

CHAPTER 1 INTRODUCTION

1.1 Background

Learning is a process between students and educators where students achieve all the knowledge and skill for the learning objectives. Traditionally learning objectives are often considered complete when a student only can produce the correct answer to a question that the teacher gave (Karpicke & Roediger, 2008). The success of a learning process only depended into the final results without considering the learning process. The acquiring of competency cannot be inferred only at the end of a learning period. It must have been evaluated continuously or cumulatively in order to guide the teacher's judgment about its development (Scallan, 2007).

The learning process needs improvement to make students more engaged in the study. The traditional way of learning proven cannot effectively make student engage in their study because information only comes from the teacher as the teacher instills knowledge directly to the student. Students get the information only from the teacher, as we know the teacher-centered learning methods. The teacher would assume primary responsibility for the communication of knowledge to students and had a role as the source of all information (Mascolo, 2009). This method will make students passively learning, receptive mode listening as the teacher teaches without considered student fully understanding while in the learning process.

To improve the quality of learning, it is not only talking about how a teacher can teach well but also how students can learn well. Learner-centered pedagogy questions this assumption, given differences in how students learn. The learner-centered instruction comes from the quest to have all learners perform well in their educational objectives (Ileri et al., 2017). Student-centered learning source from the constructivism theory, which in

that theory, students learn by connecting new knowledge with their prior knowledge and concepts, and constructing their new understanding. Why need knowledge building for students? Because students as a learner build knowledge as they explore the world around them, observe and interact with phenomena, converse, and engage with other people. (DeVries, & Kohlberg, 1997; Fosnot & Perry, 2005; Kolb, 1984; Piaget, 1948/1973 in Mascolo, 2009).

Knowledge building is a process where knowledge is purposely developed, and students need to work collaboratively to solve, discuss, and compare common problems and express their ideas. The achievement of the community will be higher than the total of individual contributions and part of more extensive cultural efforts (Bereiter & Scardamalia, 2003; 2006). In knowledge building, we talk about idea-centered collaboration, which sharing ideas in a community and have a common interest and specific goals (H.-Y. Hong & Lin, 2019). This collaborative learning makes the student more engaged in their learning because as the individuals they need to share their ideas as a group member and also discuss it. This process would interactively accomplish the community construction and maintenance of shared conceptions of tasks, so collaborative learning has more meaning than only involves individual learning (Stahl, Koschmann, & Suthers, 2006).

As we can see, the knowledge building is focusing more on the importance of the learning process in the student rather than the final result only. The knowledge building is used in science learning because this method would encourage students for sharing and contrasting ideas within other individuals within a community who are engaged in similar tasks and purposes. Science learning requires students to engage in the problem-stating and problem-solving activities that require planning, synthesis, and evaluation skills (Mayer, 2011). In order for knowledge building to succeed among students and others new to the

process, both social and technological supports are needed in the learning environment (Bereiter & Scardamalia, 2014).

Computer-Supported Collaborative Learning (CSCL) is an instructional method that makes collaboration learning interaction process happen with the help of computers or through the internet. The sharing and construction of knowledge among participants would be using technology as their primary of a communication or as a shared resource (Stahl et al., 2006). The primary purpose of CSCL environments is to support sharing in the knowledge building process that is realized by the learners in developing knowledge society qualifications (M Scardamalia & Bereiter, 2006; Stahl et al., 2006; Yücel & Usluel, 2016). Students in the collaborative learning supported by technology would enhance the effectiveness of knowledge building learning environments, like facilitate sharing and distributing knowledge and expertise among the community members (Lipponen, 2010).

Traditional learning methods cannot effectively make student engage in their study, so this study aims to improve the students learning by using technology (Computer-Supported Collaborative Learning/CSCL). Knowledge building with the support of technology by current needs is expected to help students to reach more in-depth knowledge into their learning by processing resources and building ideas with their communities. Additional statements regarding the importance of technology for children in the knowledge building environment are as stated by Tarchi et al. (2013) “*Knowledge Building supports sustained creative work with ideas, and through meaningful engagement supports the development of a broad range of literacy and 21st-century competencies. Children gain experience holding the “steering wheel,” using technology to support the advancement of community knowledge.*”

In this study, Synchronous Discussion and Reflection System (SDRS) is used to support the student in the knowledge building-based learning to reflect their previous discussion and make students got more understanding in their learning. The reflection in the learning process is essential because it would help the student to reflect and elaborate in their past result and make a clarification in themselves that lead to better perspectives (Boyd & Fales, 1983; Brockbank & McGill, 2006). Students should be able to review the knowledge they have before (prior knowledge) and then connect with new information that will be obtained in their learning (P. L. Smith & Ragan, 2005).

This study chooses Genetically Modified Food (GMF) as the topic in learning because the topic is one of the examples of Socio-Scientific Issue (SSI). Based on the Sadler (2004), Socio-Scientific Issue is the social issue that related to science, and they have ill-structured and open-ended problems which have multiple solutions to solve. So the topic can be used as the discussion topic in the knowledge building-based learning. From the background, this study would focus on applying Knowledge Building-Based Learning in the classroom to understand more about student perception and learning outcomes on knowledge building learning.

1.2 Overview of the Study

The objectives of this study are to understand the student perception of the knowledge building-based environment and the student learning outcomes. This study applies the computer-supported collaborative learning, that is Synchronous Discussion and Reflection System (SDRS) that help students in the knowledge building environment to reflect in their discussion and compare with the control group that applied the knowledge building environment but without using the system.

The first chapter is talking about the reason why the study conducted; there were several reasons for the traditional way of learning that become the background of this study. Hypothetically, the knowledge building-based learning would make students more engage in their learning and improve the student understanding about the topic. From the backgrounds, the research questions were formulated to achieve the study objectives.

In the second chapter, contain the relevant literature regarding the study. The relevant literature that discussed is knowledge building, computer-supported collaborative learning (CSCL), and reflection. The third chapter described the methodology of this study, including research participants, research design and procedure, instruments, data collection, and data analysis. Then the fourth chapter presents the findings in the study and also discuss the results about the students' perception of knowledge building-based environment and learning outcomes. Moreover, the last is the fifth chapter that gives the conclusions of the results and also suggestions for the future study.

1.3 Research Question

From the research objectives that understand the student perception of the knowledge building-based environment and the student learning outcomes, there are research questions formulated in this study, the research questions are:

- (1) What are the students' perceptions of the knowledge building-based learning environment?
- (2) What are the students' learning outcomes on the knowledge building-based learning?