

CHAPTER I

INTRODUCTION

1.1 Background

Preparedness is a significant factor in nations that are susceptible to disasters. There are various disaster management approaches. However, one common point of these approaches is that they are “preventive.” There are several components to this preventive approach, the first and foremost of which are preparedness and education. These preventive efforts can open up the possibility of capacity building in dealing with disasters which shows variations in the period and time of development. This preventive approach process also drags uncertainty by increasing awareness of all components, individuals and communities in accordance with the source of common problems in dealing with disasters (Gerdan, 2014).

Earthquakes cannot be controlled by humans, but it comes from natural disasters that can eliminate lives and property in a very short time. Earthquake is something that cannot be avoided, but by doing something to prevent the earthquake, we can at least reduce the risk (Caner Aladağ & Baştürk Kaya, 2016). Earthquake is a natural disaster. The most effective measure to be taken against earthquake and other natural disasters is individuals’ knowing what to do to save themselves (Fetihi & Gülay, 2011).

An earthquake is said to be a disaster that damages both private and public property and causes damage that hinders the pace of micro and macro scale production, infrastructure development, population development and the social structure of the country. Natural disasters similar to earthquakes can devour a city and its contents in seconds. Like the recent earthquake that has torn down houses that are still vulnerable to disasters, causing long-term damage. It is these damaging

effects which then disrupt the running of the country's abundant budget and financial assets from post-earthquake development and rehabilitation and stabilization projects. Another consequence of earthquakes is that people lose their living space that can fulfill their daily needs (Baytieh, 2015).

Indonesia is located in a geologically unstable region, so recurring natural disasters that causes severe damage cannot be avoided. Indonesia together with other countries that are close together and are in the same area are in an area called the Pacific Ring of Fire. Taken from the Asian Disaster Reduction Center (2010), various natural disasters occurred in Indonesia, including more than 30 earthquakes, floods and landslides that nearly reached 50 times, seven volcanic eruptions and at least one devastating tsunami. One of the disasters that occurred was the earthquake in Central Java, Indonesia in May 2006. The 6.3 magnitude earthquake struck up to 5,778 people, 37,883 people were injured, and 139,859 houses were destroyed (Asian Disaster Reduction Center, 2007). Judging from the impact caused by this earthquake, Indonesia must bear the risk of a devastating earthquake with potentially devastating effects. Earthquake activity in Indonesia is quite active and has a high potential to occur with an average of 400 times a month. 24 earthquakes occurred from 1991 to 2007, one of the major events that occurred between that year was the magnitude 9.3 earthquake in Aceh which caused a tsunami on December 26, 2004. In 2018 September which fell on the 28th, a similar event occurred in Palu, starting with an earthquake of magnitude 7.5 and followed by a massive tsunami which then flattened property and killed hundreds of thousands of lives.

According to Kırıkkaya (2011) an important factor for the community in reducing the potential damage caused by disasters is education. Disaster risk reduction can be started from the field of education, so as an educational institution, universities can play an important role in channeling knowledge and education about the risks of these natural disasters to the community in order to achieve alertness, awareness, preparedness and skills in survival when natural disasters

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occur (Shaw, Kobayashi et al., 2004). Therefore, schools are the right place where earthquake education can be provided in the most appropriate way. Earthquake damage can be reduced by the education of rights and increased awareness in schools. With such early training the community is expected to know how to save themselves from earthquake damage and to deal with the damage caused by the disaster in the future. With special training programs, disaster training or also called disaster management should begin with pre-school education and then continue at the next level of education (Aydın, 2010). Subject about earthquake disasters are important to be learned in schools both practically and theoretically. This natural disaster learning is for the sake of achieving awareness and also providing information about the earthquake. When awareness and information about earthquakes has been embedded in people's memories, sensitivity to natural disasters and how to deal with them will be formed (Kaya, Baştürk & Aladağ, Caner., 2016). For this, mobile learning approach will provide not only conceptual understanding about the mitigation of earthquakes but also have the skills to applied in real life.

Learning and teaching about natural disaster training requires media in the delivery of information and knowledge, learning media that can be used include mobile computing devices such as smartphones, mobile phones, tablet computers, e-readers, and other devices that can assist learning. The enthusiasm of people increases over time with the depiction, design, implementation and evaluation of how mobile computing devices are able to facilitate education, training and support the performance of this natural disaster training (Buchanan, 2010). With the times and technology, cellular usage cannot be avoided by all groups in the interests of those who need mobile devices that facilitate the needs of many people. Therefore, access to learning content outside the classroom about natural disaster training is easy to get anywhere. Learning systems through cellular media offer convenience and effectiveness for the continuation of natural disaster training with quality design principles for exchanging information (Çelik, 2012).

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The use of cellular or now more commonly referred to as a smartphone is no longer a strange thing. We can even meet students who are elementary school students playing social media skillfully through smartphones. If that's the case, then other age groups above elementary school education is also already familiar with the use of smartphones, one of which is for Junior High School students. The use of smartphones as a learning medium then becomes very effective for self-rescue training when natural disasters occur. According to previous research conducted by Winarni (2018) learning through mobile phones in Indonesia is still unfamiliar to hear and is still rarely applied as a learning medium. Schools in Indonesia still apply the teaching and learning process which is focused in class and also more geared towards examinations. In fact, knowledge of natural disaster mitigation such as earthquakes is very necessary for students to foster a 'Safety Culture' as a conscious and alert attitude to natural disasters such as earthquakes that often come in a sudden.

The use of this type of smartphone that is quite loved by people around the world today is Android. Since being bought by Google, Android has experienced very rapid growth. In September 2012, Android users had reached 200 million and more than 295,000 applications were available on the Play Store. Android is open source so that anyone can create applications for Android and can sell them on the Play Store (Maiyana, 2018). With the massive use of Android by the community, the opportunity for easy access for students to learn about mitigating natural disasters in this earthquake is huge. Considering the ease and sophistication offered by Android as a smartphone that can provide learning media through mobile applications, the learning methods regarding earthquake mitigation will be more easily accessible and accepted by Junior High School students. In this work, we aimed to develop an Android mobile learning application for earthquake mitigation. This prior study will be followed out by constructing and developing the mobile learning application as well as testing the mobile learning application itself for Junior High School level, science teachers and students.

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1.2 Research Problem

This study's research problem is "How does the development of Android Mobile Learning Application in Mitigation of Earthquake for Junior High School Students?"

1.3 Research Question

The research question in this study is:

1. What are the steps of the development of Android Mobile Learning Application in Mitigation of Earthquake for Junior High School Students in this study?
2. How does the analysis of experts' judgment on content, language, artwork, and the result of students' and teachers' questionnaire of Android Mobile Learning Application in Mitigation of Earthquake for Junior High School Students?

1.4 Limitation of Problem

In order to avoid widening of a problem on this research, the research will be limited for following things:

1. Earthquakes are natural reactions that occur more frequently as part of the planetary dynamics. Stress formed gradually by tectonic or volcanic processes will have wider consequences when there is sudden release (Wijk, Channel, Viskupic, & Smith 2013).
2. Earthquake Mitigation is a way of saving ourselves when an earthquake occurs which is very effective to be taken when a natural disaster occurs (Fetihi & Gülay, 2011).
3. With a Linux-based platform that includes systems such as operating systems, middleware, user interfaces and application software, Android is now an open source mobile operating system (Holla and Katti, 2012). The mobile application made by software called Unity
4. In this research, the earthquake topic that elaborated is only focus on the mitigation of an earthquake that limited by Indonesian 2013 Curriculum on competence 3.10 and 4.10 about Earthquake and Volcano.

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1.5 Research Objective

This results of the research are defined as follows:

1. To describe the development of mobile learning application in mitigation of earthquake for Junior High School students.
2. To analyze the expert judgment on the validity and students' and teacher's readability of mobile learning application in mitigation of earthquake for Junior High School students.

1.6 Research Benefit

The research of this study is expected to provide the following benefits:

1. Students

The outcomes of this research are expected to educate the students on the mitigation of an earthquake in order to reduce the risk for future disasters.

2. Teacher

The outcomes of this research are expected to provide teachers to use this Android mobile learning application as a supporter in the teaching-learning process in order to enhance students' interest and create opportunities for students to learn by using media that in line with learning science in 21st century.

3. Another researcher

The outcomes of this research are expected to contribute to the development of mobile learning applications especially using Unity 2D and reference to other researcher who have the same focus study.

4. Public

The outcomes of this research are expected to provide the public a media to learn about the mitigation of earthquake in order to reduce the risk of future disaster.