CHAPTER I

INTRODUCTION

1.1 Background

In this day and age, the development in society demands the education system to equip new generation of youths with new set of skills and competencies. Those skills and competencies will support them to be successful in the age of globalization and socialization, where the main asset someone need is knowledge (Ananiadou & Claro, 2009).

In 2006, a study was conducted towards four hundred hiring executives of major corporations, they were asked a very simple but significant question: "Are students graduating from school really ready to work?". Their answers to this question collectively are "Not really". The study showed that freshly graduating students from universities are lacking in some basic and applied skills. According to the study, the skills that the students are lacking are (1) oral and written communications, (2) critical thinking and problem solving, (3) professionalism and work ethic, (4) teamwork and collaboration, (5) working in diverse teams, (6) applying technology, and (7) leadership and project management (Casner-Lotto & Barrington, 2006). These skills are on demand because the jobs that require routine manual and thinking skills are less needed and started to giving way to jobs that involve higher levels of knowledge and applied skills like expert thinking and complex communicating (Levy & Murnane, 2005). The study proved this by collecting the data as shown in Figure 1.1.

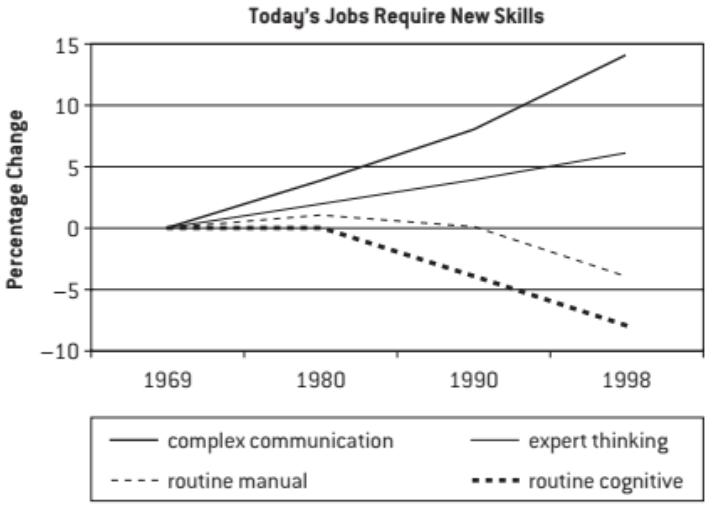

Figure 1.1 Skills Required in Workplace of 21st Century (Levy & Murnane, 2005)

The research suggests the importance of expert thinking skills that includes problem solving, and the importance of complex communication skills, which includes collaboration, in this century. The importance of collaboration and problem-solving skill is also acknowledged by Organization for Economic Co-operation and Development (OECD) through Programme for International Student Assessment (PISA) (OECD, 2017).

In PISA 2012, OECD gathers the data from 44 countries of how students handle real-life problem, and assess their problem-solving skills (OECD, 2014). Then the follow-up was done in PISA 2015, where OECD increase the level of their problem-solving assessment by including the collaboration aspect, because they realize that today's workplaces also demand people who can solve problems in collaboration with others by combining their ideas and efforts. Collaborative problem solving has several advantages over individual problem solving, where labor can be divided among team members; a variety of knowledge, perspectives and experiences can be applied to try to solve the problem; and team members can stimulate each other, leading to enhanced creativity and a higher quality of the solution (OECD, 2017). From the research regarding collaborative problem-solving done by PISA 2015, it was found that Singapore outperforms another countries by achieving highest proficiency and

mean score of collaborative problem solving. While Tunisia got the lowest achievement on the research. Unfortunately, Indonesia is not a part of participant OECD countries for this research, so no data can be gathered about collaborative problem solving for Indonesia (OECD, 2017).

To measure the collaborative problem-solving skills, PISA 2015 creates the environment and assessment tool by computer-assisted collaborative problem-solving media. This method was deemed to be effective because many research suggest that these computer-assisted learning can create a collaborative learning environment, which places a high value on cooperation, collaboration, self-determination, difference, trust, and investment of self in the collaborative learning process, also supported by the role technology that plays in the connection and mediation (Hodgson, McConnell, & Dirckinck-Holmfeld, 2012). These computer-assisted collaborative learning encourages active learning and knowledge construction, through the collaboration with peer which facilitated and assisted by software tools (Gomez-Sanchez et al., 2009). These researches further strengthen the importance of collaborative problem solving and how a computer software can be used to assist the assessment.

PISA 2015 is the first large-scale assessment of CPS. Based on the finding of PISA 2015, the average CPS proficiency level of 15 years old across 53 countries are still low (OECD, 2017). Unfortunately, from the 53 countries participating, Indonesia is not one of them. Thus, the data of CPS of students in Indonesia is still lacking. This study aims to develop an assessment tool to measure collaborative problem-solving skills in Indonesia based on the findings presented, and translate the assessment tool made by PISA 2015 into a simpler form that could be used by teachers in Indonesia to measure the data of CPS of their students easily without the need of computerized agents used in PISA 2015.

1.2 Research Problem

The problem risen by this research is “How does a collaborative problem-solving assessment tool on the cluster topic of organ system developed?”

1.3 Research Question

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

1.3.1 How is the collaborative problem-solving assessment tool designed and developed in this study?

1.3.2 What are the characteristics of the collaborative problem-solving assessment tool developed in this study?

1.3.3 How is the analysis of the validity and readability of the collaborative problem-solving assessment tool developed in this study?

1.4 Limitation of Problem

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

1.4.1 Collaborative problem solving in this case is the approach of collaborative learning that most center in developing problem-solving abilities of students, understanding of complex relationships, and decision-making in the face of uncertainty (Goodsell, 1992). Or defined in PISA 2015 as the capacity of an individual to effectively engage in a process whereby two or more agents attempt to solve a problem by sharing the understanding and effort required to come to a solution and pooling their knowledge, skills and efforts to reach that solution (OECD, 2017).

1.4.2 The assessment of computer-assisted collaborative learning in this case is assisted through a computer software that is not to facilitate use of the software itself, but to produce an impact on the users' learning, that will affect the user's behavior outside of the software (Ritter, 2018).

1.4.3 This research utilizes three topics chosen under the cluster topic of organ system limited by core competence no. 3 of 2013 National Curriculum of Indonesia. The topics chosen are also limited for 8^{th} grade of junior high school, since the target of the research is for 8^{th} grade of junior high school students. The topics chosen are Circulatory System under basic

competence no. 3.7; Digestive System under basic competence no. 3.5; and Skeletal System under basic competence no. 3.1.

1.5 Research Objectives

This research objectives are specified as follow:

1.5.1 To design and develop the collaborative problem-solving assessment tool on the cluster topic of organ system.

1.5.2 To describe the characteristics of the collaborative problem-solving assessment tool developed.

1.5.3 To analyze the validity and readability of the collaborative problem-solving assessment tool developed in this study.

1.6 Research Benefits

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

1.6.1 Students

The results of this study expected students to understand their own collaborative problem-solving skills and improve their learning based on the result obtained through the assessment tool and encourage students to learn the collaborative problem-solving skills that are important in today's society.

1.6.2 Teachers

Teachers can use this tool as an assessment tool to measure the collaborative problem solving of 8th grade junior high school students. Besides, the results of collaborative problem solving collected using this tool can be used to further improve the learning process by selecting appropriate methods based on the results, thus increasing the effectivity of learning process.

1.6.3 Researchers

The results of this study are expected to contribute to the assessment of collaborative problem-solving skills and reference to other researchers with similar focus study.