DEVELOPMENT OF LEARNING MEDIA APPLICATIONS IN ANDROID-BASED FOR GEOGRAPHIC LESSONS (CASE STUDY 34 JUNIOR HIGH SCHOOL BANDUNG)

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ABSTRACT

Bandung 34 Junior High School, is located in Jalan waas Soekarno Hatta, is the first middle level formal institution. 34 Junior High School has a Social class, where the Social class is divided into 3 parts, namely history, economics, and geography. Of these three subjects, the geography is a subject that has a lower level of understanding of historical and economic subjects. Seeing the declining students learning results, proves that students understanding of geographic material is quite low. This is because one of the learning supporting factors that cannot be fulfilled by the school, which is the procurement of teaching aids media for geography subjects. The purpose of this research is to create a media learning that can help students in the learning process using the technology that is often used, name *smartphones* based on Android. This Research uses the *Hybrid Learning* method using *waterfall* Software development paradigm. The *Hybrid Learning* method is a process of merging between conventional learning media and technology-based learning. The *Hybrid Learning* Method scan help Students and teachers to be able to take advantage of the technologies that are nearby and be used in daily activities.

Based on The results of the student's response, indicating that the application being made is well-received to assist in teaching learning activities, evidenced by a questionnaire distributed to 62 learners stating that 83% learners declare Applications that are built worthy to be applied to the learning process. The conclusion in this study is that the learning media supporting learning activities can be received by both teachers and learners to improve the quality of education.

Keywords: Media Learning, Hybrid learning, Junior High School, Android

1. INTRODUCTION

Bandung 34 Junior High School is one of the first middle level formal education institution that is under the scope of Education Office of Bandung. 34 Junior High School, currently using the standard K-13 education curriculum or curriculum 2013 which is in effect in the Indonesian education system starting from the year 2013. Based on the Ministry of Education and Culture Regulation number 22 year 2016 about basic and secondary education process standards, the learning process in the 2013 curriculum is organized interactively, inspiring, fun, challenging, motivating Learners to participate actively, and provide ample space for initiatives, creativity, and independence in accordance with the talents, interests, and physical and psychological development of learners. Each education unit performs learning planning, implementing learning process and assessment of learning process to improve the efficiency and effectiveness of graduates competency Achievement[1]. The learning process in SMP/MTs/SMPLB/package B is adapted to the characteristics of competencies that begin to introduce subjects by maintaining integrated thematic on natural sciences (IPA) and Social Sciences (IPS)[2].

Social Sciences (IPS) is one of the subjects found in curriculum 2013 in junior secondary education. IPS is a combination of several subjects related to social sciences including geography, economics, and history. Results obtained from the dissemination of questionnaires to students of classes VII and VIII, received a response from 238 respondents who said, as many as 162 students (68.1%) Have difficulty in geography lesson material, evidenced by the results of the value gained by learners can be seen at Attachment A12 up to A28.

According to Ms. R. Neneng Daningsih, S. Pd., as the teacher of IPS SMP Negeri 34 Bandung, that the delivery of geographical material to students today uses lecture methods, questions and answers and discussions using the teaching media of the board, it is not in accordance with the Learning Plan (RPP). The Limited teaching aids media provided by the school was one of the consequences of not being achieved BY RPP in the geographical subjects of Bandung 34 Junior High School.

The solutions offered to solve current problems are by utilizing learning technology as a teaching aids for learners. The choice of technology as a medium of learning must be precise in function, "the process of application of selection of learning media is essentially one of the applications of learning

technology. The application of careful selection of learning media to be later used and well utilized will in turn improve the learning quality. " (Abidin, 2016). Learning Media to be created using the *Hybrid Learning* method is a method that blends from face-to-one methods, computer-based learning, and online-based learning using *smartphones*. Based on the rules of Bandung 34 Junior High School, students are allowed to bring *smartphones* in the lesson hours to use if necessary and the permission of the teachers concerned, this is evidenced by 238 respondents (100%) Has a *smartphone* with an Android operating system as much as 224 respondents (94.1%). So based on the rules the application that will be built will utilize Android basedsmartphone devices. Based on the problem, it takes learning media in the form of *Mobile Learning*based application. Therefore, application development is hope to be able to break the problem is the development of learning Media application in geography based on Android (case study of Bandung 34 Junior High School).

1.1 Formulation of problems

Based on the problem, it takes learning media in the form of mobile learning base application.

1.2 Purpose and Objectives

Therefore, application development is hope to be able to break the problem is the development of learning Media application in geography based on Android (case study of Bandung 34 Junior High School).

The objectives that the study aims to accomplish are as follows:
1. To facilitate students in learning Geography subject matter.
2. Assisting teachers in delivering interactive Mater I on Geography subjects.

1.3 Research Methodology

The research methodology used for the writing of this thesis uses quantitative descriptive method. A descriptive method is a method of describing facts and information in situations or events where now is systematically, factual and accurate[3]

2. FOUNDATION THEORY

2.1 Media Learning

In general, the *media* is derived from the Latin word *medius* which literally means ' middle ', ' intermediary ' or ' introduction '. More specifically, the understanding of the media in a learning process can mean as graphic, photographic, or electronic tools that are in the form of supporters in processing and rearranging visual or verbal information. The following have been submitted by experts in AECT

(*Association of Education and Communication Technology,* 1997) to provide boundaries in the media as all forms and channels used to convey the message or information. In addition to being an introductory system, the media often referred to by the word *mediator* According to Fleming is a tool that participates in two parties and has made it[4].

The role of media in the learning process is a tool that plays a role in providing teacher support to the students about the content of information or learning materials, so that the learning process becomes more effective and the message Material is delivered.

Media Learning is an important tool in the process of learning to teach. In addition, learning media must have an interactive nature, because with interactive learning media will create a considerable potential when conveying a material to be easy to digest and understand by learners. Interactive learning Media can be done in many ways, can be done by providing a material with an interesting visual enhancement through a CD or with new technologies such as computers or *smartphones*.

2.2 Computer-based Learning

The term "computer-based learning" is generally m-headed on all educational *software* accessed through a computer where the user can interact with it. A computer system that presents a range of learning programs to learners, whether in the form of information, concepts, and practice questions to achieve specific objectives, and learners to conduct learning activities by interacting with the system Computer. In a computer-based learning/CBI, computers are used integrally in a learning process, where in the learning activities there are two-way interactions between learners and computers. The use of such computers is directed as "means or learning media" that can help teachers task in embedding a concept to learners and training in improving the desired skills. With the advantages, the computer has the ability to overcome the shortcomings found in teachers[5].Computer Assisted Learning is a computer application as an integral part of the learning and teaching process. Computer Assisted learning aims to assist students in learning through two-way interaction patterns using computer terminals or multi-directional media that extends through a computer network (both locally and globally) and also expanded functions Multimedia Interface[6].

2.3 Multimedia

Multimedia comes from the word *multi* (*latin nous*) which means many or assorted and *medium (Latin)* which means something used to convey or bring something and *medium (American Heritage Electronic Dictionary, 1991)* is a tool for distributing and presenting information. Multimedia can also be interpreted as the use of several different

mediums to combination or combine from digitally manipulated text, photographs, graphic art, sound, animation, and video elements [7].

Computer-based multimedia use is acceptable in learning on the basis of heightens the independent learning process as well as the active role of students. The computer-based multimedia system also provides a stimulus to the learning process that takes place outside the classroom. The Use of computer-based multimedia learning can also make learners more mindful of the materials learned.

2.4 Object Oriented Programming (OPP)

Object Oriented Programming (OOP) is a term in the programming language using techniques oriented or based on objects in the development of the system or application program, meaning that the orientation in the making The program no longer uses linear or structural orientation but rather is oriented towards separate objects [8].

2.5 Unified Modeling Language (UML)

Unified Modeling Language (Uml) is a visual modeling language used in determining, visualizing, constructing, and documenting artifacts in a software system to be built [5]. UML is used in to understand a draft, configuration and maintain control in the information system. UML captures information about static structures and dynamic behaviors for a system. A system modelled as a collection of discrete objects that interact to do the work that ultimately benefits the user. UML is not a programming language but is a tool that provides a code generator from UML to various programming languages[9].

2.5.1 *Use Case Diagram*

Use Case is one of the contributors IN UML that describes the *external view* of the system that we will create the model.*Use Case*work by describing the type of interaction between a system user and its own systems through a story of how a system is used and can be used to shape the behavior of the system to be created

2.5.2 *Activity Diagram*

The activity diagram illustrates the various activity flow in the system being designed, how each flow begins, The possible decision, and how they end. The Activity diagram is a special diagram state, where most of the State is action and most of the transitions are triggered by the completion of the previous state (internal processing).

Therefore the *activity* diagram does not depict the internal *behavior* of a system (and the interactions between subsystems) in an exact way, but rather illustrates the processes and activity paths from the upper level Public. Describing business processes and activity sequences in a process. Used in business modeling to show the order of business process activity. This diagram structure resembles a *flowchart* or Data *Flow* diagram on structured design. It is very useful when we create this diagram in advance in the model of a process to help understand the process as a whole. The *Activity* diagram is created based on a or multiple use case in the use case diagram.

2.5.3 *Diagram Class*

The diagram Class describes the types of objects in the system and the various static relationships that are found between them. The *Class* The diagram also shows the properties and operations of a class and the constraints contained in the relationship of the object. UML uses the term feature as a generic term that includes the properties and operations of a *class*.

2.5.4 *Sequence Diagram*

Sequence diagrams illustrate the interaction between objects in and around the system (including users, displays, etc.) in the form of messages that are depicted on time. Sequence diagrams consist of vertical dimension (time) and horizontal dimension (related objects).

Sequence diagrams are used to describe a scenario or series of steps performed in response to an event to produce a specific output. Starting from what triggers the activity, the process and what changes are occurring internally and what outputs are generated. Each of the objects, including actors, has a vertical lifeline. Message is described as an arrow line from one object to another.

2.6 State of Art

The following conclusions can be taken from the *state of art* obtained from previous research, namely:
1. A significant link about the utilization of E-learning towards increasing students ' abilities and the motivation of students in learning.
2. The displehaving of students leads to low motivation for learning at school or outside school. Seen during the process of teaching and learning is still there are students who go in the room regardless of the teacher in the classroom, there are still students who do not pay attention to the teacher, chat with friends.
3. The submission of material does not refer to the Learning Implementation Plan (RPP).
4. The selection of learning media can be an important role in education.

3. ANALYSIS

3.1 Problem Analysis

Analysis of problems on the development of learning Media IN SMP Negeri 34 Bandung using *Hybrid Learning* methods are:

1. Limited Learning media that can help teachers in delivering lessons to Learners.
2. Learning processes that tend to be boring in learning.

3.2 Analysis of learning Media applications to be built

Analysis of the Learning Media application This geography contains a big picture of the system to be built. The system to be built can be described as a companion learning tool based on learning Curriculum 2013 and learning Implementation Plan on geography subjects for learners in SMP Negeri 34 Bandung. Analysis of learning media applications to be built consist of analysis of learning media, application description, app *Storyboard* , material analysis.System architecture can be seen on Fig. 1

Fig. 1. Architecture of Geography system

3.3 Functional needs analysis

The analysis of functional needs is an overview, planning, and sketching or regulation of several separate elements, becoming a unified and functional whole. Tools used to help describe the general system to be constructed using an object-oriented approach of UML[10].

3.3.1 *Use* Case Diagram

The creation of a *Diagram Use case* aims to describe what the system does so that system users can understand the usability of the system to be built.*Use Case Diagram*Geography Learning Media app can be viewed in Fig. 2 and Fig. 3

Fig. 2.*Use Case Diagram* on the app *Mobile*

Fig. 3. Use Case Diagram on application *Web*

3.3.2 *Activity* Diagram

Activity diagrams are an important part OF UML that illustrates the dynamic aspects of the system. *Activity* Diagram of *Use Case* see the material seen in the image Fig. 4
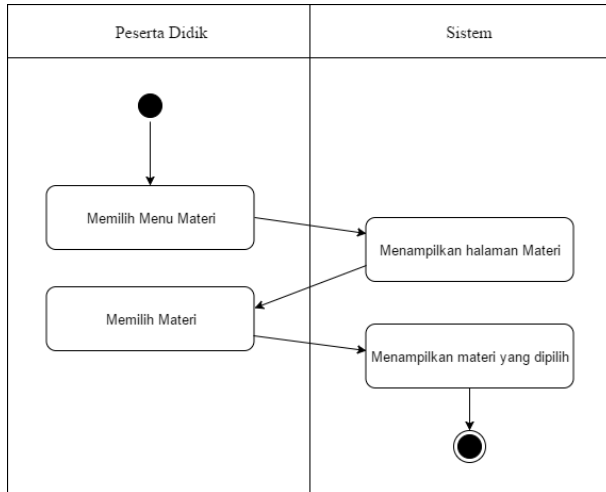

Fig. 4. Activity Diagram Viewing material

3.3.3 Sequence Diagram

Sequence diagrams illustrate the interaction between users and the system. *Sequence* Diagram showing the material can be viewed on Fig. 5
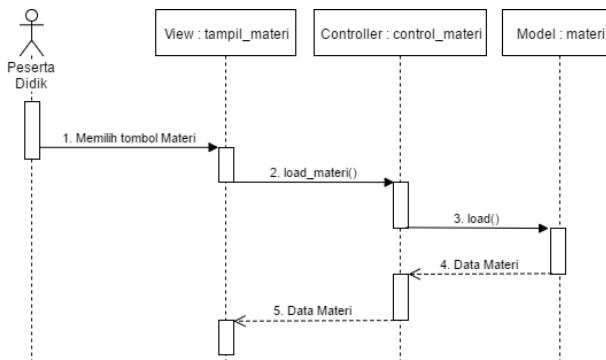

Fig. 5. Sequence Diagram Viewing material

4. SYSTEM DESIGN

System designing is a system design that can be defined as the depiction, planning and sketching or setting of several separate elements into a unified and functional whole.

4.1 Menu Structure design

Menu structure design is the main form of a program design that serves to facilitate the running of a program. The image below is the *backend* and *frontend* menu Structure of the Geography learning Media system. The Design of the menu structure can be look in Fig. 6 and Fig. 7.
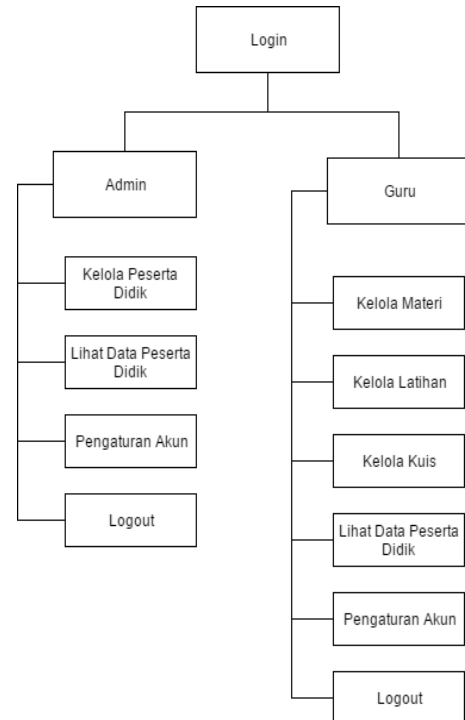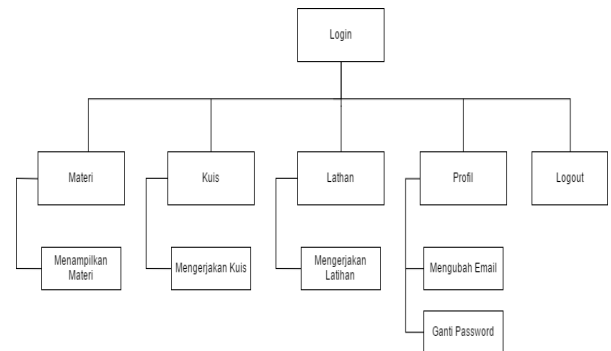

Fig. 6. Structure Menu*Backend*

Fig. 7. Structure Menu*Frontend*

5. IMPLEMENTATION

5.1. Hardware implementation

The hardware used to implement Android-based geography learning apps can be seen in table Table 1 and

Table 2

Table 1. Hardware Implementation

No	Hardware	Specifications
1	Processor	2.5 GHz
2	Memory	8 GB
3	Vga	2048 MB
4	Drive	500 GB
5	Monitor	Monitor resolution 1280×720
6	Keyboard	Standard
7	Mouse	Standard

Table 2. Hardware Implementation *Smartphones*

No	Hardware	Specifications
1	Processor	2.0 GHz
2	Operating system	Android 7.0 (Marshmallow)
3	Ram	2 GB
4	Internal Memory	8 Gb

5.2. Software implementation

The software used to implement the Android-based learning Geography media application can be seen in table Table 3.

Table 3. Software Implementation

No	Software	Specifications
1	Operating system	Windows 10 64bit
2	*Compiler Tool*	Android Studio
3	*Text Editor*	Atom
4	*Tool Design*	CorelDraw X7
5	*Tool Database*	Mysql
6	*Web Server*	Apache
7	Programming language	Java, PHP

6. SYSTEM TESTING

6.1 Testing Alpha

The Alpha test uses a *black box* test which is the test performed to observe the execution results through test data and the functional checking of the software. Testing the *black box* evaluates from the outside display and its functionality. The stage in *black box testing* is conducted in reference to black box testing scenarios , cases and the results of *black box* testing and the conclusion of *black box*testing .

Based on the results of the test that has been done then it can be concluded that the system that was built not to be expected. Of all that has been done in the test can not yet be expected to represent another function test on the built system.

6.2 Beta Testing

Beta testing is an objective test conducted by directly plunging into the field with the intention to know the extent of the quality of the learning media applications in the Bandung 34 Junior High School against respondents or prospective users of the system. Testing is conducted to determine the user's assessment of the application.

Table 4. User Questionnaire

No	Questions
1.	Is the material conveyed by Media Learning geography understandable?
2.	Whether the presented material is appropriate With the lessons given?
3.	Whether using colors, buttons, and letters for the application interface is already interesting?
4.	Is this learning Media app easy to use?
5.	Is it easy to understand how to practice and evaluate this learning media application?
6.	How do you respond to this app, that the app is easy to use and the material and simulations are easy to understand?

Table 5. Beta Test Results

No	Questions	Ss	S	Rg	Ts	Sts	Total
1	Is the material delivered by the Geography learning Media app understandable?	11	20	3	0	0	34
2	Is the presented material already in accordance with the lessons given?	12	17	5	0	0	34
3	Is the use of colors, buttons and fonts for the app's display (interface) interesting?	9	20	5	0	0	34
4	Is this learning Media app easy to use?	13	16	5	0	0	34
5	Is it easy to understand how to practice and evaluate this learning media	12	17	5	0	0	34

| 6 | How do you respond to this app, that the app is easy to use and the material and simulations are easy to understand? | 11 | 19 | 4 | 0 | 0 | 34 |

(first row partial: "application?")

Table 6. Weight Response Questionnaire

Category answers	Score
Highly agree	5
Agree	4
Hesitant	3
Disagree	2
Highly Disagree	1

To find the percentage of each of the questionnaire responses used *Likert*scale formula[11] as follows:

$$P = \frac{S}{Skor\ Ideal}\ x\ 100\%$$

Table 7. Score Interpretation criteria based on Interval

No	Percentage value	Criteria	
		Aspects of functionality	Aspects of software engineering
1	0%-19%	Highly Disagree	Very bad
2	20%-39%	Disagree	Bad
3	40%-59%	Hesitate	Good enough
4	60%-79%	Agree	Good
5	80%-100%	Highly agree	Excellent

6.3 Beta Testing Conclusion

Based on the result percentage of each *user* 's answer to the question posed on the beta test can be concluded that the Learning app interface is good, interesting and easy to understand and operate. Overall this app can help students and teachers in teaching and learning activities greatly agree with application development over the next term.

7. CLOSING

7.1 Conclusion

Based on the results obtained from the research conducted in the preparation of this final task and referring to the research objectives, it can be concluded:

1. With the development of the Learning Media application in the geographical subjects based on Android, it is easy for students to learn the subject matter of geography at Bandung 34 Junior High School.
2. With the development of media applications learning on geography subjects based on Android, can help teachers in delivering interactive material in geography subjects at Bandung 34 Junior High School.

7.2 Advice

This learning media app still needs more development by adding some of the latest features. As for suggestions that may be applicable to the development of geography learning applications, are as follows:

1. Add simulated simulation of events on Earth or off Earth with 3d visualization.
2. Can create a test system for geography lessons based on the student's school year.
3. Can be developed using video mapping using Augmented reality visualizing by reality.

8. REFERENCES

[1] Kemendikbud RI, "Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 22.Tahun 2016 Tentang Standar Proses Pendidikan Dasar dan Menengah," *Clim. Chang. 2013 - Phys. Sci. Basis*, 2016.

[2] K. RI, "STANDAR PROSES PENDIDIKAN DASAR DAN MENENGAH," 2016.

[3] M. Nazir, *Metode Penelitian*. Bogor: Ghalia Indonesia, 2013.

[4] A. Azhar, "Media Pembelajaran," *Media Pembelajaran*, 2011.

[5] D. Priyanto, "Pengembangan Multimedia Pembelajaran Berbasis Android," *Pemikir. Altern. Kependidikan*, vol. XXXIII, no. 2, pp. 81–87, 2015.

[6] H. Maulana and M. A. Aliska, "PEMBANGUNAN MEDIA PEMBELAJARAN INTERAKTIF PADA MATA PELAJARAN BAHASA INGGRIS KELAS VII (STUDY KASUS SMP XYZ)," vol. 16, no. 2, pp. 145–154, 2019.

[7] V. Tay, *Multimedia: Making It Work Seventh Edition*, 7th ed. New York: McGraw-Hill, 2008.

[8] M. Danuri, "Object Oriented Programming (

OOP) Pembangun Program Aplikasi," *Infokam*, vol. V, no. 1, pp. 40–47, 2009.

[9] Munawar, *Analisis Perancangan Sistem Berorientasi Objek dengan UML*. Bandung: Informatika Bandung, 2018.

[10] M. M and Oktafianto, *Analisis dan Perancangan Sistem Informasi Menggunakan Model Terstruktur dan UML*. Yogyakarta: ANDI, 2016.

[11] T. M. Scale, "LIKERT (The Measurement Scale and The Number of Responses in Likert Scale)," vol. 2, no. 2, pp. 127–133, 2013.