CHAPTER I
INTRODUCTION

1.1 Background of Problem

One of the successes of achieving the educational goals based on the law of RI No. 20, 2003 at article 3 about National Education System is improving the students' cognitive, affective and psychomotor outcome at once. This means to achieve these three aspects at once need to choose precise various models to inhibit the pressing to the development of one aspect only. Whereas, data from research still found problem at school which usually less creativity to do teaching learning process through various models, for example research by Saputra in 2011. According to Saputra (2011), the learning process which is done through monotonous learning model in this case always present a direct instructional learning model in class room will make students as receptor and duty implementer from teacher would be less motivated to be active in learning process. While Setiawan, W., et al. (2010) argued that a learning process through direct instructional learning model which is applied in learning process proved that there was no significant difference of students effectivity in understanding of learning between upper and lower groups.

Actually, this phenomenon still happened in Indonesian teaching learning process until nowadays. For example, researcher got this problem from experience when carried on Teaching Practice Program (*Program Pengalaman Lapangan / PPL*) in SMAN 1 Tebing Tinggi. The learning model that was applied in teaching learning process include biology class was less of variety or more often used direct instruction learning model without any combination. This condition caused the class was looked monotone. When the teacher was explaining the learning material in verbally, students were listening to the teacher's explanation and sometimes the students made notes in note book. This condition is as if focusing to the student's cognitive without stimulating the student's scientific attitude and psychomotor improvement.

Another example of unbalancing of three aspects in learning outcome is proved by observation on November 26th – 29th, 2013 in SMAN 8 Medan, the same problem was also happened like in SMAN 1 Tebing Tinggi. The direct instructional learning model was very often faced in biology. Precisely, direct instructional learning model is not enough to support the curriculum 2013 as described in Educational and Cultural Minister Regulation (*Permendikbud No. 65*, 2013) that the learning process have to be a holistic development for three aspects namely cognitive, affective and psychomotor aspect at once. It means that one aspect cannot be separated from the other aspects in order to produce personal qualities that reflect the integrity of knowledge, attitude and skill mastery.

The second problem of SMAN 8 Medan after researcher did a personal interview with one of biology teacher there, Drs. Sudirman, M.Si, the researcher found the serious fact that students got low scores in formative assessment of *Gametogenesis* sub-topic or 65.61 average score while, the minimum criteria (KKM) is more than 75 (Drs. Sudirman, M.Si. Personal interview on February 28th, 2014). Gametogenesis sub topic belongs to the process of gonad to produce sex cell that influenced by some hormones. All these need media to be learned because cannot be observed directly by the limitation of apparatus and material available in school. Furthermore, if the learning process is done by direct instructional learning as the usually applied in biology class will be not easy to make students understand about gametogenesis sub topic. If apparatus and material to observe about gametogenesis is not prepared by school, at least student's handbook comply a standard of curriculum 2013 which is able to help students in learning gametogenesis through scientific approach to help understanding the process of gametogenesis in detail.

Suyanto (2013) argued that process of teaching learning is a system which does not only need one aspect, but also contains some components that integrate one with the other to achieve the teaching learning goals, namely teacher, learning objectives, learning material, media, learning system, learning source, interacted management, evaluation and student. It means student's handbook is one of components to achieve the gametogenesis teaching learning goals.

The researcher has read the students' biology handbook for XI science of SMAN 8 Medan about gametogenesis sub topic then compared with three others biology handbooks in different publishers to see the quality of the content. The most complete book from the four samples is the student's biology handbook of SMAN 8 Medan published by Erlangga (see Appendix 16). While, this Erlangga's handbook is still far from curriculum 2013 characteristic. This book is more appropriate delivering by direct instructional learning, not by learning model which support the curriculum 2013. For example, the explanation of gametogenesis mechanisms in Erlangga book is just focusing directly to the final cells which are resulted by mitotic and meiotic I and II division, not presenting the steps so how the cells can contain a haploid or diploid chromosomes and why need to develop by mitotic and also meiotic in gametogenesis. The condition of this student's handbook adds one more reason of student's low score for gametogenesis sub topic.

One of solution for this problem is by modifying the gametogenesis student's handbook become a gametogenesis module which is oriented by a learning model that support curriculum 2013 that able to used in classroom to increase students learning outcome. POE (Prediction, Observation and Explanation) is one of the learning models which relates to scientific approach which are taught and accustomed students to find scientific truth, not give slander in viewing of a phenomenon. As the Educational and Cultural Minister Regulation (*Permendikbud No. 65,* 2013) hinted as Standard Process of Primary and Secondary Education to improve the students learning outcome acquired through the activity of "observing, asking, trying, reasoning, presenting, and create".

POE learning model was developed by White and Gunstone in 1992 which consists of three activities, namely: prediction, observation and explanation activities (Tsai, Chin Chung and Ying-Tien Wu in Lestarti (2011)). POE is suitable for gametogenesis sub topic because in learning process students will predict some phenomena that relates to gametogenesis. For example, why a sex cell needs to decrease the chromosom number while doing mitotic I. Then students will do discuss the predicted answer by doing direct observation from

complete pictures about every stages in cells division. Finally, students will get the right answer about the question before and can explain it.

For addition, the effectiveness of POE learning model has been ever observed and the result was able to increase the students' outcome especially for cognitive aspect in 14%, affective and psychomotor aspect increased 5% and 1%, respectively (Saraswati, 2011). While based on Amanah's research in 2013, the effect of POE learning model to the students cognitive, (t_{count} was 3.610 > t_{tabe} 2.052) with p value (sig). 0.001). It means that there was a very significant difference of students cognitive between before and after being taught by POE learning model.

Furthermore, from the description above, researcher will do a research by develop the Gametogenesis module in POE (Prediction, Observation and Explanation) oriented model to increase student's learning outcome grade XI science of SMAN 8 Medan academic years 2013/2014.

1.2 Problem Identification

Based on the background above, then the problem identifications of this study are as follows:

1. Biology teaching learning process is mostly implemented in direct instructional learning model which is not belong to scientific approach as curriculum 2013 characteristic.
2. The implementation through direct instructional learning model caused the student's score of formative assessment for *Gametogenesis* sub-topic was very low in last year or 65.61 average score.
3. Students' biology handbook as a learning media in Gametogenesis teaching learning process cannot be implemented through scientific approach, include POE learning model. The student's handbook can be only implemented by direct instructional model.

1.3 The Scope of Study

By regarding the extent indentified problems so in this research, the scope of study is limited in:

1. The developing of Gametogenesis module based on POE (Prediction, Observation, Explanation) oriented model for grade XI science of SMAN 8 Medan academic year 2013/2014.
2. The increasing of student's learning outcome of Gametogenesis sub topic for grade XI science of SMAN 8 Medan academic year 2013/2014.

1.4 Research Questions

In this study, the research questions are as follows:

1. How to develop a Gametogenesis module based on POE (Prediction, Observation, Explanation) oriented model for grade XI science of SMAN 8 Medan academic year 2013/2014?
2. Is there any increasing of student's learning outcome after being given the Gametogenesis module based on POE (Prediction, Observation, Explanation) oriented model for grade XI science of SMAN 8 Medan academic year 2013/2014?
3. Is there any difference of student's learning outcome between class which use Erlangga biology handbook and Gametogenesis module based on POE (Prediction, Observation, Explanation) oriented model for grade XI science of SMAN 8 Medan academic year 2013/2014?

1.5 Research Objectives

The objectives of this study are:

1. To know the process of Gametogenesis module development based on POE (Prediction, Observation, Explanation) oriented model for grade XI science of SMAN 8 Medan academic year 2013/2014.
2. To know the increasing of student's learning outcome after being given the Gametogenesis module based on POE (Prediction, Observation,

Explanation) oriented model for grade XI science of SMAN 8 Medan academic year 2013/2014.

3. To know the difference of student's learning outcome between class which used Erlangga biology handbook and Gametogenesis module based on POE (Prediction, Observation, Explanation) oriented model for grade XI science of SMAN 8 Medan academic year 2013/2014.

1.6 Significances of Research

The significances that expected from the results of this study are:

1. For teachers, this study is able to enhance the innovative learning instructional by using Gametogenesis module based on POE (Prediction, Observation, Explanation) oriented model in classroom teaching and learning process.
2. For students, the learning process by using Gametogenesis module based on POE (Prediction, Observation, Explanation) oriented model is able to increase student's learning outcome.
3. For school, can increase the learning quality especially in learning of *gametogenesis* subtopic.
4. As an idea donation for the next researcher and it can be useful in developing education of science.