The Effectiveness of Inquiry Contextual Learning Model on Student Science Process Skills in Food Microbiology in Biology Department, the State University of Medan

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Abstract

The objective of this study is to find out the effect of contextual inquiry learning model on student science process skills in food microbiology. A quasi experiment research with pretest-posttest control group design was used in this study. The population of this was 6th semester student biology department and two classes chosen as the sample by applying cluster random sampling technique. Experiment class was using contextual inquiry model as much as 42 students while control class was using direct learning model much as 40 students. The instrument used to obtain the data of student science process skill is with essay test. Technical analysis of data using Covariate Analysis at significant level α = 0.05 with the help of SPSS 22. The results showed that there was a significant contextual inquiry learning model to the students' science process skill (F = 22.760; P = 0.000). The students' science process skills that were taught by contextual inquiry (87.72 ± 5.129) were significantly higher than the direct learning model. As a follow up of the results of this study, it is expected to apply contextual inquiry model on food microbiology material in an effort to improve the skill of science process.

Keywords: Science process skills, contextual, inquiry, food microbiology.

Introduction

Biology as one of the areas of the sciences provides a variety of learning experiences to observe, define competences, use tools and choose to use learning resources are good, to dig and sort factual information relevant to test ideas or solve problems daily. Biological subjects developed through analytic thinking ability, inductive and deductive to resolve problems related to natural events around.

In the teaching-learning process, have to have strategy, so that students can learn effectively and efficiently, it stuck on the expected goal. One of the steps to have such strategies is a must to master the techniques of presentation, or commonly called learning methods. In fact the way of learning or models that is used to convey information to students in a way that is different to solidify students in mastering the knowledge, skills and attitudes. Model used to motivate students to use their knowledge to solve a problem faced by both to answer a question will be different from the model used for the purpose of enabling students to think his opinion expressed alone in the face of all the problems, but from the difference in the use of
learning methods that have similarities to make learning more effective and efficient (Sanjaya, 2006).

Based on information obtained from Biological Education courses Unimed, noted that the learning process special materials with microbiology food that has not been done for using inkuri-based learning model. It is therefore necessary to use model inkuri-based learning on microbiology courses towards students of biological education courses Unimed. The existence of a textbook will help students in the learning process so that it can support the achievement of learning objectives expected. The book is a basic tool for the process of learning and information that are important to support the success of student learning.

The initial results of a study conducted on researcher lecturer microbiology courses show that low student learning outcomes as evidenced from the acquisition value of the final exams of the four class academic year 2014/2015. The average value of the final examinations students is still not able to get the value of B (80-89). The results of the average value of the final exam biology majors Unimed 2010 academic year 2014/2015.

Microbiology is the study of microorganisms. Microbiology is part of applied microbiology. Food microbiology is the study of the influence of processing against the cells of microorganisms, including mechanism of resistance of microorganism processing. In addition, the science of Microbiology is the science which is also studying the beneficial changes as in fermented foods. Processing and preserving food is not fully able to prevent all harmful changes. In addition students also respond in less studied and less excited so that the results of the study as well as procedural knowledge such as low skills are needed in the process of science study particularly biology is still lacking.

The above is a matter of weakness and the need for learning in the classroom so that these problems can be solved. This is in order for learners to actively study and obtain the maximum achievement of results and to increase procedural knowledge such as science process skills ability and achievement of the scientific attitude. The lecturers need to find new learning models are more appropriate so that learners have a high motivation to learn. This kind of motivation will be created if the lecturer can convince learners will be the usefulness of the subject matter for the real life of the learners.

Learning with student involvement in building his knowledge can be implemented by using the learning models inquiry. Sanjaya (2006) suggests that the model of learning inquiry is a series of learning activities that emphasize the process of thinking critically and analytically to seek and find their own answers to a problem that is questionable.

Through the development of model-based learning inquiry microbiology courses should be able to provide input on current education geared to equip students with life skills that are integrating integrity potential generic and specific students to solve and overcome the problems of life. The expected results of the research of this development are to look at the effectiveness of the student in the learning process on courses with material microbiology food microbiologist in Biological Education courses Unimed.

**Literature Review**

In the teaching-learning process, the lecture should have a strategy, so that students can learn effectively and efficiently, it stuck on the expected goal. One of the steps to have such strategies is a must to master the techniques of presentation,
or commonly called learning methods. In fact the manner or method of instruction, teachers used to convey information to students in a way that is different to solidify students in mastering the knowledge, skills, and attitudes, but from the difference in the use of learning methods that have similarities to make learning more effective and efficient (Dahar, 2011).

The results of study skills are owned by students after he accepted their learning experience. The results of the study can be used as a benchmark for teachers to assess whether learning system successfully provided that henceforth will be given in the process of learning (Sudjana, 2009).

Inquiry learning model is a series of learning activities that emphasize the process of thinking critically and analytically to seek and find their own answers to a problem that is questionable. Learning strategies is called heuristic strategies which means I find. Inquiry model as a process of defining and investigating problems, formulating hypotheses, designing experiments, finding data, and describe the issues conclusion (Sanjaya, 2006).

Based on the above definition, it can be stated that the inquiry is a learning process that seeks students to be able to search and find their own answers to a problem facing ranging from solving problems, plan a hypothesis, designing experiments, gathering and analyzing data, until the last step i.e. drawing conclusions from such problems. So, through this inquiry model student involved mentally and physically to solve a given problem by teachers so that students are accustomed to being scientific in solving a problem (Sanjaya, 2006).

Is the entire process skills scientific skills headers (either the cognitive or psychomotor) that can be used to find a concept or principle or theory, to develop a concept that had been there before, or to perform denial of an invention. Science process skills are students ' ability to apply the scientific method in understanding, developing and discovering science. Science process skills are very important for each student is as the provision to use the scientific method in developing science and are expected to acquire knowledge/develop new knowledge that has been owned (Dahar, 2011).

Science process skills of students in the learning of inquiry can be seen from the activities students can carry out scientific activities i.e. observing bacteria on food. Hypothesis about the traits and the reproduction of the bacteria, communicate with a groups provides the opportunity to more students to seek and find their own facts about the characteristics of bacteria and principles through experience directly so that the learning process becomes optimal.

At the beginning and end of the student's learning experience in the process of their learning from the learning of inquiry because it emphasizes on learning activity can foster the students ' ability in using science process skills by formulating questions that lead to investigation activities, drawing up hypothesis, conduct research around the surrounding environment that can be found, put together and manipulate data, and communicate the results of its findings in the learning process. This all shows that there is research in the effectiveness of the learning model of inquiry toward skills improvement process of science.

**Research Method**

This research was carried out in the Department of Biological State University of Medan which is located in the William Alexander V Market – postal code 20221. This research was carried out in February 2017 – June 2017. Individual trial subjects are a student of biology Unimed as many as 10 people. Small group trials as much as
1st class, and test the group limited its subject was class. Subject to the test of effectiveness is a student of biology Unimed (class A and class B). Method of research uses quasi experiment with a sample research as much as 2 classes. Class of 2014 model uses A Class inquiry contextual by as much as 42 students, class of 2014 C using direct learning models as many as 40 students. Sample determined in random sampling. Research instruments using instrument science process skill test by using a test essay. Technical analysis of the data using analysis of covariation (ANACOVA) on α = 0.05 significant levels with the help of SPSS 22.00.

Results and Discussion
Summary of data research results are presented in the following table 1:

<table>
<thead>
<tr>
<th>Class</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiry</td>
<td>46.38±7.72</td>
<td>87.72±5.13</td>
</tr>
<tr>
<td>Class directly</td>
<td>44.48±8.06</td>
<td>79.25±5.72</td>
</tr>
</tbody>
</table>

The results of the analysis of covariate (Anacova) with the help of SPSS 22.00 learning model suggests that significantly influence on science process skills (F = 22.760; P = 0.000). Tukey’s test results show that the results of the science process skills being taught with Inquiry 87.72 ± 5.13 significantly more height comparison science process skill outcomes of students who in participation with the model of learning directly 79.25 ± 5.72 (Figure 1).

Figure 1. The science Process Skills students Postest Unimed taught with a model of learning and inquiry learning model directly on the Matter of Food Microbiology.

Next the percentage indicator of process skills science students which includes surveying, group, interpretation, forecasting, asking who was taught with a model learning inquiry, and process skills science.
Percentage of the Science Process Skills
Figure 2. Indicator percentage of Students of Process Skills Biology Unimed taught Learning and Inquiry with direct learning model on the material in Food Microbiology.

Discussion

Inquiry learning is seeking a student can search and find your own answers to a problem facing ranging from solving problems, plan a hypothesis, designing experiments, gathering and analyzing data, until the last step i.e. Drawing conclusions from those problems. Through this inquiry model student involved mentally and physically to solve a given problem by teachers so that students will get used to being scientific in resolving a problem.

Biology learning activities are the products, processes, attitudes, and technology. Biology learning should be carried out scientific inquiry farmed ingredients (scientific inquiry) can cultivate thinking ability in accordance with the scientific method. Inquiry brings students learning critical thinking finding problems in life and looking for creative and innovative completion (Mulyasa, 2010).

Sudjana (2009) suggests that the inquiry approach is an approach to teaching that seeks to lay the foundation and development of the scientific way of thinking. There are several main characteristics inquiry learning strategies: (1) this strategy places emphasis on the activity of students to the maximum to search and find; (2) entire activities by students are directed to seek and find their own answers from
something questionable that it can foster confidence in him; and (3) purpose of use of strategies learning inquiry is to develop the ability to think in a systematic, logical and critical, or develop intellectual abilities as part of the mentally process. With respect to the foregoing, in the inquiry learning strategy of the students are not only required in order to master the learning material, but how they can use the potential of its own.

Rusche and Jason (2011) States that inquiry is a learning process that is customer driven students as the center (student-centered learning process) which covers the activities of the questioning, investigation, interpretation, and guidance. Instructor or teacher is not the absolute owners of the "correct answer" or "expert" but it is a facilitator in the classroom. As for the targeted results after this learning students can criticize systematically, justify or give opinions, solve problems, and assess the correct answer through a variety of teaching and learning methods. Students become more inclined to learn if they are able to connect new information with what they already know (Slavin, 2011).

Based on the definitions above, it can be stated that the inquiry is a learning process that seeks students to be able to search and find their own answers to a problem facing ranging from solving problems, plan a hypothesis, designing experiments, gathering and analyzing data, until the last step i.e. drawing conclusions from such problems. So, through this inquiry model student involved mentally and physically to solve a given problem by teachers so that students are accustomed to being scientific in solving a problem (Sanjaya, 2006).

Gagne would argue that learning is influenced by growth and environment, but the greatest influence is the environment of the individual person. Environment covers home environment, geographic, schools, and other social environments. Various environments that will determine what will be learned by someone and then will determine what he will become later. There is some element of informing about Gagne's view of learning (Gagne, 1988).

Is the entire process skills scientific skills headers (either the cognitive or psychomotor) that can be used to find a concept or principle or theory, to develop a concept that had been there before, or to perform denial of an invention. Science process skills are students’ ability to apply the scientific method in understanding, developing and discovering science. Science process skills are very important for each student is to use the scientific method in developing science and are expected to acquire knowledge, develop new knowledge that has been owned (Triutami, 2014).

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Conclusion
Based on the results and discussion of the research that has been elaborated can be concluded that students who learning with inquiry model and the model of learning directly influential significantly to science process skills of students on the material food microbiology in biological science The State University of Medan.

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References