

CHAPTER I

INTRODUCTION

A. Background

Students come to school with varying experience and ideas about the natural world. The scope of these ideas are as diverse as the students' background and they are often different from those of scientist. Fisher stated that these differing frameworks have been described as misconception (Tekkaya, 2002).

Misconceptions can be resulted due to the number of contacts students make with the physical and social world around them (Wiley and Klosterman, 2012), they may occur due to something the student experienced in their personal life, from communication with different teachers and friends or through source of media (Stajonavska et al., 2012). Previous studies also highlighted that textbooks are another prevalent source that contributes to the formation of misconceptions by students (Abimbola and Baba, 1996).

All of the above statements could be described as the origin of formation of misconception and it can result a powerful, extremely persistent, and hard to change, and creating obstacle to further learning (Canpolat et al. in Stajonavska et al., 2012). Then, misconception also is one of important factors which prevent students' meaningful learning (Köse, 2008). This dangerous condition is one crucial reason why the study of misconception should be investigated well by the science educators.

In education major, there are several methods that used for diagnosing conceptual understanding and misconception, such as open-ended questions (Mondal and Chakraborty, 2013; Ozcan, Yildirim, and Ozgur, 2012), two-tier diagnostic test (Bayrak, 2013; Balushi et al., 2012), interviews about concepts (Stajonavska et al., 2012; Lemma, 2013; Thompson, 2006; Gültekin and Topsakal, 2014), drawings (Halim et al., 2014; and Gultekin and Topsakal, 2014; Wekesa, 2013), and word association (Kurt, 2013). According to Köse (2008), drawings could be considered as simple research instruments that enable easy comparisons at the international level. While many children

dislike answering the questions, drawings can be completed quickly, easily and in an enjoyable way. Children's drawings provide a window into their thoughts and feelings; mainly because they reflect an image of his/her mind (Köse, 2008).

Recent research shows that drawing can be used as an effective form of providing a creative way to gather misconceptions and giving insight to alternative conceptions. Drawing activities and interview section are successfully carried out to explore children's idea about abstract concept, e.g. basic chemical concept (Lemma, 2013). In another studies, drawing is used to improve the students' performance in biology (Wekesa, 2013) and determine the level of misconception in forces concept (Halim et al., 2014). In the previous studies, the children were asked to draw a plant and label parts of them after the researcher showed them the plants (Gultekin and Topsakal, 2014) and Köse (2008) showed that drawing method is applied to determine university students' misconception concerning on photosynthesis and respiration. In this study, misconception about plant structure and photosynthesis concept using drawing method in combination with interview are exposed.

Plant structure and photosynthesis are important science concepts which are in the middle school curriculum of many countries. Plant structure concept describes the basic morphology of plants and bridges the students to understand another correlated topics, such as photosynthesis. By acquiring the knowledge of plant structure concept, the students could understand how the plant basic organs as the external structure of plant form specialized function and take the crucial roles in photosynthesis process. Since these fundamental concepts are extremely necessary to be learnt, thus it is very important to determine the misconception and trace the sources of misconception on the relationship between plant structure and photosynthesis concept among middle school students using drawing method.

B. Research Problem

The research problem of this study is “How is the misconception concerning plant structure in relation to photosynthesis among middle school students that is diagnosed using drawing method?”

C. Research Question

Based on the research problem above, the research questions that developed and explore in this study as follow:

1. What kind of misconceptions that is helded by the middle school students regarding to plant structure include root system and shoot system that diagnosed using drawing method?
2. How is the misconception helded with the photosynthesis in plant among middle school students that diagnosed using drawing method?
3. How is the misconception helded by middle school students about plant structure in relation to photosynthesis that diagnosed using drawing method and modified Certainty of Response Index?

D. Limitation of Problem

In order to bring this study into focus, the problem is limited as follow:

1. Students’ misconceptions are diagnosed using drawing method based on Köse (2008) item test with Modified Certainty of Response Index (CRI) based on Hakim et al. (2012), and interview.
2. Students’ misconception that examined in this study about plant structure that includes the root system and shoot system (i.e. Stems, leaves, and flowers).
3. Students’ misconception that examined in this study about photosynthesis process in plant, include sites of photosynthesis, components needed for photosynthesis, product of photosynthesis, and the role of plant basic organs in relation to photosynthesis.

E. Research Objective

The objective of this research is to identify students' misconception about plant structure in relation to photosynthesis using drawing method.

F. Research Benefit

The study was expected to provide some benefits for students, teachers, schools and researcher as follow:

1. Teacher

Enrich teacher's knowledge of diagnosing method to identify student's misconception about science concept and discover a better learning strategy that can reduce misconception.

2. Student

Helping the students to construct and reveal their understanding about certain science concepts (e.g. plant structure and photosynthesis concept) through drawings.

3. School

Planning and preparing a learning strategy and select teaching media (e.g. textbook) which can decrease the potential of misconception in the classroom.

4. Further Research

- a. Giving experience to implement drawing method and interview as the method combination for determining students' misconception in science concept.
- b. Contribute the study about student's misconception that could be reference for other study.

G. Organization Structure of Research Paper

Chapter one tells about the background and problem identification which become the base of this research. Based on the research problem, the study will be brought into several research questions which determine the objectives of this research. This chapter also is crucial to determine the flow of the next chapters, such as literature review and methodology.

Chapter two gives the fundamental concepts and theories that needed by the author to analyze the result of the findings. Chapter two will be divided into different focus, namely misconception, drawing method, and an overview of plant structure and photosynthesis concept. This chapter is designed to support the argument and result analysis in this research.

Chapter three describes the methodology used in this research. Besides that, the population, sampling technique, and a brief explanation related operational definition. In this chapter three, a set of instruments that applied in this research is explained concisely.

Chapter four contains the research result and discussion. This chapter tells about the findings and analysis concerning on this study. Chapter four also will answer the research problem that has been described in the first chapter. Through chapter 4, each findings are analyzed using a selected theory and supported by previous findings in the same field of research.

Chapter five is the closure chapter which draw the conclusion of this research and give recommendation for the next research.

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The Use Of Drawing Method For Diagnosing Students' Misconception About Plant Structure In Relation To Photosynthesis

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