

Learning Media Of Applications Design Based Android Mobile Smartphone

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Abstract

This research aimed to design applications of learning media as Android mobile smartphone-based and to produce valid, practical, and efficient learning media application of Android mobile smartphone-based. This was a development study using ADDIE development model. Testing procedures in this study have done through three stages namely peers test, expert test and implementation in the form of small group trial and field trials. Informants in this study were experts, peers, and students. Data were collected by using questionnaires, interviews, and observations. Technique of data analysis was descriptive statistical analysis. The results showed that the Android mobile smartphone based learning media application; designed after the validation; was valid, practical, efficient, and feasible for use in learning. This application was practical and efficient, because can be installed on any brand of Android smartphones, and accessed at anytime and anywhere, as well as the features and facilities that exist in this application is very complete and very easy to use. Research results suggested to chairman of the study program and lecturers to use the application of Android mobile smartphone optimally.

Keywords: learning media, android mobile learning

INTRODUCTION

Nowadays, education faces the challenge of rapid changes and varied as the impact of advances in science and technology that rapidly increasing. The development of science and technology support and encourage efforts toward renewal in utilizing the results of the learning technologies implementation. As an educator, in his duties are expected to use learning media as a tool in the learning process; both of simple to sophisticated; such as the use of smartphone as a learning media.

Lifestyle with human continuous mobility increase led to a shift in the use of electronic devices. Nowadays, people are more likely to use mobile devices such as smartphones to access information, particularly smartphones based on the Android operating system. Android-based of mobile devices become the choice of many people because having good performance with the availability of fair connection and application support with affordable price.

Android smartphone can be a very exciting opportunity to be utilized in education as learning media to compensate lifestyle with high mobility, so that the learning content can be accessed via smartphone anywhere and anytime, otherwise known as Mobile Learning. Based on the statement above researcher then conducted the development of Android mobile Smartphone based learning media application on E-learning System Subject in PPs UNM.

LEARNING MEDIA

"The word media is derived from the Latin and is the plural of the word medium, which literally means an intermediary or introduction" (Sadiman, 2009: 6). In Arabic, the media is an intermediary or an introductory message from the sender to the receiver, while in Kamus Besar Bahasa Indonesia (KKBI), media interpreted as a "tool or means of communication". A lot of sense given to the word media, so that the boundaries between understanding one another sometimes become unclear, particularly for phrase learning media.

Restrictions for word media proposed by the AECT experts (Association of Education and Communication Technology) in Arsyad (2010: 3) that, "media as all forms and channels used to convey messages and information". Also described by Gerlach and Ely in Arsyad (2010: 3) that "the media if is understood human broadly, material, or events that establish the conditions that enable the pupils to acquire knowledge, skills and attitudes". While the definition of media by Roqib (2009: 70) is "anything that can be used to convey a message from the sender to the receiver so that it can stimulate thoughts, feelings, attention and interests of the learning participants such a way that learning occurs". Furthermore, according to Muhson (2010: 3) "The media is a 'container' of messages by the source or distributors want to be forwarded to the target or recipient of the message" .based on some explanations about the media mentioned above, it can be concluded that the media is anything that can be used to deliver a message from the sender to the receiver.

Media has a very large scope; talk about the media should be limited to relevant direction to the problem of learning, also known as a learning media. According Nurseto (2011: 21) "briefly, it can be argued that the instructional or learning

media is a 'vehicle' for channeling the message or information to learn", and according to Miarso (2005: 458) "Learning media is anything that is used to distribute messages and can stimulate the thoughts, feelings, attention, and the willingness to learn so it can encourage the process of deliberate, purposeful, and restrained learning". From these definitions, then learning media can be defined as any means that can be used to make the learning process can take place effectively and efficiently.

E-LEARNING

E-Learning is an acronym for Electronic Learning is the use of electronic media in the learning process. The term E-Learning contains a very broad definition, so many experts who elaborate on the definition of E-Learning from various aspects. according to Hartley in Adnan (2010) that "E-Learning is a type of learning that deliver teaching materials to students by using media of internet or other computer network media ". According to the Science of Education Development Team from FIP-UPI (2007: 503), "the term E-Learning can be defined as a form of applied information technology in the field of education in the form of cyberspace". Meanwhile, according to Surya (2004: 156) "E-Learning is a learning model by using the media and information communication technology, especially the Internet". "Although the term E-Learning has a very broad definition, but the E-Learning is more appropriately addressed as an effort to create a transformation process of learning in high school or college into a digital form that is facilitated by the Internet technology" (Education Team Developer FIP-UPI, 2007: 503).

E-Learning focused on learning by using electronic technology, so that in the broad sense of E-Learning can be defined as the use of electronic media in the learning process both online and offline. But the term E-Learning is now better known as a process of virtual learning atau form of cyberspace learning utilizing electronic technology of telecommunications or internet network.

ANDROID

"Android is a Linux-based operating system designed for touch screen mobile devices such as smart phones and tablet computers" (Nurohimah, et al., 2014: 2). According to Safaat (2012: 1) "Android is an operating system for Linux-based mobile devices that includes an operating system, middleware, and applications. Android provides an open platform for developers to create their applications ". Meanwhile, according to enterperise (2010: 15) "Android is often identified with the internet phone is a mainstay young professionals to support the work".

Android is a new generation of mobile platform that provides

the flexibility to developers to develop according to what expected, "Android is hailed as the first complete mobile platform , Open and Free" (Safaat, 2012: 3). The developer is given the flexibility to develop Android applications in accordance with the needs of Android applications with no exception in the field of education, especially as learning media. hence, smartphone completed with Andoid operating system is possible to be used as a medium of online learning or currently more popular known as M-Learning (Mobile Learning).

MOODLE

Moodle is an acronym for modular object-oriented dynamic learning environment, is a software platform of electronic learning (E-Learning) which is free and open source, also known as Course Management Courses, Learning Management System (LMS), or Virtual Learning Environment (VLE). Moodle is the most famous open source program among E-Learning programs. "This Moodle application was first developed by Martin Dougiamas in August 2002 with Moodle version 1.0" (Amiroh, 2012: 1).

The ability of the Moodle as LMS is unquestioned, Moodle virtually facilitates all the needs in the learning process. Moodle has many Plugin and Module that can be developed based on needs, another feature of Moodle is a Web Service facility that enables LMS Moodle running on Web Server integrated with an application that runs on the Android smartphone.

Mobile Learning

E-Learning defined by Hartley in Adnan (2010), is "a kind of teaching that deliver the teaching materials to students with media by using Internet or another computer network media". While the "Mobile Learning refers to the use of mobile devices in the mobile phone as one can access course materials, referrals and applications relating to learning anytime and anywhere." (Belina P & Rizal Coal, 2013: 76). while mobile device is "a small device that has limited computing capabilities. The mobile device is often also referred to a handheld device or handheld computer "(Zaki, 2008: 82).

E-Learning and M-Learning outline is two things can not be separated, but M-Learning is a form of learning more specific for those utilizing the device and mobile communications technologies such as smartphone. Android Smartphone has a large potential to be used as a medium of onlinelarning, Android smartphone is an electronic device that has the ability to communicate either via messaging (SMS), MMS, telephone and internet networks with all the developments (chat, video calls, voice calls, social media, e-mail, and others. Android is the most popular operating system for smartphones and

dominant nowadays, Android opens chance widely to the application developers to develop applications in accordance with the wishes. this indicates a big potential for developing E-Learning applications that can run on Android smartphone.

RESEARCH METHOD

This research was conducted at the Technology Education and Vocational Program Study, Graduate Program, State University of Makassar. Object of this research was an Android mobile smartphone application, and the subject of research was the students of Educational Technology and Vocational in e-learning system Subject of the second semester, academic year 2014/2015.

The research approach used in this study was research and development, refers to steps and procedures of ADDIE development model (Analysis, design, development, implementation, and evaluation). The model was chosen because it is generic and simple with systematically structured implementation, in addition, ADDIE development model provides an opportunity to evaluate and revise continuously in every phase. Technique of data analysis used in this research was descriptive analysis.

RESEARCH RESULT

The result of learning media development conducted in this study was product in the form of learning media applications that can run on the mobile Android smartphone. This learning media is the development result of E-Learning Moodle site-based, and are packaged in the form of an application that runs on the Android smartphone.

The development of this application is not replacing the function of Moodle site -based learning media overall, this application was developed to complement and make it easier in accessing a number of features provided in the Moodle site-based learning media via smartphones anytime and anywhere. Applications display generated of learning media can be seen in some of the following figures.

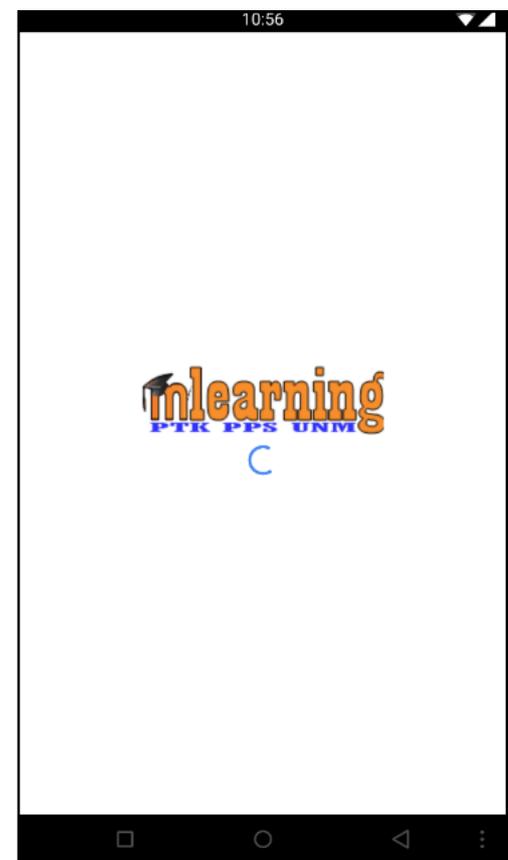


Figure 1: Display of Home Applications

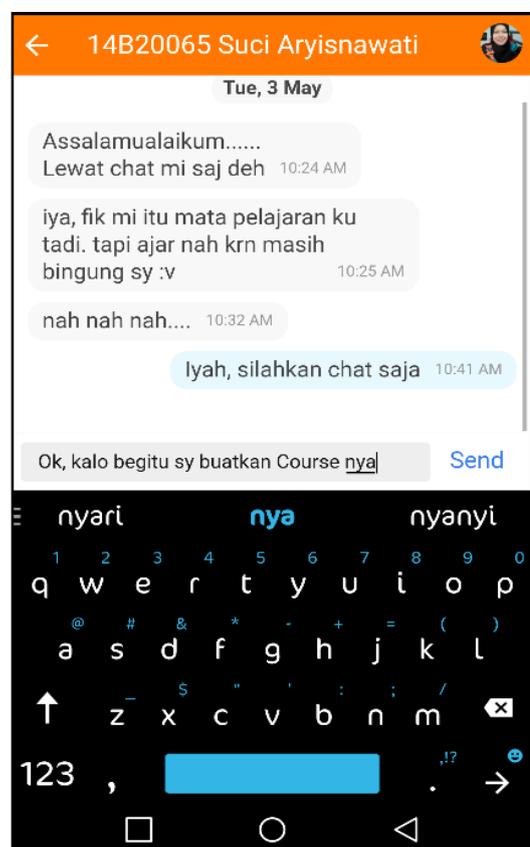
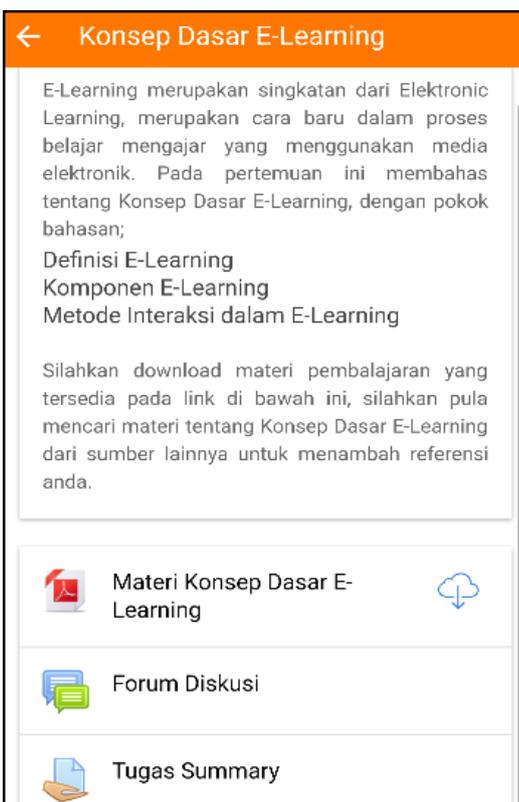
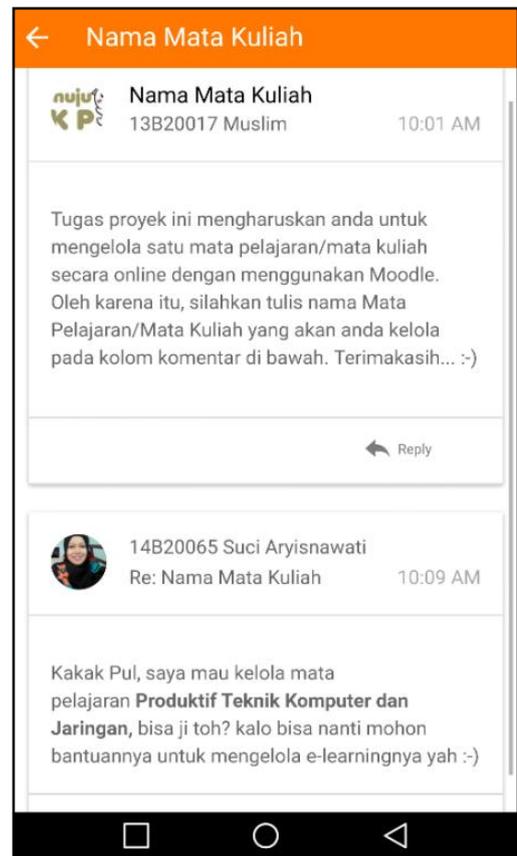
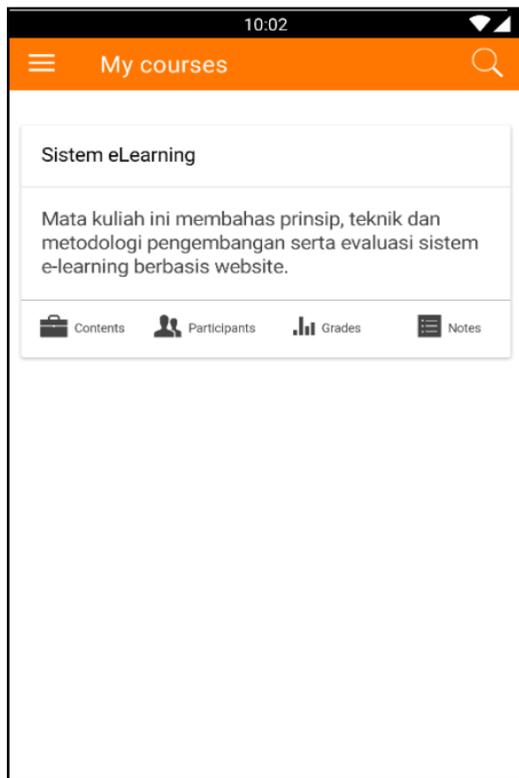


Figure 2: Display of Courses

Figure 3: Display of Forum facilities and Messages

Thus number of pictures showing the views and facilities of Android mobile smartphone based learning media application produced in this study.

Application of learning media produced in this study had been done through several stages of tests, i.e. black box testing, peers test, expert validation test, small group test, and field trials.

Black Box Testing

According to Mustaqbal, et al (2015: 34) "Black box testing focuses on functional specification of the software", while according to Hamdani (2015: 181) "Black box testing is testing conducted to determine the feature's functionality errors in an application". "Black box testing focuses on

whether the program meets the needs of the unit (requirement) indicated in the specifications" (Al Fatta, 2007: 172). So that, Black box testing is a test to find out whether all the functions of the software has been run properly in accordance with the needs of the functional results. Furthermore, result of Black Box Testing can be seen in Table 1.

Based on the results of black box testing in Table 1, it can be seen that the aspects tested run in accordance with the expected function. Therefore, instructional media applications feasible to use and can proceed to the trial stage. Furthermore, a set of tests proceeded to the peers test phase, validation expert, small group trial, and field trials. Experts requested to do validation are instructional media design experts, and content or learning materials expert. The results of the test series can be seen in following Table 2.

Table 1: Result of Black Box Testing

Num.	Aspects Tested	Testing	Result of the Testing	Ref
1	Form Log in	<i>Log in by using valid username and password</i>	The authentication process is accepted	Success
		<i>Log in by using invalid username and password</i>	The authentication process is rejected	Success
2	Messages	Exchanging messages using the Messages facilities	Messages can be sent and receive messages	Success
3	Notification	Exchanging messages using the Messages facilities	There is a notification for every incoming message	Success
		Giving a task or exercise on course	There is a notification	Success
4	Course	Opening the course	All learning sessions can be displayed	Success
5	Learning Materials	Accessing learning materials	Learning materials can be accessed	Success
6	Video	Accessing video	Video played well	Success
7	Forum	Using the forum facility	Users can interact in discussion forums	Success

Table 2: Test/Trial Results of Android mobile smartphone based learning media application.

Num.	Test/Trial	Trial Result	
		The Average Rate of Achievement	Qualification
1	Peers Test/Trial	86,00%	Good
2	Validation of Learning Media Design Experts	93,75%	Very Good
3	Validation of The Learning Materials Expert	86,67%	Good
4	Small Group Trial	83,62%	Good
5	Field Trial	92,99%	Very Good

Giving sense and decision-making on the average score of achievement refers to achievement scale conversion Table using scale 5 as shown in Table 2.

Peers Test/Trial

The peers test or trial was given to 5 students/peers who have expertise in related fields. Tests were conducted to determine the feasibility of learning media based on the assessment results, comments, and suggestions from peers, peer assessment based on some criteria. Peers test result can be seen in Table 2.

Based on the data in Table 2, it can be seen that the percentage of the average level of achievement is 86% belonging to the good qualification and does not need to be revised so that be worth to be used.

Expert Validation

An expert validation is testing performed by skilled and expert learning media design and learning materials. Tests conducted to determine the validity and feasibility of learning media applications will be generated.

Based on the Table 2, the results of the validation performed by expert of learning media design shows that the average level of achievement is 93.75% that goes into the category very good and does not need to be revised. So that the expert of learning media design stated that the Android mobile smartphone based learning media application in the Subject of E-Learning System PPs UNM was valid and feasible to use without revision.

While validation of the learning material expert has an average score of 86.67%, belongs to good qualification achievement level without the need to be revised. So the learning media material experts stated that the application of learning media of Android mobile smartphone-based in the Subject of E-Learning System PPs UNM valid and feasible to used without revision.

Based on the results of design and materials learning media experts' validation, it can be concluded that the application of learning media produced has met the criteria of validity and feasible to use.

Small Group Trial

Small group trial conducted on 15 students of Educational Technology and Vocational Study Program, Graduate Program of UNM academic year 2014/2015 in E-Learning Systems Subject. Based on the data in Table 2, it can be seen that the average level of achievement is 83.62% which is included into good category and does not need to be revised so it is worth to be used.

Based on the assessment results obtained in small group trial, then the application of learning media deserve to get to the next level of testing, that is the field trial.

Field Trial

The small group trial results showed that there is not any aspect need to be revised so that the application of learning media can be used, but as developers are still doing the analysis and development with the hope to produce better learning media applications before field trials phase.

The field trials conducted to 25 students of Educational Technology and Vocational Graduate Program academic year 2014/2015, UNM that has programmed E-Learning Systems Subject. The results presented in Table 2 which shows the average level of achievement is 92.99% which belong to the very good qualifications and do not need to be revised, making it feasible to use.

Observations were also conducted while field trials currently underway, the observation aimed to determine the compatibility of learning media applications to the Android operating system version and the Android smartphone brands. In addition, the observation was also conducted to determine the respondents' experience in using learning media applications. Data from observations can be seen in Table 3.

Table 3: Result of Field Trial Observations

Num.	Aspect/Indicator	Ref
1	Application compatibility on Android OS version;	
	Android 3.0 (<i>Honeycomb</i>)	Very Good
	Android 4.0 (<i>Ice Cream Sandwich</i>)	Very Good
	Android 4.1 (<i>Jelly Bean</i>)	Very Good
	Android 4.4 (<i>KitKat</i>)	Very Good
	Android 5.0 (<i>Lollipop</i>)	Very Good
	Android 6.0 (<i>Marshmallow</i>)	Very Good
2	Application compatibility on the Android smartphone brands;	
	Samsung	Very Good
	Sony	Very Good
	LG	Very Good
	Asus	Very Good
	Xiaomi	Very Good
	Acer	Very Good
	Oppo	Very Good
3	The ease in accessing the application facilities	Good
4	Ease of use navigation	Very Good
5	Ease of learning materials access	Very Good
6	Notification feature runs well	Good
7	Chatting Facilities runs well	Very Good
8	Discussion forum facilities runs well	Very Good
9	There is no significant barriers in using the application	Good

Based on the results of observations as shown in Table 3, it can be concluded that the application of learning media produced has a very good compatibility because it can be installed on various versions of the Android operating system and can run on different Android smartphones brands used mostly in Indonesia. Then, in the case of the application use by the respondent, there is no significant constraint or barriers

in the operation of learning media applications.

Based on the results from a series of testing, it can be concluded that the application of learning media has been valid, practical, and efficient so that deserves to be used as a learning media.

Evaluation

Evaluation is the last stage in the process of this learning media application development, which in this stage will be the extent to the results achieved in the development of Android mobile smartphone based learning media application in the E-Learning System Subject of PPs UNM. Evaluation used in this study was a summative evaluation, that is "evaluation to give a final assessment of a product" (Priyanto, 2009: 7).

Summative evaluation conducted at the end of the development process to determine the feasibility of the generated media and the extent to which students can use learning media application that has been produced. At this stage, researcher only used summative evaluation because the research is more focused on the feasibility of the resulting application to serve as tools or media of learning, testing the resulting application is more focused on functional testing to ensure that the facilities in this application works well and feasible to use as a media of learning.

Based on the results of the learning media application implementation, it can be concluded that the result of Android mobile smartphone based learning media application is feasible to used, this was confirmed by the results of interviews with respondents.

Specifications of Learning Media Application

Specifications of learning media application in this research refers to application compatibility of learning media produced to Android smartphone devices specification both on the hardware and software smartphone specifications. Applications testing was done by using different types of Android smartphone, from Android smartphone Low End types (low Specifications) to High End (High specification), and all kinds of Android smartphones used in the trial showed a very good compatibility. The type of Android smartphone with the lowest specifications used in this study of learning media applications trials as follows;

Samsung Galaxy 551

screen size / Screen	: 3,2 Inches / 240 x 400
Resolution	Pixels
Operation System	: Android 2.3 (<i>Gingerbread</i>)
CPU	: Qualcomm MSM7227 Snapdragon S1 Single Core 600 MHz
RAM	: 512 MB
GPU	: Adreno 200 (266 MHz)

While the type of Android smartphone with the highest specification used in this learning media application test is;

LG G3

screen size / Screen	: 5,5 Inches / 1440 x 2560
Resolution	Pixels
Operation System	: Android 6 (<i>Marshmallow</i>)
CPU	: Qualcomm MSM8975AC Snapdragon 801 Quad Core 2,5 GHz Krait 400
RAM	: 3 GB
GPU	: Adreno 330 (450 MHz – Boost 578 MHz)

DISCUSSION

Development of instructional or learning media were conducted in this study resulted in a product of learning media applications that can run on the mobile Android smartphone. Analysis and revision of the product continuously performed to produce valid, practical, and efficient product. Development of instructional or learning media application products is flexible so that the revision of the applications can be carried out continuously, as long as it is needed.

During the process of product development testing, experts of learning media design and materials played a major role in providing an assessment, feedback in the form of comments and suggestions for the further development process. Also the important role of peers who provide corrections, suggestions, as well as the assessment is very helpful to enhance the resulting product in the form of Android mobile smartphone based learning media application. That media applications then implemented in the form of small group trial and field trials.

Based on the results of trials that have been done, it can be seen that the application produced has been feasible and eligible to be used as a media of learning in the learning process, and can also note that users do not experience difficulties in using these learning media. It can be seen from the peers test results and testing by experts who claim that the application has been eligible to be used as a learning media, then small groups test results showed that the application of learning media belongs to the good qualification, and the results of field trials showed that the application of learning media belong to the excellent qualifications. Moreover, it can be seen from the results of interviews stating that the users do not experience difficulties in using these learning media applications. Therefore, it can be concluded that the learning media application mobile smartphone-based are valid, practical, and efficient so it deserves to be used as a media of learning.

Application of this learning media is practical because easy to use as well as applications installed on Android smartphone so it can be accessed anywhere and anytime without the need to carry a computer. Furthermore, application of this learning media expressed efficiently because access to learning media simply by running Android smartphone applications without having to set the computer first, so that it saves time, costs, and resources.

The feasibility of using an Android smartphone as a learning media was also addressed by Juraman (2014) in his research that the Android smartphone was an effective option for accessing educational information because in the process of accessing information on Android smartphone, it was developed a wide variety of applications that allows users to access information. Android smartphone is also an innovative technology which tends to provide a new understanding of the users in this case students. Nowadays, Android smartphone becomes not only communication device literally, but also a learning tool that is now present in the life of a student.

Application of learning media has produced is expected to provide advantages for improving the quality of education, the instructional media generated has a number of advantages, including and foremost is this learning media is mobile and runs on the Android smartphone, so the learning media will be easier to access anywhere and anytime, because there will always be learning media in a pocket along with Android smartphone users. But behind the advantages, there are also limitations of learning media application, the application of this learning media cannot be used to do the exercise or answer the questions directly through this application. Therefore, criticism and motivational suggestions are needed for better development of this Android mobile smartphone based learning media application.

CONCLUSION

Based on the development research of Android mobile smartphone based learning media application in the Subject of E-Learning system in PPs UNM, it is concluded that this study was conducted to produce the product in the form of Android mobile smartphone based learning media application which is valid, practical, and efficient and eligible to use.

The results of the validation by learning media design experts with the average score belongs to very good categories, as well as the results of expert validation of learning materials that also gives an average score in good categories. While the implementation of the results showed that the small group trial resulted in average score by good category, as well as the results of field trials to produce an average score with a very good category. The results of observations show that the application of learning media has excellent compatibility and found no significant obstacles or barriers in using the application. Thus, learning media application of Android

mobile smartphone-based has been tested in terms of validity, practicability and efficiency.

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