

## CHAPTER I

### INTRODUCTION

#### 1.1. Background

Chemistry is an experimental science, can't be learned only through reading, writing or listening. Learning chemistry not only mastery the knowledge of the fact, concept or principle, but also chemistry is a discovery process and mastery of procedure or can called as scientific method. Therefore, in the learning of chemistry there are two important things that must be attention, first is chemistry as a product like a fact, concept, principle, law, theory and second chemistry as a scientific work process. Thus, the learning of chemistry isn't right if done only by using conventional method, but need a method that can provide the opportunity for students to conduct a scientific work process (Jahro, 2009).

The chosen method in this research is experimental method. As a method of teaching, experimental method aims to assist the learning process to be more easily remembered by students, so it will be able to give the impression of a longer learning. Teaching methods by using the experimental method will be able to help students in providing the concept of knowledge and reality in the laboratory through experiments. Thus, the impression of learning will form better effectiveness in improving students' mastery of subject matter in school.

Learning about experimental methods previously been investigated by Sihole, (2004) which suggests that there is increasing in student's achievement that taught by experimental methods than the conventional method. The result of Sadia research (2007) suggests the performance of the research instrument of scientific research and assessment of the performance of laboratory activities is conceptually feasible to use, performance and learning outcomes of students in laboratory activities categorized properly. Afriani, (2004) shows the learning activities and practical activities undertaken to improve the skills and experience of students.

But, the reality show learning achievement in chemistry of students in high school generally is still low. In X class of MAN 2 Model Medan as the school that will be observed has the average result of daily examination chemistry is 50 until 100, with the highest result is 100 and the lowest is 50. Meanwhile, completing minimum criteria (KKM) in supervisor class is 80. The student who get the result below of KKM is about 65% or 13 people from 20 people in a

class. So, it is needed to increase the amount of student who get the result below of KKM, like conduct the experimental method as the way to increasing student's achievement.

Based on the data above, this case caused the implementation of practical activities both quantity and quality is not optimal. The results of a survey of senior high school (SMA) in the city of Medan and the its surrounding shows that most of schools don't implement practical activities and demonstrations in learning chemistry due to the lack of laboratory facilities, lack of ability, lack of teacher creativity and willingness of chemistry teachers to manage laboratory and practical activities.

In the result of evaluation data in chemistry education program, about 103 alumnus that had been worked as a teacher in some area/city in the North Sumatera said that the obstacle that got in the implementation of experimental chemistry such as there isn't laboratory about 13.665%, there isn't material about 29.814%, there isn't of experimental guidance about 14.286% and others about 27.329%.

Based on the reality above, lack of tools and materials that available in the laboratory is the cause of inhibition of practical activities in senior high school. Less complete of facilities of tool and chemical material for practical purposes isn't a plausible reason is the implementation of practical activities. Experiment not only be implemented in the laboratory room, but can also be carried out in the open field.

In MAN 2 Model Medan as the school that will be observed, the tools and materials are available in laboratory. But, in the fact of this school practical activities is seldom to conduct. This case caused the price of tool and materials that will be used to do experiment most of them is expensive, need big cost to buy the tools and materials so can do experiment. In addition, there is an assume of students that all of chemistry materials is dangerous. So that most of students still afraid to do experiment and less interest to conduct it. Based on the reason above, practical activities is seldom to conduct although the tools and materials are available in laboratory.

Thus, it can be solved by creating a simple design that isn't always use materials and tools of expensive chemicals. *PAS* is one way to overcome practical obstacle by using tools and materials that are easily obtained in the surrounding of students and also can decreasing the assume that experiment not only always use chemistry material, but also can change with the material in our environment so that this case can decreasing the negative effect of chemistry material.

It can be applied to practical activities and simultaneously implement to contextual approach to learning the subject of a redox reaction. Yandani, (2006) suggested less complete in its research facility equipment and materials can be overcome by making a simple experiment design using tools and chemicals are easily obtained in the surrounding.

Implementation of experiment in the laboratory as a means for students to assist the learning process to make it more meaningful. In addition, with the implementation of the experiment will be able to assist students in thinking about the concept of knowledge and reality in the laboratory through the experiment. Thus the impression of learning will provide better results in improving students' mastery of the material, especially chemistry, so that students can develop process skills better.

Learning activities in the laboratory like experiment can make students have the ability to think scientifically. In addition, students will be able to find scientific facts, identify, interpret observations, critical thinking and able to accept criticism of its differences, especially among fellow students. Thus it would be good to give the students motivation to learn.

A study is expected to be more increase student's understanding as a result of learning. Where according to Baugh that comparison result of learned through the sense of hearing is very prominent difference. Approximately 90% the result of learning outcomes through the senses of view and only about 5% is obtained through the senses of hearing and 5% again with the other senses. Meanwhile, Dale estimates that the learning outcomes through the sense of view about 75%, through the senses of hearing about 13% and through the other senses approximately 12% (Arsyad, 2000).

Based on the description and the fact above, the writer interested to conduct research with the title **The Influence Of Experimental Method Using PAS In Senior High School Toward Student's Process Skill and Achievement In Redox Reaction.**

## **1.2. Problem Identification**

Based on the background above, so can identified some problem such as:

1. Does teaching and learning with experimental method using *PAS* increase student's achievement in chemistry of students in high school?
2. Does teaching and learning with experimental method using *PAS* improve the implementation of practical activity?

3. Does teaching and learning with experimental method using *PAS* increase interesting of students towards chemistry subject?

### 1.3. Problem Limitation

Problem limitation of this research as follows:

1. The method that used in this research is experimental method by using *PAS* in senior high school toward student's process skill and achievement in X class of MAN 2 Model Medan at second semester in academic year 2012/2013 on the teaching of redox reaction.
2. Student learning activities that will be measured in this study is science process skill.
3. Student's achievement to be measured in this study is cognitive aspect of the level C1, C2, C3 and C4.
4. Feasibility test will be applied to *PAS* guidance.

### 1.4. Problem Formulation

Based on the background above, so problem formulation of this research are:

1. Is student's achievement who have learning with experimental method using *PAS* higher than the student who have learning with conventional method?
2. How many the percentage of average score in feasibility test of *PAS* guidance to use on the teaching of redox reaction?
3. How is the result of testing *PAS* guidance in the topic of redox reaction at chemistry subject X class SMA in laboratory UNIMED?
4. How many the percentage of average score in percentage skill of student by using experimental method with *PAS*?
5. How many the percentage of average score in student's perception to *PAS* guidance in the topic of redox reaction that have been design and tested in UNIMED FMIPA laboratory?

### 1.5. Objective of Problem

This research was conducted for the purposed of knowing:

1. The comparison of student's achievement who have learning with experimental method using *PAS* and student who have learning with conventional method.
2. The feasibility of *PAS* guidance to use on the teaching of redox reaction.
3. The result of testing *PAS* guidance in the topic of redox reaction at chemistry subject X class SMA in laboratory UNIMED.
4. The percentage skill of student with experimental method using *PAS*.
5. Student's perception to *PAS* guidance in the topic of redox reaction that have been design and tested in UNIMED FMIPA laboratory.

### 1.6. Benefit of Problem

The expected benefits of this research are:

1. As information for teachers about experiment as an alternative learning to improve student's achievement in chemistry.
2. As information for students that experimental chemistry doesn't always have to use expensive chemicals, but can use materials that found surround them.
3. Produce an innovative learning model that can enhance students learning activities, student's achievement, skills, creativity, independence, democratic attitudes and responsible behavior optimally.
4. For education, as an input to improve the learning process and improve the quality of education in schools.

### 1.7. Operational Definition

#### ❖ *PAS*

*PAS* is a term in Indonesian language can called as Praktikum Alternatif Sederhana. Where, *PAS* is an alternative method that had been famous for teacher in senior high school that can be used as replacement of usual experimental method, where in this method conducted by using tools and materials that are easily obtained in the surrounding of students. In other hand, the tools and materials also cheap or no costly, safety (not dangerous) so that not only can conduct in laboratory, but also can conduct in the class or in the field. Therefore, this case can decreasing the assume of students that experiment not only always use chemical danger material, but also can change with the material in our environment, so that this case can decreasing the negative effect of chemistry material itself.

❖ Student's Process Skill

Student's process skill is a work process of students in processing an information to found a new fact or concept so that grow their ability in physical, social and way to thinking that can develop their attitudes moral value.

❖ Student's Achievement

Student's achievement is an influence of teaching and learning activities like a level of mastery learning for students to the material that gained by effort, both individually or group, it can be seen in the form of changes in knowledge, attitudes, and skills that can be observed in the increase in better with the previous.



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