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**Study Anywhere and Anytime, not  
Necessarily in Class**

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## Study Anywhere and Anytime, not Necessarily in Class

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### Abstract

In the current era of globalization, there are many technologies that can be used as a medium of learning in the process of learning mathematics. Educators have not used much of the development of technology to be used as a medium of learning. Internet technology is one technology that enables everyone to do learning in mobile or can be called mobile learning (m-learning). The combination of telecommunication with internet technology can enable the development of m-learning system as a learning medium. This study was conducted to see whether the use of mobile phones in learning activities have been applied and able to improve the results and motivation of learning from students in learning mathematics. The study was conducted using descriptive test and questionnaire in public schools in Indonesia. The results obtained show that 100% of school students already have android smartphone. This can be used as a learning medium that can overcome the problem of lack of school study time, and lack of learning materials so as to improve student learning achievement.

**Keywords:** Distance learning, ICT, learning activities, m-learning.

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### Introduction

Mathematics is one of the subjects that becomes frightening to students. The lack of media and information sources and the time spent in studying that is very minimal for the difficulty of this lesson is one of the factors causing low interest and student learning outcomes. Especially in Indonesia the result of learning and student interest in learning mathematics is still very low, learning resources are minimal and the use of learning media is still very less is the factor. The state of the development of the science of communication technology becomes a new challenge in the world of learning mathematics, turning it from conventional learning into virtual learning by using some advantages of technological progress (Umoh, 2014). But the problem lies in limited media such as computers, internet networks, learning content and lack of students and educators in the field of ICT. (Jarvis, 2012; Misfeldt & Sanne, 2012)

In the current era of globalization, there are many technologies that can be used as a medium of learning in the process of learning mathematics. Educators have not used much of the development of technology to be used as a medium of learning. Internet technology is one technology that enables everyone to do learning in mobile or can be called mobile learning (m-learning). The combination of telecommunication with internet technology can enable the development of m-learning system as a learning medium. This is in line with Martinez's (2014) research on the Development of a Mobile Service on a Wifi Network for the Evaluation of Mathematical Skills which demonstrates that with the development of online evaluation systems through mobile phones make the assessment process easier and more effective.

Currently, m-learning technology is still in the process of development. However, m-learning technology as a medium of learning is one of the prospective technologies in the future. On the other hand, m-learning technology has several limitations, among others: the limited amount of power, the memory capacity is not as big as the computer, the processing speed is not as fast as the computer, the monitor is smaller than the computer. Therefore, m-learning applications should be designed more effectively, efficiently, and optimally to overcome their limitations.

### Using Smartphone

The use of Smartphone as a learning media is certainly interesting and practical, because it can be accessed anywhere and anytime. This is in line with Deo Shao's (2014) study of MoMath: An Innovative Design of a

Mobile based System for Supporting Primary School Mathematics in Tanzania, which shows that over 50% of teachers and students in primary schools in Tanzania like MoMath because it is easily accessible and used anywhere.

In Indonesia itself, especially the ownership of mobile phones based on android or smartpone is up among students, maybe even no students who do not have a smartpone. However, learning-based mobile learning innovation has not been widely developed in Indonesia. Study conducted to determine availability, accessibility and impact of using mobile learning on student learning outcomes. Some questions are given in the form of questionnaires to know availability and accessibility and student responses in the use of m-learning in learning mathematics. And a test is also given to see the impact on student learning outcomes, as for questions given in the form of a study. The questions in Table 1 were given to find out the availability of tools before conducting research.

Table 1. Availability of tools

No	Availability	Yes	No
1.	Do you have at least 4.5 android smartphone		
2.	Do you have a laptop/notebook		
3	In a day how long do you use your mobile/smartphone		
		<3 Hours	
		3 hours - 8 Hours	
		> 8 hours	
4	Sites or social media frequently visited		
		Facebook	
		Blog	
		Instagram	
		Youtube	
		Others ....	
5	Approve you if the smartphone is used as a medium of learning		
6	Duration Learning outside of school time		
		<3 Hours	
		> 3Hours	
7	Learning resources used in school or home		
		Book	
		E-reader	
		Learning Forums	

## Method

The research was conducted in secondary schools in Indonesia using 2 ways, the first was to use a questionnaire given to 75 students aimed at knowing the availability, accessibility and perceptions of students about the use of Smartphones as a medium of mathematics learning. to 75 students divided into 2 classes namely 38 students as the experimental class and 37 students as the control class to see whether the use of smartphones can improve student learning outcomes. This study uses face-to-face learning designs and online systems (on the network) using a smartphome as learning media and social media like Facebook, blogger etc, as communication forum and e-reader service provider as student learning material. So that little time in school can be overcome by learning anywhere and anytime

## Results

Results from the questionnaire given to 75 samples are given in Table 2. From the above results it can be seen that 100% of samples have smartphones, while only 13% have laptops or notebooks, for the duration of smartphone usage it is found that 67% of students use smartphones 3-8 hours / day, and 13% use them over 8 Hours a day. No students are using their smartphone for less than 3 hours a day. This shows that smartphone usage is more dominant than learning activities outside school. From the duration of smartphone usage obtained that the most visited sites by students is social media Facebook, which is 100% proves that Facebook is not something new and foreign for school students. While the blog is only 20% only. The use of smartphones is

everyday life beyond the time spent by students to learn. In a day the students only learn less than 3 hours. The sources or learning media used by students are just books. Even 33% have no learning resources.

Table 2. Results of Questionnaire

No	Availability	Yes	No
1.	Do you have at least 4.5 android smartphone "	75	0
2.	Do you have a laptop, / notebook	10	65
3	In a day how long do you use your mobile / smartphone		
	<3 Hours	0	
	3 hours - 8 Hours	50	
	> 8 hours	25	
4	Sites or social media frequently visited		
	Facebook	75	
	Blog	15	
	Instagram	60	
	Youtube	55	
	Others ....	-	
5	Approve you if the smartphone is used as a medium of learning	75	
6	Duration Learning outside of school time		
	<3 Hours	75	
	> 3Hours	0	
7	Learning resources used in school or home		
	Book	55	
	E-reader	-	
	Learning Forums	-	

The use of e-reader and learning forum has not been maximized so researchers research by using android-based smartphone to maximize it by providing e-reader services on a blog and create a forum to learn on Facebook so that students can discuss with others or tutors about the constraints faced In learning mathematics. This allows creating new learning styles that do not know the time and place, wherever and whenever using a smartphone. Learning in the experimental class is designed with a network assignment method, where each class member is inputted into a group on social media (Facebook, Whats Up, telegram). Next the researcher creates a mini web that must be accessed by each class member, in which there is an assignment that must be done. Learning forums on social media are used by researchers to distribute teaching materials in the form of e-readers and learning videos. By using this method, learning outside the classroom can be maximized. In the class, students only review the tasks they have received and do the work. Discuss the obstacles and difficulties that they have acquired.

**Results of Statistical Calculations**

The results of the research conducted in the control group and the experimental group calculated using SPSS were obtained as follows

Table 3. Similarity test

		N	Mean	Std. Deviation	Std. Error Mean	t	p
Kemampuan awal	Kelas	38	63.74	4.58	.74	1.912	.060
	Expetiment						
	Kelas Control	37	61.73	4.51	.74		

From the data in Table 3 it appears that, the result of the average equality test using the F test obtained Fcount = 0.350 with Ftable (1; 73) = 0.972. Since Fcount = 0.350 < Ftable (1; 73) = 3.972. Thus there is a similarity of variance between the two groups, so it can be said that both groups have the same initial ability. Homogeneity test is a test determine whether between two independent variables have the same variance or not. Homogeneity test used in this research is Levene Statistic test. From the calculation for homogeneity using SPSS version 11.5 it was found that the probability value of Levene Statistic test of learning achievement Fcount = 0,023 Table F = 3,972 and probability = 0,880 > 0,05, H0 is accepted which means that both samples have homogeneous variant.

ANOVA test, the results of the calculation of the two-way variance analysis with the cell is not the same as the significance level  $\alpha = 5\%$  using SPSS shown in Table 4.

Table 4. Results of ANOVA analysis of two paths with cells not equal

Sumber Variansi	Jk	df	Rk	F <sub>hitung</sub>	F <sub>tabel</sub>	Sig
Metode	597.305	1	597.305	8.833	3.980	0.004
Aktivitas	955.290	2	477.645	7.063	3.130	0.002
Error	4666.042	69	67.624	-	-	-
Total	316250.000	75	-	-	-	-

From Table 4, it appears that  $F_{\text{arithmic}} = 8.833 > F_{\text{table}}(1; 69) = 3.980$  and probability =  $0.004 < 0.05$  with  $\alpha = 5\%$ . Thus there is influence of learning achievement of mathematics between students who are given learning by using M-learning media using Smartphone with students who do not use m-learning media. Furthermore, the average score of learning achievement for the control group was 61.49 while the experimental group was 66.97. Thus it is clear that learning by using learning media is better learning achievement than on learning by conventional method. In addition, on learning by using smartphone media, students are more enthusiastic in following the learning. This is indicated by the responses of students who are more active in the classroom or in the forum provided.

Furthermore, from Table 5 it also appears that  $F_{\text{arithmic}} = 7.063 > F_{\text{table}}(2; 69) = 3.130$  and probability =  $0.002 < 0.05$ . Thus there is a significant student learning achievement in terms of high, medium, and low student learning activities. It can be stated that students who have high learning activities have a better influence on the achievement of learning compared with students who have medium learning activities. In addition, students who have learning activities that are having a better influence on achievement of learning compared with students who have low learning activities. This is due to the use of computer-based learning media can cause a special attraction for students, both from the category of high, medium and low learning activities to pay attention and understand the subject matter given. With students interested in math lessons, then students will play an active role in teaching and learning process.

## Conclusion

This study found that the use of technology as a medium of learning, in this case M-learning is one solution that can be offered to overcome the problems in learning mathematics such as lack of teaching materials or learning resources and the lack of time used to study in school. The result found by optimizing the use of smartphones as a learning media students become more active in activities and improve student achievement.

## Recommendations

For future research, the use of applications that can be used in mobile learning can be done, teachers who have not been able to use m-learning to attend training in order to optimize the impact of technological progress.

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