

Development of Android Based Mobile Learning as a Media for Economic Learning in Senior High School

Taufik Akbar^{1*}, Yulhendri²

^{1,2}*Universitas Negeri Padang, Padang, Indonesia*

**Correspondence Author, email: taufikakbar2106@gmail.com*

ABSTRACT

Development of Android-Based Mobile Learning as a Learning Media for Economics in class X IPS of SMA Negeri 1 Lembah Melintang is based on the rapid development of smartphone technology, predominantly smartphone devices used is an Android-based mobile phone. This is evidenced by the ownership of Android-based cellular phones which is close to 90% of the students. In addition, there is a lack of motivation for students to carry and read textbooks and the unavailability of learning with Android-based mobile learning as a medium for economic learning. Therefore, it is necessary to develop learning with Android-based mobile learning as a medium for economic learning. The purpose of this study is to develop and determine the feasibility of Mobile Learning with the Android platform as a media or economic learning tool that is feasible to be applied in class X Social Sciences. The type of this research is development and research by adopting the development of Borg & Gall that is, using 8 steps; (1) initial research and data collection steps, (2) programming steps, (3) product development steps, (4) initial experimental steps by validation, (5) product improvement steps, (6) experimental steps field, (7) step II product improvement, (8) step of dissemination and application. The result of the research is the validity of the data declared feasible by the material expert, that is "Eligible" to use, with the results of data analysis an average percentage of 77.50%. Media experts declared "Eligible" with an average percentage of 82.14%. Learning experts declared "very feasible" with an average percentage of 86.48%. Furthermore, based on field trials to students stated "very practical" with an average percentage of 88.57%. Based on the above, it means that using learning media is feasible and very practical to use in the economics teaching and learning process.

Keywords: *Mobile Learning, Android, Learning Media, Economy.*

1. INTRODUCTION

Education is an important part of the necessities of human life as well as a major aspect in the development of weighty human resources. Education is a conscious effort to humanize humans as individuals who function for life, both in the growth of personal life itself, the people, the nation and, the country. Therefore, education must be carried out properly by the objectives of education itself, because the success of a nation lies in the quality of education which increases the quality of human resources.

The rapid development of technology and information has affected the patterns of human activity in various fields, including economy, politics, socio-culture, education and others. The current educational process is

needed to develop and use information and technology for learning (Permendikbud No. 22/2016 on education process standards). Therefore, learning media must be developed in line with the needs of the times.

A smartphone is one of several pieces of informations and technology in the crent era that is very interested to the public. Rahmayani stated in Koderi et al., that the greatness of smartphones is to create the enthusiasm of people in waiting for the presence of Smartphone to be used for communication media and other activities and routines, even as a lifestyle requirement. The use of Smartphones in Indonesia has experienced a very increasing development every year [1].

The rapid development of science and information technology urged every human being to respond to all growth as fast as it follows. Human resources are required to have the expertise to respond to the growth of science and information technology. Expertise in exploring the development of science and information technology must have critical, systematic, logical thinking and have the skills to work together efficiently.

Improving the quality of human resources is a special thing in the world of learning. The efforts to improve the quality of human resources have shared responsibility, including teachers and orders that shade the world of education. A teacher is an exemplary form which is one of the references for the success of learning. Teachers need to understand the disciplines that impinge on knowledge, universal or special skills up to how to implementation of knowledge that they have acquired. In the educational planning process, teachers need the planning detailed starting from the manufacture of teaching materials, describing the characteristics of different students, and the class management.

Education has an impact on the world of education, especially in the learning process during the industrial revolution 4.0. Francis tried to show that students are motivated through the use of technology in classroom learning. The educational process can be easy and interesting with the use of technology [2].

The use of smartphones among teachers and students in the school environment in terms of learning media has still limited. In fact, it is not following the real purpose of using smartphones as a means of communication, among others, such as telephone, WhatsApp (WA), YouTube, and others. This resulted in smartphones full of junk content for their owners if it has no educational benefit. M-Learning is a medium in empowering knowledge sharing among students in the structure of the learning process which is more exploit the sophistication of mobile phones [3]. The use of Mobile Learning would be better to increase attention to learning resources, so it creates an interesting learning atmosphere and encourage students to learn all the time. In addition, compared to learning monotonously, Mobile Learning supports more opportunities to collab directly and communicate informally among students.

The basic skill that teachers must be mastered is learning strategies. A teacher does not only know about the subjects that they teach but also must be understood and be able to implement the insight to students. In this condition, procedures are more

meaningful than modules, and teachers are more meaningful than procedures and lesson modules. Looking at the situation of teachers and prospective teachers, the efforts to understand and apply innovative study was one of the substitutes for understanding in learning. Aqib, Komara, and Dalyono in Purwadi, conveyed that innovative studies have real implications and are able to improve strategies for the teacher itself as well as practice strategies for students [4].

The efforts to improve learning quality are not always easy. In fact, many things become obstacles for teachers. The aspect of student's ability in learning is one aspect of the obstacle that is difficult in learning, while that aspect is one of the aspects that affect the points that accustom students. Learning media is an intermediary that has a position as support for the success of something learning that is running. Students could be more focused on implementation through learning so they can share their reflections in a more real way with a model.

The development of smartphone technology is so fast; one of the smartphone devices which is predominantly used is an Android-based cellphone. The achievement of students who already have an Android-based cellular phone has approached 90%, moreover, there is have more than one Android-based cellphone. In this era of the Covid 19 outbreak, having an Android mobile phone for students is a necessity, so the acquisition of cellphone ownership has approached 98%.

COVID-19 is a disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). COVID-19 can have an impact on respiratory system problems, from mild symptoms like the flu to lung infections, like pneumonia, which hit all corners of the world.

Covid-19 has triggered the pattern of people's lives to change, which makes the need for technology increasing, especially in the world of learning which is dominated by the use of smartphones and the internet. This is what requires education to switch to the use of smartphones, where schools require students to have Android-based smartphones to carry out online learning.

Mobile learning is related to the movement of knowledge seekers that should be able to create sustainable meanings between location, time, and learning content via cellular phones that accessible through networks according to their purpose, as well as in learning activities without carrying it in a specific position [5]. Mobile learning is made possible

by continuing to develop operating features such as mobile phones, computers or tablets, and gadgets. Therefore, learning can be done individually and can be tried regardless of place and time [6]. According to Yildiz et al., learning efforts by using mobile learning can be combined by a wireless network, so it can be applied and used in these areas and the location itself. What must be observed is how students access learning material easily, meet fellow students and instructors anywhere, regardless of place and time [7].

Based on information from IDC (International Information Corporation) in 2014 Android held 84.4% market share of smart phones throughout the country, the iPhone operating system is the operating system of the iPhone occupying the 2nd tier with 11.7%, followed by Windows Phone in 3rd tier with 2.9%, and Blackberry at 4th level with 0.5% market share.

Through the events above, the inspiration can be realized to create innovative, productive, interactive, and innovative economic learning media that can be used anywhere and anytime. One of them is the development of mobile learning on the Android platform.

Mobile learning is an innovative and interactive stage in the way of upgrading to student interests excited about practicing. Android is operated by an open-source system, which means free and freely used for application developers; this matter makes it very easy for Android application developers to develop the applications easily because it is light in obtaining applications. Through the Play Store, consumers can download various applications for free or for free from the developer or the maker.

From the observations tried in class X SMA Negeri 1 Lembah Melintang, totaling 32 students, all of them already have cell phones that are mostly Android smartphones. During the Covid-19 pandemic, SMA Negeri 1 Lembah Melintang freed students to use smartphones and was facilitated free internet from schools in the form of Wifi and given internet quota by the central government. Previously, teachers still used books, whiteboards, laptops, and projectors for teaching. But for the first time, teachers used a smartphone to carry out learning activities. (Source published from Kementerian Pendidikan dan Kebudayaan) [8].

It can be seen from the interviews between the researcher and the economic teacher, who said that they still use learning media that is limited to the facilities and infrastructure owned by the school, and teachers who have never used smartphones in doing learning activities.

The results of the research monitoring of the learning media created several problems, that are 1) the lack of students encouragement explore learning procedures in the classroom and the lack of concern and

concentration of students to the information that teacher had informed; 2) lack of student motivation to carry and read textbooks; 3) the unavailability of learning with Android-based mobile learning as a medium for economic learning; 4) the using of media by educators is still not optimal; 5) many of the teaching staff still used hands-on learning and wrote on the blackboard without involving students participation; 6) the development of mobile technology is getting faster and students have not been able to take the advantages of technological developments in learning activities.

From the phenomena above, students can access various kinds of development of learning facilities through android applications by using the smartphone. This Android-based learning media, it will be designed like a digital book, where students only read on their smartphones. In this application, a form of questions and discussion is provided so that students can use the application at any time because it is stored on their smartphones. Learning through smartphones should be more efficient to try anywhere and make it easier for students to get used to.

From the description above, observers are interested in making research with the theme "Development of Android-Based Mobile Learning as a Learning Media for Economics in class X IPS at SMA Negeri 1 LembahMelintang".

1.1. Problem Identification and Problem Formulation

1.1.1. Identification of Problems

Sourced from the problems that have been described above, it can be identified as problems, that are: (1) Teachers are still used conventional learning systems in economic subjects at SMA Negeri 1 Lembah Melintang. (2) The low of student interesting in reading books and carrying books to school. (3) The curriculum demands to make students think critically. (4) Some teachers still do not use economic learning facilities with data-based technology platforms. (5) The development of mobile technology is getting faster and students have not been able to take full advantage of technological developments in learning activities. (6) The lack of desire to practice the students in getting used to themselves, the students decide to apply other situations such as chatting with friends and being online with their respective gadgets.

1.1.2. Formulation of the Problem

Based on the limitations of problems, this research was formulated into the following questions: (1) How is the mobile learning

development on the Android platform as a media for economic learning in class X IPS at SMA Negeri 1 Lembah Melintang? . (2) What is the feasibility of mobile learning on the Android platform as an economic learning media for material experts, media experts, actors, and students in class X IPS Negeri 1 Lembah Melintang?

2. METHOD

This development research only carries out 8 steps out of 10 of the form of Borg & Gall's development. These steps consist of (1) initial research and data collection steps, (2) programming steps, (3) product development steps, (4) initial experimental steps by validation, (5) product improvement steps, (6) experimental steps field, (7) step II product improvement, (8) step of dissemination and application.

2.1. Product Trials

2.1.1. Trial Subject

The products that have been obtained are tested on class X IPS students of SMA Negeri 1 Lembah Melintang. This tested on class X students because they are already using the 2013 curriculum.

The purpose of the experiment was to obtain information on whether the learning media developed is efficient. By using the equalization method between the pretest and posttest results in the trial group. Thus, the research looked at the process of score information obtained by the students being tried. The test points are as follows: (a) Limited experimental subjects included 21 students of class X SMA Negeri 1 Lembah Melintang.(2) The subject of research experiments to analyze the effectiveness of the media involved 21 students in the learning experiment group using android mobile learning.

2.1.2. Data Type

The types of data in this research were obtained qualitative and quantitative. Qualitative information was obtained from the results of questions and answers in the form of comments, opinions, and criticism. Quantitative data was in the form of evaluation obtained through the results of expert experiments and product trials.

2.2. Data Collection Instruments

2.2.1. Initial Analysis Instruments

This instrument is used in order to be able to accumulate data in the first analysis, namely the principle of consultation (question and answer) with the teacher.

2.2.2. Practicality questionnaire

The questionnaire was used to identify learning media created practically. The questionnaire was used by

following the duration of learning, the relief of using mobile learning on the Android platform as a media for economic learning, and the benefits obtained from mobile learning on the Android platform.

2.2.3. Effectiveness Instrument

The written test in the form of learning questions used to recognize student learning outcomes after exploring the use of media that has been designed.

2.2.4. Instrument Validation

Instrument validation is a level that shows what you want to try out in the field [9]. The validation in this research is based on a grid that was arranged on the views of experts where the arrangement of the instrument must be based on the grid as a reference in the preparation of research instruments. The validation of this instrument is seen from 3 components, namely validation of media expert instruments, material expert instrument validation, and validation of learning expert instruments (teachers).

2.3. Data Analysis Techniques

2.3.1. Validity Analysis

Analysis of the validity of the Android platform mobile learning as an economic learning media was tested using a Likert ratio with the following formula:

$$P = \frac{\sum x}{\sum x_i} \times 100\%$$

Explanation:

P is the percentage found from the validator

$\sum x$ is the total value of the validator's answer

$\sum x_i$ is the ideal score [10]

To ensure the validity level of mobile learning on the Android platform as an economic learning media, the following standards are used:

Table. 1 Standard of Validation

Validation Standards	Assessment Standards
86% - 100%	Very Eligible
76% - 85%	Eligible
56% - 75%	Fairly Eligible
< 55%	Inadequate

2.3.2. Practicality Analysis

Student reaction questionnaires are arranged in a Likert ratio. The practical questionnaire for mobile learning on the Android platform as an economic learning medium is described by the frequency analysis method with the method proposed by (Riyanto & Hatmawan, 2020).

$$P = \frac{R}{SM} \times 100\%$$

Explanation:

P is the value of practicality

R is the points earned

SM is the maximum point [10]

Table. 2 Standard Practicality Analysis

Validation Standards	Assessment Standards
85% s/d 100%	Very Practical
75% s/d 84%	Practical
60% s/d 84%	Quite Practical
55% s/d 59%	Less Practical
0% s/d 54%	Impractical

3. RESEARCH RESULTS

3.1. *Programming and Development Development*

There are several things carried out in this development programming step, starting from collecting books related to the product being developed, preparing the concept of media forms, collecting graphic material and images by the modules and characters of students at the high school, and preparing materials as an assessment in the developed learning media.

This programming considered the following steps:

- a. Accumulate learning resources that coincide with economic learning with material on banks and non-bank financial institutions as the principle of the module when researching and developing learning media on the Android platform. Learning resources can be obtained from books, worksheets, or the internet.
- b. Conceptual concepts, that is the economic learning modules that are suitable for the progress and personalities of high school students (SMA or MA).
- c. Preparing the materials needed in the development of economic learning media, this is prepared on the web.
- d. Questionnaire prepared to be validated by 3 expert validators, namely media experts, material experts, and teachers as well as audiences or users (students).
- e. Materials preparation and job requirements and assessments in the form of an online pretest and posttest.

This research was conducted at SMA Negeri 1 Lembah Melintang with the subject of class X IPS totaling 21 students. The first procedure of making observations to class X IPS and the visible problems is 1) the lack of students encouragement explore learning procedures in the classroom and the lack of concern and concentration of students to the

information that teacher had informed; 2) lack of student motivation to carry and read textbooks; 3) the unavailability of learning with Android-based mobile learning as a medium for economic learning; 4) the using of media by educators is still not optimal; 5) many of the teaching staff still used hands-on learning and wrote on the blackboard without involving students participation; 6) the development of mobile technology is getting faster and students have not been able to take the advantages of technological developments in learning activities. So it necessary to create Android-based mobile learning as education learning economics with the following steps:

a. Introduction (Intro)

In the introduction, the title, creator name, logo, animated image, and start button, the second semester of class X IPS notes which proved that this material is used to class X IPS. The introduction was made by the draw student's attention so that students are captivated in reading the material and working on it.

b. Main Menu

The main menu contained buttons or icons that lead to the menu later according to the needs of each user. In this main menu there are 7 buttons or icons.

c. KI, KD and Learning Objectives

According to the Minister of Education and Culture Regulation (2008), KI is referred to as the basic competencies of the curriculum that binding of the basic competencies which will generate the interest of the subject. Meanwhile, KD or basic competence is the competence of the subject for each class. KD is consisting of attitudes, knowledge, and skills that come from core competencies that must be understood by students. Core competencies, basic competencies, and learning objectives are used so that students can see what goals they want to achieve after the learning process takes place.

d. Concept maps

In a map scene concept, a systematic illustrative scheme or graphic image is depicted to replace a meaningful relationship between one design and another, in explaining an abstract interpretation of a person in a statement arrangement. This helps students to foster meaningful learning in the classroom.

e. Learning materials

This learning material contains a chart or button to go to the explanation of the material, where there are 4 main materials, namely banks, central banks, financial service authorities, non-bank financial institutions.

f. Conclusion

The conclusion screen has a function to share opportunities as well as data and results from the material to readers to recognize in a flash how the final results will be obtained from this learning media.

g. Quiz

On the questionnaire, students are presented with a blank sheet on the screen that is required to fill in the name, email, and class to enter the question sheet. After entering the question sheet, students choose an optional answer from the objective question according to students' knowledge. For the next question, students only press the next button to continue the test. The quiz menu has been designed in the Indonesian language and this quiz has a duration of 45 minutes. It is an easy-version mode that can be used so that students can replay it if they still have any more time left. After finishing the quiz, students' answers can be corrected immediately and sent to the application owner.

h. Bibliography and Bibliography

In the final part of this research, students will be presented with Bibliography lists. The function is to find out the learning resources that were created and who are the creator of the application.

Android platform learning is learning using communication equipment in the form of an Android smartphone which includes a learning module in it. This form of learning is packaged in an application that can be owned and opened at anytime, anywhere regardless of time and place, without requiring internet access. As a result, maximizing smartphones for students is not only in peer-to-peer communication or buying and selling, but can act as equipment for the teaching and learning process. Until this latest innovation, students are expected to be able to master the economic modules submitted by the teacher. Because of this situation, the researchers have the latest innovations as solutions in the description of the economic model, namely by developing eLearning media on the Android or mobile learning platform.

3.2. Presentation of Trial Data

3.2.1. Product Validation

The results of the validity test on the development of economic learning media on the Android platform are on the subject matter of Banks and Non-Bank Financial Institutions. The data presented were questionnaire data on the feasibility of material expert validators by Padang State University lecturers, media expert validators by Padang State University lecturers, and learning expert validators (teachers) at SMA Negeri 1 Lembah Melintang.

The feasibility of mobile learning on the Android platform as an economic learning medium in class X IPS at SMA Negeri 1 Lembah Melintang was carried out to determine the amount of feasibility before being tested using a validated questionnaire. At this stage of limited field trials, limited trial results were obtained. The limited trial was conducted on 21 students of class X IPS at SMA Negeri 1 Lembah Melintang. The following are the results of all validations for mobile learning on the Android platform as a medium for economic learning.

Table. 3 Results of all validation of mobile learning on the Android platform as a medium for economic learning.

No	Information	Percentage	Criteria
1	Material Validation	77,50%	Well worth it
2	Media Validation	82,14%	Well worth it
3	Learning Validation	86,48%	Very Worth it
4	Trials	88,57%	Very Practical
Validation Average		83,67%	Well worth it

Source: data processed by researchers

Based on the 3rd table above, the overall validation average is 83.67% with feasible criteria. The results of the validation by material experts were declared "Feasible" to be used, which obtained the results of data analysis with an average percentage of 77.50% with a standard percentage level of 76% - 85%. Then, media experts obtained an average percentage of 82.14% with a standard percentage level of 76% - 85%, which means that this development product is "Feasible" suitable for use in the field. Learning experts obtained an average percentage of 86.48% with a standard percentage level of 86% - 100%, which means that this development product is considered very suitable for use in the field. Furthermore, based on field trials to students, the average percentage was 88.57% with a standard practicality level of 86% - 100%, it means that the use of learning media was stated to be very practical to use in economic learning.

3.2.2. Revision of Learning Media Development Products

Based on the comments, suggestions, and criticisms obtained from the validators, namely media experts and material experts. The results of the revision of the Android platform mobile learning as a media for economic learning are as follows:

- a. Changing the color and background of the text to make it more clearly visible.
- b. The color of the writing is yellow/gold/light brown not too clear when using an image in the background. Then change the color of the writing.
- c. The entry is illegible so it needs to be changed color.
- d. The writing is too long and less legible because the background color is stronger than the text. So, the substitution of plain background color with a soft color.
- e. The presentation of the image must be designed in a landscape manner.
- f. Improvements to the material and trim are simple and the original files are stored on the Osf link.
- g. Adding close navigation and color replacement on the button, also limiting each material.
- h. Adding some instructions for quiz work (a form of questions, number of questions, how to answer, time allocations, and so on).
- i. Make the question page to be full screen and more effectively.
- j. Adding a "back" button to go back Home on the last page of the quiz.
- k. Providing a final evaluation of the results, so students can use them as feedback, and questions that are worked on are sent directly to the user's email and can be printed.

4. CONCLUSION

Based on the research results, it can be concluded that Android-based mobile learning is "Feasible" and very practical to be used in economic learning by students.

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