CHAPTER I
INTRODUCTION

1.1 Background

Education in the 21st Century has been and is being profoundly influenced by technology and globalization (Voogt, Erstad, Dede, & Mishra, 2013). There is an emerging global consensus on the importance of developing 21st Century skills as a part of education curricula (Ontario Ministry of Education, 2007). Integrated curriculum is one of the effective ways to resolve some challenges associated with developing 21st Century skills (Drake & Savage, 2016). As a response to 21st Century needs, fostering students’ creativity has been explicitly included in the school curriculum of Indonesia that use Integrated Science Curriculum to encourage students to see the interconnectedness and interrelationships between the subjects (Asrizal, Amran, Purwani, & Sudargo, 2018; Lykke et al., 2014).

The ministry of education and culture of Indonesia realized that the integration of science literacy education is important. For this purpose, the 2013 curriculum requires science subjects in junior high school to be implemented with the integrative approach to improve the literacy of students in the school (Yuliati, 2013). However, the real condition shows that the implementation of integrated science learning and integration of literacy in learning process cannot be implemented well because the instructional material still write in separated topic in a books (Ardianto & Rubini, 2016; Asrizal et al., 2018; Pursitasari, Nuryanti, & Rede, 2015). Besides, Science is one subject that students often find confusing and mistakenly judged as a difficult subject to be learned, especially for Physics. Hesti, Maknun, & Feranie (2017) stated that students feel indifferent toward Physics lessons because of the complexity of the concepts. To visualize its’ complex concepts, appropriate instructional material is needed to apply for the teaching-learning process (Asrizal et al., 2018; Cook, 2007).

Instructional materials are an important part of the learning process. Moreover, the annual survey done in 2007 by Indiana University's High School Survey of Student Engagement (HSSSE), shows that more than 81,000 students in
110 secondary schools in 26 states dropped out of school because they experienced boredom of teaching-learning process on the class. According to Seifert (2004), boredom occurs because of the way of the instructional material is presented, the students are not fully involved in a class, so they lose the motivation to learn. This indicate that many traditional lessons are boring and make the lesson ineffective.

One of the ways to deliver instructional materials rather than traditional lesson is through technology or Interactive application that work with Smartphones or Personal Computer, and it is in line with the 21st century that is marked by the usage or the integration of technology in daily activities (Walsh, 2014; Chawinga & Zozie, 2016). The technology of the internet is more present than ever (Ardies, Maeyer, Gijbels, & Keulen, 2014). The latest study was done by the United Nations agency for children, UNICEF shows that the children and adolescent in Indonesia are more interested in using the internet rather than books, it includes of junior and senior high school students that reach 30 million users of internet aged 10 to 19 years old. As many as 98percents of the children and adolescent know about the internet and 79,5percent of them were the internet users (Kominfo Republik Indonesia, 2014).

The young generation are fully aware of the benefit of personal computer and tablet devices, and almost every student have for accessing the internet, mainly for e-learning and playing games (Goh, Bay, & Chen, 2015). Keengwe & Anyanwu (2007) argue that technology in education is focused to be a tool for creating the process of learning more alive, concrete, and interesting. Web-based technology is often the technology of choice for distance education, given the ease of use of the tools to browse the resources of the web from any devices, and the relative affordability of accessing the ubiquitous website and it also can develop properly to facilitate students to learn a certain material and to support the acquisition of knowledge, competency, and skills (Bolkan, Goodboy, & Kelsey, 2015; Olayinka, 2016; Srivastava, Cooley, Deshpande, & Tan, 2000). Distance education is a field where web-based technology was very quickly adopted and used for course delivery and knowledge sharing properly in order to catch up with 21st century era where digital era is required in education environment to make it available anywhere and anytime (Horton & Wiley, 2004; Zaïane, 2001).
Web-Based Learning is an online learning media or a website that has educational goals, many institutions develop instructional material of science as a media for a source of integrated science learning material (Kenny, 2000; M. Wang, Cheng, Chen, Mercer, & Paul, 2017). The advantages of Web-based learning from the others learning models is one of the learning models that used the technology of web and using of the internet and it can be accessed anytime and anywhere from any devices using any operating system like android, windows, ios, etc, (Zaïane, 2001). Even though most sites meet the criteria for general information websites, but many educational websites do not apply the principles of effective learning, only 17% have all components of the learning paradigm which are critical thinking, independent learning, evidence-based learning, and feedback; and less than 50% do not meet any criteria because of the content inside the web that does not encourage the readers (Chou, 2003; Cook & Dupras, 2004; Dogan & Dikbiyik, 2016).

The Interactive website means that there is an existing of the feedback to measure their understanding after reading the contents, with the addition animation, the colorful media and the existence of the game are able to attract especially for the students’ excitement. Therefore, the data that have been shown means that the website education just delivers the content without giving the feedback and with two ways communications. It is proven by Norman (1998) one last time for his advice for new and improved interactive interfaces. They should include: (1) A central role of language (ask for things even if not visible), (2) Richer internal representation of data objects including user history of interaction with documents, applications, web pages, (3) A more expressive interface, (4) Shared control proactive computers and agents without human commands.

The solution to visualize the effective website education is by using the interactive media for the content as the instructional material that will overcome the student boredom to make the materials easier to understand and to encourage student motivation. In addition, one of the materials of integrated science is levers in the human body which is a combination of physics and biology subject and that is the sub-topic of the simple machine materials. Holzinger, Emberger, Wassertheurer, and Neal (2008) described that human body, the chemical substance others are hard to imagine without any multimedia that will show how complex the
materials because we cannot see directly with our eyes. While the example of the simple machine can be used on daily life and the levers mechanism example is exist on the human body too. So, it needs interactive multimedia through the video and animation to make easy to understand and learn.

This research aimed to develop an interactive website education for web-based learning. The interactive website education will use five-dimensional interactivity of the website (Chou, 2003). The five-dimensional interactivity are: (1) Playfulness, (2) Choice, (3) Connectedness, (4) Information Collection, (5) Reciprocal Communication. Those used to measure the interactivity of the website education with the existed of the feedback from the quiz games to measure the readers understanding after reading the content on the website education. Other than that, to investigate the perceptions of subjects, this study uses the technology acceptance model (TAM) towards the behavioral intention to use the website education (Davis, Bagozzi, & Warshaw, 1989). This research will be conducted by designing and producing the website education for web-based learning, and to test the instrument of the website education will be assessed to the experts and after that it will be applied to science teacher, and students in junior high school to get the perceptions to respond towards the use of the website education.

1.2 Research Problem

According to the background which has already stated, the problem of this research is “How does the development of web-based learning using interactive media for integrated science?”

1.3 Research Question

Elaborating on the research problem, the research attempts to explore the following questions:

1. How are the characteristics of Web-Based Learning using Interactive Media for Science Learning on Levers in The Human Body Topic?
2. How are the experts’ judgments validation on content, language, and media of The Web-Based Learning using Interactive Media for Science Learning on Levers in The Human Body Topic?

3. How are the teachers’ and students’ perception on The Web-Based Learning using Interactive Media for Science Learning on Levers in The Human Body Topic?

1.4 Limitation of Problem

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

1. Web-Based Learning as Distance education is a discipline in which web-based technology has been embraced very rapidly and used for teaching and information exchange. Web-based learning includes course content delivery tools, and quiz modules, virtual workspaces for sharing resources, whiteboards, grade reporting systems, etc., (Zaïane, 2001).

2. Interactive Website Education is mutual interest in two-way communication and the existence of the feedback to measure the readers understanding towards the materials that have been delivered, the proposes of interactivity should be described in view of the point to which the communicator and the public react to or are prepared to promote the interaction needs of one another (Chou, 2003).

3. In this research, the integrated science topic that contains physics and biology subject. It is limited by the 2013 curriculum for grade 8th junior high school on a basic competence 3.3 about simple machine and focuses on Levers in Human the Body topic.

1.5 Research Objective

This research objective is specified as follow:

1. To analyze the characteristics of Web-Based Learning using an Interactive Media for Science Learning on Levers in The Human Body Topic.
2. To analyze the validation result on content, language, and media The Web-Based Learning using an Interactive Media for Science Learning on Levers in The Human Body Topic.

3. To analyze the result of students' and science teachers’ perception The Web-Based Learning using an Interactive Media for Science Learning on Levers in The Human Body Topic.

1.6 Research Benefits

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

1. Students

The results of this study are expected to provide students to upgrade their knowledge toward the application of levers in the human body, improve the flexibility of learning that is not limited by place and time, and encourage students to learn effectively by using technology.

2. Teachers

Teachers as the instructors can use this website education as teaching media on teaching-learning process and as a tool to measure students’ understanding of junior high school, make effective teaching-learning process in the material of levers in the human body, create opportunities for students to learn by using media that in line with learning science towards 21st Century skills and the teacher can evaluate the quality of the website and make it has a better performance.

3. Another researcher

This website education can be used as a reference of another researcher in developing website education for web-based learning using an interactive media that can be used on a personal computer, handphone, and any devices, for example, for future research that has a relatedness with web-based learning to measure the topic of the research that has been determined.
4. Web Publisher

   The developers of this website education can collaborate with web publisher (hosting) for e-commerce purposes.

### 1.7 Organization of Research Paper

In order to make the research paper systematically arranged, this paper is divided into five-part as follow.

1. Chapter I Introduction. Generally. This chapter explains why this study conducts research. It consists of background, research problem, research question, limitation of the problem, research objective, research benefit, and organization of the research.

2. Chapter II Literature Review. This chapter explains the literature review that supports the research. It consists of the concept of web-based learning, The interactive website education used five-dimensions of interactivity learning and the technology acceptance model towards behavioral intention, integrated science (levers in the human body) and relevant research.

3. Chapter III Research Methodology. This chapter explains how the way to conduct this research. It consists of a research method, research subject, operational definition, research instrument, and research procedure.

4. Chapter IV Result and Discussion. This chapter explains this study result. It consists of the production of web-based learning (the preliminary and the final design) and the instrument analysis (the validation by the experts’ judgment and the readability of the subject).

5. Chapter V Conclusion and Recommendation. This chapter explains the conclusion and the recommendation of this study for future research.