CHAPTER I
INTRODUCTION

1.1 Background

The 21st century is marked by its rapid pace innovations in various fields especially in terms of information and technology. As a part of this era, we are required to master certain skills in order not to be left behind and most importantly to become a progressively developed person. (AACTE, 2010). The 21st century skills (TFCS) can be attained in formal education such as school because it is no longer the only place for textual learning, tests and assignments but it holds an extensive mission to develop students as capable individuals. Besides that, the urge to implement TFCS in classroom for students' acquisition is fostered by its role as educators' responsibility to prepare students for the society in which they will work in the forthcoming time (Elrod, 2010; Kaufman, 2013).

However, in order to facilitate students with the qualified skills effectively, teachers should take concern on their character. Students nowadays are usually familiarized by digital technologies from a very young age, technologically-savvy, and have higher need to technology-based stimulation which lead to students' disinterested attitude to traditional methods of education and also becoming a challenge for the teachers (Jones, Jo, & Martin, 2007). Thus, it should be a strong encouragement to improve the implementation of TFCS in education since it involves information and communication technology to leverage the learning process, and generates students' opportunities for individual success and potential with the note that imperative recognizing of technology is not as simple as playing with gadgets but engaging in inquiry (Kaufman, 2013; Larson, Miller, & Ribble, 2010). There are plenty of skills can be taught to students but in this study the focus is on scientific literacy and communication skills.

Scientific literacy is selectively chosen because this skill covers the understanding of science and science-based technology that will lead to the vital innovations and discovery of numerous scientific knowledge and new technologies to help simplifying human needs. Besides, this skill also involves the use of knowledge and information in a balanced way to solve daily life problems, enable an individual to explain, describe daily phenomenon based on scientific facts and evidence. Additionally, by becoming a scientifically literate, a person would develop a meaningful and thoughtful participations in any kind of interactions such as in classroom, environment, economic and social concerns (Adolphus, Telima, & Arokoyu, 2012; Millar, 2006; Rychen & Salganik, 2005; Wang & Wu, 2016). Aside from that, the report from Programme of International Student Assessment (PISA) 2015 should be the key concerns to include this skill throughout the learning process in classroom because Indonesia's rank itself especially in science is in the 62nd out of 69 participating countries. Moreover, based on the latest report, Indonesia's average performance in science is also still low which is 396 points compared to an average of 489 points in all participating countries in PISA (Nuryanti, Kaniawati, & Suwarma, 2019; OECD, 2018).

On the other hand, communication skill contributes an important role as a doorway to other skills to be acquired in the 21st century. Communication skill refers as the ability to articulate thoughts and ideas effectively in various forms and contexts (oral and written). It involves the ability to employ and receive information verbally and visually which leads to more complex soft skills such as critical thinking, problem solving, stress management as well as risk taking (AACTE, 2010; Jacobson-Lundeberg, 2016). In particular, communication skill includes two main parts, those are verbal communication skill and visual communication skill. By improving verbal communication skill, students would be able to deliver their generated ideas and thoughts clearly by selecting the appropriate topics to be delivered. In addition to that, current condition with its high-speed communication has defined the way people

connect with each other that prompts the need to advance visual communication skill. Because my mastering visual communication skill, an individual would be more able to produce information that can be understood easily and concisely by the audience. The information delivery can be brought with the help of data visualization using illustrations, charts, diagram and other things (Estrada & Davis, 2015; Morreale, Moore, Surges-Tatum, & Webster, 2007; Wahlström, 2010).

Communication skill is interrelated with scientific literacy since it can be considered as the supported competency (Chung, Yoo, Kim, Lee, & Zeidler, 2016). That is why integrating both skills are becoming the focus of this study to be acquired by students by incorporating info-graphic. Info-graphic has been increasingly used to help conveying information briefly. Furthermore, the process of creating info-graphic would prompt students to be informatively literate since they have to engage to the contents meaningfully and lead them to various using of digital tools and technologies in order to create creative content (Kibar & Akkoyunlu, 2014). In previous study mentioned that info-graphics can be used for learning process and give students opportunity to be more aware about the benefits of data presentation, discovery of important features and relationship of data, and the conviction of data validity as well as representation accuracy (Krauss, 2012).

Info-graphics can be created using digital tools such as certain software or website. In this research, the digital tool used is Genially website since it is easily accessible and provides the users with more than 1000 various templates. Genially is a website which specifically generated to assist learning process in this 21st century education to create digital visual output such as info-graphics, presentations, illustrations, gamification, quiz, as well as portfolios. The website serves illustrations, graphics, charts and animation from many creators to be freely used. Aside from that, users can log in to the website with their own various accounts such as email address, Facebook and Office 365. The users will also be able to join the community in the website to get inspiration in doing their works, enrich their visual products knowledge and share their works to gain broader audiences and feedback as well. Due to its free

accessibility, easiness, and its rich features, Genially is chosen to create the info-graphic (Genially, 2020).

In addition to the experimental implementation of info-graphics using to enhance students' scientific literacy and communication skill, the topic chosen in this research is climate change. The main reason to this decision is due to its topic consideration as socio-scientific issue to be included in science learning process to progressively improve scientific literacy skill. Socio-scientific issue is a widely discussed topic that can motivate students' involvement related to awareness or decision making by taking concern about health and environment. Additionally, climate change is a dynamic topic that follows the current condition, controversial and widely discussed in public. This topic is also important as the fundamental understanding for overcoming the real life environmental challenges (Dawson, 2015; Kolstø, 2001; Sadler & Zeidler, 2005).

Considering the things mentioned, the incorporation of info-graphics creating in classroom is determined as an effort to actualize the development of students' scientific literacy and communication skills even more when it is combined with socio-scientific issue. Especially climate change is considerately chosen as the main topic of this study. Moreover, knowing that students' understanding towards climate change is still weak (Hansen, 2010).

1.2 Research Problem

The research problem of this study is "How is the enhancement of student's scientific literacy and communication skills of science by creating info-graphics using Genially in learning climate change?"

1.3 Research Question

Elaborating the research problem, the research attempts to explore the following questions.

1) How is the enhancement of student's scientific literacy after creating info-graphics using Genially?

2) How is the enhancement of student's communication skills of science after creating info-graphics using Genially?

1.4 Limitation of Problem

There are several terms used in this study and in order to avoid misinformation, the terms are limited as followed:

1) Student's scientific literacy is an understanding of science and awareness to apply the knowledge in daily life covers competency, knowledge and attitude (DeBoer, 2000; OECD, 2017a; Wang & Wu, 2016).

2) Student's communication skill is the way student communicate effectively, they will be able to use various formats (verbal and visual) to sharpen their explanations and understanding of scientific matters (Estrada & Davis, 2015; Morreale et al., 2007).

3) Info-graphics is a representation of information and concepts in form of picture to communicate complex concepts to be easily comprehend by the readers (Baglama, Yucesoy, Uzunboylu, & Özcan, 2017; Fadzil, 2018; Mohd Amin et al., 2016).

4) In this research, the topic coverage is limited to health and environment. The specific topic chosen is climate change in grade 7 which includes the sub topics about greenhouse effect, global warming process, factors and impacts of global warming, and overcoming global warming. The topic is limited by core competence no. 3 and 4. Then, for basic competence limited for 3.9 and 4.9 that are attached in 2013 National Curriculum of Indonesia.

1.5 Research Objectives

This research is conducted to analyze students' scientific literacy and communication skill by creating info-graphics using Genially website. The objectives of this research are as followed:

1) To investigate student's scientific literacy in learning climate change by creating info-graphics using Genially.

2) To investigate student's communication skill in learning climate change by creating info-graphics using Genially.

1.6 Research Benefit

The results of this study are expected to provide the following benefits.

1) Students

Students are able to create info-graphic using Genially website to be presented publicly. Besides, from the creating process, expectedly they will also improve scientific literacy, communication skills, and certain soft skills that will be useful in the work field.

2) Teachers

Teachers are able to apply interesting teaching method by incorporating info-graphics in class using Genially. Info-graphics can also be used as another alternative media to asses students' skills especially in scientific literacy and communication skill.

3) Researchers

Results of this study are expected as a reference and additional exposure in using info-graphics as a learning media to improve students' scientific literacy skills and communication skill.

1.7 Organizational Structure of Research Paper

The research paper contains of five chapters with each sub chapters. The systematic of this research paper is as followed:

1) Chapter I: Introduction

This chapter covers the background of the research, research problem, research questions, limitation of problem, research objectives, research benefits and research paper systematic structure.

2) Chapter II: Literature Review

This chapter contains the relevant theories and researches related to the variables. The literature includes the fundamental explanations about scientific

literacy, communication skill, info-graphics, climate change topic, and Genially website.

3) Chapter III: Research Methodology

This chapter explains the details of methodology in conducting the research beginning from the research method, research design, research subject, operational definition, research instruments, instrument analysis result, data analysis and research procedure.

4) Chapter IV: Result and Discussion

This chapter describes the data and discussion related to the findings on the implemented research. The research problems stated is being answered in this chapter with the analysis using figures, tables and relating to the previous studies.

5) Chapter V: Conclusion and Recommendation

This chapter is the closure which consists of the conclusion of the research and further recommendation for further related researches.