

CHAPTER I

INTRODUCTION

A. Background

Science deals with how to find out about the systematic nature, so science is not just the acquisition of knowledge in the form of facts, concepts, or principles, but also a process of discovery. As stated in the Education Unit Level Curriculum who have goals in each subject area to produce a product of quality education. One of these subjects is science, it allows learners to develop an understanding of a wide range of natural phenomena, science concepts and principles that are useful and can be applied in everyday life (Badan Nasional Standar Pendidikan, 2006). Education Unit Level Curriculum or can be called as KTSP has goals that has to be reached by each subject, so that it can be produced the qualified education. One of the science subject goals is develops the understanding of nature phenomena, concept, and science principals that advantages for apply in daily life (BSNP, 2006).

In reality and implementation, that expectation is not happened. Because, science in implementation is delivered on by one way direction means that teacher give science material only lecturing. This statement is in a line with the result of preliminary observation in the school that becomes experiment schools. The students learn science especially physics only by lecturing and they rare to do experiment activity because of lack the equipment, a lot of equipment are broken. Then, teachers is not search about the alternative for doing the experiment or enable physics learning becomes more active and fun for the students. This is strengthen by the data taken from interview with teacher subject of physics. Actually, if the experiment activity want to take a place it will take a long times, so the times is not enough for that and some of the equipment are broken. Teacher also said that they do not know about laboratory virtual that can be easily taken from the internet or interactive CD. Because of that, there is bad impact to the conceptual mastery result of students in physics subject. This is the data from final

examination in physics lesson year 2012-2013 of Pribadi Bilingual Boarding School students grade VIII. The data shown that students achievement above graduation standard, boys class has 29,4% out of 100%, while girls class got 21,7% out of 100%. It is shows that their achievement in physics lesson still low.

So, to overcome all of the obstacle that occurs in physics lesson at Pribadi Bilingual Boarding School Bandung is develops a media that provides students to get their self-learning activities, construct their understanding of physics concept by themselves, and also media that can make them easier to comprehended the physics concept, especially in optic topics that tends to cumulative and contains abstract concept. The media is virtual laboratory as multimedia interactive.

Virtual laboratory as simulation program using computer that more specific to the science experiment activity such as, biology, chemistry, and physics. This program provide the material and substance as like in laboratory, then students do the experiment based on the objective of experiment. After that, students can develop that experiment based on the clue or objective of experiment itself. And students are expected can explain certain concept or phenomena based on virtual experiment that has been done by them (Warsita, 2008). After that, students can improve their achievement. Because the instruction using computer can improve students motivation to improve students comprehension in concept of material (Warsita, 2008) especially in physics. When there is a motivation inside a students, so the students minds will be opened to receive a concept that is given during an instructional process. This also in a line with the research which is told that virtual laboratory can overcome the remote observations and remote experiments to be used to update information and motivate students, e.g. in the form of virtual experiments to be applied in interpretation of real experiments (simulators of laboratory activities, predicting and verifications of results in experiments) and experiments which cannot be made in schools (dangerous, requiring demanding instruments, unobtainable, etc.) (Bilek and Skalicka, 2009).

This cases also has already researched by other researcher, which is stated that virtual laboratory or multimedia interactive can improve students conceptual mastery (Yahya *et al*, 2008; Hutagalung *et al*, 2007;Tuysuz, 2010; Herga and

Dinevski, 2010; Putri *et al*, 2013). So, actually this solution has already done by other researcher and it is proven this solution is effective to overcome the obstacle in learning science especially in experiment activity.

This research is very important to carry out because in this research there is differences with other research that has been explained before. Therefore this research is quite similar with the research that has been done by Tuysuz (2010), it has uniquely different with that.

This research use two classes with different gender or we can called single sex class. This research use boys class and girls class. Both of class got the same treatment using virtual laboratory in optic topics. And this research is conducted in international schools that has different curriculum. Also characteristic of students is different also because they placed in single sex class.

So, this research would investigate about differences of students improvement in conceptual mastery by using virtual laboratory between boys class and girls class at that schools. Then, teachers can know the appropriate media to overcome in different characteristic of students during physics learning. Also the can know the appropriate way to make physics learning become meaningful in different class based on gender.

This research also very important to do because it can develop a model that can use virtual laboratory learning media inside in order to improve learning outcomes of students especially conceptual mastery of students based on gender in optic topics. So, this research has the tittle about ***Gender Differences and Junior High School Students Conceptual Mastery by Using Virtual Laboratory Media on Optic Topics.***

B. Research Problem

The research problem of this research, “Is there any differences of student’s conceptual mastery improvement based on gender differences by using virtual laboratory learning media in optic topic?”

C. Research Questions

1. How is the differences of conceptual mastery improvement between boys class and girls class by using virtual laboratory learning media in optic topics?
2. How is the differences of students interest in physics lesson especially on optic topics between female and male students?

D. Limitation of Problem

In order to this research more focused, so to limit the problem as follows:

1. The differences of conceptual mastery improvement can be measured if the results of statistical test (independent sample t-test) from posttest, tends to $t_{\text{computation}}$ is greater than t_{table} .
2. Students' interest in physics lesson will be determined from the percentage of students' answers to the questions in the questionnaire.

E. Research Variable

In this research there are independent variable (X) that can be applied to the object of research, students. There is Virtual laboratory learning media as independent variable in this reasearch. While, dependent variable (Y) is variable that can be changed because of the treatment of independent variable. The dependent variable in this research is Students conceptual mastery. The flow of diagram according to Sugiyono (2007) as follow:

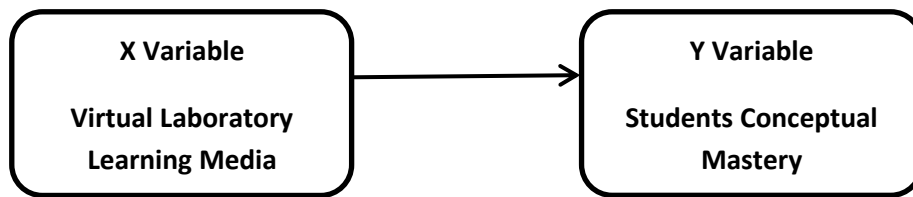


Figure 1.1
Flow of Dependent Variable and Independent Variable of Research

F. Research Objective

This Research objective is to investigate gender differences and junior high school students conceptual mastery by using virtual laboratory media on optic topics.

G. Research Benefit

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

1. For teachers, this study may add insight teachers about using innovative media or multimedia computer-based learning as an alternative learning model and media that can be used in teaching at schools, so that learning is done more innovative and varied in order to increase students' skills and concepts. Also teacher can know the characteristic and ability of students based on gender, so that the teacher can apply the appropriate learning media in his or her teaching learning activity.
2. For students, the existence of this research, students can have new experience in learning physics lessons at school in particular optical material implemented using virtual laboratory learning media, so that they can improve their understanding of science and improve their achievement.