

CHAPTER I

INTRODUCTION

1.1. Research Background

Based on the Content Standard of Biology subject in senior high school, the goal of Biology learning is so that the learners have the ability to develop the mastery, apply the concept and principle of Biology (Departemen Pendidikan, 2006). Additionally, the purpose of learning is to make students are able to associate one to other concepts, and able to solve problems in daily life (Rahmawati *et al.*, 2013).

The process of learning on the formation of concept in teaching materials is very important, because it can be directly affect students toward the comprehension of subject matter. The concept is one thing that can not be separated in learning Biology. The concept is one aspect of product, process, and attitude. The aspect of biological product consist of concept, principle, theory, and law. The aspect of the process is in the form of science process skill that practiced after student learn Biology such as identifying and controlling variables, designing experiment, making generalization, and others. The attitude aspect is in the form of a scientific characters which internalized in students' selves after studying Biology such as curiosity, conscientious, honest, responsible, and others (Prayitno, 2012).

Planting the concept is very necessary in learning Biology. The concept is the foundation for thinking and formulating basic principles and further generalization. Understanding and procurement of a strong concept can make students to develop themselves in understanding the higher concept. Several factors can affect students' concept procurement include: (1) The weakness of students' basic knowledge (Tekkaya, 2002), (2) The lack of material's deepening, and (3) Lagging with the latest information related to the material (Sugihartono, 2008).

Students come to school with varying experience with ideas about and explanation of the natural world. The scope of these ideas are as diverse as the

students' backgrounds and they are often different from those of scientists. These differing frameworks have been described as misconception (Fisher, 1985), alternative conceptions (Arnaudin and Mintzes, 1985), preconceptions (Gallegos, Jerezano, and Flores, 1994), alternative frameworks (Driver, 1981), erroneous ideas (Sanders, 1993), and children science (Gilbert, Osborne, and Fenshman, 1982). The characteristics of misconceptions are summarized by (Adeniyi, 1985) and (Fisher, 1985). They tend to be pervasive (shared by many different individuals), stable, well embedded in individual's cognitive ecology, often resistant to be changed at least by traditional teaching methods and remain intact throughout the university years and into adult life.

Several studies have investigated students' understanding of biological concepts in different countries: Cell (Dreyfus and Jungwirth, 1988), photosynthesis (Haslam and Treagust, 1987; Waheed and Lucas, 1992), genetic (Lewis, Leach and, Wood-Robinson 2000 ; Pashley, 1994), ecology (Griffiths and Grant, 1985; Munson, 1994), respiration (Sanders, 1993), classification (Trowbridge and Mintzes, 1988), the circulatory system (Yip, 1998), vertebrate and invertebrate (Braund, 1998) and energy (Boyes and Stanisstreet, 1991). These studies revealed that the majority of students leave secondary school with a distorted view of biological objects and events. Many of these topics about which students hold misconceptions are basic to biology knowledge and interrelated.

In Turkey, in recent years there also has been an interest in determining students' misconceptions concerning various biological concepts (Çapa, 2000; Özkan, 2001; Sungur, Tekkaya, and Oeban, 2001; Tekkaya, Şen, and Özden, 1999; Tekkaya, Çapa, and Yilmaz, 2000; Tekkaya, Özkan, and Aşçı, 2001). These studies revealed that regardless of the age and the level of schooling misconceptions are also prevalent among Turkish high school and university students.

Common misconception that often occur the material in class XI that involves human body physiological system. This material is considered complex and difficult to understand by students giving rise to misconception in students. Moreover, students often have had the initial concept of the application body

physiological material and daily environment that is not completely true according to scientists. The example of misconception that occur in the material of body physiological system including the digestive system is in the digestive system concept common occur misconception, such as the concept of the digestive mechanism. Many students assume that the mechanism of mechanical digestion occurs only in the mouth with the aid of the teeth, but the destruction of food in the stomach with the aid of the stomach muscles is also include to mechanical digestion. In addition, students also have to understand the process of digestion found in the body. This concept is still look abstract because it is still difficult to imagine the process occur in body system. The difficulty of the student in understanding concept and false preconception that are not considered here which cause misconception.

This problem is also found in SMA Negeri 1 Sidikalang the students' understanding to the concept of Biology learning is still lacking. Based on the initial observation and interview that has been done previously in SMA Negeri 1 Sidikalang, the students' understanding about the concepts of Biology and the relationship between the concept of is a problem that considerable apprehensive in the cognitive structure of students' thinking. Biology teachers and student say that the digestive system material is abstract difficult to understand thus providing opportunity for misconception. The overview of students' Biology learning outcome in this school on the digestive system material is still relatively low. Low learning outcome is characteristic or the impact of the misconception that happened in students (Kusumawati *et al.*, 2014).

In addition, the issues that occur in this school namely, teachers teach the concept of Biology with lecture method and learning process that makes the students quickly get bored, sleepy, passive, and perform other activities such as noting result in many students do not understand these concept deeply, in addition teachers do not pay attention to students' initial conception before receive a new concept, result in misconception in students. In daily life the students also have different conception about natural phenomenon that occur around them and not infrequently that are formed conception was different from the conception of

scientists. These events also lead misconception in students. Students who have misconception will hold the concept that they consider right and this will lead to misconception that are stable and resistant to change.

The material is too much and too abstract make students lazy to read and do not pay attention well when the teacher explain the material in class, so that make students' understanding of Biology concepts are getting lower and weak. Misconceptions in students that occur continuously could disrupt and inhibit the formation of scientific concepts in cognitive structure of students. One effort to overcome the difficulties students in understanding the concept that lead to misconception, namely the concept map method that is used to detect the error concept. In addition, concept maps can be used to investigate what is already have been known by students, to show how to learn, show misconception, and as evaluation instrument.

Based on the background described above, the researcher want to know how the misconception that are experienced by the students by using concept map on grade XI IPA Science SMAN 1 Sidikalang, by conducting research entitled **“Analysis of Misconception and The Role of Concept Map to Minimalize Students’ Misconception on Human Digestive System Topic at SMA Negeri 1 Sidikalang Academic Year 2015/2016.”**

1.2. Problem Identification

Based on the background above, the identification of problem formulated as following:

1. The presence of students’ misconception in human digestive system topic.
2. Students are less able to correlate the concepts in human digestive system topic correctly.
3. Misconception affect students to understand the concept of human digestive system topic which occur in students of XI IPA in SMA Negeri 1 Sidikalang.
4. The teacher still use conventional method in the class which can affect the students’ understanding and can lead to misconception.

1.3. Problem Scope

Referring to the description of the background and identification of problems that have been described above, this research is limited:

1. The research is conducted on students of XI IPA at SMA Negeri 1 Sidikalang Academic Year 2015/2016 who learn human digestive system topic.
2. The research focus on the misconception in human digestive system concept which consist of various nutrients contain in the food, the structure and function of digestive organ, the mechanism of digestive occur in human digestive system, and the disease or disorder occur in human digestive system.
3. The aspect measured are students' misconception by doing diagnostic test and post test result after give concept map in students of XI IPA at SMA Negeri 1 Sidikalang.

1.4. Research Questions

Referring to the description of the background issues that have been described above, then the problems of this research is formulated as following:

1. Is there any students' misconception in students of XI IPA in the concept of the human digestive system at SMA Negeri 1 Sidikalang?
2. At which indicators of human digestive system most students undergo misconception in students of XI IPA at SMA Negeri 1 Sidikalang?
3. At which cognitive level most students undergo misconception occur on human digestive system topic in students of XI IPA at SMA Negeri 1 Sidikalang?
4. Does the concept map have role in minimalizing students' misconception at SMA Negeri 1 Sidikalang?

1.5. Research Objectives

Based on the research scope and the research question above so, the objective of this research are:

1. To know whether there is any misconception in students of XI IPA on human digestive system topic at SMA Negeri 1 Sidikalang.

2. To know the indicators of misconception on human digestive system topic in students of XI IPA at SMA Negeri 1 Sidikalang.
3. To know the cognitive level of students' misconception on human digestive system topic in students of XI IPA at SMA Negeri 1 Sidikalang.
4. To know the role of concept map in minimizing students' misconception at SMA Negeri 1 Sidikalang.

1.6. Research Significances

The result of this research can be meaningful for the various parties who use it among other things:

1. As the acquisition of direct experience for researchers to know the misconception in senior high school students on the concept of human digestive system.
2. Information for teacher to determine the teaching strategy that can avoid misconception.
3. To help the school in improving the quality of learning in Biology subject.

1.7. Operational Definition

- The concept is someone thinking obtained from facts, events / occurrences, natural phenomenon, experience, generalization, or the result of abstract thinking that describes the characteristics or good character of the same in a particular group and that distinguishes it from other groups, so it can answer the problems that exist.
- Misconception is error or mistake on a concept in interpreting relationships between different concepts that mutually influence each other.
- Concept map is a process that involves the identification of concepts of subject matter and the regulation of these concepts in a hierarchy, started from the most general, less general and more specific concept.