

CHAPTER I

INTRODUCTION

A. Background

The world keeps on developing, in the scientific, economic and social aspects of life as well as the communication revolution results from the knowledge advancement and globalization. As a response to those developments and challenges it was crucial to prepare a generation that capable to face those challenges through changing the traditional methods of learning and teaching as well as focusing on providing students with the suitable training on different thinking styles. Individuals cannot be prepared for present and future through pouring information into them through the traditional teaching methods that depend on the teacher in the first place.

However, this must be done through guiding students towards achieving knowledge understanding in relation with everyday problems since we live in the era of openness between communities requiring us to employ information and investing it in solving problems in the environment leading to the development of the ability of thinking as well as developing innovation and creativity (Al-Khatib, 2012). One of such strategies is the constructivist approach which lay emphasis on the active role of the learner in constructing knowledge as well as making sense of information (Owo, Idode & Ikwut, 2016). According to Orji & Ekpo (2013) constructivism is a theory that believes in human generation of knowledge and meaning from the interaction between their experience and ideas.

The constructivist approach to teaching stresses on meaningful learning and knowledge building through two processes: 1) The learners' internal (cognitive) process. In this process, new knowledge is derived from previous knowledge by the transformation, organization and reorganization of previous knowledge. (2) The interaction between both the learners' internal and external processes. Here new knowledge is constructed as a consequence of the relationship or interaction between cognitive experience or prior knowledge and the external (i.e. environmental or social) factors.

The external or social factor here can be in the form of social interactions with knowledgeable adults or peers who render help or scaffolding. During scaffolding, previous knowledge is activated. In any of these processes, prior knowledge is required for meaningful learning to take place (Owo, Idode & Ikwut, 2016).

Brainstorming as one of the constructivist techniques was originally introduced by an American advertising executive, Alex Osborn (1953) as a technique of generating ideas from a group of people in an attempt to solve a problem. He established this strategy when he realized that the traditional modes of business meetings were unable to create new ideas. He also proposed the following four rules for effective brainstorming: (i) No criticism of ideas: During brainstorming, judgement or criticism of ideas is excluded until the end of the session. (ii) Encouraging large quantities of ideas: Quantity of ideas is the major goal of brainstorming. The more ideas the group or participants generate, the more the chance of having good ideas among them. (iii) Building on each other's ideas: Combination and improvement of ideas are very necessary. Participants should be very free to associate, build and elaborate their own ideas based on ideas from others. (iv) Encourage every idea: Take every idea (both silly and intelligent ones) as valid, and encourage the participants to share their ideas (Owo, Idode & Ikwut, 2016).

Brainstorming can be viewed as a technique in which an individual or a group engages in critical thinking to generate wide-ranging ideas and creative solution toward solving a problem. This strategy is now widely applied in different fields of human endeavour including education (Owo, Idode & Ikwut, 2016). Brainstorming provides a free and open environment that encourages everyone to participate. Quirky ideas are welcomed and built upon, and all participants are encouraged to contribute fully, helping them develop a rich array of creative solutions.

When used during problem solving, brainstorming brings team members' diverse experience into play. It increases the richness of idea

explored, which means that you can often find better solutions to the problems that you face. What's more, because brainstorming is fun, it helps team members bond, as they solve problems in a positive, rewarding environment. While brainstorming can be effective, it's important to approach it with an open mind and a spirit of non-judgment (Al-Mutairi, 2015).

Creative thinking skills is something that rarely considered as important in learning science. Teacher usually put logic as a the most essential point and assume that creativity is not important in learning science. Creative thinking is known as a compound mental activity aiming to direct a strong desire to look for solutions or reaching original solutions that were not known before (Jarwan, 2008). Al-Khatib (2012) defined it as the multiple thinking that includes the breaking up of old ideas, making new connections, enlarging the limits of knowledge and the onset of wonderful ideas.

Many researchers assume that people are creative, but their degree of creativity are different from one to another (Siswono, 2010). In exercising to learn creatively, students can improve their creative thinking skills. The role of teacher is to provide the teaching and learning process that facilitate students to practice and improve their creative thinking skills.

Through implementing brainstorming, it is expected that the process can improve students' conceptual mastery as well as creative thinking skills. Students' creative thinking skills is needed in the learning process because by thinking creatively, students can explore more about science in their daily life, so that students can feel that science is a part of their life.

Based on the statement above, it is essential to implement research that able to investigate students' conceptual mastery as well as creative thinking skills by utilizing brainstorming technique. Therefore, the researcher has intention to conduct research entitles ***“The Effect of Brainstorming on Students' Creative thinking skills and Concept Mastery in Learning Nutrition.”***

B. Research Problem

According to the background which has already stated, the problem of this research is formulated into: “How is the effect of brainstorming on students’ creative thinking skills and concept mastery in learning nutrition?”

C. Research Question

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

1. How is the implementation of brainstorming in learning nutrition concept?
2. How is the effect of brainstorming on students’ creative thinking skills in learning nutrition?
3. How is the effect of brainstorming on students’ concept mastery in learning nutrition?

D. Research Objective

According to research problem and questions that are stated above, this research aims to investigate several aspects as follow:

1. To investigate the implementation of brainstorming in learning nutrition.
2. To investigate the effect of brainstorming on students’ creative thinking skills in learning nutrition.
3. To investigate the effect of brainstorming on students’ concept mastery in learning nutrition.

E. Limitation of Problem

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

- a. Brainstorming strategy that was applied in this research is the one that is introduced by Alex Osborn in his book *Applied Imagination: Principles and Practices of Creative Thinking* (1953). The aspect that is covered in this research is limited to fluency, flexibility and originality.
- b. Students' creative thinking skills is measured according to Torrance Tests of Creative Thinking (TTCT) (Torrance & Ball, 1984; Torrance, 1990) verbal test which was designed to measure three skills such as fluency, flexibility and originality. According to Al-Mutairi (2015), fluency represented in the possible number of responses for the situation within a time unit, flexibility represented in the different categories of responses in the fixed time unit and originality represented in the number of fixed and unique responses in a certain time unit.
- c. Students' concept mastery that is measured in this research involves level cognitive of remembering (C1), understanding (C2), applying (C3), analyzing (C4), and evaluating (C5) based on Bloom's revised taxonomy (Anderson & Krathwohl, 2001).
- d. The topic of nutrition in this research is limited to nutrients including balanced diet for human and food test, microorganism in industry and food additive that classified into food coloring, flavor enhancer, emulsifier and food preservative. All the topics were based on the IGCSE curriculum.

F. Research Benefit

It is expected that the result of this research able to conquer these following benefit:

1. For science teacher, this research may add teacher's insight about using brainstorming as one of learning approach to be implemented in a class, so that students are more involved in the learning process which will lead to the improvement of students' concept mastery as well as creative thinking skills.
2. For students, to give them new learning experience through brainstorming strategy and also to enhance their other skill and competencies besides their concept mastery, which is their creative thinking skills.
3. For other researcher, as a reference and information to develop further research in science education especially regarding the implementation of brainstorming in class.

G. Research Paper Structure

Overall, this reseach paper consist of 5 chapters and several appendices and each chapter consist of sub-chapters. The systematic of this research paper is as follows:

1. Chapter I: Introduction
This chapter outlines the background, research problem, reseach questions, research objective, limitation of problem, benefit of study, and research paper structure. This chapter was becoming the base of the research. All discussion was based on the research problem and questions and every effort given to this research are based on the thought that served as the background in this first chapter.
2. Chapter II: Brainstorming, Students' Creative thinking skills, Students' Concept Mastery and Nutrition Concept
This chapter describes in details the definition and stages of brainstorming, definition of creative thinking skills, TTCT, concept

mastery, nutrition concept and other things that correlated to the science issue under the study.

3. Chapter III: Research Methodology

This chapter explains about the methodology that was conducted during the research. It consists of research method and design, population and sample of research, assumption, hypothesis, operational definition, research instruments, instrument analysis result, data processing technique and research procedure.

4. Chapter IV: Result and Discussion

This chapter concern with the data that gathered in this research. The author analyzes and interpreted it based on the needs of answering research questions that has been determined in chapter one. The data are presented in the form of tables and figures.

5. Chapter V: Conclusion and Recommendation

This chapter describes about conclusion and recommendation of the research.