IMPLEMENTATION OF CONCEPT MAPPING LEARNING STRATEGY ON GENETICS COURSE IN STATE ISLAMIC COLLEGE (STAIN) OF KERINCI

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ABSTRACT

This research aims to describing the implementation of concept mapping learning on genetic course in State Islamic College of Kerinci (STAIN). This research focused on improving student achievement on cognitive domain through the implementation of the concept mapping strategy. Research subjects are biology students 5th semester year 2015/2016, amounting to 25 people. This type of research is classroom action research. The research instrument is a learning device (syllabus, SAP, and textbook), while collecting data by test and observation sheet. Based on the result of the study, found that student achievement in the cognitive domain in general has increased after the implementation of concept mapping strategy on genetic course. The results showed that the average score of the students average in the first cycle 66,6 (adequate) increased to 71,8 (Good) on the second cycle. This suggest that student achievement on cognitive aspect have increased after the implementation of concept mapping learning strategy on genetic course.

Keyword: concept mapping, genetics, student achievement, teaching and learning

INTRODUCTION

The process of education should be capable of forming human intact who ready to face a full of challenges and rapidly changing the world. Education can not be separated from a teaching learning process, that is main activities in formal education at school. In teaching and learning process, interaction between the teachers components, the subject materials, and students. The interaction between the components involved the facilities and infrastructures such as a method, media, and environmental design for learning path. So it creates a learning situation that able to achieve the aims that have been planned earlier (Ali, 2007) .

Biology is the science which learn about everything about living things. On the biology subjects which is part of science, demand the learn ing competence from high levels understanding part and comprehensive (Wena, 2009). So, teaching and learning process of biology is an activity which was worth interactive to be educative that occurs between teacher and students and between students with students and between students with their environment.

The educational value of these interactions serve to achieve the goals that had been formulated before the study was conducted.

The teaching and learning process will be good if each component is aware of its the duties and responsibilities. Teachers and students should know what their respective tasks each other. Between teachers and students there is also a relationship or communication and influence as well. Learning that occurs in an individual is complex behavior, acts of interaction between teachers and students twith an aim (Dimyati, 2002).

Genetics is one is one of the science areas that studies and review of heredity and hereditary variation. In genetics subject , we will learn things about heredity from organisms to molecules and cells (Campbell, 2010). Then, Tamarin (2001) said that genetics is the study of inheritance in all of its manifestations, from the distribution of human traits in a family pedigree to the biochemistry of the genetic material in our chromosomes—deoxyribonucleic acid, or DNA. Genetics is an empirical science, which means that our information comes from observations of the natural world.

Concepts of genetics should be presented detail and the connections in the concepts are presented clearly. In fact, the genetic material seems abstract so it is difficult to understand. Genetic concepts with one another are served separately. The concept is not presented from the general to special, so it is not formed a hierarchy concepts, which is easy to understand. The emphasis in the teaching and learning of genetics subject can not summarize the topics then student memorize. Teaching Genetics Subject must have the understanding concept and encouraged thinking during learning (Chattopadhyay, 2004). Learning that encouraged the critical thinking push students to be able to assimilate and accommodate information relating in real life situations. In biology education course State Islamic College of Kerinci, genetics is the courses with 2 credits. Previous experience when genetics learning is in progress, student for being active still low and only a few number of students want to give a good response such as, questions or answers. Student also have many difficulties in solving problems related to classical genetics subjects or molecular genetics. As a result, students got difficulty in understanding and finding genetic concepts.

One strategy that fits this learning issue is concept mapping strategy. Concept mapping (concept mapping) is used by Novak (1984) about the strategies used by the teacher to help the student organize the lessons that have been learned based on meaning and relationships among its components. The relationship between one concept with another concept describes the relating concept or known as proposition. The concept is expressed in the form of a term or concept label. The concepts woven significantly with connecting words so it can form the proposition. One proposition contain two connecting words and concepts. The concept that one has a wider scope than the other concept . In other words the one concept more inclusive concept than others. Novak (2008) said that concept maps are tools for organizing and representing knowledge. They include concepts, usually enclosed in circles or boxes of some type, and relationships between concepts or propositions, indicated by a connecting line between two concepts. Words on the line specify the relationship between the two concepts. We define concept as a perceived regularity in events or objects, or records of events or objects, designated by a label. The label for most concepts is a word, although sometimes we use symbols such as + or %. Propositions are statements about some object or event in the

universe, either naturally occurring or constructed. Propositions contain two or more concepts connected with other words to form a meaningful statement. Sometimes these are called semantic units,or units of meaning.

Ausubel (in 2009 Trianto) stated, the use of the first initial organizing is a teaching tool to corelate the new lesson materials with basic knowledge. The initial knowledge underlined the new ideas with the knowledge that already exist in the students. "the concept mapping can help children to produce meaningful learning in class" (Martin in Trianto, 2009). Concept mapping could give a concrete visual to assist organizing information before the information is learned. Concept mapping strategy can help and facilitate students in learning certain material, due to the hierarchical concept mapping, meaning that there is a concept which have wide position (inclusive) that will be placed at the top of the map and there are concepts that is more narrowly in supporting the main concepts (less inclusive). This will greatly help students in learning, so the learning outcomes that acquired will be better. Based on Pohan research (2013), concepts mapping strategy in learning gave better leraning achievement.

To find out how big the influence of concept mapping learning strategy toward learning achievement in genetic subject, so we needs to do a research that aims to (1) describe the learning achievements of students in genetic subject with a strategy of learning concept map (2) figure out the student activity during the learning by using the concept mapping strategy in genetics courses.

METHODS

This research was carried out in the course of tadris biology stain kerinci in the first half of academic years 2015/ 2016. The sample in this research is student of tadris biology course stain kerinci who took a genetics course, which consisted 25 people.This research is classroom action research.

Costello (2003: 5) said that action research is referred to variously as a term, process, enquiry, approach, flexible spiral process and as cyclic. It has a practical, problem-solving emphasis. It is carried out by individuals, professionals and educators. It involves research, systematic, critical reflection and action. It aims to improve educational practice. Action is undertaken to understand, evaluate and change. Research involves gathering and interpreting data, often on an aspect of teaching and learning. Critical reflection involves reviewing actions undertaken and planning future actions. Then, Arikunto (2007: 3), that classroom action research is an action to the learning activities in the form of an act, that deliberately raised and happenned in a class. This course of action given by a tutor or with the direction of teachers who performed by a student in one times . That step was given by teachers or teachers guidance and did by students.

According to Lufri (2007) research procedure consists of 4 main stages of Research Action class, are :
1) The planning stage (*planning*): prepare the learning device,
2) Action stage (*action*) : by using concept mapping learning strategy ,
3) Observation stage (*observation*): by using observation sheets,

4) Reflection stage (*reflection*): analyzing the drawbacks and advantages of concept mapping learning strategy.

After the fourth stage of the cycle I, the results of the stages is used to determine the step for cycle II. This research was conducted in two cycles. The cycle is stopped when condition of the class is stable , the student is familiar with concept mapping strategy and data shown in class has presented an increase student liveliness and achievement of learning .

Data collecting techniques in this research were observation, tests, and documentation. Research instrument used. learning devices and data collection instruments. Learning device consists of a syllabus, a unit of the learning event (SAP), and Genetic materials. Data collection instruments are tests, and student activity observation sheets.
Data analysis using descriptive qualitative and quantitative data analysis . Data that will be used to measure the study biology achievement is post-tests outcomes. The average assessment of the class according to Sudjana (2008) is by using the formula:

$$M = \frac{\sum x}{N}$$

Description:
   M : Mean (average).
   $\sum x$: The amount of the total value derived from the results of the calculations value of each individual.
   N: The number of individuals.

For the liveliness of the students data, researchers use observation sheets. This observation is aiming to pay attention to the object of research by using the entire senses and direct observation. This method is used to measure the work level and attitude of the student during the learning session. In this study, the researchers set up observation sheets student to assess students liveliness during the lecture session.

RESULTS

The research was executed by two cycles of research that is carried out gradually with the following explanation:

The Result of Observation of the Cycle I

Observations of Student Activity. Based on the Table 1, in the cycle I percentage of indicators on student activity observations showed that the average student liveliness when learning implementation of genetics as a whole being 60% with adequate criteria.

Table1 Result observation of student activity sheets

No	Observation Aspects	Rating Score of (1-3)
Learning Preparation		
1	Students prepare themselves by learning material that will be taught	2
2	Students have been prepared to follow learning session	1
3	Students respond to the motivation or the appreciation from teachers	2
Learning Implementation		
4	The classrooms atmosphere when the learning is starting	1
5	Students watch teachers explanation	2
6	Students noted teacher's explanation	2
7	Students active to ask teachers	3
8	Students active to answer the question from the teacher	1
9	Students opinion about the learning session	2
Learning Evaluation		
10	Students ability in doing the evaluation tasks	2
The score quantity		18
The percentage		60%
Criteria		Adequate

Student Learning Outcome. Based on Table 2, it can be seen that aspects of research on concept mapping learning strategy for the cognitive domain that obtained from students on the action cycle I with average grade by 66.60 and completeness percentage 52% with total the number of students who get the score ≥ 70 are 13 students and students who gets < 70 are 12 students. The average learning outcomes students the course Tadris Biology in fifth semester academic year 2015/2016 didn't reach the satisfactory results.

Table 2. The learning outcomes of students in cycle I

No	Learning Outcomes	Score
1	Average value	66,60
2	Lowest value	50
3	Highest Value	85
4	Completeness Percentage	52%

Learning process in cycle I which have done can be considered quite good in general. Based on the researchers observations there are still problems and shortcomings that still need to be improved in order to make the learning process in cycle II goes well that will certainly give a positive impact on increasing student motivation and learning results.
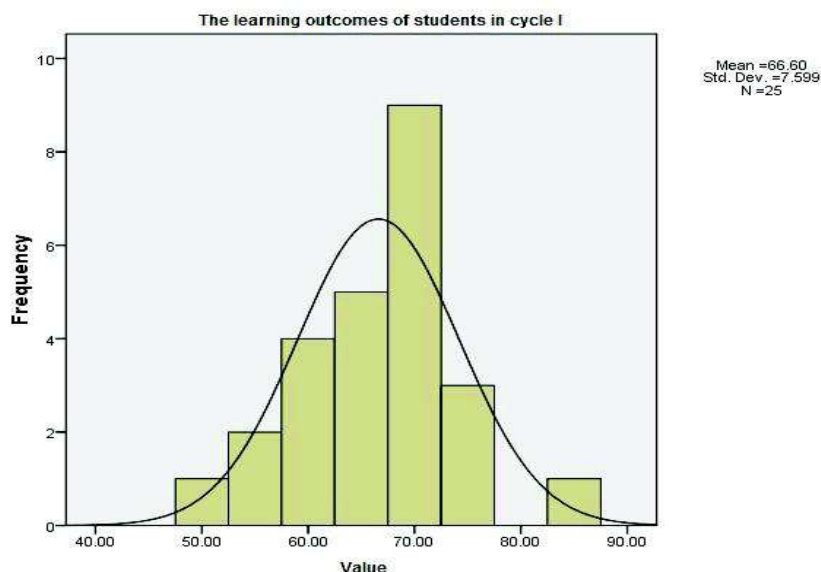
Figure 1. Learning outcomes of students in cycle I (Haryanto and Ferry, 2015)

The Result of Observation of the Cycle II

Observations of student Activity. Based on the Table 3, in the cycle II percentage of indicators on student activity observations showed that the average student liveliness when learning implementation of genetics as a whole being 77% with good criteria.

Table 3. Student activity observation sheet results in cycle II

No	Observation Aspects	Rating Score of (1-3)
	Learning Preparation	
1	Students prepare themselves by learning material that will be taught	2
2	Students have been prepared to follow learning session	2
3	Students respond to the motivation or the appreciation from teachers	2
	Learning Implementation	
4	The classrooms atmosphere when the learning is starting	2
5	Students watch teachers explanation	3
6	Students noted teacher's explanation	3
7	Students active to ask teachers	2
8	Students active to answer the question from the teacher	2
9	Students opinion about the learning session	3
	Learning Evaluation	
10	Students ability in doing the evaluation tasks	2
	The score quantity	25
	The percentage	77%
	Criteria	Good

Student Learning Outcome. Based on Table 4, it can be seen that aspects of research on concept maps learning strategy for the cognitive of learning results obtained by students on the cycle II action with average score by 71.80 and completeness percentages being 76% with the number of students who get the value ≥70 are 19 students and students who gets an below 70 numbered 6 students . the average of student Biology Education course learning outcomes in fifth semester academic year 2015 /2016 for cycle II got a significant improvement compared to the cycle I.

Table 4. The learning outcomes of students in cycle II

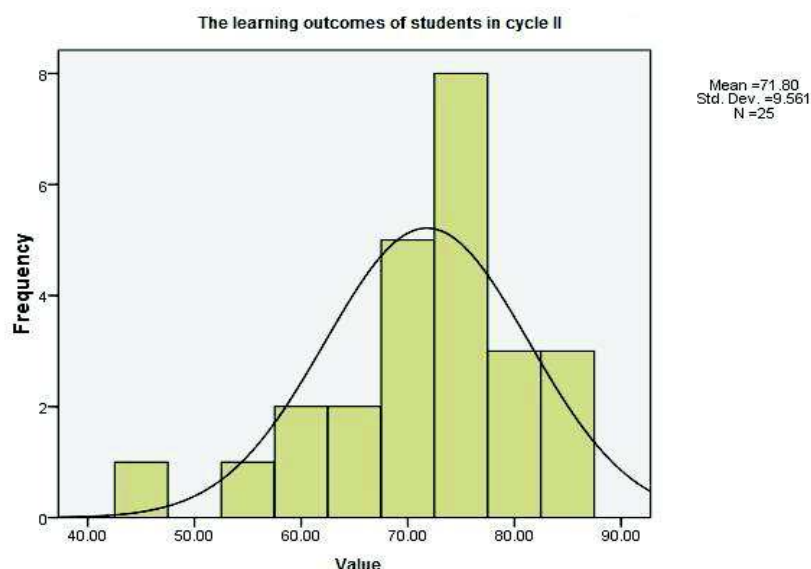| No	Learning Outcomes	Score
1	Average value	71,80
2	Lowest value	45
3	Highest Value	85
4	Completeness Percentage	76%

Figure 2 Learning outcomes of students in cycle II (Haryanto and Ferry, 2015)

DISCUSSION

Observation about student activities

Based on the observation that researchers done about the student activities during the implementation of concept mapping learning strategy on the subjects of genetics, it can be seen that the percentage of student activity on the cycle I was 60% with adequate criteria. The main cause,s for it because there are still many students who are less prepared to follow lecture session and also the lack of student activity in giving a response and answering the questions from lecturer. Furthermore, the percentage of student activities during the imple-mentation of the concept map learning strategy in genetics courses on cycle II is 77%. It showed thar there are significant increases in cycle II related to the liveliness of the student. In

cycle II, students prepare themselves properly to follow process of lectures, student enthusiasm in responding to the lecturer also better, so that later gives a positive impact towards the learning achievement of students. The attention that have been given by the students when the lecture is taking place make students become active during learning session. The changes in student behaviour can be happened without the role of lecturer as educators , teach students to focus when the lecture is starting.

The Learning Achievements of Students

Learning achievement in cognitive student begins from I to II cycle, it has visible distinction, an increase in the average value of the study results in cycles I with average 66.60 (adequate), completeness percentage being 52% and cycle II the average percentages with 71.80 (good) with completeness percentage with 76% . Thus, it can be said that the implementation of the concept mapping learning strategy can enhance cognitive learning achievements of tadris biology course of students in fifth semester academic year 2015/2016 in State Islamic College of Kerinci.

According to Novak (1985), the use of concept mapping as media in learning is one part of the strategy of the organization. The organization strategy helps the students increase the meaningfulness of new materials. The organization strategy is done by using a new organizing structures on these materials.

The strategies organization can be consisting of grouping repeated ideas or terms or divide ideas or these terms be a smaller substance. this strategies also composed from identification ideas or facts key from large more information.This research supported by previous research by Pohan (2013) stated that the use concept mapping strategy in learning significantly can increase student learning achievements. This is proven with an increase in learning achievements after the implementation of this strategy.

CONCLUSIONS

Based on the research has done can be concluded that the implementation of concept mapping leraning strategy in lecture genetics can provide a positive effect on increasing learning achievements of the tadris biology students in fifth semester in State Islamic College of Kerinci with academic year 2015 / 2016 .This can be in showed in the results of the research and analysis from data that can be seen in the lecture session from the cycle I the average value being 60,60 while the students activity percentages with 60 %, then it increases in cycle II, the average value being 71,80 while the students activity percentages by 77 %.

ACKNOWLEDMENT

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