CHAPTER I
INTRODUCTION

A. Background

The needs of science education are essential to the life challenge where science education is one of important aspects in developing high quality human resources. It is emphasized that science education aims to foster students who eligible for pursuing life challenge by showing excel capacity in solving real life problem. Like other thinking skills, problem solving is quite important to be mastered by students. This competency is essentially important to have by each individual in facing daily life situation where knowledge that they have should be engaged with the problems of daily which is generally have unobvious solution. Problem solving is also fostering better citizenship as Problem Solving Expert Group (PEG) (2010) stated that development of problem solving includes the willingness to engage with such situation in order to achieve one’s potential as a constructive and reflective citizen. The importance of problem solving skills is also reflected while in 2012 OECD develops PISA 2012 Problem Solving Assessment which has objective to measure individual Problem Solving competency of the students as one of basic competency that should belong to the students (PEG, 2010).

Finding the method which more emphasizes to student center learning is urged to be done as the critical point where development of student problem solving skill should be accelerated to answer the needs of student. Experiment Activity is proposed as one method that utilize in fostering problem solving. As Unal and Ozdemir (2013) state that experiment activity offers experience opportunity to solve problem and develop understanding. It is also emphasized that experiment activity is usually used by teacher to develop students thinking skill, which somehow, helps the students understand the various aspects of scientific investigation including problem solving skills development during the process. Laboratory activity is compatible with
the process of problem solving where usually it involves scientific investigation of problem.

In fact, science laboratory activity has only been emphasized on the process of conducting experiment without considering development of problem solving skill. During the implementation of experiment activity which generally uses cookbook method, Students are rarely engaged in the material. Accordingly, Kelly et al. (1994) stated that students can be successful in their laboratory class even with little understanding of what they are actually doing. This method seems to be effective while most of the time students are able to conduct laboratory activity successfully. As the impact, the result foster that students intend to perceive if they need to follow instruction and getting the right answer (Unal & Ozdemir, 2013), thereby defining unreachable developing of problem solving.

Based on the argumentation above, the use of novel method of experiment activity is needed considering that cookbook method fails to meet the requirement of problem solving development. Problem based experiments is triggered to fulfill the needs of improvement in science experimental work from traditional or cookbook model. Problem based experiment is experiment activity which is redesigned using problem-based learning.

According to Adesoji (2008) students in both low and high level could improve their problem-solving skills if they are exposed to problem-solving instructional strategy. Problem-based experiment is considered benefit to enhance problem solving skill and performance skill of student as the result of activities arrangement that facilitate the student to explore problem solving method related to daily problem through experiment activity. Basically, problem based experiment will give more chance to student to elaborate more rather than following instruction available on cookbook. Furthermore, student will be able to reach meaningful life as
te process of problem based experiment where they are able to apply the concept of knowledge with real situation.

This research is aimed to study the implementation of problem based experiment as the effort to improve students’ problem solving skills. In this study, the implementation will be implemented to secondary level students of 8th Grade in the concept of separation method. Concept determination is reconsidered based on characteristic analysis of the concept where it is contextually related with daily life. This concept is compatible with the characteristic of problem based learning which the problem comes from daily activity and familiar condition that usually faced by students.

B. Research problem

In line with the explanatory background that has been described, problem that rose in this research is stated in the following question:

“How is the improvement of students’ problem solving skills in the concept of separation method by using problem based experiment?”

1. Research Question

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

a. How is the improvement of students’ problem solving skill in domain of problem analysis, problem solving planning, and problem solving evaluating?

b. How is the improvement of students’ problem solving skill in domain of problem solving planning?
c. How is the improvement of students’ problem solving skills in domain of conducting problem solving?
d. How is the improvement of students’ problem solving skill in domain of problem solving evaluation?

2. Research Scope

The problem stated is limited to the aspects as follows:

a. Problem solving skills which is examined in this research refers to problem solving skills domain proposed by Mettes et al. (1981) included problem analysis, problem solving planning, conducting problem solving, and evaluating problem solving.
b. The concept of separation method which is described is limited to the indicator arranged in Cambridge curriculum for secondary two students.

C. Research Objectives

This research is aimed to investigate the improvement of students’ problem solving skills as the result of problem based experiment implementation in the concept of separation method.

D. The Significance of Research

This research is beneficial in giving alternative method to improve problem solving skill during science instruction.