

CHAPTER I INTRODUCTION

1.1. Background

Nowadays, educational research is on advance increasing, in which studies are carried out in an attempt to find solutions of the problems arising either focuses on teachers or students. In addition to this problem, the researches were held to provide the contribution to development and advancement in education. The issue is basically revolve around usual problems on learning process such as difficulties in learning, obstacles in applying learning method, low learning outcomes which represented by unachieved learning completion (KKM), teacher tendency of only use traditional method during learning process that certainly make student feel bored in participating lessons.

Classroom learning problem should also mention not only from students learning perspective but also educators' classroom problem. Sometimes learning process only objected to educators, whereas the success of class achievement and activities also depend on students' ability. Factors that contribute to students' learning achievement for example are, their tendency on receiving stimuli, processing information, solving problem, either individually or in group work, self-motivation, self-awareness and self-directed learning which represent their learning characters (Cook, 2005).

In accordance to the following learning characters; every student has their unique preferences, personality, intellectual and different method in processing information. Therefore, when arranging proper teaching and learning strategies, the teachers have to consider their learners' characteristic. Teaching strategies are the elements given to the students by the teachers to facilitate a deeper understanding of the information. The emphasis relies on the design, programming, elaboration and accomplishment of the learning content. Teaching strategies must be designed in a way that students are encouraged to observe, analyze, express an opinion, create a hypothesis, look for a solution and discover knowledge by themselves. Aside from comprehending the curriculum content, teachers should have a basic understanding of how people acquire and absorb knowledge (Franzoni, & Assar, 2009).

The expected conditions are an educator must be able to provide various effective learning and teaching strategies model for encouraging or handling the diverse personalities and needs of students and also suing students understand the topics not only cognitively but also another learning domains, learn actively, develop critical and creative thinking, problem solving, behavioral changes, self-directed learning and etc.

In fact, According to Anita (2013), the Indonesian teacher's average competence has not been as expected. The average of mastery learning topic ability of biology teacher is approximately about 57%. This may become one of several factor which influence pupils' understanding and reasoning biology topic. This case closely related with the teacher quality. Teacher quality is widely believed to be important for effective teaching. The good teacher has a role not only to deliver information in the form of recitation but also to set learning environment and strategies which allow students to learn. Actually, biology is one of the important subjects in formal school. It is enables learners correlate theory with the real cases.

Furthermore, Depdiknas (2003) states that in studying science, students tend to be more memorizing concepts, theories, and principles without interpret the acquisition process. Learning more geared to the success of the exam tests essentially take more emphasis on low-dimensional cognitive processes such as memorizing concepts, while the higher cognitive processes; analyzing, process skill, evaluating and creating are rarely emphasized. In addition, the true meaning of the nature of science itself has been neglected, as well as aspects of attitude and its application in everyday life. As a result, students become less trained to think and use the power of reason in understanding natural phenomena that occur or when faced with a problem. When given a new problem, they can only move sentences from text books to a blank paper.

Science learning assessment process is currently only focused on the cognitive (Maryam, 2006; Rapi, 2005). This statement is supported by the result of research which conducted by Suastra (2006), which indicates that the assessment used to assess students' science process skills 100% only measure cognitive aspects of using the quiz, the final test in the end of subject matter,

general tests, and homework less assessing student performance. This led to the evaluation of the aspects of the skills and attitudes that also become demands of the curriculum in term of learning process assessment in the classroom is not doing optimally. Meanwhile assessment of student performance in the form of assignment is rarely performed as an alternative scoring model that is more meaningful. Student performance needs to be assessed at the time of ongoing activities (Suastra, 2007).

Similar problem happened in SMP Negeri 1 Labuhandeli. Based on the preliminary observation in this school, researcher found that the average learning outcome is tending to be low category. More, the assessment is also only concern in cognitive domain. In other words, the learning outcomes show that the assessment is less valuing of performance or project and science process skill. Learning processes are less of encouraging students to activate their science process skill. Students are accused to be smart exploring their abilities and also they must be able to show good behavioral changing after studying the lesson.

Table 1.1. The Science average scores of 7th grade students' learning outcomes in SMP Negeri 1 Labuhandeli from 2010 until 2014.

Academic Year	VII-6	VII-7	VII-8
2010/2011	70.00	75.00	70.06
2011/2012	73.87	69.50	60.15
2012/2013	73.00	75.00	60.36
2013/2014	68.50	68.33	60.42

(Source: school administration of SMP Negeri 1 Labuhanbatu)

In accordance with the results of students' learning outcomes, researcher conducts interview session with some science teachers about the way in designing the learning process. According to the teacher's interview results, most of science teacher teach science topic traditionally. The activities of the students are terminating only inside of the classroom based on the text book. Some of them teach students especially biology topic that is about ecosystem, sometimes they encourage learners to study outside classroom for recognizing biotic and abiotic components. But, its mean that the teacher never asks the students to generate something new; product or ideas about ecosystem that can be used for increasing

students' science process skill, attitudes, creativities, activities and self-directed learning.

Discussing about students' self-directed learning in this school, it is unspecifically define by the teacher. This school does not yet have an appropriate tool to assess their students' independence and still need development of the instruments. According to Guglielmino, *et al* (2001), teachers need Self-Directed Learning Readiness Scale (SDLRS) to measure the students' directed learning. It is a self-report questionnaire with Likert-type items developed by Guglielmino in 1977. It is also designed to measure the complex of attitudes, skills, and characteristics that comprise an individual's current level of readiness to manage his or her own learning (Guglielmino, *et al*, 2001).

Up to now, the teacher has not been specifically mapping their student's cognitive styles; learning style. In fact, if this is done, the teacher will be easier to evaluate and choose appropriate learning models for their students. The selection of the learning model must be accompanied consideration the characteristics of the subject matter and learners. An abundance of information exists concerning learning styles and their implications for learning and teaching.

It is important to study learning styles because recent studies have shown that a match between teaching and learning styles helps to motivate students' process of learning. That is why teachers should identify their own teaching styles as well as their learning styles to obtain better results in the classroom. Discovering these learning styles will allow the students to determine their own personal strengths and weaknesses and learn from them. Teachers can incorporate learning styles into their classroom by identifying the learning styles of each of their students, matching teaching styles to learning styles for difficult tasks, strengthening weaker learning styles.

The analysis to provide information about learning style that varies and characteristically diverse, makes it more complicated, difficult and time consuming. But once we gain such information about learning style, it will absolutely be helpful for school curriculum arrangement, administration and preciously provides information for teaching learning improvement. Learning style analysis for improving teaching learning process is basically comes from the

fact that different student will reflect different way of thinking, and treating them equally will remains meaningless since they represent different style in learning. If such condition continuously happened, an effective expectation of learning cannot be reached.

The way to package these problems are through project work and experimental activities. These learning models are quite challenging and they considered as an effective tool for treating students actively. They are encouraged to not depend on entirely on the teacher, but it is directed participant to be able to learn more independently. Project-based learning method is learning model which refers to the philosophical constructivism, that knowledge is the result of cognitive construction through a student activity which includes the skills and scientific attitude of students so that students can construct their own knowledge and meaningful through real experience. Project work includes complex tasks based on questions and problems are very challenging and require students to design, solve problems, make decisions, conducting investigations, as well as provide opportunities for students to work independently (Cheong & Christine, 2002).

Relevant researches about the effects of project based learning model and cognitive style towards science process skill was conducted by Siwa, *et al*, 2013). The results of the research shown that there are differences in learning outcomes on the science process skills of the students who treated by Project-based learning model and the students who teach by conventional learning model. There is also an interaction effect between the model of learning and cognitive style on learning outcomes of science process skills. There are differences in learning outcomes on the science process skills of the students who have a field independent cognitive style and students who have a field dependent cognitive style (Siwa, *et al*, 2013).

Multu and Temiz (2013) also investigate science process skills of students having field dependent and field independent cognitive styles. As a result of this comparison, it has been observed that students with field independence were more successful than field dependent students in all science process skills examined. Results of the independent sample t-test demonstrated statistically meaningful

differences in identifying responding variable, controlled variables, formulating hypotheses and manipulating variables skills.

Science process skill and self directed learning could be also promoted through scientific investigations during science lessons. Winda, *et al* (2013) has been implemented group investigation learning model to train students' scientific process skill of junior high school students. The results show that learners are able to start their ability in process science. Furthermore, Shunk, & Ertmer, (2000) have been conducted a research to identify the extent in which experiments and scientific investigations promote the self-regulation skills of 15 years old Romanian pupils. The participants' answers revealed the reduced concern for developing students' abilities, establish independently learning goals and preparing independently planning, the selection of strategies. (Shunk, & Ertmer, 2000).

In accordance with the previous studies Ulfa, *et al* (2014) also investigates the effects of group investigation learning model towards science process skill in senior high school. The results show there is significant differences (of science process skill between previous and after students taught with group investigation learning model. The contribution of this model is relatively high category, which about 37.5%. More, Pitoyo, *et al* (2014) were examine the effect of group investigation learning model, accelerated learning team and role playing on elementary school students' writing skills viewed from cognitive style. The results reveal that the writing skills of students who follow the group cooperative learning model in the type of investigation group is better than the group of students who are learning in accelerated learning team and role playing.

So, based on the background which has been describes, researcher try to implement project based and group investigation learning model. In which, by implementing these learning models students can improve their science process skill and self directed learning. Besides that, this school has never previously applying these learning models.

1.2 Problem Identification

Based on the background elaboration, the problems are identified as followed:

1. Students learning outcomes is in low category from 2010 until 2014.
2. Teachers tend to treat students classically and traditionally less considering their students' learning style.
3. Students do not have good science process skill and self directed learning.
4. Teacher never asks the students to generate a product, idea and investigation about ecosystem that can be used for increasing students' process skills and self-directed learning. The activities of the students are limited only inside of the classroom based on the text book.
5. SMP Negeri 1 Labuhandeli has not had the data base about learning style mapping. They need to design various best teaching learning processes.
6. It is necessary to consider the differences of students' learning style and proper learning model. Project Based Learning and Group Investigation learning model will choose as solution for carry out differences of students' cognitive style, improving learning outcomes and self-directed learning.

1.3 Research Scope

In order to make this research have clear objectives and scope, so the researcher makes some problems limitation, namely:

1. The research was done at SMP Negeri 1 Labuhandeli and the participants are the students in three different classrooms; VII-6, VII-7 and VII-8. This research is quasi experiment research method.
2. The learning models were treated for the learners were projecting based learning, group investigation and conventional learning models.
3. Students' learning outcomes are concerning cognitive domain, which is science process skills and for affective domain is self directed learning.
4. The science process skills were examined include basic science process skills; observation, classification, prediction, interpretation, purposing questions, applying concepts and communicating.

5. Learning styles which is investigated in this research only focus on cognitive style differences according to the psychology Herman Witkin (field dependent and field independent).
6. Mapping on student's learning style are also limited to the field dependent and field Independent learning style using Embedded Figure Test developed by Witkin. The mapping was done in the first stage of research conduction.
7. The topics of learning models implementation were focused on Ecosystem that consist of four sub topics; definition of environment, what did you find in an environment, interaction in an ecosystem construct a particular pattern of living things and the pattern of living things will effect of ecosystem.

1.4 Research Questions

It is important to know the effect of learning models, Project Based, Group Investigation and Conventional Learning models and students' cognitive styles (FD-FI) toward science process skills and self directed learning for ecosystem topic, the researcher were pointed some problems formulation, namely:

1. Is there any effect of learning models (PjBL, GI and Conventional) toward students' science process skills of SMP Negeri 1 Labuhandeli?
2. Is there any effect of cognitive styles (FD and FI) toward students' science process skills of SMP Negeri 1 Labuhandeli?
3. Is there any interaction between learning models (PjBL, GI and Conventional) and cognitive styles (FD and FI) toward students' science process skills of SMP Negeri 1 Labuhandeli?
4. Is there any effect of models (PjBL, GI and Conventional) toward students' self directed learning of SMP Negeri 1 Labuhandeli?
5. Is there any effect of cognitive styles (FD and FI) toward students' self directed learning of SMP Negeri 1 Labuhandeli?
6. Is there any interaction between learning models (PjBL, GI and Conventional) and cognitive styles (FD and FI) toward self directed learning of SMP Negeri 1 Labuhandeli?

1.5 Objectives

The objectives of the study were to:

1. Examine the effects of learning models (PjBL, GI and Conventional) toward students' science process skills of SMP Negeri 1 Labuhandeli.
2. Analyze the effect of cognitive styles (FD and FI) toward students' science process skills of SMP Negeri 1 Labuhandeli.
3. Analyze the interaction between learning models (PjBL, GI and Conventional) and cognitive styles (FD and FI) toward students' science process skills of SMP Negeri 1 Labuhandeli.
4. Investigate the effects of models (PjBL, GI and Conventional) toward students' self directed learning of SMP Negeri 1 Labuhandeli.
5. Analyze the effects of effect of cognitive styles (FD and FI) toward students' self directed learning of SMP Negeri 1 Labuhandeli.
6. Analyze the interaction between learning models (PjBL, GI and Conventional) and cognitive styles (FD and FI) toward self directed learning of SMP Negeri 1 Labuhandeli.

1.6 Research Significance

The research significances of this study are theoretically significance and practical benefit, namely:

By implementing Project Based Learning and group investigation learning model then analyze students' science process skill and self-directed learning of ecosystem topic, Author expects it can be used as consideration in the development of the research school. This study could be as suggestion and recommendation for teacher in manage and improve strategies of learning. By knowing how students learn (learning style) teachers capable for constructing proper strategy for learners. Presence the student's learning styles mapping (field dependent and field independent) give students information about their own style in learning. So that, they able to develop their self not only in one learning style but also in several styles in learning to get good mark in learning process, improve their science process skills and self-directed learning.