

CHAPTER I

INTRODUCTION

1.1. Background

Nowadays the education curriculum demands the students to learn actively and independently. Learning material is one of the component that needed by students to motivate them to learn. The development of innovative learning material is very needed, especially in improving the quality of student's education . Innovative learning material expected can be motivated students and also can support the students to be more active in the learning activity.

The learning activity often contain the abstract material and beyond to the students experience in daily life, so the material become difficult to be taught by teacher and difficult to be understood by students. Visualization is one of the way that can be done to declare an abstract thing. We can not be denied that multimedia technology can give a big impression in learning media because it can be integrated text, chart, animation, audio and video.

The development of science and technology is very fast and spread widely so influenced the field of life, including in education field. Technology can be used to solved any problems. In the learning process, it will be more effective and efficient if it was supported by the using adequate media, because students interacted directly to the learning resource which can lead to the optimal learning achievement. Media defined as the everything that used to distribute a message from the shipper to the receiver (student) so it can be stimulate mind, feeling, attention and interest so the learning process occur. Simplify the media is used to facilitate students to understand the learning material. The other reason in using media is to simplify the message, decrease the verbalistis , to equate the perception, arrest attention, and saving time.

As a result of advances in technology, courseware has increasingly become more elaborate in terms of realistic graphics, audio, colour, animation and complex simulations (Clark & Mayer, 2011). These advances have offered new opportunities for teaching and learning. Indeed, learning is increasingly relying on

multimedia technology, which involves learning from words (such as printed or spoken text) and pictures (such as animation, video, illustrations or photographs) (Mayer, 2009). One of the key characteristics of multimedia learning involves perceiving and processing information in different presentation modes and sensory modalities (Brunken, Plass, & Leutner, 2003).

Innovation in teaching and learning activities is very interesting to discuss, as it is believed that implementation of the right teaching strategy would increase student's achievement in learning chemistry (Situmorang&Situmorang, 2014). Learning innovation was very needed to build the communication between teachers and students optimally and efficiently so it can give the better learning outcome (Situmorang dkk, 2013: situmorang). Innovation in education often associated to the renewal that originated from the creative ideas, finding, and modification that contain ideas and methods that used to solve an education problem. The innovation of education also a plan or scheme that can be used to build instructional learning material in class or outside of classroom (Situmorang, dkk, 2010; Riskin et al., 2006), including the learning material.

The learning material have a superiority than textbook in learning which is the learning material was chosen, styled, and arranged in such a way, so it would be optimal to help achieve the goals of learning. Furthermore the learning material especially design to be used by student with the material structure based on the student needed and also can be improved the students achievement because student was motivated to use learning material in class when the learning process occur and in the outside of class to do the enrichment and learn independently. (Situmorang, 2013).

Chemistry is one of the part of Science that must be learned in Senior High School. Most of the chemistry topic were contain the experiment and mainly the knowledge obtained from the research laboratorium (Chang, 2005). Generally, chemistry have abstract concept that causing the chemistry difficult to be learned and need the high thinking skills to understand it (Kean and Middlecamp, 1985) Chemistry should be taught in three representation levels, macroscopic, microscopic and symbolic (Johnstone, 1993). Macroscopically, the chemical

process can be observed and sensed by our sensory motors. The arrangement and movement of particles and the interactions among them can be explained in the microscopic level. All the chemical processes involved can be represented by symbols, numbers, formulae, and equations symbolically.

Nowadays, chemistry in school is using new curriculum it was curriculum 2013, the student was not only demanded to understand the material but also analyzing the material. Improving the quality of education could be performed through innovation in the teaching and learning materials.. It could help the students to understand chemistry concept clearly, and make the learner free from students misconception on specific chemistry terms. Many SHS students consider chemistry as a difficult subject that make them not interested to study (Situmorang & Saragih, 2013; Situmorang et al., 2006). Learning Innovation to improving the students achievement in chemistry was very needed because it associated to increasing the quality of graduate in fill the employment in chemistry field.(Machtmes,dkk,2009) Therefore, innovation in teaching and learning chemistry has to be made to make the students are motivated to study chemistry. One of a strategy is conducted through the development of innovative chemistry learning material to obtain Good teaching materials that suit to students. Based on the previous research which state that the using of multimedia modules can help the learner to visualizing the abstract concept but the use of multimedia modules in schools is still low (Lee and Kamisah,2011). And then the modules in the market are too formal,unattractiveand does not follow the syllabus(Ghazali, 2008; Abdullah,2005).

As Rosenberg (2001) argued that a good learning materials must be able to present the learning material according to the demands of the curriculum, following the development of science and technology and can bridge the learning for competencies has been established can be achieved. Chemical materials in the learning materials should be systematic, complete, and easier to understanding, attract, motivate independent study and has additional material as appropriate to the characteristics of student enrichment because chemistry presents some special challenges (Lang, 2009).

The topic of buffer solution includes definition of buffer solution, characteristic of buffer solution, calculate the pH of the buffer solution and function of buffer solution. So the buffer solution can be developed into a learning material based and based on multimedia that can be displayed into any media, audio, visual or audiovisual. Buffer Solution topic was abstract, such as the dissolving of substances to determine the pH can be displayed into animation. This topic also will be easily to understand if it was used audiovisual media like narration video. Besides easier to understand, by using narration video, we would not have to do the experiment so it will saving time and material.

If In this learning proces was using interest learning media such as learning material based interactive multimedia so the learning process will not be boring and more effective. To achieve this goal, it is necessary interactive learning (using multimedia) to improve students achievement as cognitive aspect and build education character. By using interactive learning material (using multimedia), teachers more easily to deliver learning material to students with some application to make students interest. The application in interactive learning (using multimedia) is quiz or games, pictures animation, videos, and simulated that make students interesting, easily understand, improve students achievement and to constructive the style of learning.

Some research done about the development of learning material state that the using of chemistry learning material can be increase the student learning outcome. There are some innovation that has been done in that research such as the innovation by using media, method, or learning strategy, even by combining the using of media and learning method. Indeed it could help the student easily to understand the material and also help teacher in learning process (Gultom, 2015). Like in the research that had been done before by Dewi N Marpaung under title *“The development of innovative learning module on the teaching of electrolyte and non electrolyte solution based on curriculum 2013”* stated that the average of students achievement in using textbook is less than the student which using the learning material based multimedia. She also concluded that chemistry learning module is able to increase students achievement in high group. The affectivity of

learning in experiment is 99.37% higher than in control class 97.18% (Dewi, 2014). The research about “*Developing of interactive learning module to increase student’s achievement and student’s collaboration by using problem based learning model in Teaching buffers solution*” get the assesment that the standarization average value is 4 from lectures and 3.44 from students. The toattal average score is 3.72.(Ika, 2014). And in the other research which is done by Arif Wardiman Lase under title “*The development of innovative learning material reaction rate with active learning and multimedia*” stated that learning material set in e book was easy to use in teaching and learning process in offline system. The total average of responses toward developed learning is 3.57, it means valid and good. So the innovative learning material reaction rate with active learning and multimedia can use in senior high school in teaching and learning process(Arif,2016). So in this case study the researcher interest to developing the learning material on topic buffer Solution.

Based on the descriptions, the researcher were interested to do a relevant research that has been mentioned above, that in this study, the researcher will make a chemistry learning material in the form of innovative learning material. This title of this research is “**The Development of Innovative and Interactive Learning Material in Multimedia based on the Teaching of Buffer Solution**”.

1.2. The Problem Identification

Generally, the issue in this research is : How to develop the innovative learning material based multimedia in buffers solution topic to create creative, effective, comfortable learning and it can make student get an optimal learning achievement, so we do the identification of problem based on the background :

1. The student difficult to understand the learning material.
2. The textbook used is difficult to understand.
3. The student learn buffer solution topic only use the memorize method and monotonous.
4. The textbook used doesn’t arranged sistematically based on syllabus.
5. The textbook used doesn’t has been used the multimedia.

6. The arrangement of learning material doesn't has been sistematically.

1.3. The Problem Formulation

Based on the background that has been stated previously, then the problem formulation in this study are :

1. How to develop an innovative and interactive learning material in multimedia based on the teaching of buffer solution ?
2. What component would be integrated in the buffer solution material to make the learning material become innovative ?
3. What components have to be included in the developed learning material to make the material suited to multimedia bases ?
4. How to standarize the developed learning material to make it standard based on BSNP Criteria ?
5. Are the students achievements taught by using developed innovative learning material better than conventional teaching ?

1.4. The Problem Limitation

From the formulation of these problem, so that limitation of the problem in this study are :

1. The topic that will be analyzed and developed is Buffer solution in senior high school.
2. Developing of learning material based on BSNP standard and suited with curriculum 2013 .
3. Developing of learning material done by integration of laboratory activity, animation and learning multimedia
4. The respondent used is student who learn buffer solution in senior high school.
5. Validator for developed learning material is the expert chemistry lecture in State University of Medan.

1.5. Research Objectives

The objectives of this research is to develop an innovative and active learning material on the teaching of buffer solution in senior high school. The specific objectives to be achieved in this study are :

1. To develop an innovative and interactive learning material in multimedia based on the teaching of Buffer solution
2. To make the component would be integrated in the buffer solution material to make the learning material become innovative.
3. To make the components have to be included in the developed learning material to make the material suited to multimedia bases.
4. To standarize the developed learning material to make it standard based on BSNP criteria.
5. To know that the students achievements taught by using developed innovative learning material better than conventional teaching.

1.6. Research Benefits

In the implementation of this study is expected to be able to provide benefits to many people. This study is expected to provide the following benefits :

1. For researchers, is a valuable experience which can be used to develop and innovate interactive learning material based of multimedia in learning Buffer Solution.
2. For teacher, as an inputs to make the interactive learning media in learning activity so they can create active,creative and pleasure learning .
3. Student who learn chemistry can help them to increase knowledge and interest in learning so that students can learn according to their ability and absorption characteristics.
4. For further research, provide information and reference in future studies for students, especially students in chemistry department in State University of Medan.

1.7. The Operational Definition

Based on that explanation, the operational definition as the following :

1. Innovation are research activities, development and engineering which aims at developing or applying the practical value and the context of the new science or new ways to apply science and technology that already exists. The Innovation in this reasearch designed / composed by integrating a laboratory activity, animation video, and attached the hyperlink of trust website for future reading, so that the student will be more active, independent and easier to understand the learning.
2. Interactive learning in this research means there are the interaction between student with the learning material by do some exercise, and in the end of chapter will be give the key answer. And beside that the student will give the video and animation that will invite the student attention and hopefully make the student being active.
3. Multimedia is the using some media to present information such as text, sound, graph, animation, figure, and video. Multimedia used in this learning material is *software flipbook maker* which packed in *electronic book (e-book)*.