CHAPTER I
INTRODUCTION

1.1. Background

The learning process occurs throughout the ages. Starting from a child is born, the learning process is always happens. The learning process done through formal education and informal education. The informal education that we all know, happen in the natural environment and social environment. The formal education happen in school and the teacher get the main part. The role of teacher is often formal and ongoing, carried out at a school or other place of formal education. Since teachers can affect how students perceive the course materials, it has been found that teachers who showed enthusiasm towards the course materials and students can affect a positive learning experience towards the course materials. On teacher/course evaluations, Daren Olson was found that teachers who have a positive disposition towards the course content tend to transfer their passion to receptive students. And Bob Sullo (2011) states that these teachers do not teach by rote but attempt to find new invigoration for the course materials on a daily basis. Teachers that exhibit enthusiasm can lead to students who are more likely to be engaged, interested, energetic, and curious about learning the subject matter. Recent research has found a correlation between teacher enthusiasm and students' intrinsic motivation to learn and vitality in the classroom (Patrick, et.al, 2000).

Currently, the concentration of this research is the high school students where included in the group of teenagers who are experiencing puberty. Many of the current graduates are found to be lacking in creativity, communications skills, analytical and critical thinking, and problem-solving skills (Teo and Wong, 2000; Tan, 2000). These problems affect to the lack achievement of learning outcomes obtained.

During implementing the Integrated Field Experience Program (PPLT) in 2015 at Senior High School District 1 Plus Matauli Pandan, researchers found a number of problems that stand on access to learning, especially in the field of

chemistry. Among them is the lack of student interest, lack of motivation, lack of media used by teachers to support learning, teaching model that was not relevant to the content being taught, the tight schedule of student activities outside chemistry learning activities.

There are two issues related to chemicals that can not be separated, i.e chemistry as the products (chemistry knowledge in the form of facts, concepts, principles, laws, and theories) and chemistry as the process of scientific work (E. Mulyasa, 2006: 132-133). One of the efort that used to improve learning and student learning outcomes is through the model and instructional media. Since these traditional approaches "do not encourage students to question what they have learnt or to associate with previously acquired knowledge" (Teo & Wong, 2000), problem-based learning (PBL) is seen as an innovative measure to encourage students to "learn how to learn" via "real-life" problems (Boud & Feletti, 1999). Boud and Felleti claim that a PBL approach produces more motivated students with a deeper subject understanding, encourages independent and collaborative learning, develops higher order cognitive skills as well as a range of transferable skills including problem solving, group working, critical analysis and communication. We would like to extend this contention further by using multimedia technologies to create a multimedia-oriented project. By doing so, we hope to further develop the students' ability to become creative and critical thinkers and analysers, as well as problem-solvers, within this multimedia-mediated problem-based learning (PBL) environment. This learning mode is constructivist in approach whereby the students participate actively in their own learning process and construct their own knowledge (Jonassen, Peck & Wilson, 1999). Research approach is to use the principles of PBL to develop problem-solving case studies. According to the reasearch of Frida, et al. (2014) that conducted in SMA Al-Azhar 3 Bandar Lampung class X, the average value of pretest in control class is 16.33 and the average value of pretest in experiment class is 19.19. The result showed that *problem solving* learning model was effective to improve student's flexibility thinking skills in electrolyte and non electrolyte subject matter. Other research stated problem solving model can trained student

creative thinking skill is Nurmaulana (2011). It shows that the implementation of problem solving learning model proved effectively increase students' creative thinking skill in soil pollution material.

Researcher intends to collaborate two models in this study to make an innovative learning to achieve maximum value of students learning. By using macromedia flash as the media, researchers will know the value of student's achievement as the result between Learning based Problem (PBL) collaborated with Discovery-based Learning model. Bruner argues that "Practice in discovering for oneself teaches one to acquire information in a way that makes that information more readily viable in problem solving" (Bruner, 1961). According to a meta-analytic review conducted by Alfieri, Brooks, Aldrich, and Tenenbaum (2011), a discovery learning task can range from implicit pattern detection, to the elicitation of explanations and working through manuals to conducting simulations. Discovery learning can occur whenever the student is not provided with an exact answer but rather the materials in order to find the answer themselves. Research has been conducted over years to prove the unfavorable effects of Discovery Learning, specifically with beginning learners. "Cognitive load theory suggests that the free exploration of a highly complex environment may generate a heavy working memory load that is detrimental to learning" (Kirschner, Sweller, Clark, 2006). Beginning learners do not have the necessary skills to integrate the new information with information they have learned in the past. Sweller reported that a better alternative to Discovery Learning was Guided Instruction. Guided Instruction produced more immediate recall of facts than unguided approaches along with longer term transfer and problem-solving skills (Kirschner, Sweller, Clark, 2006). According to the research of Bambang Supriyanto (2014), that conducted in SDN Tanggul Wetan Kecamatan Tanggul Kabupaten Jember class VIB, students' achievement raise 30,30% from cycle I to cycle II and the result is optimal. The result showed that Discovery Learning model was effective to improve student's achievement. Furthermore, the research of Putrayasa, et al. (2014), that conducted in fifth grade elementary school students in Bontihing village, Kubutambahan District in the school year 2013/2014,

students' achievement in conventional class is 70,3 while in discovery learning class is 74,7. There was a difference science outcomes between groups of students who follow their lesson using discovery learning with conventional learning. In addition, found different effect in high motivated learning and low motivated learning (Arinawati, E., et al., 2014). Arina conduct the research in SDN in all Gugus Permadi Kutowinangun Kebumen that consists of 6 SDN. Anava result shows that high motivated student has the marginal column average 84,56 while the low motivated student has the marginal column 62,44. It means that high motivated student has the higher concept comprehension level. Sadirman (2012: 84) stated that learning activities is important to own the motivation.

The supporter for a learning is media. Media helps to increase students curiosity. The more curoisity the more motivation they have. One study that has examined the relationship between multimedia and student learning and attitudes was conducted by Butler and Mautz (1996). Butler and Mautz did find an interaction between the effects of the multimedia presentation and the student's preferred class representation style (i.e., whether the student was considered a "verbal" or "imaginal" learner). Butler and Mautz concluded, based on a one class period experiment, that students considered multimedia presentations entertaining.

Hence the advantages of learning using these models, the researchers intend to compare stundent's achievement whom taught by the Model Problem-based Learning that use Macromedia Flash collaborated with Discovery-based Learning Model to the student's achievement whom taught only by using Model Problem-based Learning and Macromedia Flash. Moreover, the study of electrolyte and non electrolyte solution that related with daily life through those model and media can help student to solve and improve their learning motivation. Student's motivation in each experimental class will be measured to see how the effectiveness of the models that have collaborated. Thus the title of the research is **"The Collaboration between Discovery based Learning and Problem based Learning Model that Using Macromedia Flash to Student's Achievement and Motivation in Electrolye and Non Electrolyte Solution Topic".**

1.2. Problem Identification

Based on the background described, problems can be identified as follows:

1. The lack of student motivation in learning chemistry.
2. The lack of applicating the instructional media to support the classroom learning process.
3. Students assume that the chemistry is an abstrack lesson because only taught theoretically.
4. The lack of students participation in learning process.
5. Learning models that are less varied as required by the subject matter.

1.3. Problem Limitation

Based on the scope of problems identification above, this research will be limited as follows:

1. Arranging the teaching materials in the form of syllaby and lesson plan systematically.
2. Preparing the discussion material that taught by Problem based Learning, Discovery based Learning model, and the macromedia flash.
3. Instrument test will be reviewed and validated by the lecturer from the Department of Chemistry Education.
4. Distributing questionnaires to measure students' motivation.

1.4. Problem Statement

Problem statement can be formulated as:

1. Does the collaboration model between problem based learning and discovery based learning with macromedia flash gives higher result to the student’s achievement than the student’s achievement taught using problem based learning with macromedia flash?
2. How does the correlation between student’s motivation and student’s learning achievement in experiment class I?

1.5. Research Objective

Based on the problem statements above, the objectives of this research are:

1. Knowing whether the student's achievement whom taught through the collaboration model between problem based learning with discovery based learning is higher than the student's achievement whom taught through problem based learning in learning electrolyte and non electrolyte solution.
2. To analyze the correlation between student's motivation and student's learning achievement in experiment class I.

1.6. Research Advantage

The advantages of this reasearch are:

1. Provide the broad outlines of innovative learning to the science teachers, especially in using the collaboration model between PBL with Discovery Learning in learning process.
2. Provide the learning reference that can be used in high school on the material electrolyte and non electrolyte solution.
3. Help students to learn through active learning to foster their interest and motivation to learn.
4. Provide input to the next researcher to conduct the same experiment later.

1.7. Operational Definition

The operational definition in this research consist of:

1. Problem based learning

   Barrows (1996) defines the Problem-Based Learning Model as student centered learning done in small student groups, ideally 6-10 people. Teachers guide the students rather than teach the problem forms as the basis for the organized focus of the group, and stimulates learning. The problem is a vehicle for the development of problem solving skills. It stimulates the cognitive process. So new knowledge is obtained through Self-Directed Learning (SDL).

2. Discovery based learning

   Discovery learning is a technique of inquiry-based learning and is considered a constructivist based approach to education. In discovery learning, participants learn to recognize a problem, characterize what a solution would look like, search for relevant information, develop a solution strategy, and execute the chosen strategy (Faye Borthick and Donald Jones, 2000)

3. Motivation

   Motivation has been classified as being intrinsic, extrinsic, or achievement driven. According to Newstead and Hoskins (1999), intrinsically motivated students enjoy a challenge, want to master the subject, are curious and want to learn; whilst extrinsically motivated students are concerned with the grades they get, external rewards and whether they will gain approval from others.

4. Learning Achievement

   Student learning achievement measures the amount of academic content a student learns in a determined amount of time. Each grade level has learning goals or instructional standards that educators are required to teach.

5. Media

   Media education in general, is a teaching and learning tool. Multimedia application design offers new insights into the learning process of the designer and forces him or her to represent information and knowledge in a new and innovative way (Agnew, Kellerman & Meyer, 1996).