Android-Based Mobile Learning : Its Effect on Students' Learning Achievement

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Abstract— **Android-based mobile learning in learning strategy courses is a product that has been developed. Previously this media had gone through a testing process and tested it valid and practical. And as a sequel, in this study researchers will explore information about the effect of Android-based mobile learning on student achievement. This experimental study used one group pretest-posttest design and was participated by 19 student. The instrument used in this study is a test of student learning achievement. The Data was tested using the Paired t-test (SPSS 22). The results showed that a significant value of less than 0.05 (0,000 <0.05), which means that there is a significant difference between students pretest and post test scores so that it can be concluded that Android-based mobile learning is effectively used in the Learning Strategy course Educational Technology Study Program, Faculty of Teacher Education, Baturaja University.**

Keywords: mobile learning, android, students's learning achievement

I. INTRODUCTION

The progress of science and technology (Science and Technology) is expected to help improve the quality of learning. In universities, especially Baturaja University, the utilization of science and technology is centered on the use of information and communication technology in every learning system both on media and learning models. One form of its utilization is the application of e-learning in learning. Information and communication technology is utilized as the main facility in implementing e-learning learning models. According to Clark and Mayer e-learning has characteristics in the form of content that must adapt to learning objectives, use effective learning methods, have visual and textual elements, use independent learning approaches, and form a deep understanding and skill in individuals[1].

In its implementation, instructional media in learning strategy courses have used ICT in the form of PowerPoint and Edmodo-based presentation media as part of e-learning. However, this apparently is not enough to overcome the time and place efficiency problems that are often faced by students.

In the course material that is theoretical or conceptual, it is important to use learning media. This is used to facilitate students in understanding concepts and theories.

Based on the phenomena that occur in the community, smartphones become a part of primary needs that cannot be separated in the necessities of daily life. However, smartphone ownership is only used as a trend and lifestyle so that its use tends only to be used as a means of communication and less exploiting the potential of various smartphones. Smartphone features that can access many applications are positive things that can be utilized. Therefore the Educational Technology Study Program of the University of Baturaja has developed an Android-based mobile learning product on the subject of learning strategies that have been tested for validity and practicality. But the Android-based mobile learning is not yet known its effect on student learning achievement. On this basis, this research was conducted with the aim to see the effect of android-based mobile learning media on student learning achievement that are expected to be a consideration for users, students and lecturers to be used as a variety of instructional media that has been proven to be viable, valid, practical and effective on student learning achievement.

Research on the influence of Android-based mobile learning has been conducted by Shofiyah (2016). In this study, there is a significant influence on the use of mobile learning based on Android in social studies subjects with a t value greater than t-table (3.204> 2.01), which means that social studies learning using Android-based mobile learning as a instructional media can improve learning achievement [2].

A. E-Learning

Agustiawan and Subagyo point out that e-learning is learning the material through electronic media such as audio/videotape, cd-rom, tv, satellite, and computers both connected via the internet/intranet or stand-alone computer[3]. Suteja and Harjoko argued that information and communication technology was made as the main element that supports the implementation of independent learning through e-learning. [4].

Put, Horton defines "e-learning is the use of information and computer technologies to create learning

experiences". Horton's opinion can be interpreted as e-learning as all forms of use of information and computer technology to create learning experiences. This definition emphasizes how learning experiences are formulated, organized, and created through e-learning tools[5]. Based on some expert opinions, e-learning is an innovative approach to learning that is facilitated and supported independently by internet and web technology to create learning facilities anywhere, for anyone and at any time..

B. Mobile Learning

Mobile learning (m-learning) uses cellular devices and devices / information technology (IT) in learning [6]. M-Learning is part of e-learning so in other words mobile learning is part of distance learning [7]. Some important abilities that must be provided by m-Learning learning tools are connections to computers to present teaching materials and interactive tools for instructors and students.

Facts on the ground that cellular users in Indonesia are very large so that it can be used as a basis for the implementation of mobile-based learning as a solution to solving learning problems. This is because mobile learning can be used as a medium for student learning without being limited to time and place. The practical characteristics of mobile learning that is easy to carry everywhere are one of the reasons mobile learning is in great demand. With mobile connected to the internet, it is certain to be able to explore any world, including in finding teaching materials that support the pursuit[8].

Wirawan stated that the term mobile learning can be said as an instructional media that utilizes cellular technology as part of the development of E-Learning.The term Mobile learning refers to handheld and mobile IT devices which can be in the form of PDAs (Personal Digital Assistants), cellular phones, laptops, tablet PCs, and so on. Mobile learning can make it easier for users to access learning content anywhere and anytime, without having to visit a particular place at a certain time. Mobile learning is related to learning mobility, in the sense that students should be able to engage in educational activities without having to do it in a certain physical location [9].

Clark Quinn states that mobile learning learning resources that can be used without being constrained by time and place, with strong search access, can be used to assess student learning achievement based on performance, interactive and independent of their use. Mobile learning has innovations and variations in teaching materials that can be accessed anytime with an attractive display interface. The important thing to note is that not every teaching materials is suitable for use mobile learning [10].

Based on the opinions of some of the experts it can be concluded that mobile learning is a learning approach that utilizes technology and mobile devices that can help students to obtain material / information related to learning without limited geographical elements.
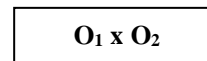
C. Android System

Android is a mobile operating modification that is similar to the Linux operating system. The history of Android explained that Android was released since October 2003 by four IT (Information Technology) experts namely Andi Rubin, Rich Minner, Nick Sears, and Chris White. IT experts founded a company called Android.Inc in California, US. But in August 2005, Google bought it from Android.Inc [11]. Linux-based mobile device operating systems such as Android has several components namely the operating system, software and middleware[12]. A developer can create applications by utilizing an open platform provided by android. Android is a Linux-based operating system for cellular phones such as smartphones and tablet computers that are open source. This operating system was acquired by Google from the Android Inc. company and continued development until now [13].

From the opinion of some experts, it can be understood that Android is a Linux-based cellular operating system that includes an operating system, middleware, and applications for mobile phones such as smartphones and tablet computers that are open source.

II. METHODOLOGY

This research is using experimental method. Experimental research methods are used to look for the effect of treatment[14]. The design used in this study is Pre-Experimental Designs. The Pre-Experimental Design used in this research is One-Group Pretest-Posttest Design. According to Sugiyono One-Group Pretest-Posttest Design compares with the situation before and after being given treatment. This was done to obtain valid treatment results[15].

The design of this study is as follows:

$$O_1 \ x \ O_2$$

Information:
O_1 = pretest value
O_2 = posttest value
X = treatment

The research sample is the fourth-semester students of educational technology totaling 19 people. The sampling technique is total sampling technique. The data collection technique used is a test technique. According to Arikunto, tests are a series of questions or exercises as well as other talents possessed by individuals or groups [16]. To obtain the data needed in this study the authors used a data collection test in the form of learning achievement tests. The data is tested using a paired sample t-test through SPSS 22. One of the advantages of SPSS is that it can perform faster all statistical calculations from simple to complicated ones, which if done manually will take longer [17].

A paired sample t-tests was conducted to obtain information about differences in learning achievement before using android-based mobile learning and afterwards. If the significance value is greater than 0.05, the average pretest-

posttest results are the same or there is no increase, whereas if the significance value is less than 0.05 then the average pretest-posttest results are different or there is an increase in learning achievement.

III. RESULTS AND DISCUSSION

A. Results

The media that will be used in learning strategy learning courses is android-based mobile learning. This Android-based mobile learning was developed by adjusting the needs of students and lecturers in overcoming the limited space and time of learning courses in learning strategies of FKIP Baturaja University educational technology courses Android-based mobile learning has been tested valid and practical through expert testing (expert) and practicality testing on individual evaluations, small group evaluations, and field trials. On the occasion of this study, researchers conducted research to complete the quality of eligibility in the form of testing the influence of Android-based mobile learning on learning achievement. To achieve the research objectives, researchers gave treatment to fourth-semester students taking courses on learning strategies. Before giving treatment, researchers have prepared several preparations including a semester learning plan and an Android-based mobile learning application system that has been downloaded by students through Playstore.

Before conducting paired sample t-test, researchers conducted homogeneity and normality tests. A normality test is done to determine the normality of existing data. The results of the normality test carried out are normally distributed data was concluded based on the SPSS test using the Kolmogorov-Smirnov one-sample test with sig value. (2 tailed) 0.678 for the pretest and 0.733 for the posttest. This value is greater than 0.05 so it can be concluded that the data are normally distributed. The following are the results of the normality test.

TABLE I. NORMALLY TEST

		Pretest	Posttest
N		20	20
Normal Parameters	Mean	60.7500	80.800
	Standar Deviation	7.65627	5.93473
Most Extreme Differences	Absolute	.161	.154
	Positive	.139	.154
	Negative	-.161	-.126
Kolmogorov-Smirnov Z		.720	.687
Asymp.Sig. (2.tailed)		.678	.733

Test distibution is normal

In addition to the normality test, researchers conducted a homogeneity test through the one-way ANOVA test with a significance value of 0.333 greater than 0.05 so it can be concluded that the data are homogeneous. The following is the homogeneity test results.

TABLE II. HOMOGENEITY TEST

Levene Statistic	df1	df1	Sig.
1.255	4	14	.333

The data tested are homogeneous and normally distributed, then paired sample t-tests can be performed.

To find out the significant effect of student learning achievement using (posttest) and not using Android-based mobile learning of learning strategy (pretest) subjects, then a statistical hypothesis is proposed that serves as a null hypothesis and alternative hypotheses to be tested using paired sample t-test with the program SPSS 22. The following is a null hypothesis and an alternative hypothesis.

H0: tidak ada pengaruh yang signifikan *mobile learning* berbasis android terhadap hasil belajar.

Ha: ada pengaruh yang signifikan *mobile learning* berbasis android terhadap hasil belajar.

The test results of the data obtained are that the sig (2-tailed) value is 0,000. The value (2-tailed) is smaller than 0.05 so it is stated that there is a significant influence between Android-based mobile learning on student learning outcomes.

The value of pretest and posttest learning outcomes in classes taught by using android-based mobile learning media can be seen in the following table:

TABLE III. RECAPITULATION OF LEARNING ACHIEVEMENT IN LEARNING STRATEGY COURSES

Group	The value of learning achievement	
	Pretest	*Posttest*
The Highest	75	93
The Lowest	50	74
Average	60,75	80,8

From the table above, it is known that the average score of pretest learning achievement is 60.75 while the average posttest score is 80.8 shows that the average post-test scores are higher than the average pretest scores.

B. Discussion

Based on paired sample t-test and recapitulation of the value of student learning achievement, it is known that android-based mobile learning has an influence on improving student learning achievement in courses of learning strategies in Baturaja University Education Technology study programs. Research findings are supported by relevant theoretical foundations so that it can be concluded that the subject of Android-based mobile learning from learning strategies has a significant effect on student achievement. The use of the type of Android Smartphone has a significant effect on learning achievement with a mobile learning system.

This is supported by Asebere and Enguah's research [18] which states that learning to use mobile phones and system experts, if implemented can improve student talent, for adjustments in training each student, especially on the basis / speed of independent learning that allows students to gain a deep understanding of the basics and can follow more advanced topics from the CLT 101 program or more specialized fields.

In addition, Arain's research also found that Android-based mobile learning had a positive effect on students' learning achievement in higher education[19]. Hanafi believes that mobile learning supported by the Android system will build a pleasant learning atmosphere, interactive communication with users, and form intuitive abilities for students. In fact, newer versions are better in terms of processing and have an intuitive interface design [20]. Even though it is fun, it should be kept in mind that mobile learning has a primary goal for learning, not for entertainment[21].

Android-based mobile learning for learning sstrategy courses is very helpful for students' understanding of theoretical or conceptual material. The results of the learning experience show that the product developed not only shapes learning interest and expertise, but also builds students' understanding of theoretical concepts that are difficult to understand. [22].

IV. CONCLUSION

There is an effect of Android-based mobile learning on student learning achievement in learning strategy courses. This can be seen from the difference in the average learning achievment on student learning achievement pretest and posttest in the learning strategy course and paired sample t-test.

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