

# CHAPTER I

## INTRODUCTION

### 1.1 Background

In this century, a variety of technology is more advances and it will continue to develop to assist or aid humans. Not less with advanced technology in other fields, technology in educational field also experience into better and will still developing to assist educator or teacher in delivering the subject to the students, so the students understand what teachers taught, either in teaching methods or the instrument teacher used. Particularly in science, science educations experienced great change. Science education has changes from teaching a text-based activity to an activity to teach students to get more involved in inquiry, fostering students' senses of curiosity.

Science is a way of learning about physical universe (Trefil and Hazen, 2013). According to Khan, Jan and Amin (2014) science is an intellectual activity carried on by humans that is designed to discover information about the natural world in which humans live and to discover the ways in which this information can be organized into meaningful patterns. Other than the fact that science is a merge of basic ideas and theories about how universe behaves, it also provide a framework for learning and solving new questions and concerns that come in the future. Through science, natural disasters, curing diseases, and discovering new materials and technologies that benefit people and lives can be predicted (Trefil and Hazen, 2013). A primary aim of science is to collect facts (data), however to collect facts or data it has through a process known as a scientific method.

In an era where everything is progressing, cause the emergence of high competition between countries especially in education to improve the quality of its citizen. Indonesia is one of the countries which should be able to take part in the competition (Jirana and Damayanti, 2016). Improving the quality of the citizens is an important goal of all countries, as improving the quality of citizen becomes an absolute necessity of country and to realize this goal education serves as weapon (Mulyasa, 2006). However, in realizing this goal it is facing the difficulty which is

citizens' lack of skills related to education is lack of quality of skills which is one of them is science process skills (Jirana and Damyanti, 2016).

TIMSS (Trends in International Mathematics and Science Study) is a study center that aim to support and promote the use of data by researchers, analysts, and others interested in improving education (TIMSS, 2015). TIMSS has monitored student achievement in mathematics and science at fourth and eighth grades every four years since 1995. It is well positions to provide an overview of countries' performance in mathematics and science and how that performance has evolved (Mullis, Martin and Loveless, 2016). The latest result of TIMSS 2015 the top performing countries in science of eighth grader are Singapore, Japan, Chinese Taipei, Republic of Korea, and Slovenia. Comparing by the data, Indonesia has occupying the low ranking in place 45 (Rahmawati, 2016). Through the data that was obtained researcher take interest in figuring out students' science level. As the curriculum evolving, process skills is given explicit attention in the curriculum, most notably problem solving, reasoning, and communicating in mathematics, and inquiry and investigations in science (Mullis, Martin and Loveless, 2016).

A process skills approach to science instruction means that learning is focused on intellectual skills rather than on content (Rami et al., 2013). They engaged their ability in learning for knowledge and understanding into work. However, content cannot be excluded from this approach, because process skills are practiced in scientific situations which must necessarily deal with content.

Science process skills are thinking skills that scientist uses to construct knowledge in order to solve problems and formulate results (Ozgelen, 2012). In the same way, Nwosu and Okeke (1995) also stated science process skills have been described as mental and physical abilities and competencies which serve as tools needed for the effective study science and technology as well as problem solving, individual and societal development. Just as Akinbobola and Afolabi (2010) stated science process skills as cognitive and psychomotor skills employed in problem solving, problem identification, data gathering, transformation, interpretation and communication.

Aka, Guven and Aydogdu (2010) stated science process skills consist of basic science process skills and integrated science process skills. Basic science

process skills which include: observing, asking questions, classifying, measuring, and predicting. The second group was integrated science process skills which include; namely identifying and defining variables, collect and transform data, create data tables and graphs, describing the relationship between variables, interpret the data, manipulating materials, recording the data, formulating hypotheses, designing investigations, make inferences and generalization (Karamustafaoğlu, 2011).

Understanding of science process skills usually refer to skills or abilities that must be owned by the scientists on the process of scientific discovery (Sukarno, Pemanasari, and Hamidah, 2013). Process skills are important because process skills help students to deal with experiences that are relevant in or connected in all parts of life, to find out things for themselves, gaining skills contributes to students' general mental development and helps learn how to learn, to understand new ideas, concepts, and facts in science, also be creative, open-minded, and curious about the world around them. Furthermore, Indonesia curriculum stated science education and social education developed as integrative science and integrative social studies. Both as education applicative oriented, thinking skill, curiosity, also caring and responsibility toward the social and nature (Kemendikbud, 2013).

The process skill assessment one of effective method for testing student achievement, and provide the teacher with feedback on student performance. The assessment designs to be flexible enough or easy to be administrated individually, in a small group, or with the entire class, more importantly it meets the needs of both teachers and students (Oslund, 1992).

Experiment is a test under controlled conditions that is made to demonstrate a known truth, examine the validity of a hypothesis, or determine the efficacy of something previously untried. The experimental\_method is a systematic and scientific approach to research in which the researcher manipulates one or more variables, and controls and measures any change in other variables (Blakstad, 2008). Similar to definition of experiment, laboratory skills refer manipulative and thinking skills involved in laboratory activities; they area also called process skills (Liu, 2010). Experimental method usually used by people

who works in science fields, especially in biology. However, experimental method might as well be used in chemistry, physics, and other science related field.

Biology is the scientific study of life. The study of life extends from the microscopic scale of molecules and cells that make organisms to the global scale of the entire living planet (Reece et al., 2012). Muscle tissue is groups of similar cells that work together on a specific task. Muscle has many types of tissue, found in various places inside the body. By doing experiment investigating human muscle tissue students should be able to identify various muscle tissues and categorize them.

Refers to *Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 22 Tahun 2016* about elementary and secondary education standard process in making lesson plan teacher should consider about the difference of every students based on aptitude, level of intelligence, talents, learning styles, gender, ability level, ethnics, motivation and interest of students. Due to the statement, it is important in understanding the diversity of student to improve the quality of learning especially for based gender differences.

## **1.2 Research Problem**

The research problem of this study is “How is The Profile of Students’ Science Process Skill in Learning Human Muscle Tissue Experiment at Secondary School?”

## **1.3 Research Question**

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

- 1) How is the profile of students’ basic science process skills in experiment of human muscle tissue?
- 2) How is the profile of students’ integrated science process skills in experiment of human muscle tissue?
- 3) How is the profile of students’ science process skills in experiment of human muscle tissue based on gender?

#### **1.4 Limitation of Problem**

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

- 1) Students' basic science process skill will be observed is limited by four basic science process skills which are observing, communicating, classifying, and measuring.
- 2) Students' integrated science process skill will be observed is limited by two integrated science process skills; designing investigation, and experimenting, through the experiment of human muscle tissue.
- 3) Human muscle tissue is used as the topic of the research, as stated in Curriculum 2013 revised in 2015, Core Competence number 3 and Basic Competence number 3.1 about human movement system.

#### **1.5 Research Objective**

Based on the problems that elaborated above, the objectives of this study are:

- 1) To analyze the profile of students' basic science process skill in experiment of human muscle tissue at secondary school.
- 2) To analyze the profile of students' integrated science process skill in experiment of human muscle tissue at secondary school.
- 3) To analyze the profile of students' science process skills in experiment of human muscle tissue at secondary school based on gender.

#### **1.6 Research Benefit**

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

- 1) For teachers, this research is expected to be reference for teacher in extending knowledge of science process skills in students' science process enhancement, also as the guidance to analyze students' science process skills and the factor that influence their ability.
- 2) For students, as the guidance and reference in measure theirs science process skills.

- 3) For another researcher, this research expected can be material study and reference for their research about science process skill and as the information for them about the profile students' science process skill in an area.

### **1.7 Organization Structure of Research Paper**

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 to 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 explained some literatures and supportive theories of the research. The deep explanation of science process skills, the brief explanation of gender differences, and the chapter review of muscle tissues.

- 3) Chapter III : Methodology

This chapter explains about research procedures, research object, the type of research, how the data are be collected, the instruments used, and the research plot.

- 4) Chapter IV : Result and Discussion

In this chapter, the interpretations of all of the research data are served. Then the discussion are followed after, it analyses the result of research and its correlation between the result and the theories.

- 5) Chapter V : Conclusion and Recommendation

This is the last chapter of this research, all of research questions are concluded based on the result. The suggestions that derived from difficulties and obstacles found in this research are shared in recommendation part.