

CHAPTER I INTRODUCTION

1.1. Research Background

Education is a basic requirement indispensable and can not be separated from human life. Education according to UU SISDIKNAS no. 20 tahun 2003, is a conscious and deliberate effort to create an atmosphere of learning and the learning process in such a way so that students can develop their own potentials actively in order to have self control, intelligence, social skills, spiritual power of religion, personality and noble character. Education serves to develop the ability and character development and a dignified civilization in the context of the intellectual life of the nation.

Realising that, the study has a curriculum program, which will be updated to improve the quality of human resources. Renewal of the current from education unit level curriculum (KTSP) into the curriculum in 2013, which requires changes in the model of learning that focuses on teachers become focused on student learning.

Curriculum 2013 is a curriculum based character that promotes the understanding, skill, and character education, in which students are required to understand the above materials, active in the process of discussions and presentations as well as having good manners and discipline is high. Curriculum in 2013 there were scientific approach that imparts scientific attitude on students which has three aspects: knowledge, skills aspects, and aspects of attitudes and behavior.

Chemistry is one of the subjects of natural sciences study the phenomena of nature, but specializes in studying the structure, composition, properties and changes of matter and energy that accompany changes in the material. Chemical subjects having the following characteristics: (1) most of the chemicals are abstract, abstract concepts of chemistry can be solved by using an analogy, (2) chemistry is a simplification of the truth, (3) chemical materials character sequence, the concept of chemical its hierarchy must be mastered thoroughly, (4)

the chemistry is not only to solve problems, (5) the material must be studied very much (Kean and Middlecamp, 1985: 5-9). According to Jahro (2009), chemistry is an experimental science, can not be learned only through reading, writing or listening only. Studied chemistry not only master the body of knowledge in the form of facts, concepts, principles, but Also a process of discovery and mastery of procedures or the scientific method. Nekhleh (1992, in Sudria 2006) states that the misconceptions commonly found in the chemistry of atoms, molecules, and ions.

Based on the author's experience when field experience program (PPL) in SMA N 2 Lintongnihuta, many students who scored below the KKM. The lowest value was 46.67, while the value of completeness is 70. For each class there are 20 students and 8 of them have a value below the KKM. During an interview with the students, many say that the chemistry is complex, monotonous and not real. It was submitted in accordance with Sanjaya (2008) that learning process especially chemistry that is monotonous and less interest had Become one of the problems that causes low of learning result on students. Besides it is monotonous, mostly According to students, the materials in chemistry are Also cognitive and abstract. During an interview with the subjects chemistry teacher at the school, said that students have first afraid receive materials especially those of class X, so many students who are not active. This led to low yields of learning and critical thinking skills of students.

Related to the above, we need a treatment to improve learning outcomes and students' critical thinking. The right way is to use a model of student-centered learning with the teacher as a facilitator who encourages students to be more active in developing its own potential. The learning model that can be used is a model of PBL and guided inquiry learning model.

Model of problem-based learning makes students are required to learn through direct experience based problems. PBL is an innovation in teaching because of the students' thinking skills PBL truly optimized through the process of work group or team that is systematic, so that students can empower, honing, testing, and develop the capacity to think an on going basis. Syntax in the PBL are: 1) orientation of students on the problem, 2) organize the students to learn, 3)

guiding the experience of individual / group, 4) develop and present work, 5) analyze and evaluate the problem-solving process. Through the application of PBL in the learning process can improve student interest in learning interest both inside and outside the classroom and be able to increase the students' understanding. PBL also can improve students' motivation, where students can build their own understanding and knowledge.

Guided inquiry learning model provides the opportunity for students to learn how to find the facts, concepts and principles through direct experience. So the students not only learn to read and then memorize the lesson material, but also get a chance to practice developing thinking skills and scientific attitude so as to enable the construction process with a good knowledge so that students will be able to improve the understanding of the material being studied (Ibrahim, 2010).

According to Hanafi (2009) inquiry learning model has several advantages, namely: (1) helping learners to develop, readiness, and mastery of skills in cognitive processes. (2) learners acquire knowledge individually so that it is understandable and settle in his mind. (3) can generate motivation and passion learners to study harder. (4) provide opportunities for developing and developed according to the abilities and interests of each. (5) strengthen and increase the confidence in yourself to find yourself because the learning process is centered on the learner with the teacher's role is very limited.

Several studies have submitted the effectiveness of problem-based learning model and guided inquiry learning model to improve learning outcomes. According to research Yussi, Tri and Masykuri (2014), concluded that the effective use of PBL seen from the achievement of learning targets, namely; 76.25% of students have high learning activity; 81.25% of students achieving KKM material redox reactions; and 90.63% of learners have a very good attitude through the assessment questionnaire as well as 82.29% of learners have a good attitude through observation assessment.

According to research Eka, Ratu and Tasviri (2014), concluded that the guided inquiry learning model is effective in improving students' mastery of concepts in the material the basic laws of chemistry. Guided inquiry learning

model effectiveness is measured by the difference n-Gain students' mastery of the concept of significant between experimental class and control class. The results showed an average n-Gain mastery of a concept for an experimental class and control class is 0.62 and 0.28. Based on hypothesis testing using t-test.

Application of learning models such as the above, which emphasizes the involvement of students in full process both physically and mentally to be able to find the material studied and connect with real-life situations that encourage students to be able to apply it in their lives are guided inquiry models. Guided inquiry is an inquiry approach where teachers have a more active role in defining the issues and the stages of completion. And a learning requires students are expected to actively think, communicate, and manage the data and ultimately make their own conclusions and the knowledge that the desired PBL model. PBL is an approach that is used to stimulate students' critical thinking in situations oriented to real world problems.

Based on this background, the authors are interested in making the study titled **“The Differences of Student’s Achievement and Critical Thinking by Implementing Problem Based Learning (PBL) and Guided Inquiry Learning On Stoichiometry Topic”**.

1.2.Problem Identification

Based on the background of the study, the problems identification in the study are:

- a. Reaction of student in the learning process.
- b. Characteristic of chemistry for students.
- c. Student’s achievement in learning chemistry.
- d. Student’s critical thinking in the learning process.

1.3. Problem Limitation

The Problems Limitation of this research are:

1. The learning model used in this research is PBL for the experimental class I and Guided Inquiry Learning for the experimental class II.
2. The material that discuss in this research is limited to the subject of stoichiometry.
3. Student's achievement in this research can be divided into two, namely the cognitive and affective. Cognitive domains measured by the Bloom's taxonomy C1 (Knowledge), C2 (Comprehension), C3 (Application), C4 (Analysis) and affective domains in this research of student's critical thinking skills in learning groups.

1.4. Problem Formulation

Based on the background of research and the scope of research above, the Problems Formulation of this Research are:

1. Is there a difference between student's achievement that is taught by using PBL and Guided Inquiry Learning on stoichiometry topic?
2. Is there a difference between student's critical thinking skills that is taught by using PBL and Guided Inquiry Learning on stoichiometry topic?

1.5. Research Objective

The Researches Objective of this research are:

1. To know there is a difference between student's achievement that is taught by using PBL and Guided Inquiry Learning on stoichiometry topic.
2. To know there is a difference between student's critical thinking skills that is taught by using PBL and Guided Inquiry Learning on stoichiometry topic.

1.6. Research Benefit

The Benefits expected from the result of this Research are:

1. For Researchers/Students, the results of the research will add knowledge, ability and experience to improve their competence as a teacher candidate.
2. For Chemistry Teacher, the results of research will provide input on the use of PBL model and Guided Inquiry Learning model in the teaching of chemistry, especially on the subject of stoichiometry.
3. For Students, this Research is expected to increase the knowledge and experience of student learning.
4. For Schools, this Research is expected to contribute to improving student achievement in schools so as to improve the quality of teaching chemistry at SMA N 1 Sidikalang.
5. For the Next Researcher, this Research can be used as a reference in conducting further research.

1.7. Operational Definition

In order to avoid different interpretations in understanding any existing variable in this study, it was necessary given the operational definition to clarify it. The operational definitions of research are:

1. Nana Sudjana (1992: 2) states that student learning outcomes is essentially a change in behavior as a result of the process of learning activities and the ability of the formulation containing the desired behavior as covered in the learning objectives. Benjamin S. Bloom (1979) classifies learning outcomes in three domains, namely: cognitive, affective domain, and psychomotoric domain. Cognitive domain includes the ability development of intellectual skills (knowledge) with the levels which Knowledge (C1), Comprehension (C2), Application (C3), Analysis (C4), Syntesis (C5), and Evaluation (C6). In this study, the observed learning outcome includes two aspects: cognitive domains consist of C1 through C4 and affective domain includes aspects of critical thinking skills and attitudes of students in cooperative learning groups.

2. According to Richard Paul (Fisher, 2001 : 7), critical thinking is that mode of thinking about any subject, content, or problem in which the thinker improves the quality of his or her thinking by skillfully analysing, assessing, and reconstructing it. Critical thinking is self directed, self disciplined, self monitored and self corrective thinking.
3. A learning method of PBL is one of the alternatives from the many innovative methods are applied in the process of teaching and learning activities to help students in processing the information that has been so in her mind and put together their own knowledge about the social world and beyond (Kusnadi, et.all, 2013)
4. A Guided Inquiry learning activity engages students, promotes restructuring of information and knowledge, and helps students develop understanding by employing the learning cycle in guided inquiry activities. The learning cycle consists of three stages or phases: *exploration*, *concept invention or formation*, and *application* (Hanson, 2006).
5. The matter of stoichiometry is one of the lesson in senior high school chemistry class X. Topic stoichiometry includes basic chemical's law, mole concept, the application of mole concept in defining chemical formula, and the application of mole concept in the chemical calculation.