CHAPTER I
INTRODUCTION

1.1 Problem Background

People agree that learning is important, but they hold different views on the causes, processes, and consequences of learning. Learning is an enduring change in behaviour, or in the capacity to behave in a given fashion, which results from practice or other forms of experience (Schunk, 2012). Actually there is no one defenition of learning that is universally accepted by theorists, researchers, and practitioners (Shuell, 1986). Best point of learning is changing from do not know become know about some materials.

Biotechnology is an important topic in a modern science curriculum in that it increasingly plays a role in the daily life. The teaching of biotechnology within a science education presents teacher with many challenges. From the explanation above, biotechnology plays important role lately in the science not only education side but also ethical side. Biotechnology is regarded as a very important development for both scientific and economic progress. Many pieces of information concerning concepts in Biotechnology are present in the daily news as well as in TV shows and movies, such as the use of DNA in criminal justice cases or paternity identification; and human cloning in films and in the press (Jensen, 2008).

Students of today need to be aware of the risks and benefits of biotechnology to make intelligent decisions regarding this science for themselves and future generations. Dawson and Schibeci (2003) have thrown light on the need of teaching students about the recent technological discoveries. They explain further that students should be able to make personal and social choiches about issues related to science and technology. The tools of biotechnology are responsible for many of today's rapid advancements in areas such as agriculture and medicine.

Many studies stated that many students were unable to distinguish between current and potential uses of biotechnology. Lock and Miles (1993) reported that one third of the sample claimed that they did not know what genetic engineering and biotechnology meant. About 47% of the students could not exemplify

biotechnology, nor could 52% of them exemplify genetic engineering. When their attitudes were analyzed, it was found that there was a broad approval of biotechnology and genetic engineering applied to plants and microbes but not to animals. In another study, Chen and Raffan (1999) found that 31% could not define genetic engineering and 33% were unable to give an example of genetic engineering.

The national science framework also recognizes the need for science students to be made aware of biotechnology as an important topic for the Science Curriculum. Also, Dawson (2007) reported that students' ability to provide a generally accepted definition and examples of biotechnology, cloning, and genetically modified foods was relatively poor amongst 12- to 13-year-old students. Similarly, Cavanagh *et al*. (2005) reported that at least two-thirds of students (from Riverina high school in the rural Australia) had a good knowledge of medical biotechnology issues; however, a significant proportion of the students did have concerns about the use and/or safety of biotechnology.

In general, students in the UK studies are more accepting of the genetic modification of microorganisms and plants than genetic modification of food, animals and humans. For example, Gunter *et al.* (1998) examined the attitudes about biotechnology of 48 teenagers. Overall, they considered genetic engineering of plants to be more acceptable than genetic engineering of food crops and animals. Less support was found for the genetic modification of plants for food and even less for the genetic modification of animals and humans. Their reasons for opposing genetic engineering of animals was that it is 'unnatural', 'dangerous', 'shouldn't be done' and 'unethical'. Reasons to support genetic engineering were related to progress and humanity.

Similar reasons were reported by Hill *et al.* (1999) who examined the attitudes of 778 students aged 11 - 18 years about using genetically engineered animals in medical research. Of the sample, 42% felt it should not be allowed because it was cruel (47%) or unnatural (53%). The result of Dawson and Schibeci (2003) show that the students' attitudes ranged from those of the 55 (6.0%) students who do not agree with the use of any living organisms in

biotechnology to the 125 (14%) students who approve of all the stated uses of biotechnology, with a wide spread in between.

Based on observation in State University of Medan, after interviewed 30 students still 7 persons can describe what biotechnology meant and they are still said just 75% of the biotechnology material can be mastered. However, 20 students agreed that biotechnology is good for human life.

Dawson and Taylor (2000) support biotechnology education which stated that the students are to become well-informed decision makers then they need to be aware of the practical applications of current developments in biotechnology, and appreciate the social and bioethical implications of this relatively new and controversial science. Schibeci (2000) recognizes that the teaching of biotechnology is important both in terms of its science as well as providing a vehicle to examine ethical issues associated with its use. Steele and Aubusson (2004) interview a number of teachers to determine why they were not presenting biotechnology classrooms. They felt biotechnology was too difficult for the students, and this would disadvantage the students in the university entrance examinations. Another problem according to the teachers is the lack of opportunity for practical work in the classroom. By looking some explanation above, that it is necessary to conduct the research about "Analysis Of Knowledge And Attitudes towards Biotechnology Biology Department Students In State University Of Medan".

1.2 Problem Identification

Based on the description of background above, researcher identified the research problem as follows:

1. The knowledge of biology students still low based on observation..
2. Many studies stated that many students in a broad unable to explain what biotechnology meant.

1.3 Research Scope

In order to obtain an appropriate discussion, the limitations for this research are just focuses on 6th semester about biotechnology conventional and biotechnology modern.

1.4. Research Question

There are some questions of this research as follows:

1. How is the 6th semester students' knowledge about biotechnology in Biology Department State University of Medan?

2. How is the 6th semester students' attitude about biotechnology in Biology Department State University of Medan?

1.5 Research Objective

This research is conducted to achieve some objectives as follows:

1. To get the data of students knowledge about biotechnology in the 6th semester of biology department students State University of Medan.

2. To get the attitudes data of biology departments in the 6th students semester in State University of Medan.

1.6 Research Significance

Considering about the research result and discussion, this research expected has significant beneficial both theoretical and practical.

In theoritical, this research hopely has some significant benefit, as follows; additional reference for lecture about students' understanding and attitudes toward biotechnology, as motivation to the lecture to improve the way to teach biotechnology and being reference to conduct further research. Meanwhile, practically as references for develop meaningful learning process focused on biotechnology.