CHAPTER I

INTRODUCTION

1.1 Problem Background

Education is defined as a human effort to foster his personality in accordance with the values in society and culture. In an education, the educational program will create a learning atmosphere and learning process so that later students will be able to actively develop their abilities to have religious spiritual strength, self-control, intelligence, personality, noble character, and skills needed by themselves, society, nation and state. This is in accordance with state basic constitution (UUD) no. 20 of 2003 concerning the National Education System. For this reason, the government planned a nine-year compulsory education program which later turned into a twelve-year learning. This means that education has received attention from the government in the program to educate the nation's children. (UUD, 2003)

Teaching and learning activities are the most basic activities in the educational process. This indicates that the success or failure of obtaining educational goals is highly dependent on how the teaching and learning process is organized and professionally implemented to achieve the educational goal afterwards. Teachers and students are constantly active participants in the teaching and learning process. The teacher, in his or her role as a teacher, creates intentional, systematic, and continuous learning environments for students. Meanwhile, students as learning subjects are those who accept the teacher's learning circumstances.

Based on the pre-research observations, the researcher conducted an observation in class X SMAN 3 Bekasi in learning biology for the 2021/2022 academic year. Based on the results of observations, the facilities and infrastructure are quite adequate. But the implementation of practicum is rarely carried out because there is still a lack of facilities and infrastructure in the laboratory. In the learning process, the teacher performs the stages in the preliminary activities. Even though the teacher hardly carried out these activities in delivering the learning objectives. As the consequences the teachers simply

master the learning material well, provide guidance to students during learning activities, and provide concrete examples in everyday life.

Teachers are expected to increase the quality of learning process as the world of education progresses, by arranging active, creative, effective and entertaining learning,the teacher as created the memorable learning experience for students. By applying the concept of learning methods as one of the most significant aspects that may help the learning process succeed.

In the teacher-centered learning model, the teachers dominantly control the teaching and learning activities in the form of lecturing. The teacher becomes the center in achieving learning outcomes as the only source of knowledge. In the teacher-centered learning model many improvements have been made including the combining lecturing with questions and answers or giving assignments. however the obtained results are still considered not optimal. As a fact the students experience a very significant increase in learning activities. When the test or exam approaching the student learning outcomes dropped back significantly after finishing the exam. In this accordance the teachers only pursued the target time to spend the subject matter (Sudjana, 2005).

The phenomenon of teacher-centered learning (TCL) has become a habit that is difficult to change. Where students only accommodate all the information from the teacher without thinking to act actively. There is no preparation whatsoever before starting to study. Activities in class are also just sitting, silent and listening. Asking when given a question, the rest learn to use only one of the senses (Minhas, Ghosh & Swanzy, 2012; Tawalbeh & AlAsmari, 2015).

TCL is often termed as pedagogy of answer. The point is that teaching with TCL places students as objects in education. Although students are not at the age of children anymore. As a result, teachers like to teach, teachers evaluate and students are evaluated. Research conducted by Potvin, Riopel, Masson, and Fournier (2010) indicated that TCL students find it difficult to develop if they encounter an obstacle or problem in learning, while students who study with problem-centered approaches and SCL can face all the problems that arise in learning and can develop the problem into creative ideas.

TCL is suitable for children whose cognitive phase is from sensorimotor to concrete operational. Because at that age they must be given instructions to train and develop their mindset. This is in line with Kolhberg's moral development at the same phase where he must obey orders and prohibitions from adults (Slavin, 2009). In higher education, TCL is not suitable for use because learning is not only memorizing and increasing knowledge, but it must improve skills such as: good communication, analytical and synthesis skills, to create something new (Wilkin, 2014).

The fatal failure of education is when students' products is no longer having a conscience based on morality, and a sense of humanity. The humanity whereas the substance of education is to humanize humans the humanity is placed as the highest degree by maximizing work and initiative (Elmubarok, 2013).

The lack of students' concern for the environment is one example of the failure of education. The lack of this concern for the environment is indicated by the students care when there is trash scattered, throwing garbage in the wrong place and leaving the classroom conditions dirty. Ideally, with the knowledge that has been obtained during the learning process, especially biology subjects. The students should be able to behave and behave intelligently, improve their quality of life, think logically and systematically, and be responsible for environmental sustainability.

Studying nature and ecosystem as a part of studying biology is a relatively easy thing. Because the existence of this nature is something concrete. We can sense anything that is around us, observe it, learn it ,and then use it for the benefit of the whole human. Natural events can occur either directly or indirectly with humans. The events that occur are related and continuous. One system that occurs can cause another system to occur. From every natural occurrence that exists, it can raise questions as a problem that can ultimately be useful for humans after experiencing verification and observation. Therefore, the learning science requires the active involvement of students.

Metacognitive skills are needed for successful learning because metacognitive skills allow students to be able to manage their cognitive skills or knowledge. Beside that the students will be able to see their weaknesses so that improvements

can be made in subsequent actions. Furthermore, it is stated that the students using their metacognitive skills will have better achievements compared to that students who do not use their metacognitive skills. This is because metacognitive skills can enable students to plan, follow developments, and monitor their learning process (Eriawati, 2013).

Metacognitive ability and academic achievement have a positive relationship that can be empowered. The reality in biology learning carried out so far only emphasizing the mastery of cognitive concepts obtained by objective written test. In other side the space for metacognition is not empowered. The learning activities like this make the students tend to learn to remember or memorize only without understanding what is taught by the teacher. As a result, when the students faced the problems, students have difficulty solving them (Pratiwi, 2016).

The learning methods must be adapted to basic competencies with indicators of learning achievement. Such as mastering, understanding, and applying the learning methods in everyday life. One of the science learning approaches using the SETS approach (Science, Environment, Technology and Society). The students should be in advance trained to be able to think globally, solve problems by applying concepts from various related sciences (Heru, 2013).

The SETS approach is a learning approach using an idea that is currently happening in the community as a learning topic. In addition, the SETS approach is an approach relating to the natural surroundings and daily life. By the SETS approach the students are able to develop their existing potentials and relate the knowledge they learn to everyday life (Maulana, 2018).

Based on the research conducted by Thiur Dianti Siboro, it is stated that there is an increase in the learning outcomes in the comparison of student learning outcomes using the sets approach (science, environment, technology and society) on ecosystem materials. The students taught by the SETS approach provide higher learning outcomes then the students who are taught without using the SETS approach (Thiur, 2020). From the results of the study, the average pre-test and post-test scores for the experimental class were 5.43 and 8.86, while the average values for the pre-test and post-test for the control class were 4.12 and 7.17. This shows that there is an increase after the use of the SETS approach in

the digestive system material in class VIII of SMP Negeri 3 Pematangsiantar. Dian Nugrehi, also proved the students cognitive and affective learning achievements in SETS learning were better than non SETS learning models. The significant differences were obtained from learning using the SETS approach with non-SETS learning models on cognitive learning achievement. In addition the learning outcomes were better using the SETS approach (Nugraheni, 2013).

Budi Susena in his research stated that there is an increase of students behavior in fermentation learning from 53.60% to 69.80% in the first cycle, and then increased to 83,40 % in the second cycle,. It means that the constructivism approach with SETS vision was proven to be appropriate for learning biology, especially fermentation. From all aspects of learning achievement showed an increase compared the research carried out before. It stated that there is an increase in the average daily test from the first cycle (62.63%), the second cycle (70.50%), and the third cycle (75.00%). Complete learning outcomes achieved an increase from 55.00% before the cycle to 72.50% in the first cycle, 87.50% in the second cycle, and 95,00% in the third cycle. This describes the learning process with a constructivism approach with SETS vision applied in accordance with the research objectives so that there is an increase in understanding of the concept or learning outcomes of fermentation (Susena, 2018).

Ismiyatun Khasanah, M. Aji Faturokhman and Mobinta Kusuma in their research stated that there are differences in the results of the pretest and posttest. Considering the value of posttest is higher than the pretest, so that the hypothesis is accepted. It means that there is an increase in learning outcomes and students critical thinking by the applying of the concept mapping method with SETS vision (Khasanah, Faturokhman, Kusuma, 2019).

With SETS-based learning it is hoped that: (1) the students are accustomed to having a comprehensive mindset in viewing the material in biology subjects as integrated science with environment, technology and society; (2) SETS can make students aware that technology affects the rate of growth of science, as well as its impact on the environment and society; and (3) with SETS the students become more interested in learning the material because it is associated with the real

things in daily life, so that they gain a deep understanding of the knowledge they have (Yulistina, 2015).

SETS's main concern is the use of water for living things and the processes of the water cycle and human activities that affect the water cycle. SETS is a way of looking forward. leading to an understanding that everything we face in life contains aspects of science, environment, technology, and society as a whole and influence each other reciprocally. Meanwhile, SETS is a way of learning by linking what is learned with aspects of Science, Environment, Technology, and Society that are reciprocally appropriate as a form of integrated linkage.

In line with the above reasons, it is necessary to apply the right learning choice, namely the SETS approach. The SETS approach can improve metacognitive abilities which refer to a person's ability to monitor or regulate their cognitive activities. During the problem solving and self regulation in setting goals for themselves and being involved in behavioral and cognitive processes leading to the achievement of learning objectives done by the students.

Then to compare the differences in the results of approaches to students using SETS, researchers used the Problem-based Learning (PBL) approach and the conventional approach.

As we know that teachers are expected to be able to develop learning models that already exist today. Learning models that are considered relevant and supportive, one of which is the PBL learning model or problem-based learning. Syaiful Bachri Siregar (Siregar, 2019) argues that the problem based learning is a form of learning based on constructivism, which is oriented to the student learning process (Student-centered learning).

The link between critical thinking in learning is the need to prepare students to become strong problem solvers, mature decision makers, and people who never stop learning. The use of this problem-based learning model is expected to be able to train students in problem solving and critical thinking skills so that students become skilled in solving every problem, both in relation to how students learn biology and its provisions in living their lives later. Ecosystem is one of the concepts related to the environment and learning science leading to inquiry so as

to help students gain a deeper understanding of the natural surroundings (Trianto, 2007).

In line with the results conducted by Trianto, I Ketut Reta (Reta, 2012) stated that:

1. There is a significant difference in critical thinking skills between the group of students studying through the problem-based learning model and the students studying through conventional learning model,
2. There is a significant difference in critical thinking skills between the group of students having a field independent cognitive style and the students through a field dependent cognitive style,
3. There is an interaction effect between the learning model and cognitive style on critical thinking skills,
4. There are differences in critical thinking skills between a group of students learning through the pbl model and the students studying the pedagogical knowledge (pk) model in the field independent cognitive style group,
5. There are differences in critical thinking skills between a group of students learning through the pbl model and the students learning through the pk model in the field of dependent cognitive style group.

Sutikno states that the focus of the learning system includes three aspects (Sutikno, 2008), namely:

1. Students; Students are the most important factor because without students there will be no learning process.
2. Learning process; the learning process is what students experience when they learn, not what educators must do to teach the subject matter but what students will do to learn it.
3. Learning situations; the learning situation is the environment where the learning process takes place and all the factors that affect students or the learning process such as educators, classes and interactions in it. In teaching and learning activities, teachers are also required to be able to develop critical thinking skills, be creative, and be able to solve problems.

The results of PBL research on Ecosystem material in Class X carried out by Lela Ningrum Suwarno, can be concluded as follows:

1. Student learning activities increase by applying the PBL learning model. Based on the results of research, the percentage of student learning activities in the experiment class increases at each meeting. The first meeting was 66% with sufficient category and the second meeting 78% with good category.
2. Student experienced a significant increase in critical thinking skills between the class that applied the PBL model compared to the class that did not apply the PBL model. Based on the results of the MannWhitney U difference test showing the value of Sig. 0.001 < 0.05 meaning that Ho is rejected and Ha is accepted.
3. Learning by applying the PBL model has a positive response. It is proven based on the results of the average percentage of the questionnaire by 81% with a very strong category, meaning that students give a positive response with the PBL learning model on the ecosystem concept.

Therefore, it is necessary for teacher and students to use a learning model approach entitled: "**The Effect of Learning Approach on Student Achievement of Class X Students on Ecosystem Topics**".

The results of this study are expected to be useful for biology teachers, school principals, policy makers, and other interested parties. seek to improve the quality of biology education in senior high schools, especially in the field of Biology, Ecosystem material in Class X Semester 2. Improving the quality of learning is expected to affect student learning outcomes so that it is expected to improve learning achievement. Improvements in such settings and conditions are considered appropiate measures to address the problems that teachers and students face.

1.2 Problem Identification

Based on the description on teaching and learning activities in the background section, several problems can be found as follows:

1. The teaching and learning approach applied is partially teacher-centered. The teacher tend to teach the subject material mostly by lecturing.
2. Some teacher apply innovative approach such as SETS and PBL, but most of them uses conventional approach.

3. The metacognitive ability of students has not been developed, because in the learning process the teacher is more focused and busy explaining the learning material so that learning is not centered on students.
4. Biology teacher so far has mostly used the lecture method, question and answer, and discussion because there has not been any fun learning biology that has resulted in students less interested in studying biology
5. The students are less interested in studying biology because the teacher tend to teach biology by lecturing.

1.3 Scope of Study

The scope of study is limited to:

1. The object of this research is the influence of the Science, Environment, Technology, Society Learning Approach on student scores. Judging from the learning approach given to the class, the PBL and conventional approaches for Class X SMAN 3 Bekasi
2. The subject of this research is class X even semester at SMAN 3 Bekasi Academic Year 2021/2022
3. This research was applied to even semester, grade X students at SMAN 3 Bekasi in the 2021/2022 academic year on ecosystem materials with different learning approaches including SETS, PBL and Conventional.
4. The time of the research will be in the second semester of 6th May 2022 – 30th May 2022

1.4 Research Question

Does student learning achievements in Ecosystem material of class X in SMAN 3 Bekasi that have been taught using SETS, PBL, and Conventional are different?

1.5 Scope of Problem

The Scope of problem in this study is limited to positive influence, negative influence, and effect of applying SETS, PBL and Conventional approach.

1.6 Problem Limitation

Based on the existing problems to avoid the emergence of wider problems, it is necessary to state the problem boundaries which include:

1. The learning model used to improve student achievement uses the SETS (Science, Environment, Technology, Society) approach. The stages of learning science with the SETS (Science, Environment, Technology, Society) approach are the invitation stage, the exploration stage, the solution stage, the application stage, and the concept maturation stage.
2. This research was conducted to improve the ability of participating students according to indicators by Gregory Scraw and Rayne Sperling Dennison which divides into 3 indicators, namely declarative, procedural and conditional knowledge.
3. Learning materials are limited to ecosystem materials for the even semester of class X.
4. The study only focus on SMAN 3 Bekasi and three classes that participating in the experimental research.

1.7 Research Objectives

The objective of this research is to find out the differences in student learning achievement between classes using the SETS learning approach (Science, Environment, Technology, Society), Problem Based Learning approach (PBL) and classes using the conventional approach in the class X Ecosystem subject at SMAN 3 Bekasi.

1.8 Research Benefits

The benefits of this research are divided into 2, namely:

1. **Practically**

   Practical benefits, namely the benefits of research that are useful for solving practical problems. Usually the practical benefits of research are not only used for one subject but can be useful for more than one subject. The subjects in the research applied by researchers are:

1. For schools, the researcher want to contribute ideas that are useful in the context of improving learning outcomes in the teaching and learning process.
2. For teachers, the researcher wishes to suggest on how to enhance the biology learning method, which is predicted to increase student learning accomplishment.
3. For students, the researcher want to increase the interest and achievement in learning biology particularly on ecosystem material.

2. Theoretically

The results of this study can be used as a basis for developing biology learning approach to improve students' conceptual understanding by using the SETS approach, and PBL approach. Enriching the understanding of teachers and students in biology lessons through an innovative learning approach.

1.9 Operational Definition

1. Approach to Science, Environment, Technology, Society (SETS)

   The SETS approach is an approach that examines learning material in terms of science, technology, society and the environment by presenting issues at the beginning of learning so that it is able to attract students to carry out scientific processes that aim to solve problems.

   The stages in the SETS approach include:

   1. Invitation/presentation of issues or problems
   2. Exploration stage
   3. Solution stage
   4. Application stage
   5. Concept Consolidation stage (Husman, 2018)

2. Learning Outcomes

   Biology learning outcomes are students' ability to study Biology after going through the teaching and learning process as measured by learning outcomes tests. Learning outcomes are also used to measure the

extent to which the teacher is able to convey the material and the students are able to capture the material presented by the teacher. Where learning outcomes are measured from student learning outcomes tests. (Rusman, 2017)

3. Ecosystem Material

   Ecosystem is a reciprocal relationship between living things and the environment. Living things include green plants as producers, herbivores, carnivores, omnivores and decomposers. (Evi, 2016)

   Ecosystem is a Biology subject that is studied in class X at the second semester of SMA/MA in accordance with the 2013 curriculum (Kurtilas).

4. Learning Achievement

   Learning achievement can be defined as the results of an individual or group of individuals in a school subject or activity. The term achievement can also be defined as something which is achieved or done successfully with efforts and skills (Hornby, 1989: 8).