CHAPTER 1

INTRODUCTION

A. Background

Learning is an activity containing interaction between teacher-students and communication occurred in educative situation to achieve goals of learning. In the process of teaching, teacher does all the things arranged in the lesson preparation. Students comprehend materials through learning experience and arranged in lesson preparation (Rustaman *et al*., 2003). Rationality of the development of 2013 curriculum one of them is based on perfecting mind set, some of them are monodisciplinary learning pattern become multidisciplinary one and passive learning pattern become more critical one. In 2013 curriculum, the essential class competency becomes organizing elements of basic competency, whereby all the basic competencies and learning processes are developed to achieve essential competency. Basic competency is developed based on the accumulative principals, reinforcing, and enriching among subjects and education networks (Mendikbud, 2013).

Mansilla and Duraising (2007) reveal that interdisciplinary understanding as the capacity to integrate knowledge and modes of thinking in two or more disciplines or established areas of expertise to produce a cognitive advancement – such as explaining a phenomenon, solving a problem, or creating a product – in ways that would have been impossible or unlikely through single disciplinary means. Integration as the key move or operation for interdisciplinary learning, other possibilities are translation, balancing, accommodation, synthesis, or making connections between multiple perspectives. There are numerous integrative structures that may result: an interdisciplinary interpretation or explanation, conceptualisation, theory or meta-theory, resolution or solution, deeper understanding or illumination, model, metaphor, product, policy, narrative, taxonomy, rule or application (Nikita, 2002; Miller and Boix, Mansilla, 2004; Gardner, 2008; Boix Mansilla and Duraising, 2007; in Golding, 2009).

In relevant with the characteristic of 2013 curriculum which is 'thematic', it is needed a learning strategy that can develop interdisciplinary thinking skill and use logic that can make senior high school students comprehend what is studying. Integrated approach integrates two elements or more in a learning strategy. Learning elements which are integrated can be a concept in process, concept in a subject with another subject or integration a methodology with another methodology. Integration can be emphasized on connected principals between an element with another element so that hopefully can increase students' comprehension and increase knowledge because learning involves more than one view point. Integrated approach connected type try to connect a concept with another concept, a topic with another topic, a skill with another skill, an idea with another idea but still within a subject, for example natural science or social science (Rustaman *et al*., 2003).

Rahmat (2007) reveals that learning and logic development of individual is not a separated line which can be broken into separated parts, but it is very complicated and continuous process suited to the development of a person. Meanwhile, learning (especially studying in class) occurred in a complex ecosystem, a dynamic environment whereby teacher, students, learning tools, technology, and social structure are connected each other and interacts interdependently. Therefore, learning needs to be presented well so that students can get useful learning experience. This learning can be done if the teacher implements six learning assumptions from Marzano (1998) into a holistic learning system. According to the third assumption from Marzano (1998), that what we know regarding learning indicates that the instruction focused on wide and interdisciplinary learning theme is an effective way to stimulate students to learn.

Dimensions of learning are an instructional framework which is comprehensive to help teacher in planning learning experience that will be presented to students. Dimensions of learning are arranged based on result of intensive investigation toward results of observation about learning and how the mind works. Therefore, the dimensions of learning translate how a person learns and thinks (dimensions of thinking) into a practical framework learning so that

can be used by teacher to increase his learning quality. The framework help teacher in organizing, descripting, and developing learning strategy which can develop students' logic (thinking process), integrate instructional models, and plan curriculum, instruction, and assessment system by giving attention on critical aspects of learning (Marzano, 1992). By examining dimensions of learning, teacher in the class can keep learning focus on how to learn and can learn how learning process in his students occurred (Marzano, 1992; Rahmat, 2007).

Dimensions of learning comprise dimension 1) attitude and perception, 2) acquire and integrate knowledge, 3) extend and refine knowledge 4) use knowledge meaningfully 5) habits of mind (Marzano *et. al*., 1992). First and fifth dimensions are parts which determine the success of others dimensions. Attitude and perception of students toward knowledge will influence how students gain and deepen knowledge. Students who do not have positive attitude toward knowledge will not give good results. Beside attitude, fifth dimension that is habits of mind become a base for students in deepen knowledge and solve problem within (Sriyati, 2011).

Based on the result of Santi's (2013) research, using connected teaching approach can increase students' mastering concept and analytical skill in medium category ($g \geq 30$). Connected teaching approach can help students to increase analytical skill in the way of learning. Besides, Idris's (2013) research beckon that using dimensions of learning framework in teaching-learning activity contribute in increase students' habits of mind.

Excretory system concept is a quite complex and complicated concept. To make students learn meaningfully, learning need to be presented connectedly with other relevant subject, for example, concept from Chemistry. Characteristics and demand from the topic of excretory system are interesting and applicative concepts because students experience it in their real lifes. Connected teaching integrated with instructional framework which has grounding of dimensions of learning hopefully can facilitate students to think interdisciplinary.

This research also very important to do because it examines the important of effective learning to increase students' thinking skill comprehensively, deeply,

and integrated in excretory system topics. So, this research has the tittle *Interdisciplinary Thinking Skill of Senior High School Students in Excretory System Topic on Connected Teaching Using Instructional Framework Based on Learning Dimensions***.**

B. Statement of Problem

The problem that will be focused in this research is as follow ‘*’How is students’ interdisciplinary thinking skill through connected teaching with the dimensions of learning in excretory system topic in experiment class compared with control class?*”, the problem was then expanded into several research questions as follow:

1. *How is students’ disciplinary grounding (biology, chemistry and physic) of excretory system topic in experiment class compared with control class?*
2. *How is students’ advancement through integration (biology, chemistry and physic) of excretory system topic in experiment class compared with control class?*
3. *How is students’ critical awareness of excretory system topic in experiment class compared with control class?*
4. *How is the correlation among each component of interdisciplinary thinking skills (disciplinary grounding, advancement trough integration, and critical awareness) of students?*

C. Purposes of the Study

The main purpose of this study was to compare between interdisciplinary thinking skill of senior high school students through connected teaching with dimensions of learning in excretory system topic in experiment class and control class use connected teaching only. The purposes are broken into specific aims as below.

1. Comparing between disciplinary grounding (biology, chemistry and physics) of excretory system topic in experiment class and control class.

2. Comparing between advancement through integration (biology, chemistry and physics) of excretory system topic in experiment class and control class.
3. Comparing between critical awareness of excretory system topic in experiment class and control class.
4. Analyzing the correlation among each component of interdisciplinary thinking skills (disciplinary grounding, advancement trough integration, and critical awareness) of students.

D. Problem Limitation

In order to this study more focused, so to limit the problem as follows:

1. Indicators measured in each category of interdisciplinary thinking skill are limited in:

a. Disciplinary grounding: The degree to which student work is *grounded* in carefully selected and adequately employed disciplinary insights - that is, disciplinary theories, findings, examples, and methods.
b. Advancement trough integration: The degree to which disciplinary insights are clearly *integrated* so as to advance student understanding - that is, using integrative structures such as conceptual frameworks, graphic representations, complex explanations, or solutions would have been possible under a single disciplinary framework.
c. Critical awareness: The ability to consider choices, possibilities and challenges with care-characterizes the process of producing interdisciplinary work that is, framing problems in ways that invite interdisciplinary approaches and exhibiting awareness of distinct disciplinary contributions, how the disciplines are integrated and the limitations of the integration.

2. This research use the concept of excretory system as the topic to reveal interdisciplinary skill of students in relevant with connected teaching and instructional framework which has base of dimensions of learning. Excretory system include (liver, skin, ren, and pulmo) and the diseases of human excretory system. Meanwhile, animal excretory system comprise Platyhelminthes, Annelida, Insecta, and fish excretory system. This topic will

connected with chemistry in precipitation principle, buffer concept, and Law of Dalton. Besides, excretory system topic will connected too with physics especially in hidrostatic pressure principle.

E. Assumption of the Study

The assumptions using in this study are presented below.

1. Dimensions of learning can facilitate students to develop reasoning skill and grow positive attitude and perception toward learning.
2. Connected teaching can present comprehensive learning process through interconnected among relevant concepts and give thinking experience and also interdisciplinary work.

F. Hypotheses of the Study

The quanitative part of this study tested theses hypotheses:

H_{1-1} : *There is a significant difference of students' disciplinary grounding between experiment and control class*

H_{1-2} : *There is a significant difference of students' advancement through integration between experiment and control class*

H_{1-3} : *There is a significant difference of students' critical awareness between experiment and control class*

H_{1-4} : *There is a significant correlation of each component of students' interdisciplinary thinking skill in experiment and control class*

G. Significance of the Study

This study will produce some findings in the forms of facts occurred in relevant with the concepts and theory of the observation. This findings hopefully can give some benefits, among of them are presented below.

1. For teachers: the result of this research can be used to drive an alternative in learning strategy to apply curriculum 2013 and help teacher in developing students reasoning skill, specially to develop students' interdisciplinary thinking skill.

2. For students: the results of this research hopefully can increase interdisciplinary thinking skill of students so that the students can solve problem by using various perspectives of multidisciplinary, get deep comprehension and positive attitude in learning. Besides, this observation hopefully can help students in comprehending deeply the concept of excretory system.
3. For Biology Education Department: the results of the research has a positive value specially to enrich learning strategy in secondary school level and can be used to new knowledge in education subject.

H. Organization of the Writing

Chapter 1 gives introduction of the research, and it consist of seven subchapters which are background of the study (A), statements of problems (B), purpose of the study (C), problem limitation (D), assumption of the study (E), hypotheses of the study (F), significance of the study (G), and organization of the writing (H). Chapter 2 comprehensively discusses theories used in this research, which include interdisciplinary thinking skill (A), connected teaching (B), dimensions of learning (C), and characteristic of excretory system. Chapter 3 present the operational definition (A), data source (B), research design (C), instrumentation (D), data processing (E), data analysis (F), and summary of the previous subchapter (of chapter 3) in the procedure of the study.

Chapter 4 include the findings and discussion of the study which organized into several subchapter based on the design of the study into: (A) interdisciplinary thinking skill which consist of (1) disciplinary grounding, (2) advancement through integration, (3) critical awareness, (B) correlation among each component of interdisciplinary thinking skill which consist of (1) correlation between disciplinary grounding and advancement through integration, (2) correlation between disciplinary grounding and critical awareness, (3) correlation between advancement through integration and critical awareness, (C) interdisciplinary thinking skill based on learning objectives, (d) questionnaire result. Finally, in

chapter 5 conclusion (A) and recommendation (B) of the study complete this paper.