

CHAPTER I

INTRODUCTION

A. Background

In this digital era, there is so much information spread out easily and rapidly. Thus, according to Kivunja (2014), one of essential skills in learning and jobs for 21st century require critical thinking skills. Critical thinking comes as paramount. When everything is google-able, works automatically even hoax, teaching students to think critically is very necessary (Teotonio, 2017).

Critical thinking is included in one of higher order thinking skills. According to Paul and Elder (2006), critical thinking is the form of analyzing and evaluating thinking with a point of view to improve it. Critical thinking is reasonable reflective thinking focused on deciding what to believe or do (Ennis, 1993). As the standardization of critical thinkers can be followed from the functions based on Inch's (2006), students' critical thinking consist of eight interrelated functions which are generating purpose, raising question at issue, making assumption, embodying point of view, using information, utilizing concept, making interpretation and inference, generating implications and consequences.

Critical thinking as major goal of education can be assessed with several ways. Based on Martina and Smith (2014), there are variety of methods and instruments that available to measure or assess critical thinking skill. The examples are California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Disposition Inventory (CCTDI). Even we can make our own test for assessing critical thinking skill (Ennis, 1993). The questions of critical thinking test must be prepared by the enhancement of technology nowadays.

In measuring critical thinking skills, make a profile can describe the students' critical thinking in certain area. According to Alfaro (2003), critical thinking is intuitive and logic. Both are playing on critical thinking, decision

making and clinical judgment. So then, another skill that researcher would like to observe is the correlation with logical thinking of students. Since logical thinking also has a role in critical thinking of students. The term of logic is actually reason in formal or strict way, the word of logic is easier to be measured correct or not since it needs logical sense than reasoning sense (Dunn, 2013). Piaget's cognitive development leads to the meaning of logical thinking skill. The skill is seen during preoperational and concrete operational period. Logical thinking is observing and analyzing phenomenon, response, and feedback withdraw and construct conclusions based on data input (Doyle, 2016). Besides logical thinking, academic achievement has correlation with logical thinking disposition (Karag and Bekmezci, 2015). Thus, the next study is about the correlation with students' science score, as an achievement of students in science subject.

Correspondingly, the rapid development of technology in this digital era, the presence of ICT can support various components in education. One of the components is assessment system. According to Jim, Sean and Pead (2004), assessment system that has been designed well and systematic makes student performance improves. Then, it is necessary for developing assessment system which can reach our core educational goals and can improve students' skills in order to give benefits for themselves and also its society.

The form of assessment in digital era is familiar with e-assessment, e-exam or computer-based test. According to Thurlow et al. (2010), during decade, the development of Computer-Based Testing or well-known as CBT is included as one of the recent "innovative" approaches to assessments that most followed by countries, because it has cheaper and speeder test delivery for country and district-wide assessment. There are many advantages of using Computer-Based Testing as assessment rather than using Paper-Based Test. Advantages include: easier manage test timing, easier for administration matter, decreased printing costs, increased test security, rapid feedback, and have more interactive types of questions (Bridgeman, 2009). According to Jim, Pead and Sean (2004), using computer-based assessment can prevent the crucial of current paper-based systems, evaluate precious life skills and

also help enhance the quality technique of tests by improving the reliability of test items.

In Indonesia recently, as an example of using Computer Based Test is National Examination. Some schools which is available to provide computer in Indonesia for implementing *UNBK* or Computer Based National Examination. The advantages of using *UNBK*, according to Kemdikbud in Mardana (2017), *UNBK* is deemed more efficient and can reduce any type of cheating since the examination files should be delivered a day or even a week before implementing the test (with the opportunity for the files to be stolen and uncovered before the test). While using computer-based test, it can be sent over the internet at the last minute or even during the test is in progress (Bridgeman, 2009). Another advantage comes to the other researchers. Allabi and Issa (2012) stated that CBT can measure different skills or sets of knowledge in order to provide new and better information about individuals' abilities.

Another instrument already made is Science Virtual Test (SVT) as one of computer based-test to assess students' critical thinking skills. This media has been developed by Rusyati and Firman (2017), provides some problems related to science context –exactly about living things and environment, and the questions can measure students' critical thinking. The use of computer based test is because it is easier to provide the questions by showing pictures, videos, or animation that make students more imagine the content rather than only in paper based test.

The content of this science virtual test, in order to know students' critical thinking, has a theme of living things and environmental sustainability. This theme is also familiar with our daily life and has broader theme. On big theme consist of five topics which are structure and function of plant, reproductive system, greenhouse effect, radiation and climate change.

Since the importance of critical thinking skill in this digital era in line with the rapid development of technology and innovation, the use of CBT to measure the essential skill is interesting to be investigated. According to McMahon (2009), stated that the result of his research indicate there are

statistically significant correlations between studying within a technology-rich learning environment and the development of students' critical thinking skills. Therefore, by combining ICT in doing test and identifying students' critical thinking, this research study focus on the profile of students' critical thinking in Junior High School by using Science Virtual Test on Living Things and Environmental Sustainability theme.

B. Research problem

The research problem of this study is “How is the profile of students' critical thinking through science virtual test on 8th grade secondary school?”

C. Research Question

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

1. How is the level of students' critical thinking skill through science virtual test on 8th grade secondary school?
2. How is the level of students' critical thinking skill on structure and function of plant, radiation, reproduction system, greenhouse effect and climate change?
3. How is the correlation between students' critical thinking and students' science score?
4. How is the correlation between students' logical thinking and students' critical thinking on 8th grade secondary school?
5. How is the students' impression after using science virtual test?

D. Limitation of Research

In order to make the proposal more focus, the following below are the limitation of research:

1. The research contains the descriptive explanation about the profile of students' critical thinking from the result of Science Virtual Test with the theme of Living Things and Environmental Sustainability limited by 2013 curriculum and the correlational explanation between students'

science score from their latest achievement report and students' logical thinking from Test of Logical Thinking. Also, the students' impressions are required to make the information clearer and more details.

E. Research Objective

1. To describe the profile of students' critical thinking through science virtual test on 8th grade secondary school.
2. To investigate the level of students' critical thinking on structure and function of plant, radiation, reproduction system, greenhouse effect and climate change.
3. To investigate students' relation between critical thinking skill and science score.
4. To investigate students' relation between critical thinking and logical thinking skill.
5. To investigate students' impression after using Science Virtual Test.

F. Research Benefit

1. For teacher

By knowing the profile of students' critical thinking through science virtual test, teachers are able to develop a new strategy or idea in order to make teaching-learning process be better than before

2. For students

By knowing the profile of students' critical thinking through science virtual test, students are able to know the advantages of using science virtual test

3. For another researcher

By knowing the profile of students' critical thinking through science virtual test, other researchers can develop another research related with this paper. Such as, e-assessment (SVT) for measuring other skills. Or probably, measure students' critical thinking in another way or method.

G. Organization Structure of Research Paper

This research paper is arranged based on these following structures:

1. Chapter I: Introduction

The first chapter contains background, research problem, research questions, limitation of the problem, objective of the research, and research significances.

2. Chapter II: Literature Review

This chapter contains the theory and literature of the research variables. Those explanation consist of critical thinking skill, computer-based test (CBT), living things and environmental as the big theme of this study, logical thinking skill and the research relevant with this study.

3. Chapter III: Research Methodology

This chapter contains the research method, data gathering especially for sample and population, research instrument, data analysis technique and research procedure

4. Chapter IV: Result and Discussion

This chapter contains the data result with interpretation and analysis, and the discussion of the findings

5. Chapter V: Conclusion and Recommendation

This chapter contains the conclusion of all the research result as the answer of all the research questions, also the suggestion and recommendation for other researchers and teachers.

