CHAPTER I

INTRODUCTION

1.1 Background

According to the constructivist model, learning can be seen as an active, goal-oriented process. The role of learners is very important in forming 'constructive habits of mind' so that learners have a habit of thinking, then it needs freedom and learning attitudes. The style of language also affects how students understand a text. In the end of the book is only used to teach practice questions, and is rarely used to build students' conceptual understanding of the consequences of lack of content of the book that can stimulate students to think according to their abilities, though students will get a lot of knowledge from reading book, especially if conditioned reading before the lesson begins (Beerenwinkel, Parchmann, & Grasel, 2011).

This also in line with the regulation of the Minister of National Education Republic of Indonesia Number 2 in 2008 also states that the book has an important role and strategic in an effort to improve the quality of education (*Menteri Pendidikan Nasional*, 2008). According to *Badan Standar Nasional Pendidikan* (2005), books should have the eligibility criteria of content, language, representation and style graph and it can be used as a learning resource for students. However, in fact the use of books as teaching materials is not used optimally. It also happens in the use of physics book. Based on the results of the survey during teaching and learning activities in school, most teachers do activities explaining the learning materials in the classroom directly without involving the student handbook. This is due to the inconsistent use of language and explanations that make the students confusion.

In addition, textbooks are also one of the causes of the occurrence misconceptions. Suparno (2005) stated that the causes of misconceptions of textbooks are usually found in false explanations, misstatements in formulas, the level of difficulty in writing books is too high for students and students do not know to read textbooks. These situation makes the students' concept of

understanding still not good and intact so that it requires a text reading that can help students understand the concept of the material being studied.

The role argumentation in science education is the effectiveness of argumentation on students' conceptual understanding of scientific concepts (Jiminez-Aleiandre & Erduran, 2008). Some research explored that argumentative discourse develops students' conceptual understanding in the fields of science. One of the materials which have many abstract concepts is sound concept. The material discusses about the different characteristics of sound such as pitch and intensity and the speed sound traveling based on the type of medium (solid, liquid or gas) (Hrepic, 2004).

One of the efforts to improve students' conceptual understanding and overcome the misconception is by using Conceptual Change Text. According to Sendur & Toprak (2013), Conceptual Change Text is a written piece that can identify misconceptions, improve student understanding, and provide scientifically acceptable concepts. Conceptual Change Texts are designed to make students aware of their inaccurate preconceptions and help them change their non-scientific conceptions toward more scientific ones through the use of explanations and examples (Hynd, McWhorter, & Suttles, 1994). Conceptual Change Text is given to the students to bring about four conditions of conceptual change as proposed by Posner et al., (1982), namely:

a) There must be dissatisfaction with existing conceptions
b) A new conceptions must be intelligible
c) A new conception must be plausible
d) A new conception must be fruitful

These conditions must be fulfilled in the learning process so that the process of student concept changes can occur well. One way that teachers can do to meet these conditions is to provide problems that require students to compare the initial concept of students with the correct science concepts to solve problems given (Ruhf, 2003).

Many studies used Conceptual Change Text in learning because this text can effectively be used in both small and large classes to facilitate conceptual change and understanding of student concepts (Chambers & Andre, 1997). In some studies, Conceptual Change Texts were prepared concepts such as “solutions” (Pinarbasi et al., 2006); “cellular respiration” (Ozlem, Omer, & Nejla, 2002); “heat and temperature” (Umit & Fatih, 2012); “electric” (Chambers & Andre, 1997); “electrochemical cells” (Yuruk, 2007) “cell” (Urey & Calik, 2008). These studies show that the use of Conceptual Change Text can improve students' conceptual understanding and reduce misconceptions. Conceptual Change Texts are designed to make students aware of their inaccurate preconceptions and help them change their non-scientific conceptions toward more scientific ones through the use of explanations and examples (Hynd, McWhorter, & Suttles, 1994).

A look into the previous research about Conceptual Change Text on sound concept (Ozkan & Selcuk, 2013), the researchers only provided two teaching materials about sound. Those are properties of sound and musical sound with descriptive research method. However, in this research, the work will present an example of Conceptual Change Text that has been specifically prepared about sound in four concepts material. The topics are sound waves, properties of sound, sound reflection, and musical sound. The research method that used in this research is quasi experiment method with analyzing the correlation between students’ understanding and students’ argumentation skill through Conceptual Change Text in learning sound. Therefore, the researcher decided to conduct the research entitled “The Effect of Conceptual Change Text toward Students’ Understanding and Argumentation Skill in learning Sound”.

1.2 Research Problem

The research problem of this study is “How is The Effect of Conceptual Change Text towards Students’ Understanding and Argumentation Skill in Learning Sound?”. Based on the research problem proposed, the research is carried out to explore the following questions:

1. How is the effect of Conceptual Change Text towards students' Understanding in learning sound?
2. How is the effect of Conceptual Change Text towards students' argumentation skill in learning sound?
3. How is the correlation between students' understanding and students' argumentation skill in learning sound?

1.3 Research Objective

The research has these following objectives:

1. To investigate the effect of Conceptual Change Text on students' understanding in learning sound concept.
2. To investigate the effect of Conceptual Change Text on students' argumentation skill in learning sound concept.
3. To investigate the correlation between students' understanding and students' argumentation skill in learning sound concept.

1.4 Research Benefit

The results of this research are expected to provide some benefits for student, teacher, school and researcher as follow:

1. Teacher

   This research can help the teacher to get the information about Conceptual Change Text, and also it is expected Conceptual Change Text produced can be one of the alternative reading in learning physics, especially in learning sound concept.

2. Student

   This research can help the students to get a new experience of learning in class. By using Conceptual Change Text as teaching material, it is expected that students can improve their argumentation skills and their understanding in learning science especially in learning sound concept.

3. Schools

   This research also can help the school to planning and acquaint a learning strategy through Conceptual Change Text which can improve students' understanding and students' argumentation skills.

4. For other researchers

   This research can help other researcher to find out more about the advantage of using Conceptual Change Text as teaching material and giving experience for other researchers about the implementation of the Conceptual Change Text instruction in teaching science especially in physic. It is hoped that this research will guide the future research and can implemented in other science areas like chemistry and biology.

1.5 Organizational Structure of Research Paper

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

1. Chapter I: Introduction

   In this chapter there will be the background of research, research problem, research objective, research benefit, and organizational structure of research paper, and limitation of problem.

2. Chapter II: Literature Review

   The second chapter will represent the literature review about Conceptual Change Text, students' understanding, students' argumentation skills, and sound concept.

3. Chapter III: Research Methodology

   The third chapter gives the explanation about research method, research design, population and sample, instrument, procedure, and data collection and analysis.

4. Chapter IV: Results and Discussion

   The fourth chapter discuss about the result of research and how it interpreted.

5. Chapter V: Conclusion and Suggestion

   The fifth chapter is about conclusion and suggestion.

1.6 Limitation of Problem

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

1. Students' understanding that is measured in this research involves level cognitive of remembering (C1), understanding (C2), applying (C3), and analyzing (C4) based on Bloom Taxonomy Revised (2012).
2. Students' argumentation skill which measured is the written argumentation skill because it can easily be measured. Toulmin (1958) state that there are five aspects of argumentation while in this research only involves four aspects of argumentation, which are (1) *Claim*, (2) *Data*, (3) *Warrant*, and (4) *Backing*.
3. In this research, the topic learned is Sound that is limited by Physic for Cambridge IGCSE that are attached in document of Cambridge curriculum for secondary two students.