

# CHAPTER I

## INTRODUCTION

### 1.1 Background

As science and technology development in 21st century is getting broader, many skills that people need in everyday life are included in scientific literacy, including the ability to solve problems creatively, think critically, work cooperatively in teams, and use technology effectively (Akçay & Yager, 2010). To be able to utilize those skills, people need to develop their science literacy first, because scientific literacy is frequently characterized as the knowledge and understanding of scientific principles that are relevant in everyday life (National Research Council, 1996). Thus it is necessary to let people to get the science literacy at school. The way in fulfilling the need, science learning is conducted through education in school. Students of the future must be able to evaluate evidence, comprehend the importance of science-based issues in their daily lives, and recognize that scientific pursuits are governed by societal values (National Research Council, 1996; deBettencourt 2000).

In Indonesia, science becomes a part of the national curriculum as it included in the syllabus with various core competences and basic competences since the first grade of elementary school until 9th grade in junior high-school (Kemdikbud, 2017). In the government school, all primary and lower secondary school students learn basic science prior to entering senior secondary school. Science is taught as an integrated and themed subject at these levels, with no clear distinction between physics, chemistry, and biology content. Meanwhile, for higher secondary school, there are several choices for students to choose type of school which each type of school may have different courses and purposes and might not including science subject in their syllabus. (Faisal & Martin, 2019).

Current curriculum in Indonesia is curriculum 2013 and one of its goals is to fulfill the scientific literacy knowledge by following PISA. Scientific literacy is an important aspect in learning science so the learning process is

more meaningful and students are having broader knowledge and ability to interpret their knowledge to interact with the real world to solve many problems scientifically.

Currently, Indonesia government has released a new program called *Asesmen Kompetensi Minimum (AKM)* or assessment of minimum competency as the exchange of National Exam. AKM is to assess student literacy which is divided into 2 categories which are reading literacy and numeric literacy. The purpose of this program is to know student basic learning ability. For example, how they can interpret or evaluate the materials by reading the content

Indonesia according to the data result of PISA test from year of 2000 until 2018 always in the position of bottom 10 among all participant countries. No significant improvement in every PISA result conducted every 3 years according to the result that is showing if Indonesia's rank is staying on the bottom 10. According to the fact, it is indicating that Indonesia has a low scientific literacy knowledge is student is still low.

There are many aspects that could be the reason why Indonesia have a low scientific literacy level such as student condition, school and teacher condition, teaching and learning processes, curriculum arrangement, and/or learning sources such as learning media or model and textbook.

Science textbook is needed to support student in learning science to reach the goal of Curriculum 2013 in which its content has been adjusted with the demand of mastering science content according to TIMSS and PISA (Kemendikbud, 2017). To fulfill the need, science textbook content need to be adjusted with the criteria of scientific literacy aspect so the evaluation of current existing textbook to find the representation of scientific literacy is required as the consideration materials to improve the book content in the future.

In this case, PISA is focused on examining the knowledge of scientific literacy to student age 15 in which the science learning student experienced mostly is from the primary school until lower secondary school level. According to Jufrida, J., Basuki, F. R., Kurniawan, W., Pangestu, M. D., &

Fitaloka, O. (2019), there is a high correlation between scientific literacy and science learning achievement in junior high-school, so it is expected to develop scientific literacy in order to improve the science learning achievement. One of the suggestions to improve scientific literacy of students is by improving the learning resources, such as textbook.

Lee (2012) stated that it is an unfortunate since the representation of research toward science textbook is small compared to another research in science education field, although it is an important component in improving education curriculum. In the latest research by Saputriani (2020) which was analyzing science textbook for 8<sup>th</sup> grade students using national science textbook (BSE) and using instrument adapted from Chiapetta (1999), found that the textbook contains scientific literacy competencies but the result showed if the representation of each competency was still imbalance with scuh variative numbers.

According to PISA 2018 in OECD (2019) with the current revised aspects and indicators, scientific literacy is consisted of 4 aspects which are context, competencies, knowledge, and cognitive demand. In which context, competencies, and knowledge aspects are inter-related which mean the scientific literacy component/aspect needed in the textbook in order to support the existence among each aspect.

Based on the background stated above, this research is aimed to analyze not only scientific literacy competencies but also scientific literacy context and scientific literacy based on PISA 2018 indicators which was revised and added more component from the previous version. Hopefully the finding of the research can be used as a reference for further analysis related to the connection between context and competencies aspect in the science textbook for 8<sup>th</sup> grade students in junior high-school.

## 1.2 Research Problem

The research problem of this study is “How is the analysis of scientific literacy in 8<sup>th</sup> grade student science textbook (BSE) 1<sup>st</sup> semester for junior high school?”

### 1.3 Research Question

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

- a. How is the representation of scientific literacy context in 8<sup>th</sup> grade students' science textbook 1<sup>st</sup> semester?
- b. How is the representation of scientific literacy competencies in 8<sup>th</sup> grade students' science textbook 1<sup>st</sup> semester?

### 1.4 Limitation of Problem

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

- a. Science Textbook

This research is limited to Indonesia national science textbook (BSE) for 8<sup>th</sup> grade students 1<sup>st</sup> semester in junior high-school. The textbook is edition 2017 and was published by the Ministry of Education and Culture (*Kemendikbud*) of Indonesia government.

- b. Scientific Literacy

Scientific literacy is recognized as an individual understanding toward knowledge of science and the ability how to use it to interact with the world. Scientific literacy according to PISA framework 2015-2018, consist of four aspects which are context, competencies, knowledge, and cognitive demand (OECD, 2019). In this research, the analysis is limited to only analyze scientific literacy context and scientific literacy competencies.

- c. In this research, topics are 1<sup>st</sup> semester chapters in 8<sup>th</sup> grade students' science textbook that limited by core competencies and basic competencies of science subject for 8<sup>th</sup> grade that are attached in Peraturan Menteri Pendidikan Nasional No.37 (2018).

### 1.5 Research Objective

- a. To determine the representation of scientific literacy context in 8<sup>th</sup> grade students' science textbook 1<sup>st</sup> semester.

- b. To determine the representation of scientific literacy competencies in 8<sup>th</sup> grade students' science textbook 1<sup>st</sup> semester.

### **1.6 Research Benefit**

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

- a. For teacher, this research can be used as a reference to improve scientific literacy in teaching-learning process using science textbook and consider for another learning resources.
- b. For school, this research can be used to evaluate and improve the quality of teaching-learning process using textbook and to anticipate the additional sources to fulfill the students need.
- c. For another researcher, this study can be used to develop science textbook for 8<sup>th</sup> grade students in the future to have better contents for improving students' scientific literacy skills.

### **1.7 The Organization of Research Paper**

This section describes the structure of this research paper for each chapter.

This research is composed of five chapters as follows:

- a. Chapter I Introduction

This chapter contains the basic information about the research which consists of background, research problem, research questions, limitation of problem, research objectives, research benefits, and organization of this research paper..

- b. Chapter II Literature Review

This chapter consists of literature review of this research which contain about curriculum 2013, scientific literacy, PISA frameworks, science textbook materials for 8<sup>th</sup> grade students 1<sup>st</sup> semester, and relevant researches.

- c. Chapter III Research Methodology

This chapter explains about the methodology used for this research. Other points that are attached in this chapter include research object and sample, operational definition, and research instruments.

d. Chapter IV Result and Discussion

This chapter showed the data result and discussion based on the implementation of research procedure using research methodology and research instrument stated in chapter 3 toward the research object and subject.

e. Chapter V Conclusions, Implications, and Recommendations

The conclusion of this research is stated in this chapter, summary of the research result and discussion that answered the research question and reached the purpose of the research, followed by including the implications and recommendation.