

CHAPTER 1

INTRODUCTION

1.1 Background

At the moment, individuals have hoped to produce the knowledge besides finding the existent knowledge. The basic goal of science education system is bringing in skills to get information instead of transferring to literal at the present day in the information age. One of the widest purposes of science education reformation is to train up students who are interested in science actively. As a result of these rapid changes, the science education instructions especially physics need to be modified that they can enable the students to learn the ways to reach the knowledge, improve the skills of decision-making and to solve problems (Lorsbach & Tobin, 1992). Much of the literature concerning the relative performance of girls and boys in science indicates that boys outperform girls in most areas of the science curriculum, and that it is rare to identify areas of the science curriculum in which girls outperform boys (HOLA, 2005).

Student's attitudes towards science have been found in some studies to be linked to performance in the subject and have been found to be influenced by different teaching approaches (HOLA, 2005). Students process of acquisition knowledge and achieving goal in class activity commonly done by their own effort (Ajaja & Eravwoke, 2010).

Another problem in science instructions, it is a common problem from middle school students that school is boring and that they cannot relate to nor understand the material that is presented to them each day in class (King, 2009). Students are neither passionate nor motivated to learn in class. This problem can be both challenge and opportunity for teacher to deliver the material in alternative way by engaging the students to learn in class. Students' engagement can be done by providing several activities which lead them to have experience and connect them immediately to the knowledge (Umam, 2014). In other hand, application of interaction among students will help to

reshape and develop students reasoning, critical thinking and some others students' ability. Cooperative learning is one of way in teaching learning process which gives chance to students to interact each other in order implementing their learning ability. This interaction will eventually lead students to shape their values and perspective that can be useful to be used either inside or outside class (Ajaja & Eravwoke, 2010).

One of the fundamental achievements of education is to enable students to use their knowledge in problem solving. Therefore, many researchers find that their students do not solve problems at the wanted level of proficiency. To help improve the teaching and learning of physics problem solving, studies were started in the 1970's (Gok and Silay, 2010).

Two primary goals in teaching introductory physics are to help students learn major concepts and principles, and to help students learn how to apply them to solve the problems. In traditionally taught courses we assign many problems with assumption that solving the problems will help develop students in understanding of concepts and principles, as well as an appreciation of the role they play in solving problems. The research on student's concept has been be approved as a key concern for science learning especially after Ausuble has developed the idea about the importance of prior knowledge to the learning of scientific knowledge (Ausuble, 1963). Students nowadays are lack of critical thinking and they are only good at memorizing. Instead of giving ready prepared information, teaching students to learn how to learn, make comments, getting them to understand and apply the information are needed in science courses. Furthermore, making them gain skills of problem solving, behaviors and helping them to gain a habit of scientific thinking should be taught. Therefore, it is needed to improve students' skills of problem solving (Altunçekiç, Yaman & Koray, 2005).

Motivation is the determining factor in learning, since students who do not want to learn will not learn regardless of the caliber of the instructor, and students who do want to learn will. To keep students engaged, students need to maintain a task-oriented outlook on learning, which is associated with

deep-level learning and learning for the sole gratification of acquiring knowledge. In comparison, those who are surface learners, gravitate towards ego-oriented learning, and rely on how others perceive them as a source of motivation (Nguyen, 2008). Motivation is deemed self-perpetuating. Students who are motivated conduct themselves in ways that maximize learning and success in academia. Motivated students attend classes on a regular basis without a need for external rewards, they seek additional help when needed, and they turn in quality work on time. On the other hand, unmotivated students minimize the effort they exert, which result in continued poor performance (Moore, 2007).

The issue then is how to encourage students to think positively about learning so that they are motivated to learn. One notion has to do with how students perceive intelligence. Students who believe intelligence is fixed tend to shy away from tasks that challenge them. Their belief is that if they are challenged, they are not smart enough to complete the task, so why bother; whereas students who believe in a growth mindset thrive on opportunities to learn (Dwek, 2008). Growth mindset students understand the concept of hard work and how through hard work your abilities grow and further develop. A technique is to explain and show students that the brain is a muscle that can get stronger with use. Problem solving method is a learning model which centers on student, develops active learning, skills of problem-solving and field knowledge, and it is based on understanding and problem solving (Malinowski & Johnson, 2001). Problem solving method includes process of scientific thought. Problem solving method shows thought in advanced level when this method is described as a scientific process in terms of finding, inquiry, critical thought (Kemertag, 2001).

AAAS (1993) point out that ability of problem-solving is generally viewed as the ability to reason analytically, to think critically and to create productively, which all involves quantitative, communicative, manual and critical-response skills. Problem solving method is widely used in science teaching. Problem solving method is the center of the science curriculum,

which would affect the whole curriculum. This method which provides the group working is student-centered. Problem solving method is beneficial for developing education, especially for improving students' mastery concept. The importance of the role of process and problem solving skills in the teaching and studying of science is widely acknowledged by experts in the field. Method of problem solving should be effective for increasing individual's success and developing science process skills (Aka, Aydogdu and Guven, 2010). Therefore, this research about which is investigating the impact of problem-solving model in learning heat based on gender class can answer some of the problem above.

1.2 Research Problem

Based on the background that have stated before, the research problem of this study is "How is the Effect of Problem Solving Model towards Students' Concept Mastery and Motivation in Learning Heat Based on Gender?"

1.3 Research Questions

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

- a. How is the effect of problem solving model on students' concept mastery in learning heat based on gender?
- b. How is the effect of problem solving model on students' motivation in learning heat topic based on gender?

1.4 Limitation of Problem

In order to make the research become more focus, the problem is limited as follow:

- a. Problem-solving model has five steps of syntax which will be applied to students in implementing treatment part. The steps of the problem solving model which are included problem identification, problem definition, strategy formulation, organization of

information, allocation of resources, monitoring and evaluation. Demonstrating experiment activity involves in the instructions.

- b. Students' concept mastery that is measured in the research involves level concept mastery of remembering (C1), understanding (C2), applying (C3), analyzing (C4) and evaluating (C5) based on Bloom Taxonomy in Anderson et al (2012).
- c. Students' motivation in Attention, Relevance, Confidence and Satisfaction towards problem solving model is measured in this research (Keller, 2006).
- d. In this research, heat topic that is limited by competency standard no. 3 and basic competence no. 3.7 that are attached in Kurikulum 2013.

1.5 Research Objectives

This research objective is specified as follow:

- a. To investigate the effect of problem solving model on students' concept mastery in learning heat based on gender.
- b. To investigate the effect of problem solving model on students' motivation in learning heat based on gender.

1.6 Research Benefit

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

- a. For students, this research may improve their understanding in learning heat as well as motivation in learning.
- b. For teachers, this research may improve their performance in teaching-learning activity in order to make effective learning environment.
- c. For another researcher, this research can be used as reference for another research in the future.

1.7 Organization Structure

In order to get organized structure of paper, this research paper is arranged based on the following organization structure:

1) CHAPTER I: Introduction

This chapter describes about the background of the research and continues the problem proposed as well as its limitation. This chapter also explains the aim of the research and also the significance of the research in the same field of study.

2) CHAPTER II: Literature review

This chapter explains some literature and supportive theories of the research. It explains basic knowledge about problem-solving model, students' concept mastery, students' motivation, heat and gender.

3) CHAPTER III: Methodology

This chapter explains about research procedures, the object of this research, type of research, how the data is obtained and collected, instrument used and the research plot.

4) CHAPTER IV: Result and Discussion

This chapter interprets the data obtained and collected then the discussion followed after. It analyzes the data result and correlation with the theories that is explained.

5) CHAPTER V: Conclusion and Recommendation

This is the last chapter of the research, to answer research question that is concluded according to result. The suggestion is constructed from difficulties and obstacles that found during the data collected shows in the recommendation part.