CHAPTER I

INTRODUCTION

1.1. Background of Study

Education is a basic need that must be met in life, because formal and non-formal education will provide changes in each individual both in terms of character advancement such as giving values and ethics as well as advancing knowledge. Education plays an important role in improving the quality of competent human resources and in accordance with the demands of development (Rista & Ariyanto, 2018). The state has set educational goals which "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and the skills they need, society, nation and state" (No. 20 of 2003 concerning the National Education System). Therefore education is needed to improve the quality of human resources who are diligent, reliable, responsible, and honest who are able to keep up with changing times (Nurdiyana, 2019).

The development of technology, especially the Internet has brought great changes in people's daily activities, everyone is easily connected with each other and can communicate easily without limit of space. Time and time again, humans have acted as digital natives (Perdana, 2020). The development of technology also affects aspects of education, lectures and students can change due to the development of technology and use of technology such as developing learning materials in the implementation of the learning and teaching process (Setiadi et al., 2018). The continuous development of information technology and digital is also changing the learning process and the way students interact with lectures. Younger students use digital technology in their daily activities and are inseparable from digital technology such as computers, gadgets, video and music, and short messages. This habit motivates them to automatically use digital technology in their daily study routine. Students prefer to use digital learning resources that provide more diverse,

1

convenient, portable and easy-to-use learning resources than using limited traditional learning resources (Shtepura, 2018))

In order to balance the change in students' learning habits over time, e-learning has been developed, the teaching process using the Internet. Online learning is a learning method using information technology, technology and communication (Jamun, 2018). In the field of education, efforts are being made to increase the quantity, quality, effectiveness and efficiency of the teaching and learning process, especially by developing ICT-based learning materials. Teaching and learning situations often confront abstract material, the past of which cannot be experienced by students, making it difficult for educators to teach that material and students having difficulty understanding the topic at all next time. The various learning problems mentioned above can be overcome if lectures use pictures, documentaries and animations to bring abstract material to life. ICT media can be a multimedia medium to deliver various learning materials in the form of text, animation and images. ICT media provide students with many options and help in understanding the learning material (Suryani, 2015).

Since the COVID19 pandemic in Indonesia, the government has done everything to prevent the spread of corona virus, especially in the education sector. Education is restricted to break the chain of transmission of corona virus according to the circular letter of the Ministry of Education and Culture (Kemendikbud) of the Directorate General of Higher Education No. 1 in 2020, including instructions for participating in training remotely in their respective homes (Handarini, 2020). The teaching and learning process needs to take advantage of a variety of learning resources and an adequate network so that the learning results are not different from the face-to-face learning process. Online learning uses the internet system with convenient online activities and is superior to the face-to-face learning system because it can be accessed anytime, anywhere. Online learning is more flexible because lectures and students can choose the communication model appropriate to the conditions of the learning implementation (Maulah et al., 2020) and understanding of the Physiology course materials plant.

Plant physiology is one of the subjects that should be studied by all biology department students. This course covers the complexity of the relationships between

biological concepts (anatomy, morphology, biochemistry, ecology), so a clear understanding of the concepts is needed to be able to solve problems. topics related to plant physiology. When communicating a course concept, the lectures must teach it in a real-life context by relating it to the environment or the students' daily lives. This will help develop students' thinking skills and improve their conceptual understanding of the subject being taught. A common obstacle that teachers face when teaching this course is that many students are sometimes still confused with the concepts being taught (Adhani & Darius, 2111020).

Gobec and Strgar (2019) reported that many students still feel confused in the process of studying photosynthesis. The same has been reported by Rosanti (2013), to study the physiology of plants means to study the physiological and metabolic processes of these plants. The concept of metabolism is a confusing concept for students because it is considered complex, abstract and boring also has many chemical reactions to understand (Tambunan, 2015). One of the causes low understanding of concepts is that students are less involved in constructing their own knowledge, absorbing only the information imparted by the lectures. This underlying cause requires a good teaching strategy. Each student has a unique personality that sets them apart from other students. For example, they differ in performance levels, learning rates, and learning styles. Learning style refers to a student's preferred way of learning. According to DePorter (2000) "A person's learning style is a combination of how they absorb, then organize, and process information". A person's learning style is generally considered to be derived from variables of personality, knowledge, psychology, sociocultural background, and educational experience. Hamzah (2008) states that "There are a number of learning styles that we can observe and maybe we can follow if we really think we are adapting to that style, including: style visual learning style, auditory learning style and kinesthetic learning style".

According to Musrofi (2010), only 30% of students succeed in learning in class because they have a learning style that matches the teaching style that teachers apply in class. The rest, up to 70% of students find it difficult to participate in class because they have a different way of learning, which is not suitable with the teaching method being applied in class. This means that 70% of students' behavior does not match the

teacher's teaching style in learning. Teachers' lack of understanding of how students learn has a bad effect on students. As a result, the student's academic success does not match the student's intelligence level. Teachers must know and recognize each student's learning style in order to facilitate the learning process (Papilaya & Neleke Huliselan, 2016).

To improve students understanding need practical experience such as experiment. Experiment is an important component in learning science subjects. Sometimes, there are few obstacle such as time, safety and cost to set up the scientific laboratory in university. However, these constraints can be resolved by using learning materials using computer-based technology which includes virtual laboratories (Muhamad et al, 2010). Virtual laboratories, could be proven as an important educational tool that deals with the lack of practical experiences in real time education (Gumaraes et al, 2003). A Virtual laboratories is a virtual reality environment that simulates the real world for the purpose of discovery learning. It allows one, in principle, to evaluate real experiments and operations due to limitations of time, safety or cost in the real time environment and is usually used within science teaching. Virtual laboratories is said to be equivalent in value to the learner because it addresses different learning styles and offers flexible and open ended environment for inquiry. Even though a Virtual laboratories cannot be identical or equal to traditional laboratory or wet laboratory, it is worth to consider the weighing many benefits that it offers.

Based on observations made with biology majors at Universitas Negeri Medan, it can be concluded that by leading the learning process, faculty provides learning resources. But the learning material provided by the instructor is still not enough to understand the course material, so additional learning resources are always needed. Likewise with learning styles, many students still have to use different learning styles to meet their needs in the learning process. In addition, when studying online, 84.6% of students use smartphones with Android as operating system. The smartphone used is also compatible with the needs of the student's learning process. So the authors are motivated to develop learning materials using Android based applications by applying various learning styles to biology students. The application is developed to support and facilitate the teaching and learning process as well as the

delivery and presentation of Plant Physiology courses more interesting and fun to arouse the interest of students and brings many advantages in education. Learning with gadgets is also more flexible, as students can study anywhere and anytime more easily.

1.2. Problem Identification

Based on the background of the problem above, various kinds of learning problems can be found, including:
1. Educators must be able to change the way of educating that is relevant to the times. Among other things, by implementing innovative, technology-based and multimedia-based learning strategies that attract students to study.
2. Students are accustomed to using gadgets so that study habits are also dependent on gadgets because they can access complete and practical information
3. Educators still use conventional methods (lectures) in teaching Transpiration topic to Biology Department students at Medan State University.
4. Students have difficulty understanding the material in the Transpiration topic because there are less learning resources.
5. The subject matter in the Transpiration topic is abstract so it is difficult for students to understand.
6. Lack of variation in the use of learning styles in Transpiration topic during the teaching and learning process.
7. In pandemic situation its difficult doing experiment in traditional laboratories.

1.3.   Scope of Study

Based on the background and problem identification described above, the scope of tis research is to develop android-based application as a learning media with variety of learning styles in the Transpiration topic.

1.4.   Scope of Problem

The problems in this study is limited to:

1. Research on the development of learning media in the form of an Android-based application with the application of learning styles for the Transpiration topic is focused on measuring the feasibility of learning media, not discussing its effect on learning achievement.

2. This application as a learning medium was developed in the Transpiration topic specifically on the topic of Plants and the Environment.

3. Most of students who have devices with the Android operating system so that android system operation can be used as learning media for Transpiration topic.

4. The validators in this study are material experts, media experts, and students who have studied and are currently studying Transpiration topic.

1.5. Research Questions

Based on the background, problem identification and scope, the formulation of the problem in this research are:

1. How is the feasibility of an android-based application as a learning medium for transpiration material in the Department of Biology, State University of Medan according to media experts?

2. How is the feasibility of an android-based application as a learning medium for transpiration material in the Department of Biology, State University of Medan according to material experts?

3. How is the feasibility of an android-based application as a learning medium for transpiration material in the Department of Biology, State University of Medan based on student responses?

1.6. Study Objectives

Based on the formulation of the problem, the objectives of this research are to:

1. To determine the feasibility of an android-based application as a learning medium for transpiration material at the Department of Biology, State University of Medan according to media experts.

2. To determine the feasibility of an android-based application as a learning medium for transpiration material in the Department of Biology, State University of Medan according to material experts.

3. To determine the feasibility of an android-based application as a learning medium for transpiration material in the Department of Biology, State University of Medan based on student responses.

1.7. Research Benefits

Through research on "Development Of Android-Based Application As A Learning Media On Transpiration topic In Biology Department Universitas Negeri Medan", there are various benefits that can be learned both theoretically and practically.

1. Theoretically

This research is expected to add insight and references for the implementation of learning using media, especially android-based learning media for Transpiration topic.

2. Practically

a. For students, it can provide an alternative to learning Transpiration topic for students so that students can access learning materials anytime and anywhere

b. For Lecturers, it can provide understanding and add insight into alternative learning media that are interesting and useful for Transpiration topic learning activities.

c. For researchers, gain valuable experience developing android-based applications as a medium of learning and entry into the world of education.

1.8. Operational Definition

Operational definitions are given to obtain a clearer understanding and description in interpreting the variables of the study in order to avoid differences in the interpretation of the terms contained in this study. The terms that need to be defined in this research are as follows:

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 (Nazruddin, 2012)

2. Transpiration is a process that involves loss of water vapour through the stomata of plants. The loss of water vapour from the plant cools the plant down when the weather is very hot, and water from the stem and roots moves upwards or is 'pulled' into the leaves (Mukhopadhyay & Midha, 2016)

3. Virtual laboratories is an interactive experience in which students observe and manipulate system-generated objects, data, or phenomena in order to fulfill learning   objectives   (Katkar,   2014)