

CHAPTER I

INTRODUCTION

1.1. Background

Constitution of 1945 article 31 paragraph 1 states that every citizen is entitled to education. Education is essentially an effort to help students improve the potential which exists in students. The success of the achievement of the objectives of education depends on the learning process. A study done in a good and right will speed up development of potential students. In contrast, a study carried out by amateurish and unsuitable will make difficult improving of students's potential or even could not develop at all and finally avoid fields that relate to the potential. One of the fields given since level of elementary school up to high school that is the Natural Sciences (in Indonesia called IPA).

Natural Sciences (IPA) is concerned with how to find out about natural phenomena systematically, so that the Natural Sciences is not just a collection of knowledge mastery of facts, concepts, or only principles but also is a process of discovery. Natural Sciences education expected to become a vehicle for learners to learn about human and surroundings, as well as the prospect of further development in applying them in everyday life. The process of learning places emphasis on providing hands-on experience to develop competence in order for learners to explore and understand the natural surroundings scientifically. Natural Sciences education geared to finding out and doing so can help learners to gain a deeper understanding of the natural surroundings.(Badan Standard Nasional Pendidikan, 2006). Science education at high school level is divided into several subjects to be chemistry, physics, and biology, and studied by each student in the first year. On the second and third year of high school, Natural Science became one of majors program where the material provided and more analytical study time.

Physics is one of the science education that to be important to attended in the world of education in both national and international. Studying the physics of natural phenomena which occur in everyday life and is explained scientifically and can be proven through a practice in the laboratory or in the field. Historically many experts study physics in detail in one aspect and giving inventions and new concepts are very useful for the development of human life. Experts try to learn what happens in nature, understand the concept, practice the

same thing, practicing the other possibilities of happening and poured it into a masterpiece. This works in the development of technology that was donated has an effect on the increase of human civilization.

Based on curriculum of 2006, the aim of learning Physics in Secondary High School (in Indonesia SMA) are: (a) to gain experience in applying scientific method through trial or experiment where students do it through the testing of hypotheses by testing mounting instrument, retrieval, processing data, and its interpretation and submit the experiment verbally and in writing; (b), understanding the concept principle law, and interconnectedness and theoretical physicist and mutual action to resolve problems in daily life and technology. Capability of observation and experiment is emphasized on exercise think that includes ability diagnosticate experimental apparatus used in measuring, both in the laboratory and in everyday life (Badan Standard Nasional Pendidikan, 2006). It is hinted that in physics learning need for the right blend between theory and experiment that supports the theory of knowledge. Thus students follow a process of learning more meaningful through his own experience mengeksplorasikan with scientific experiments that start from an observation came to the conclusion that will become the new knowledge.

During this time, most of the learning of Physics in schools using the teacher learning center with reason that physics is difficult to taught so that teachers need delivering learning in detail. But this matter often makes students bored in classrooms and don't have the opportunity to develop the ability to think conceptually because the teacher focuses on solving the question mathematically. Preparation for National Exams (in Indonesia Ujian Nasional) or National College entrance exam, became one of the reasons why teachers give priority to resolving the question mathematically.

According to constructivists view of learning every students construct their own understanding about the content of every case. This perspective based on premise that every people construct their own views of the world around, through integrating the individual experiences and schema with new knowledge. Therefore, constructivism focuses on preparing the students to solve problems in ambiguous situations. From a constructivist perspective, knowledge is not independent of the knower; knowledge consists of physical and abstract objects in experience. For example, there is no one true definition of inquiry waiting to be discovered, but an understanding of inquiry is constructed by individual himself. Every students needs to be active to investigating around, because by involved directly in an

investigation, student construct their own understanding and built the ability in solvel problem and new knowledge. Furthermore, physics is not only a theoritically sciences, so many of physics concepts can be seen in real life or done using models and media in experiment.

In the school observed by researchers also performed a teacher center learning and teaching of Physics in mathematically. This is bring an effect in student outcomes in National Exam that not satisfying enough. According to the data value of the UN during the last ten years, starting from the school year 2001/2002 to 2010/2011 school year, the value of the UN on the lessons of physics having the lowest value 5.24 on the school year 2001/2002. While the next year has increased until it reaches the highest value 8.56 at 2004/2005 school year. Then experienced a decline until the value of 6.84 in academic year 2010/2011.

Based on the data known that the achievement of physics students in a school is still not good enough and unstable. Compared with other subjects physics is always occupy one of the lowest position on the national examinations. Seen more in again, students achievement in daily learning is also low, including interest and motivation to learn physics. Based on interviews directly to some students, known that most of graders X dislike lesson in physics. The reason, physics is very difficult to understood, physics had complicated formulas, or the teacher less interactive.

Inquiry-based learning environment is one that provides and supports development of learning experiences where students observe events, ask questions, construct explanations, test those explanations, use critical and logical thinking, generalize observed patterns, and consider alternative explanations. The questions lead to the curious for answers to the question (or for solutions to a problem) and result in the beginning of exploration and hypotheses creation. These hypotheses lead to an investigation to test the hypothesis or find answers and solutions to the question and/or problem. The investigation leads to the creation or construction of new knowledge based on investigation findings.

Inquiry-based learning models not only include the development of intellectual abilities, but the entire development potential, including the emotional development and skills development. The learning materials are not given directly. The role of students in this model is to seek and find their own subject matter, while teachers act as facilitators and mentors students to learn. (Novak, 1977). Dale's cone of experiences states that by viewing the demonstration people remember 50% of what he saw and heard in the demonstration, while doing it in a practical, man can remember 90% of what heve done.

Researchers in several countries had been doing some research to find out any real effect of inquiry-based learning model against learning outcomes or the ability of developing students knowledge, of whom:

Study entitled “**Effects of Inquiry-based Learning on Students’ Science Literacy Skills and Confidence**” done by Peggy Brickman, Cara Gormally, Norris Armstrong, from University of Georgia and Brittan Hallar from West Virginia Higher Education Policy Commission Division of Science and Research (2009). According to this study, in the sciences, inquiry based learning has been widely promoted to increase literacy and skill development, but there has been little comparison to more traditional curricula. In this study, they demonstrated greater improvements in students’ science literacy and research skills using inquiry lab instruction. They also found that inquiry students gained self-confidence in scientific abilities, but traditional students’ gain was greater –likely indicating that the traditional curriculum promoted over-confidence. Inquiry lab students valued more authentic science exposure but acknowledged that experiencing the complexity and frustrations faced by practicing scientists was challenging, and may explain the widespread reported student resistance to inquiry curricula.

Abdelraheem, A., & Asan, A(2006) also done the study entitled “**The Effectiveness of Inquiry-based Technology Enhanced Collaborative Learning Environment**”. The purpose of this study is to examine the effect of inquiry-based learning model enhanced collaborative learning environment on students' learning experiences. Success has been reported in the development of course units using technology as cognitive tools, benefiting both graduate and undergraduate students. This study showed that well designed an inquiry-based technology enhanced collaborative learning environment can enhance students learning experiences. In the well designed inquiry-based learning students asks questions. These questions lead to the desire for answers to the question and result in the beginning of exploration and hypotheses creation. These hypotheses lead to an investigation to test the hypothesis or find answers and solutions to the question and/or problem. The investigation leads to the creation or construction of new knowledge based on investigation findings. Students discusses and reflects on this newly-acquired knowledge, which, in turn leads to more questions and investigations that lead to conclusion. Also found evidence that an Inquiry-based technology enhanced collaborative learning can help students acquire and flexibly use complex knowledge.

Another researcher, K-E. Chang, Y-T. Sung, and C-L. Lee (2003) done a study entitled **“Web-based collaborative inquiry learning”**. This study proposes a web-based collaborative inquiry learning system. This system uses the World-wide web (www) as a source of knowledge exploration, and provides exploratory problems to guide students to think and explore. A concept map is used as a tool of anchoring and representing knowledge during inquiry process. In the process of learning, learners are allowed to exchange the evidence they have collected, their personal opinions, and the concept maps that they have built. In order to effectively integrate the inquiry learning, collaborative learning, and concept map in the system, this study proposes a collaborative inquiry learning model and related learning activities.

In Indonesia, some researchers previously have also been researching on application of inquiry-based learning model as an effort to improve student learning outcomes and successfully proved that inquiry-based learning model was able to increase the understanding of the concepts and student learning outcomes. One of the researchers, Primadani and Alimuf Rohmah Arief (2012) who conducted a study entitled **“Pengaruh Model pembelajaran Guided Inquiry dengan Self Assesment terhadap Hasil Belajar Siswa Kelas X pada Materi Listrik Dinamis di SMA Negeri 1 Krian**. Researchers try to apply the guided inquiry-based learning model with self assessment. This research aims to determine the effect of guided inquiry learning model with self assessment to students learning outcomes class X in the material dynamic electricity at SMA Negeri 1 Krian. From the analysis obtained the conclusion that the application of guided inquiry-based learning model with self assessment has a positive effect to students learning outcomes class X in the material dynamic electricity at SMA Negeri 1 Krian.

From study entiled **“Pengaruh Model Pembelajaran Inquiry Terhadap Hasil Belajar siswa pada Materi Pokok Suhu dan Kalor di Kelas X Semester II SMA N I Percut Sei Tuan T.P. 2010/2011”** done by Rubianum (2011) obtained that the results of student learning in the classroom of experiment, which uses the inquiri-based learning model have an average value 70.25 with standard deviation 18.15. Whereas in the class of control that uses the conventional learning model obtained average value 62,50 with standard deviation 18.15. In this study there were obstacles experienced when doing research, namely in terms of allocating material at each stage of learning and set up the division of groups of students hard because students do not get used to learning in groups.

Further researches mentioned above use the model of inquiry-based learning with different approach. Besides that also there is a difference a few things as research purposes, the term that observed, and of course the result obtained. However, there is a similarity is in the event that inquiry-based learning influential positive in the development of knowledge and behavioral science student. Of course these things affect the learning outcomes of the students in the subject that observed, the learning outcomes is better after given treatment use the model of inquiry-based learning compared with before apply inquiry-based learning.

Dynamic electricity constituting a topic of lectures in grade X second semester and is the very important concept in the curriculum of physics learning. This concept is actually very interesting and close to the phenomenon that can be seen in daily life, but in reality, most students have difficulties in learning the concepts and apply on the issue of daily. It is caused by in learning at school, students only accept the study by listening and write down the laws used on dynamic electricity without really understand the concept.

In connection with that, a study needs to be done so that the teacher can teach in a school with fun and vary in their teaching. Researchers want to apply model of inquiry-based learning in physics subjects in high school. The using of inquiry-based learning model is one of the recommended way to help students understand the concepts of physics so that student learning outcomes better. In addition to give understanding easily, the inquiry-based learning model could also give a good learning motivation and attract the attention of students as seen or experienced the events directly related to the concept learned by students.

Based on it above, researchers interested do research influence inquiry-based learning model on topic listrik dinamis, by title **“Effects of Inquiry-Based Learning Model on Student’s Learning Outcomes in Topic of Dynamic Electricity in Grade X SMA N 2 Balige Academic Year 2012/2013”**

1.2. Problems Identification

From the explanation above, can be identified the scope of the problem, namely:

1. The learning process of physics that is teacher-oriented, then students are rarely involved to think discover a concept of physics in daily life so that learning physics becomes boring.

2. The using of a less varied learning model, as well as the still low level of understanding of the concepts and student learning outcomes.

1.3. Problems Limitation

Focus on this research is implementation of inquiry-based learning model in material of electric dynamic concept to improve student's learning outcomes in secondary high school grade X limited on the following:

1. Research conducted in two classes namely class of control and class of experiment that implement inquiry-based learning.
2. Improvement of the cognitive aspects of students learning outcomes is change of the cognitive aspect of student learning outcomes after using inquiry-based learning models. Cognitive aspects of student's learning outcomes can be reviewed on this research is limited on level remember (C1), understand (C2), apply (C3), analyze (C4), evaluate (C5), and create (C6) in the cognitive domain of the revised Bloom's taxonomy.
3. Matter of physics which reviewed at this research is dynamic electricity which includes concepts: (1) Electric Current and Instrument of Electrical Measurement, (2) Electric Resistance and Ohm Law, (3) Electrical Power and Energy, (4) Electrical Circuit of Direct Current, and (5) Kirchoff law.

1.4. Problems Formulation

Based on the background that has been explained above so it can be compiled research problems as follows:

“Do implementation of inquiry-based learning model can further enhance the learning outcome of students of class X on the topic of Dynamic Electric?”

Problem Formulation above can be divided into several research questions:

1. How the average of student learning outcomes in the cognitive aspect of dynamic electricity material after learning by using an inquiry-based learning model?
2. There is significant differences between student learning outcomes use inquiry-based learning model and conventional model.

1.5. Research Objectives

This study aims to construct learning model by using inquiry-based learning model in topic dynamic electricity in secondary high school grade X and observe its effect on improving cognitive learning outcomes of students.

1.6. Benefits of Research

This study provides information on the development process of learning physics by using inquiry-based learning model. This research can be expected a correction or a preliminary study to the development of inquiry-based model in learning physics. For students, this research is expected to facilitate the development of a knowledge base through the experience of the students directly in learning to be able to explore, explain and analyze the physics concept logically and conceptually.

