CHAPTER I

INTRODUCTION

1.1. Background

Education is a conscious and structural effort to create an atmosphere of learning and the learning process so that learners are actively developing the potential for them to have the spiritual strength of religious, self-control, personality, character, skill needed for themselves, society, nation and state In other words, education is an important requirement for every human being. Without education will be difficult to adjust to the environment and will not function optimally in public life. As Tirtarahardja (2005) states that in process of personal formation, education is defined as a systematic and directed activity to the formation of the learners' personality.

Progress of a country can be measured by the progress of education in the country. Especially in this era of globalization, the progress of a country tends to be determined by the progresses of science and technology, such progress experienced by United States, Japan, China, and India. One of factors that affect progress of science and technology is the success of science learning. The success of science learning is influenced by several factors, namely: the curriculum, the four pillars of education, resources, learning environment, and evaluation of learning.

Based on the Regulation of Ministry of National Education of Indonesia No. 22 Years 2006 about the content standards for units of primary and secondary education, science learning should be taken in scientific inquiry method to foster the ability to think, work and scientific attitude and communicate it as an important aspect of life skills.

Beside it, UNESCO considers that education as a building that is supported by four pillars: learning to know, learning to do, learning to live together and learning to be. So, good science learning should be able to apply to the four pillars, is not enough to simply referred to the course or books (learning to know), but it must be equipped with experiment tools (learning to do), and are associated with the environment (learning to live together). Thus, students will be

encouraged to develop the skills and scientific attitude in useful learning for continuing education and to live in their communities (learning to be).

But in fact, until to the 21st century, Learning Science has not been able to apply to each of the four pillars, especially in Indonesia. Learning Science in Indonesia still tend to only apply the "learning to know". The main orientation of learning considered only on completion of the materials to be delivered according to the allocation of appropriate curriculum time available. This statement is supported by the Balitbang Depdiknas research (Rustad et al., 2004) which showed that about 51% of junior high school science teacher and approximately 43% of high school physics teachers in Indonesia can not use the tools available in the school laboratory, consequently, the level of utilization of the tool in learning tends to be low. Thus, science is supposed to be taught through lecturing or demonstration only. When that happens, then the science of learning can not be optimal for developing students' potential.

The low of quality of science learning in Indonesia also can be seen from the decline of Indonesia position in the world rankings. Based on the results of study conducted by PISA (Programme for International Student Assessment) in 2012 to 65 participating countries, in terms of students' performance in Science, Indonesia is at position 64 with a mean score of about 382. This result is still very far below the OECD's average score 500. And if we compare this result to the four researches before at year 2000, 2003, 2006, and 2009 Indonesia still got average mean score 394, so there was a decline about 3% . In addition, an ironic thing again in term of student's performance in Science, around 30% of Indonesian students are below level 1 from 6 levels of assessment categories (OECD Volume I, 2014). Beside it, from the study results of PISA 2012 in terms of conceptual understanding and problem solving skills, students in Indonesia are still likely to only apply the concept of "learning to know" and have not been able to know and understand the lessons well, even not able to apply it in any various problems. (OECD Volume V, 2014)

That data confirmed also by the observation results obtained by researcher while were implementing the PPLT (teaching training) program in school SMA N

2 Lintongnihuta as long as 3 months. For physics lesson, student's outcome is still low. From any test and observation result, researcher gets four important information.

First, for physics lesson, student's outcome is still low. It is caused of student tend not been able to resolve the problems, even theoretical problem or their problem solving skill is very low. Students tend to memorize formulas and equation, do not understand the concept. The students are also difficult to accept that conceptual learning by using demonstration model. Whereas, from results of questionnaire which had been given to 40 student, 80% of the students are interested in Physics subject, but they had difficulty to understand lesson because the learning system which was not engaged them.

Second, they almost never done the experiment, even though the school facilities are adequate, especially for Physics Laboratory, there are almost complete experiment instruments and tools like a kid mechanic, optics, electricity, sensors.

Third, learning process did not engage them and students were still afraid to give their opinion and to ask something, they still do not understand. Or in other word, students tend to be more passive.

And the last, researcher indicates that the students of this school have a good creativity and innovation. It can be seen from their activity in daily life, for example in every morning, students have to make a show in group or personally in English and Indonesian language such as short drama, stands up comedy, singing a song, dance, debate, and etc. In addition, they had ever made a simple house design from wood and a Christmas tree from air mineral bottle. From this information, researcher wants to improve their problem solving, creativity, innovation, and critical thinking.

One of actual and active learning model especially for physics that can improve students' critical thinking skill is Project Based Learning (PBL). The suggested Project-based Learning is important in the learning process. It is touted to be the approach and means to achieve the 21st century skills (critical thinking,

collaboration, creativity, and problem solving). Moving away from rote learning and memorization, Project based learning builds on individual strengths, and allows individuals to explore their interests in the framework of a defined curriculum. Project-based Learning is holistic in nature and incorporates the principles of providing challenging and complex work, interdisciplinary and encourages cooperative learning. Project based learning also lends authenticity to learning. While in practice, practitioners plan, implement and evaluate projects in real-world situations beyond the classrooms. (Ministry of Education Malaysia, 2006:1)

The core idea of project based learning is that real-world problems capture students' interest and provoke serious thinking as the students acquire and apply new knowledge in a problem-solving context. The teacher plays the role of facilitator, working with students to frame worthwhile questions, structuring meaningful tasks, coaching both knowledge development and social skills, and carefully assessing what students have learned from the experience. Project-based learning helps prepare students for the thinking and collaboration skills required in the workplace. Projectbased learning creates opportunities for groups of students to investigate meaningful questions that require them to gather information and think critically. Typical projects present a problem to solve; a phenomenon to investigate; a model to design; or a decision to make. (ASCD.org)

In summary of many researchs, which had been collected by CELL (Center of Excellence in Leadership of Learning) indicates that PBL: (a) has a positive effect on student content knowledge and the development of skills such as collaboration, critical thinking, and problem solving; (b) benefits students by increasing their motivation and engagement; and (c) is challenging for teachers to implement, leading to the conclusion that teachers need support in order to plan and enact PBL effectively while students need support including help setting up and directing initial inquiry, organizing their time to complete tasks, and integrating technology into projects in meaningful ways. (CELL, 2009)

The results of previous researchers study also revealed some advantages of this model. As the research of Thomas (2000: p. 11-12) suggests that student learning outcomes of project based learning model rose almost 26% compared to control schools and there is a significant increase in the ability to solve a problem between pretest and posttest for the experimental class of project based learning model. Result of Rais' research (2010: p. 14-15) also showed that PBL can synergize academic skills such as understanding the theory and soft skills (problem solving, self-reliance, teamwork, self-reliance, responsibility, honesty, and the ability to communicate ideas and concepts expressed by the percentage of the project group). And from Bas research (2011: p. 11) project-based learning was found to be more effective on students' academic achievement levels and attitudes towards the course than the activities instruction based on student textbooks.

Based on explanations above, researcher was interested to do research about: "**The Effect of Project Based Learning Model toward Students' Critical Thinking Skill about Dynamic Electricity at Grade X-Science in SMA N 2 Lintongnihuta Academic Year 2014/2015.**

1.2. Problem Identification

Based on the explanation about background of problems above, the relevant problems which identified are:

1. Student's learning achievement in SMA N 2 Lintongnihuta for Physics subject was still low.
2. The low student's learning achievement caused by poor conceptual understanding, critical thinking, and problem solving skills of students.
3. Learning process was still teacher-centered (student is not active).
4. Students tend to memorize formula (considering physics is only about mathematical operation).
5. Student was rarely to do experiment.
6. Student was almost never or afraid to give their opinion.
7. Learning process less involved creativity and innovation of students.

1.3. Problem Limitation

To give scope clearly in discussion, then researcher limited the problems as following as:

1. Research done to develop the students' critical thinking skill about dynamic electricity.
2. Learning model should be used is Project Based Learning (PBL) model.
3. The research location in SMA N 2 Lintongnihuta grade X-Science Academic Year 2013/2014

1.4. Problem Formulation

Based on the problem identification above, so the problem formulations in this research are:

1. Does the implementation of PBL models in the learning process has an effect to improve critical thinking skill of students about the dynamic electricity?
2. How is the activity of the students during the learning process using the learning model of project based learning?

1.5. Research Objective

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

1. To know effect of PBL models in the learning process toward critical thinking skills of students about the dynamic electricity?
2. To know how is the activity of the students during the learning process using the learning model of project based learning?

1.6. Research Benefit

The benefits of this research are:

1. For any educational units and teachers especially for high school level, as additional suggestion in choosing the proper learning model to increase the actual and active learning especially in teaching and learning physics.
2. For SMA N 2 Lintongnihuta, as additional information how to increase their students' performance either knowledge and skill or attitude.
3. For State University of Medan, as additional literature about this Project Based Learning Model
4. For researcher, to increase knowledge and experience how to make a good research, how to prepare being a good and professional teacher, and especially to increase knowledge about project based learning.