

CHAPTER I

INTRODUCTION

1.1. Background of the Study

The development of mobile android-based mathematics learning materials to improve student motivation and achievement is very important to help high school students in their learning process. Development of teaching materials is expected to motivate and student achievement can support students to be more active in learning activities. The innovation was carried out to provide standardized learning materials for high school students to make it easy to learn and to improve student competence.

Online learning resources can be designed to provide learning modules or in this case called electronic modules. Moreover, currently in Indonesia the widespread use of Android-based smartphones (Rosenberg, 2001) states that the development of smartphone products with the Android operating system has experienced extraordinary developments, while the development of Android use in Indonesia reaches 40% per year. There are 18 million Telkomsel customers who already use smartphones and 2 million of them use Android smartphones.

Education is a forum that serves to prepare human resources who have competence in carrying out the functions of life. The education system should not be separated from the changes that occur in various fields as a result of globalization. The rapid development of science and technology today can have a significant influence on the world of education. All components of education are expected to be able to adapt so as not to experience gaps in facing the progress of the times. In an effort to educate the nation's life, improving the quality of education is very important for sustainable development in all aspects of human life. The national education system continues to be developed in accordance with local, national and global needs and developments (Mulyasa, 2004).

The need for a new atmosphere in Mathematics learning activities is expected to make students materially active in learning, so as to improve student achievement (Siregar and Parera, 2013).

Learning activities are a process that contains a series of teacher and student activities on the basis of reciprocal relationships that take place in an educational

situation to achieve certain goals. To be able to achieve a good reciprocal relationship, teachers are required to create a meaningful and effective learning process so that the learning process can run smoothly and the learning objectives are achieved. Education is a forum for the intellectual life of the nation, because through education it will create educated human resources who are able to face the increasingly rapid developments of the times. However, if the quality of education is still low, then what is created is a lack of human resources. Until now, the quality of education in Indonesia has not shown satisfactory results. This condition also occurs in mathematics education today. One indicator of the quality of education is the acquisition of student learning outcomes. Student learning outcomes can be seen from the success of the teacher in delivering the subject matter, the results of which meet the objectives of the specific interaction of the subject matter, absorption and the level of students' understanding of the lessons delivered. (Djamarah and Zain, 2006).

In line with efforts to improve the quality of education, learning innovation is one of the concerns in addition to learning support facilities. Learning innovation and integration of character education will be given the opportunity to improve the quality of education and develop the nation's character in accordance with Indonesian culture (Situmorang, 2013). Where the use of information technology for learning has also encouraged a shift in learning from conventional learning to independent learning so that the impression of learning is remembered by students (Thomkins, 2006).

As an educator, a teacher does not only carry out his role in presenting material in front of the class to achieve learning objectives in the field of study that is his responsibility, but is also expected to have skills and competencies that can support his profession. The learning process in education generally involves four main components, namely students, teachers, learning environment and learning materials. These four components influence students in achieving learning objectives. Each student has a different level of ability seen from the aspect of perception, knowledge in the field to be studied, learning motivation, learning skills, and learning objectives. To improve student achievement, teachers are required to create more innovative learning that encourages students to learn optimally, with independent learning in the classroom. Therefore, learning media must be used effectively and selectively according to the main topic being taught. The development of innovative multimedia in this research is expected to help problems in learning. So that educational

innovation is needed, because innovation is a plan or pattern that can be used to build a curriculum, design teaching materials and as a guide for learning activities inside and outside the classroom. Innovation in education is often associated with renewal that comes from creative thinking, discovery, and modification that includes ideas and methods used to solve an educational problem (Riski et al, 2006).

Educational innovation can make students more active in the teaching and learning process, because active learning does not only involve the experience of doing something with the material being studied but also reflection and dialogue, which can occur either alone or in groups (McCormick, 1996).

Innovation in education is often associated with updates that come from the results of creative thinking, findings and modifications that make ideas and methods used to solve educational problems. Educational innovation also includes plans or patterns that can be used to build learning teaching materials in the classroom or outside the classroom, including teaching materials. Thus, innovation in learning materials is very urgent to be applied so that the delivery of material can be directed and able to support the achievement of student competence in learning. Therefore, learning is needed that can make students understand the subjects presented and can be applied in everyday life. Concrete efforts are needed to design learning that makes it easier for students to solve problems and guide students to associate science in real life creatively (Giantcarlo and Slunt, 2004).

Good teaching materials must be able to present teaching materials according to the demands of the curriculum, following the development of science and technology can bridge learning so that the competencies that have been set can be achieved (Rosenberg, 2001).

Based on observations and interviews with UmmiAulia. S.Pd. at SMAN 10 MEDAN, it was explained that all classes had used the 2013 curriculum and the teaching materials used were textbooks and worksheets in accordance with applicable regulations.

All students at this school have the freedom to bring their smartphone/android to school. Especially Mathematics teachers who only use textbooks and worksheets. The learning model applied today is a conventional model, namely the lecture and discussion method, this method is expected to help teachers and students in making it

easier to understand lessons, especially mathematics. According to him, the use of various learning models is feared to make it difficult for students to receive the material. They have not made new innovations in mathematics teaching materials based on multimedia learning, internet web learning and android mobile learning. Based on the identification of the problem, the researcher will create an Android-based mobile mathematics learning material to increase students' motivation and learning achievement in teaching and learning activities, especially Arithmetic sequences and series. Learning mathematics requires the skills of a teacher so that students can easily understand the material provided by the teacher. If the teacher does not teach students to master the strategy it will be difficult to receive the subject matter perfectly. Teachers are required to innovate and be creative in carrying out learning, so that student learning outcomes are satisfactory. Based on these problems, the researcher intends to innovate teaching materials, in order to make it easier for students to understand the concepts being studied.

The learning process cannot be separated from learning mathematics which is considered the most difficult subject for students. One of the materials contained in it is algebraic material. Algebra subject matter requires students to have careful and critical thinking in solving problems related to Derivative, this material is part of the material for high school class XI. The need to package mathematical problems in critical thinking or present problems that force students to think critically certainly has the potential to affect the effectiveness of learning. Many students have not been able to understand and solve mathematical problems related to Derivative. So that making students understand the material well is the task of a teacher regardless of the level of differences in student abilities. It was also explained that practice questions are given at the end of the sub-chapter and not all students get scores that reach the Minimum Completeness Criteria (KKM) for mathematics, there are still students who have to take remedial actions because their scores have not reached the KKM. Based on the data on the average value of mathematics, it can be said that students do not understand the material that has been explained by the teacher before being tested. This is because when the teacher explains, students tend not to pay attention and are busy with their own activities, some are drawing in their notebooks, playing and talking with their classmates and not paying attention to the teacher who is explaining the lesson.

Based on the explanation from the mathematics teacher, it is said that the media is still an important factor in learning mathematics. More interesting media will greatly affect students' interest in learning, there needs to be an innovation and renewal in the development of learning media that can motivate students so that difficulties that become obstacles for students in learning mathematics can be minimized.

In connection with this observation, the researcher wants a change that occurs in the way students acquire knowledge. These facilities are in the form of learning media which will later become a support for students in learning, if the teacher is more optimal in utilizing learning media it will make it easier for students to convey the material and students more easily understand the material described.

The results of observations on Thursday, August 25, 2022 at SMA N 10 MEDAN, the results of students' test scores on derivative and series material obtained the following data:



DINAS PENDIDIKAN PROVINSI SUMATERA UTARA
SMA NEGERI 10 MEDAN
DAFTAR NILAI PESERTA DIDIK TAHUN PELAJARAN 2021/2022

Kelas : XI MIA III
 Semester : I
 Mata Pelajaran : Matematika

No.	NAMA	TANGGAL 5/ NOVEMBER
1.	ALFARO DEDI SUANDA MARBUN	60
2.	ANDRE CRISTIAN NAINGGOLAN	80
3.	ANGELINA EKA VRAJISTA	80
4.	ZRINA NUR RAJIMA	50
5.	CHRIS MULYONO	20
6.	DIHARMA SAPRIAN S.	60
7.	ELISABETH HUTAGAOL	100
8.	ERVAN SAMUEL CHRISTIAN SIDADUTAR	70
9.	GETRAN GERALDI	60
10.	HAFNI MEYLANI HARAHAP	60
11.	ILSA ILLONA BR SEMBIRING	40
12.	JOEL ALEX CHRISTY BARUS	100
13.	JOSUA CORNELIUS SITORUS	80
14.	KELVIN ADVENTO PURBA	60
15.	MAYANG PURNMA RIVI	60
16.	MIRANDA OLIVIA NAPITUPULU	-
17.	MUHAMAD ALFARIZI ALAIKA	60
18.	MUHAMAD RIZALLOH ALAIKA	60
19.	MUHAMMAD RIDZUAN	40
20.	MUHAMAD RIZAQ ARKAAN PURBA	90
21.	NADRATUSSAKINAH	80
22.	NAZWA AULIA	20
23.	NURAKILA	40
24.	PHANIA AURORA D.S	60
25.	RAISYAH NUVUS ADELLINA	70
26.	SHAFIRA ALFIYAH	60
27.	SEPTI YASA	90
28.	SHAVDNA ALVISA NATALIE SIFAMUTAR	20
29.	SITI AZZAHRA WANNIA	40
30.	STEVEN LOUIS NAPITUPULU	40
31.	YOHANA SIMANJUNTAK	50
32.	YOHANA FELIX TAMPUBOLON	90
33.	ZAHRINA SALSABILA	80
34.	JERY NAPITUPULU	50
35.	FRANSISKUS SIMBOLON	50

Table 1.1
 Data for Even Semester Observation Values for 2021/2022 Class XI Mathematics
 Subjects

KKM	Score	Student	Percentage
70	< 70	23	65.7%
	>70	12	34.2%
Total		35	100%

Based on table 1.1 above, it can be seen that the results of observations on derivative on Odd Semester students of SMA N 10 MEDAN who have a KKM in mathematics are 70, students who meet the KKM are 12, namely 34.2% students, namely as many as 23 students have not met the KKM while 23 students are 65,7%,

The low score of students' mathematics occurs because during the learning process there are always obstacles for students to understand it. Such as the lack of mastery of the material by students so that it has an impact on low learning outcomes. This is also in accordance with the results of an interview with UmmiAulia, S.Pd as a mathematics teacher, that in learning mathematics, due to the limited media available in schools, teachers mostly explain the material from the textbooks provided and do not use learning media. The lecture method is one of the learning models that is often used by teachers, the use of this method causes students to have low learning desires and students feel bored quickly and the lack of practice questions given to students makes students less active in participating in learning. in class and it tends to be difficult to get the KKM standard score set by the school.

Development through innovation of teaching media for mathematics textbooks is required by using e-learning/mobile android media which can improve the quality of education in an application called Android Studio. Based on this description, researchers are interested in conducting research and trying to develop learning modules in learning mathematics. The development of mathematics learning modules is very important in order to motivate and increase student achievement to learn and make students active in the teaching and learning process and will help students to learn mathematics easily. Therefore, it is necessary to conduct a research entitled "Development Of Media Interactive Learning Problem Based Learning Android-Assisted To Improve Student Outcomes And Motivation At SMA NEGERI 10 MEDAN".

1.2. Problems Identification

Based on the background described above, the identification of problems in this study include:

1. The mathematics learning system in class is saturated and monotonous.
2. Students do not carry out interactive activities in following the learning process in class.

3. The learning system in schools is still limited to conventional learning (not using learning media).
4. There is still a lack of use of media that functions as a student learning companion that can support learning so that it is necessary to have student assistance in the learning process on the material on derivative.

1.3. Scope Of the Problem

Based on the description of the previous problem identification, researchers need to limit the problem so that this research is more focused and focused. So the limitations of the problem in this study are: The interest of SMA NEGERI 10 MEDAN students on derivative is still relatively low because the media used does not support students in learning.

1.4. Research Question

Based on the description above, the research problem can be formulated as follows:

1. How to develop learning media based on android mobile with Android Studio in improving students' ability to understand mathematics learning in derivative material?
2. How is the validity of learning media based on android mobile with Android Studio to improve students' ability to understand mathematics learning in derivative material?
3. How is the effectiveness of learning media based on android mobile with Android Studio to improve students' ability to understand mathematics learning in derivative material?
4. How is the practicality of learning media based on android mobile with Android Studio to improve students' ability to understand mathematics learning in derivative material?

1.5. Study Objectives

In line with the formulation of the problem mentioned in the previous section, the objectives of this study are:

1. Finding effective learning media in improving student learning outcomes and motivation

2. Development of android mobile with Android Studio based learning media to improve students' ability to understand derivative topics.
3. Development of android mobile with Android Studio learning media using the Problem Based Learning learning model.
4. Development of android mobile with Android Studio based learning media using a deductive approach.

1.6. Research Purposes

The results of this study are expected to provide benefits for teachers and high school students in general and for researchers in particular. In general, the benefits obtained from this research are:

1) For Educators (High School Teachers)

The existence of this research adds mathematics learning media in the form of mathematics teaching materials on the topic of derivative that can be used by teachers as independent teaching materials. learning facilities to facilitate the learning process.

2) For High School Students

- a) Increase students' interest in studying derivative.
- b) Improve students' understanding which can improve student learning outcomes.

3) For Researchers

This research is useful for researchers because it can increase insight and knowledge in training skills as educators and can improve researchers' skills in making learning media in the form of mathematics teaching materials for the learning process.

4) For Mathematics Education Study Program

Can add references to develop other products and obtain additional library reading materials related to research, especially the development of Android-based Mathematics teaching materials on topic of derivative.

1.7. Operational Definitions

Based on this explanation, the operational meaning is as follows:

1) Research Development

Development research is an effort to develop effective educational products in the form of teaching materials, media, strategies, or other materials in learning to be used in schools not to test theories (Gufon, et al, 2007).

2) Learning Materials

Learning material is a modification of material to meet interesting material. It is said to be innovative because users will experience an innovative and active experience, for example actively paying attention to images, paying attention to colorful text or motion, sound, video and even animated films (Sanjaya, 2010).

3) Android Phone

Android phones are Linus-based operating systems for mobile phones such as smartphones and tablet computers. Android provides an open platform for developers to create their own applications for use by various mobile devices. Initially Google Inc. Buy android inc. A newcomer who makes software for mobile phones. Then developing Android, the Open Handset Alliance was formed, a consortium of 34 hardware, software and telecommunications companies, including Google, HTC, Intel, Motorola, Qualcomm, T-mobile, and Nvidia (Supardi, 2012).

4) Student Achievement

Student achievement are statements that describe significant and essential learning that learners have achieved and can reliably demonstrate at the end of a course program (Lesch, 2012).

5) Motivation

Motivation is able to initiate to succeed in our choices and at the same time lack of motivation can initiate the main obstacle preventing success (Valarmathie, 2017).