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Utilization of Malmath ICT-Based Learning Tools on Student Learning Outcomes

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Abstract:
The aimed of this reseacrh was to find the effect of using the malmath application learning media on learning outcomes on the subject of boundaries for 1st semester students of the Departement of Informatics. The population in this research were 1st semester students of Informatics Departemen. The sample consists of two classes taken randomly. One class is used as an experimental class with the use of malmath application learning media called class TI batch 1 the other class is a control class with conventional methods, called class TI batch 5. The data instument used for 5 validated quations. The data analysis used was the t-test. The findings of this research are as follows: (1) student learning outcomes in the experimental class using malmath aplication learning media obtained an average value (X) = 79,34 and standard deviation (s) = 13,59, (2) studen learning outcomes in the conventional class using only conventional methods, the average value is obtained (X) = 64,44 and standart deviation (s)19,17. Thats means the student learning outcomes in the experimental class are better than those in the control class. Hypothesis testing show that t_{count} = -2,9127 dan t_{table} = 2,0227, for $\alpha = 0,05$ so that $-t_{\left(1-\frac{1}{2}\alpha\right)} < t_{count} < t_{\left(1-\frac{1}{2}\alpha\right)}$, from the t test results it is found that t_{count} is outside the t_{table} interval, it is realized that there is an effect the utilization of learning media for the malmath application on learning outcomes of STMIK Pelita Nusantara Medan students

Keyword: Learning Media, Maltmath Aplikation, Learning Outcomes

INTRODUCTION

The development of technology is increasingly advanced in various fields, one of which is in the fields of education and teaching. The progress in education and teaching can be seen in the use of media used in the learning process, where the media makes it easier for students to understand the material taught by educators. Therefore, it is necessary to increase the quality of education and teaching to deal with technological developments in the world of education.

This is in line with Y. Marpaung (2004) that: "Countries in the world are competing to improve the quality of their mathematics education because the role of mathematics is very important in the development of science and technology". And in line with what Suyanto (2005) states: "Mastery of science in which there is mathematics requires mathematics to be improved in order to adapt to changes and developments in science and technology".

Calculus 1 is a subject that is very tedious and difficult for students because the material is computation which is partly the same material as mathematics in school. This is because currently most mathematics lecturers still use learning methods that are centered on the lecturers themselves and this is not much different from those in school. Therefore, there is a need for changes and differences in the learning process by utilizing technology that supports the learning process.

The results of observations and interviews with students showed that it was very difficult for them to follow the calculus 1 course, especially on the limit material. This is caused by the lecturers' quick explanation. Therefore, it is necessary to have technology that can be used by students in exploring the material repeatedly outside the campus learning process so that students can better understand the material that the lecturer has explained and will explain. Learning media is a tool used in the process of teaching and learning activities so that lecturers can more easily convey the material being taught. ICT (Information and Communication Technology) is an information and communication technology system that is used as a medium in learning activities. According to Prahani, (2012) Information and Communication Technology (ICT) covers two aspects, namely information technology and communication technology. Information technology includes all matters relating to the process, use as a tool, manipulation, and information management. Communication technology is all things related to the use of tools to process and transfer data. Therefore, information technology and communication technology are inseparable. Both contain definitions related to processing, manipulation, management and transfer or transfer of information between media.

According to sahid (2012) the use of ICT-based media provides several advantages, including: 1) visualizing abstract concepts, 2) making it easier to understand difficult materials, 3) simulating processes that are difficult to do manually, 4) presenting learning material in various formats (multimedia) so that it becomes more interesting, and up to date from various sources, 5) enabling interaction between learners and learning materials, 6) accommodating differences in student learning speed and style, 7) overcoming limitations of space, time, and energy, 8) supporting change the role of the teacher in a positive direction as a facilitator and mediator, from its original position as the only source of knowledge, 9) improving the individual skills of its users.

According to Indri Yani (2019) Malmath is an application in solving math problems whose solution is completed with stages and graphs. The menus in Malmath include

1. Home: to direct you to the homepage.
2. Worksheet: to direct you to problem solver types.
3. Graph: to direct you to a graphical solution to a typed problem.
4. Problem generator: generates a random problem as said before.
5. Favorites: shows a list of solutions that you have added to favorites.
6. Share: to share solutions with friends or with the public via social media.
7. Save: saves a screenshot of the solution with the Malmath watermark.
8. Add to favorites: quite clear
9. Settings: takes you through the settings for additional options.
10. Send feedback: option to send the developer
11. Help: small tutorial with sample problems and solutions, to show how the application works.

The malmath application plays a very good role for students in solving math problems such as limits, trigonometry, integrals and others. Helping students study anywhere, because this application can be uploaded on a smartphone.

Learning outcomes are the final abilities of students in the learning process. Learning outcomes can be seen from the results of tests and tests after learning. Learning outcomes relate to the achievement in obtaining abilities in accordance with the specific goals planned. Before learning activities begin, the lecturer has arranged learning activities, namely SAP, where the SAP contains learning objectives that have been set by the lecturer first, therefore if the student has met or achieved the learning objectives set by the teacher, the student is said to be successful. in study.

RESEARCH METHOD

The population in this study were all students of the 1st half STMIK Medan Pelita Nusantara.

Sampling researchers conducted a randomized, meaning that every class has the same chance to be sampled. The sample in this research consists of two classes, one class is taken as an experimental class IT class A and one other class as the class of the control that IT classes B.

As for the variables in this study are:

1. Independent variable: is Malmath assisted learning and conventional learning.
2. Bound Variables: student learning outcomes after being treated in the form of teaching with different methods.

The objectives of this research are: To find out whether learning with ICT Malmath Learning Media is higher than conventional learning on the subject of Limits in 1st semester students of STMIK Pelita Nusantara Medan

This research was conducted at STMIK Pelita Nusantara Medan. Iskandar Muda Street no. 1 Medan.

This research method is a quasi-experimental. The study was conducted to determine differences in student learning outcomes in the experimental class and the control class by collecting the results of the tests carried out and then calculating the average, standard deviation, data normality test, homogeneity test and hypothesis testing.

RESEARCH RESULTS AND DISCUSSION

Description of Research Results

This research was conducted at STMIK Pelita Nusantara Medan on the students of class 1 and TI batch 5. The method of this research is experimental. This research involved two research groups, namely the experimental class in the TI class A and B TI control class. The experiment uses a learning model with Malmath software and the control class uses a conventional learning model.

This research method is a quasi-experimental research method. Quasi-experimental research or quasi-experimental research is basically the same as pure experimental research. Pure experimental research in the field of education, subjects, or research participants are selected randomly where each subject has the same opportunity to become research subjects. The researcher manipulates the subject according to the design. In contrast to quasi research, researchers do not have the flexibility to manipulate subjects, meaning that random groups are usually used as the basis for determining as a treatment and control group . The data of this study consisted of a final test on infinite limit material using a learning model with Malmath software. 2019.

In this study, researchers obtained data from the results of the final test (post-test) conducted on the experimental class and the control class. The results data obtained can be seen in the following table:

Table 1. Data Average Value of Student Learning Outcomes and Standard Deviation

Pembelajaran Konvensional		**Pembelajaran berbantuan Malmath**	
Tes Akhir		**Tes Akhir**	
$\overline{X}$	SD	$\overline{X}$	SD
69,44	18,62	79,35	13,59

Based on the table above, it is obtained from the results of the initial test in conventional learning with the average is 69.44 and the standard deviation is 18.62 and in learning with the help of Malmath the average is 79.35 and the standard deviation is 13.59. From the results obtained in the final test it can be concluded that learning with the help of Malmath software is higher than conventional learning.

Data Normality Test

Experiment Class

Table 2 the normality test of the experimental class pre-test data

Xi	**Fi**	**Fk**	**zi**	**F(zi)**	**S(zi)**	**|(F(zi)-S(zi))|**
60	3	3	-1,42	0,077	0,130	0,053
65	3	6	-1,06	0,145	0,261	0,116
70	3	9	-0,69	0,245	0,391	0,146
75	1	10	-0,32	0,375	0,435	0,060
80	3	13	0,05	0,52	0,565	0,045
85	2	15	0,42	0,663	0,652	0,011
90	4	19	0,78	0,782	0,826	0,044
95	1	20	1,15	0,875	0,870	0,005
100	3	23	1,52	0,936	1,000	0,064

The results of calculations for the final test (post-test) using Microsoft Excel on the treatment data of ICT Malmath learning media with a total sample of 23 students, the class average was 79.35 and the standard deviation was 13.59. From the critical value table L for the Liliefors test for n = 23 and the real level $\alpha = 0.05$, it is obtained $L_{table} = 0.185$, from the table above it is obtained that $L_{count} = 0.146$, then $L_{count} < L_{table}$ (0.146 < 0.185). Then the data above comes from a group of normally distributed samples

Control Class

Table 3 Normality test of the final test (post-tets) control class data

Xi	**Fi**	**Fk**	**zi**	**F(zi)**	**S(zi)**	**|(F(zi)-S(zi)|**
40	3	3	-1,28	0,101	0,167	0,066
50	4	7	-0,75	0,226	0,389	0,163
60	3	10	-0,23	0,408	0,556	0,147
70	2	12	0,29	0,614	0,667	0,053
75	2	14	0,55	0,709	0,778	0,069

85	1	15	1,07	0,858	0,833	0,025
90	1	16	1,33	0,909	0,889	0,020
95	1	17	1,59	0,945	0,944	0,000
100	1	18	1,86	0,968	1,000	0,032

The results of calculations for the final test (post-test) using Microsoft Excel on conventional learning treatment data with a sample size of 18 students, the class average is 64.44 and the standard deviation is 19.17. From the critical value table L for the Liliefors test for n = 18 and the real level α = 0.05, it is obtained L_{table} = 0.200, from the table above it is obtained that L_{count} = 0.147, then $L_{count} < L_{table}$ (0.147 < 0.200). Then the data above comes from a group of normally distributed samples.

Homogeneity Test

Table 4 Homogeneity

	Variable 1	*Variable 2*
Mean	64,44444	79,34783
Variance	367,3203	184,7826
Observations	18	23
Df	17	22
F	1,987851	F hitung
P(F<=f) one-tail	0,065239	
F Critical one-tail	2,113771	F tabel

From the calculation results obtained the initial test data Fcount = 1.987851. After comparing the price of F_{count} with F_{table} with the real level α = 0.05, the value of F_{table} = 2.113771 is obtained. It turns out that $F_{count} < F_{table}$ (1.987851 < 2.113771), so student learning outcomes for both classes have the same variance in other words the two classes are homogeneous

Hypothesis testing

Table 5 Hypothesis Test

	Variable 1	*Variable 2*
Mean	64,44444	79,34783
Variance	367,3203	184,7826
Observations	18	23
Pooled Variance	264,3503	
Hypothesized Mean Difference	0	
Df	39	
t Stat	-2,91275	t hitung
P(T<=t) one-tail	0,00295	
t Critical one-tail	1,684875	
P(T<=t) two-tail	0,005901	
t Critical two-tail	2,022691	t tabel

From the data obtained t_{count} = -2.91275 and the value of t_{table} at dk = 39 and the real level α = 0.05 is t_{table} = 1.684875. In accordance with the criteria for testing the hypothesis,

accept H_0 if $-t_{\left(1-\frac{1}{2}\alpha\right)} < t_{hitung} < t_{\left(1-\frac{1}{2}\alpha\right)}$, it turns out that t_{count} is not in that interval, H_0 is rejected and Ha is accepted, which means that there are differences in student learning outcomes using the assisted learning application Malmath with conventional learning.

CONCLUSION

By using Microsoft Excel to obtain the t-test results in the experimental class, the post-test average was 79.34, with a standard deviation of 13.59. And the results of the t test in the control class using Microsoft Excel obtained an average post-test of 64.44 with a standard deviation of 19.17.

Furthermore, based on the t test obtained the value of t count = -2.91275. The value of t table with df 39 at the 5% significance level is 1.684875. Therefore $t_{count} < t_{table} < t_{count}$ (-2.91275 < 2.022691 < 2.91275), so it can be stated that there is a significant increase in student learning outcomes scores in the experimental group or those using ICT Malmath learning media.

ICT Malmath learning media is a learning medium that makes it easier for students to solve practice questions. With the help of Malmath students can solve various questions such as limits, trigonometry, integrals and others.

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