttest-Only Control Design. Random sampling technique with a population of 259 students of class X MAN 1 East Lampung. The sample of the experimental class is 30 students, and the control class is 30. Collecting data in the form of tests, interviews, and documentation. The data analysis technique used is One-way Multivariate Analysis of Variance test with a significance level of 5%. The result of the study is (1) There is an effect of schoology-based e-learning media on concepts understanding and mathematical communication abilities, the F value is 3,821 with a significance of 0,042. (2)There is an effect of schoology-based e-learning media on the ability to understand concepts with an F value of 126.761. (3) There is an effect of schoology-based e-learning media on mathematical communication ability with an F values of 19.532. it can be concluded that schoology-based e-learning media is effective in increasing the concepts understanding and mathematical communication abilities. However, in this study, it has not emerged what learning model is used in applying the schoology media. Hence, when measuring mathematical communication ability, students only measure in the form of written communication (answers to description questions). Further research can be done by showing the use of appropriate learning models for schoology media. Also, the measurement of mathematical communication ability must also be considered in other forms, namely during discussion forums in schoology.

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INTRODUCTION

Mathematical science underlies the development of modern technology and plays an important role in various discipines and develops human thinking power (Darma et al., 2020). Some of the objectives to be achieved through learning mathematics in the 2013 curriculum are: (1) Understanding mathematical concepts that explain the interrelationships between concepts and using concepts in problem solving; (2) Communicating ideas, reasoning, and being able to compile mathematical proofs by using complete sentences, symbols, tables, diagrams or other media to clarify the situation (Anih, 2020).

Currently, Indonesian students' ability in mathematics from the results of the 2015 PISA test and survey is still low, this is evidenced by Indonesia only being ranked 63rd out of 69 countries evaluated (OECD, 2015). This has worsened with the Covid-19 pandemic and to anticipate transmission, the government has issued various policies, ranging from isolation, i, social and

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physical distancing to large-scale social restrictions (PSBB) (Hamid et al., 2020). Circular letter No. 4 of 2020 was issued concerning the Implementation of Educational Policies in the Emergency Period for the Spread of Corona Virus Diseases-19 (Covid-19).

Finally, learning must be carried out at home and through online media(Anih, 2020). The implementation of online learning is still ineffective because there are many obstacles for educators and students (Nissa, 2020). This is in accordance with findings of Megawanti's research which states that it is difficult for students to understand and master the subject matter because the teacher does not explain or the teacher is not clear in his explanation (Ningsih, 2020).

This is not much different from the situation of students at MAN 1 East Lampung. Based on the results of an intervies with one of the mathematics teachers named Mr. Mulyono, S.Pd., that many obstaces were encountered starting from network limitations, lack of teacher control over students and limited media in delivering learning materials so that the delivery of material was less than optimal. Some of the obstacles that occur will have an impact on the ability to understand students' mathematical concepts, the quality of understanding mathematical concepts also affects students' mathematical communication ability. This is because, if students do not understand correctly a mathematical concpt, of course students will not be able to explain or communicate their understanding (Widyastuti, 2015). Students can benefit from doing mathematical communication so that they can understand mathematics in depth(Tong et al., 2021). The Global Institute conducted a survey and found that the results of Trends in International Math and Science Study (TIMSS) in 2015 showed that Indonesia's achievements were still far away, below other countries, which is ranked 45 out of 50 countries, this is because Indonesian students are less able to reason when given questions in the form of pictures, graphs or tables so that students are only able to answer correctly by 4% when working on questions in the form of table/graphic data (Pitriani et al., 2019).

MAN 1 East Lampung still applies conventional learning media. Learning in the traditional way is to learn at school so that some students lack understanding of the topic at hand (Jung, 2011). The conventional learning media in this study is the use of whatsapp group media. Whatsapp is messaging *platform* that can be used in learning, where students are gathered in one group and the learning process is carried out in message either by writing, sound or pictures (Kusuma & Hamidah, 2020).

Based on the problems revealed, it is necessary to have a solution, namely using e-learning. Before the covid-19 pandemic, e-learning was a complementary media that only functioned as a complement to the learning process in the classroom(Hermawan, 2021). On the other hand, with technological advances, educator themselves learn to use all media for the advancement of their teaching(Hassan et. al., 2012).

E-learning is a general term that displays a variety of electronic-based learning (Ketabchi et al., 2008). Learning with e-learning is different from conventional learning. E-learning has several characteristics, namely first, interactivity, the availability of more communication lines. Second, *independency*, flexibility in terms of providing time, place, teachers, and teaching materials. This causes learning to be more students centered (student centered learning). Third, accessibility, learning resources are more easily accessible through distribution on the internet network. Fourth, enrichment, presentation, and training activities as enrichment. These four characteristics are the things that distinguish e-learning from conventional learning activities.

The benefits of e-learning are that students show that e-learning materials help them to understand better, stay focused on the material in class and ost importantly can review the material repeatedly(Wong, 2008). Other benefits are expected to trigger an increase in the quality of learning, and teaching materials, independence as well as communication between educators and students, and between students themselves(Alfiyandri et al., 2020). As a learning innovation that can help educators and students use the Software Learning Management System(Luckyardi & Rahman, 2021).

Now there are three lessons offered by e-learning that are currently popular, such as Edmodo, Moodle, and Schoology. Schoology was chosen as a learning medium because it has more complete specifications than Edmodo, Moodle, and WhatsApp group. This is based on the advantages of Schhology which has a variety of learning tools as it is done in the real world, ranging from checking attendance, tests, quizzes, to collecting student assignments that allow collaboration of various individual data, groups, and class discussions (Rizki et al., 2017).

This is supported by the results of research from Firdayanti Ektafia that the application of schoology-based e-learning is effective on the ability to understand mathematical concepts of class VIII SMP N 1 Sragi (Ektafia et al., 2021). In line with the research conducted by Lia Yulianah that schoology e-learning media can provide an understanding of the concept of the flat side of cubes and blocks for class VIII students in the Cihideunghilir Village, Cidahu District (Yulianah et al., 2020). Both studies have similarities with this study, namely the use of schoology media has an effect on understanding of mathematical concepts, while the difference from previous research is that researchers use e-learning media based on schoology for two abilities, namely the ability to understand concepts and mathematical communication ability. Based on the explanation above, the researcher is interested in conducting research entitled "The Effect of Schoology-Based E-Learning Media on Concept Understanding and Mathematical Communication Abilities."

METHOD

Types of Research

This study used a quasi-experimental design method. The design used in this study used a posttest-only control design. The data used is the final test of students' concept understanding and mathematical communication abilities, the data analysis technique used in this study is one-way multivariate analysis of variance test with a significance level of 5%. The thinking framework used in this study is presented as shown in Figure 1:

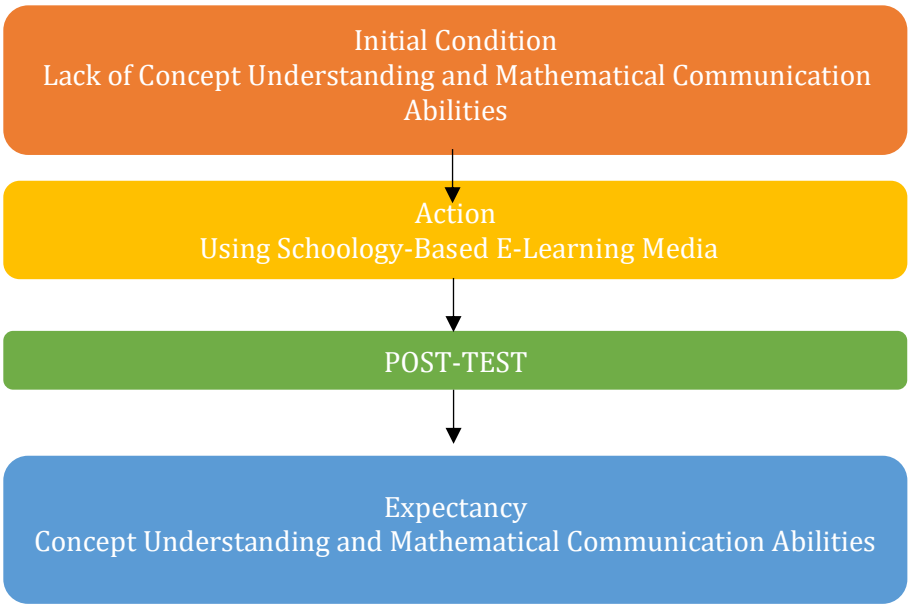

Figure 1. Thinking Framework

Place and Time of Research

The place of this research is in MAN 1 East Lampung. The time of the research was carried out in the odd semester of the 2021/2022 academic year.

Research Subject

The population in this study were all students in class X MAN 1 East Lampung, totaling 259 students. The sample at the time of the pre-study was class X IPA 1. The sample at the time of study consisted of class X IPA 2 totaling 30 students as the experimental class using schoology-based e-learning media and class X IPA 3 totaling 30 students as the control class.

Research Instruments

The instruments used in this study was a test in the for of interviews, documentation, 7 questions about description of the ability to understand concepts and 6 questions about the

description of mathematical communication ability. Figure 2 is an instrument about concept understanding.

1. What is meant by a three-variable system of linear equations in your opinion? Give general forms and examples!
2. Know the following equation:
   $10x + 2y – 2z = -3$
   $5x + 2z = 7 – 2y$
   $2x + 6y = 4- 2z$
   Which is called a variable, constanta, coefficient from the above equation?
3. Mrs. Mei went to a fruit shop to buy gifts for her three children. Mrs. Meli bought 3 bags of fruit to share with her children. The first bag contains 3 apples, 5 apples and 2 S*alak*. The second bag contains 2 apples, 3 oranges and 4 *Salak* fruit. While the third bag contains 6 apples, an orange and a *Salak*. The price of each bag is different. The price of the first bag is Rp. 17.500, the price for the second bag is Rp.13.500, and the price for the third bag is Rp. 17.500. turn it into math!
4. $X + y + z= 25/4$
   $X + y – z = 13/4$
   $(t^2 – 9) z = t – 3$
   What is the value of t so that the system:
   A. Has no solution
   B. One solution
   C. Infinitely many solutions
5. Using the substitution method, determine the solution set for the following three variable linear equation system (SPLTV) below.
   $x + y – z = -3$
   $x + 2y + z = 7$
   $2x + y + 2 = 4$

Figure 2. The instrument questions of mathematical concepts understanding ability

Instruments about mathematical communication ability is shown in Figure 3:

1. The average gestation period (in days) of elephants, rhinos and camels when added up is 1835 days. The gestation period of a rhino is 220 days longer than that of an elepant. Twice the gestation period of a camel and then added 20 days is the gestation period of an elephant. Make a mathematical model of the story problem above!
2. A number consists of three digits that add up to 11. The units digit is six more than the tens digit. If the hundreds digits and tens digits are swapped, then the same number is obtained. Determine the number!
3. A stationery store provides a variety of colored markers. The ratio of the number of blue markers and red markers is 4 : 3. The ratio between many red markers and black markers is 4 : 5. The number of the three types of markers is 240 pieces. If x, y, z, respectively represent the number of blue, re, and black markers, then the SPLTV which states the relationship between the three types of markers is…..
4. The perimeter of a triangular field is 95 m. let's say the triangle is abc. Length ab is 9 m longer than bc. The length of ac is 4 m less than the length of ab. Determine the form of SPLTV and the relationship between the lengths of the side of triangle abc?
5. One day Mr. Ardi, Mr. Fauzan, and Mr. Sobri went to a shop that sells baby fish. Mr. Arfii bought 2 baby fish of tilapia, 1 baby goldfish, and 4 baby fish of carp at a price of Rp. 84.000,00,-. Mr, Sobri bought 2 baby goldfish and 1 baby fish of carp at a price of Rp. 37.000,00,-. While Mr. Fauzan bought 3 baby fish of tilapia, 2 baby fish of carp at a price of Rp. 56.000,00,-. Which baby fish is the most expensive?
6. The average catch of Mr. Revan and Mr. Nanda is 49 quintals. The average catch of Mr. Revan and Mr. Tiyan is 47 quintals. While the average shrimp catch of Mr. Nanda and Mr. Tiyan is 48 quintals. Dtermine the average shrimp catch of Mr. Revan, Mr. Nanda and Mr. Tiyan!

Figure 3. Instrument questions of mathematical communication ability

RESULT AND DISCUSSION

Data Result of Concept Understanding Ability and Mathematical Communication Ability

The data from the posttest results of the ability to understand concepts of students in the experimental class, namely the class that applied the schoology-based e-learning media and the control class, namely the class that applied the WhatsApp group media, in the table 1,

Table 1. Data from the postest results of students' conceptual understanding abilities of the experimental class and control class

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
Experiment	30	83.3667	3.63397	78.00	91.00
Control	30	73.3667	3.56693	70.00	81.00

Based on table 1, it is found that for the experimentel class, namely the class that applies schoology-based e-learning media, the maximum value is 91,00 and the control class, namely the class that applies whatsapp group media, the maximum value is 81,00. The lowest score for the experimental class was 78,00 and the control class was at 70,00, the average of the experimental class was 83,3667 while the control class was 73,3667 and the standard deviation of the experimental class was 3.63397 while the control class was 3.56693. with the average difference in concept understanding ability is 0,06704 where the experimental class is higher than the control class.

Data from the *posttest* results of students' mathematical communication ability in the experimental class, namely the class that applied the schoology-based e-learning media and the control class, namely the class that applied WhatsApp group media as shown in table 2,

Table 2. The posttest data on the mathematical communication ability of students in the experimental class and the control class

Descriptive Statistics					
	N	Mean	Std. Deviation	Minimum	Maximum
Experiment	30	80.1000	7.40154	70.00	95.00
Control	30	72.0667	6.65885	60.00	87.00

Based on table 2 above, it is found that for the experimental class is 95.00 and the control class is 87.00, the lowest score for the experimental class is 70.00 and the control class is 60.00, the experimental class average is 80.100 ehile the control class is 72.066 and the standard deviation of the experimental class is 7.401 while the experimental class control is 6.658. with the average difference between mathematical communication ability of 0,743 where the experimental class is higher than the control class.

Research Data Analysis

Data Normality Test

The results of the analysis of the normality test of the ability to understand concepts using SPSS are in table 3,

Table 3. The correlation of SPSS results on concept understanding ability

One-Sample Kolmogorov-Smirnov Test			
N		Experiment	Control
		30	30
Normal Parameters[a,,b]	Mean	83.3667	73.3667
	Std. Deviation	3.63397	3.56693
	Absolute	.236	.227

Most Extreme Differences	Positive	.227	.227
	Negative	-.236	-.173
Kolmogorov-Smirnov Z		1.292	1.245
Asymp. Sig. (2-tailed)		.071	.090
a. Test distribution is Normal.			
b. Calculated from data.			

Based on Table 3, the normality test of concept understanding uses the Kolmogorov-Smirnov Test. The significance value of asymp.Sig. (2-tailed) in the experimental class of 0,071 and the control classof 0,09 > 0,05 it can be concluded that the grouping data is normally distributed.

The results of the analysis of the normality test of mathematical communication ability using SPSS are in the table 4,

Table 4. Correlation results SPSS communication ability

One-Sample Kolmogorov-Smirnov Test			
N		experiment	control
		30	30
Normal Parameters[a,,b]	Mean	80.1000	72.0667
	Std. Deviation	7.40154	6.65885
Most Extreme Differences	Absolute	.188	.178
	Positive	.188	.163
	Negative	-.146	-.178
Kolmogorov-Smirnov Z		1.029	.976
Asymp. Sig. (2-tailed)		.240	.297
a. Test distribution is Normal.			
b. Calculated from data.			

Based n Table 4, the normality test of concept understanding uses the Kolmogorov-Smirnov Test. The significance value of asymp.Sig. (2-tailed) in the experimental class of 0,240 and the control class of 0,297 > 0,05 it can be concluded that the grouping data is normally distributed.

Homogeneity Test

Homogeneity test was carried out to find out whether the samples had similarities or not. The homogeneity test used is the Barlett test. The following are the results of the calculation of the homogeneity of the concepts understanding ability in table 5,

Table 5. Test of homogeneity of variance on concept understanding ability

Levene Statistic	df1	df2	Sig.
.041	1	58	.840

The results of table 5 show the ability to understand the concept obtained a significance level of 0,840 because the significance value is > 0,05 it is said to be homogeneous.

The following are the results of the calculation of the homogeneity of mathematical communication skill on table 6,

Table 6. Test of homogeneity of variance on mathematical communication ability

Levene Statistic	df1	df2	Sig.
.777	1	58	.382

The results on table 6 show that mathematical communication ability is obtained with a significance level of 0,382 because the significance value is > 0,05, it is said to be homogeneous. Then,

because of it the concepts understanding, and mathematical communication abilities is homogeneous, MANOVA can be continued.

Hypothesis testing

After the two hypothesis test requirements, namely data that are normally distributed and homogeneous, are met, it is continued with the MANOVA hypothesis test. The MANOVA test was used to test whether there were differences in the dependent variables between different groups. The first test conducted was the Multivariate test with the help of the SPSS program. The test results can be seen in Table 7,

Table 7. Output Results of SPSS multivariate tests

	Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.998	15948.592[a]	2.000	57.000	.000	.998
	Wilks' Lambda	.002	15948.592[a]	2.000	57.000	.000	.998
	Hotelling's Trace	559.600	15948.592[a]	2.000	57.000	.000	.998
	Roy's Largest Root	559.600	15948.592[a]	2.000	57.000	.000	.998
Class	Pillai's Trace	.699	66.121[a]	2.000	57.000	.000	.699
	Wilks' Lambda	.301	66.121[a]	2.000	57.000	.000	.699
	Hotelling's Trace	2.320	66.121[a]	2.000	57.000	.000	.699
	Roy's Largest Root	2.320	66.121[a]	2.000	57.000	.000	.699
a. Exact statistic							
b. Design: Intercept + Class							

Based on table 7, the concepts understanding and mathematical communication abilities of learning media using Pillae Trace, Wilk Lambda, Hotelling Trace, Roy's Largest Root method H_0: $\mu_{13} = \mu_{23}$ is rejected because it has a significance smaller than 0,05. This means that the F values are all significant, so it can be concluded that there is an effect of concepts understanding and mathematical communication abilities between students who are taught using schoology-based e-learning media(X_1) and students who are taught using WhatApps group media (X_2).

Hypohteses 2) and 3) are carried out after knowing the hypothesis testing between all abilities, then testing the I nfluence between subjects/variables, namely tests of between-subject effects with the help of SPSS. Program. The test results can be seen in Table 8,

Table 8. The output results on SPSS tests of between-subjects effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Concept Understanding Ability	1622.400[a]	1	1622.400	126.761	.000	.686
	Mathematical Communication Ability	968.017[b]	1	968.017	19.532	.000	.252
Intercept	Concept Understanding Ability	370363.267	1	370363.267	28937.229	.000	.998
	Mathematical Communication Ability	347320.417	1	347320.417	7007.868	.000	.992
Class	Concept Understanding Ability	1622.400	1	1622.400	126.761	.000	.686
	Mathematical Communication Ability	968.017	1	968.017	19.532	.000	.252
Error	Concept Understanding Ability	742.333	58	12.799			
	Mathematical Communication Ability	2874.567	58	49.561			
Total	Concept Understanding Ability	372728.000	60				
	Mathematical Communication Ability	351163.000	60				
Corrected Total	Concept Understanding Ability	2364.733	59				
	Mathematical Communication Ability	3842.583	59				
a. R Squared = ,686 (Adjusted R Squared = ,681)							
b. R Squared = ,252 (Adjusted R Squared = ,239)							

Based on the results of the Manova test in Table 8 it can be concluded:

a. H_0: $\mu_{11} = \mu_{21}$ is rejected because the value of sig 0,00 < 0,05 means that there is an effect of schoology-based e-learning media on the ability to understand concepts caused by differences, with an F value of F 126.761.

b. H_0 : $\mu_{12} = \mu_{22}$ is rejected because the value of sig 0,00 < 0,05 then there is an effect on mathematical communication abilities caused by the difference, with an F value of 19.532.

Discussion

First Hypothesis Analysis

The analysis of the first hypothesis reads that there is an effect on the concept understanding and mathematical communication abilities between students who use schoology-based e-learning media with whatsapp group media. Based on the results of the MANOVA test analysis, it was obtained that the F value was 3,821 with a significance of 0,042, which was significant at a significance level of 0,05, this indicates that there is an effect on the concepts understanding and mathematical communication abilities caused by differences in learning media.

The results of the students' answers were analyzed according to the scores of each indicator of the students' concepts understanding and mathematical communication abilities. This is supported by the results of the hypothesis test of the difference between the two posttest averages, after doing the learning there is a difference in the average concepts understanding and mathematical communication abilities between classes that use schoology-based e-learning media and WhatsApp group media.

In the experimental class whose learning uses schoology-based e-learning, in this case class X IPA 2, students participate more actively, are more enthusiastic, and easily communicate ideas in participating in learning activities. This is because schoology provides more choices of resources than those provided by the platform, physical appearance that is packaged like social media facebook that can be used on mobile phones, availability of attance facilities, namely the attendance feature, schoology has a shelter for various types of questions that will be used during learning (Putri & Manoy, 2019).

This allows an increase in the ability of students to understand the concepts of the material that has been given, apply concepts of algoriths in problem solving, and be able to express everyday events with mathematical symbols in presenting mathematical ideas. And students can download the material whenever they want so that the material can be reviewed again so that it helps students absorb the material that has been taught by the educator. While the WhatsApp group in implementing this application was complained by some students due to the lack of interaction and educators tended to give assignments too often during distance learning.

After the learning acgivities ended, it was seen that there was an average difference in the concepts understanding and mathematical communication abilities. In the class that uses schoology-based e-learning media, the average concept understanding, and mathematical communication abilities of students is 7,07 while in the class with WhatsApp group media it is 5,53. Therefore, on the effect of the concepts understanding and mathematical communication abilities of students who use schoology-based e-learning media with WhatsApp group media, so that the application of schoology-based e-learning media is better than WhatsApp group media.

This study is also relevant to several previous studies, firstly research from Firdayanti Ektafia, Amalia Fitri, Muhamad Najibufahmi whose research results are the use of schoology-based e-learning media is effective in measuring the ability to understand mathematical concepts(Ektafia et al., 2021). Both studies from Lia Yulianah, Khomsatun Ni'mah, Diar Veni Rahayu whose research results are schoology-based e-learning media can provide concepts understanding, increase students motivation, can be used as an alternative to online learning both in pandemic conditions and normal conditions(Yulianah et al., 2020).

So it can be concluded that there is an effect on the ability to understand mathematical concepts and communication of students who use schoology-based e-learning media as indicated by the value of −< value of test criteria which causes to be rejected, so for the first hypothesis it can be concluded that there is an effect of ability understanding of mathematical concepts and communication ability between students who use schoology-based e-learning media and students who use WhatsApp group.

Second Hypothesis Analysis

The analysis of the second hypothesis reads that there is an effect of schoology-based e-learning media on the ability to understand mathematical concepts. Based on the results of calculations carried out using the MANOVA test, the second hypothesis was obtained, namely it can be concluded that there is an effect of schoology-based e-learning media on student's concepts understanding as indicated by the value of −< value test criteria which causes to be rejected.

The calculation results obtained from the learning treatment where the class that uses the schoology-based e-learning media is better than using WhatsApp group media. This can be seen in table 4.16, the data on the concept understanding ability test scores obtained data on the average value (73.3667) for the control class and the average value (83.3667) for the experimental class, where students in class X IPA 2 were more active and easier to participate in activities. Learning as well as with the facilities provided by schoology so that students are more enthusiastic because they are interested in how to use it and enthusiasm in learning so that it helps students absorb the material that has been taught and students can download material whenever they want so that the material can be reviewed differently from class X IPA 3 which tends to be monotonous so that students are passive (Adiatama, 2018).

This research also has relevance to Indah Adiatama's research explaining that the use of schoology-based e-learning media in learning mathemathics such as choology has proven to be more efficient for improving students' mathematical concept understanding abilities. This is in

accordance with research by Choirudin which states that schoology-based e-learning media is better than conventional learning (Choirudin, 2017).

Schoology that offers learning the same as in the classroom for free and easy to use like social media Facebook, maing it easier for students to follow learning. when students are able to follow the lessons given well, making it easies for students to understand the material presented, communicate ideas in an effort to solve problems mathematically, participate actively in discussions, and be accountable for their answers to problems(Dewimarni, 2017).

So, it can be concluded that there is an effect on the ability to understand concepts of students who use schoology-based e-learning media as indicated by the value □ − □□□□□ < value □ of test criteria which causes □$_{0}$□ to be rejected, so for the second hypothesis it can be concluded that there is an effect of schoology-based e-learning media on the ability to understand concepts.

Third Hypothesis Analysis

The analysis of the third hypothesis reads that there is an effect of schoology-based e- learning media on mathematical communication ability. The calculation results obtained from the learning treatment where the class that uses the schoology-based e-learning media is better than using the WhatsApp group media. This can be seen in table 8, the data on the concept understanding ability test scores obtained data on the average value of the control class and the average value of the experimental class, where students of class X IPA 2 are more active and easy to participate in learning activities and with the facilities provided by schoology so that students are more enthusiastic because they are interested in how to use it and are enthusiastic in learning so that it helps students absorb the material that has been taught by educators and students can interact not only focused in two directions but can also be done in many different directions with class X IPA 3 which tends to be monotonous so that students are passive.

This research also has some relevance to Setiyani's research which explains that students have a positive response to learning using schoology-based e-learning media, through this media students learn continuously without being limited by classrooms and are effectively used as learning media so that online learning is based on schoology is more effective in growing students' mathematical communication ability(Setiyani, 2019). This is supported by Andi Saparuddin Nur who explained that various research results have shown the successful use of schoology in mathematics learning so that it can be used as a reference so that learning obectives can still be achieved even though(Nur, 2020).

So, it can be concluded that there is an effect of schoology-based e-learning media on mathematical communication ability as indicated by the value □−□□□□□ < value □ test criteria which causes □$_{0}$□ to be rejected, so the third hypothesis can be concluded that there is an effect of schoology-based e-learning media on mathematical communication ability.

Based on the research that has been done, it shows that schoology-based e-learning media offers learning the same as in the classroom where this media helpad educators to plan, create and organize online teaching materials as well as facilitate interaction and access schoology at any time so that it affects the concepts understanding and mathematicals communication abilities.

CONCLUSIONS

Based on the research results obtained, it can be concluded that (1) There is an effect of schoology-based e-learning media on the concepts understanding and mathematical communication abilities, the F value 3,821 with a significance of 0,042. (2)There is an effect of schoology-based e-learning media on the ability to understand concept with an F value of 126.761. (3) There is an effect of schoology-based e-learning media on mathematical communication ability with an F value of 19.532. The use of schoology has proven to be effective in improving the concepts understanding and mathematical communication abilities. However, in this study, it has not emerged what learning model is used in applying the schoology media. Also, in this study, especially in measuring students' mathematical communication ability, only measured in the form of written communication (answere to description questions). Further research can be done by showing the use of appropriate learning models for schoology media. So, the measurement of mathematical communication ability must also be considered in other forms, namely during discussion forums in schoology.

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