

USE OF CONCEPT MAP IN IMPROVING OUTCOMES OF LEARNING SCIENCE PACKAGE MATERIALS IN BLOOD CIRCULATION SYSTEM SEKOLAH PAKET ASA GENERUS JAKARTA

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Abstract

This research is aimed at knowing the improvement of student's increase value studies with concept map exercise method toward the concept of the blood circulation system, the method implemented in this study is classroom action research concerning 4 phases. Those are planning, acting, observing, and reflecting. This research is implemented at school non-formal ASA GENERUS at Mangga Dua Selatan on 2016/2017 with consist of 10 students. This study is done within 2 cycles. Meanwhile, the technique of data gathering is through an objective test, student's observation sheets. Through data analysis in a cycle I and II reached N-Gain 0.47 in cycle I and 0.68 in cycle II. So it can be concluded that it shows the improvement high-value studies of students and understanding with concept map. That circumstance is also supported by the calculation trough Wilcoxon test statistically, resulted about $J_{hitung} \leq J_{tabel}$ was 59 accordances with significance level α (0.5). So H_0 is rejected. As the result, there are improvement increase value studies of students and understanding with concept map exercise toward the concept of the blood circulation system

Key Word: Exercise/Assignment, Concept Map, Increst value and understanding concept.

Introduction

Education has an important role in improving the quality of Indonesia's human resources, namely Indonesian people who believe, are independent, advanced, intelligent, creative, skilled, responsible, and productive. Various educational efforts have been made to improve the quality of these resources. Improving the quality of these resources can be developed through formal and non-formal education.

Based on the results of the interview and the results of the students' scores in Package B class, the results showed that students found it difficult to understand science material. From the science material that was asked through the questioner material the concept of the circulatory system was deemed complicated and understood. Many package students experience difficulties in understanding the concept, considering that science materials use a lot of mechanisms, functions, and parts. This condition results in a decrease in learning outcomes which can be seen in daily replication assessments. The use of appropriate and varied methods is very important so that students are easier to learn the theories and concepts of science.

Starting from this problem the author took the circulatory system material as research material to be followed up using concept maps. Concept maps or concept mapping are props to show the relationship

between concepts can be specified in the form of statements. Concept maps are used to bring together meaningful relationships between concepts in the form of propositions.

Based on research conducted by Mia (2008), it was found that the use of the concept map method was better compared to using conventional methods. In the research, the method improves student learning outcomes in science learning. Yusuf (2006) reported that the method of assigning concept maps can improve students' science learning outcomes, the initial value obtained is 72.43 in the first cycle increased to 82.4 in the second cycle. Based on the background described, classroom action research was carried out with concept maps

Literature Review

A. Learning Outcomes

Learning is a relatively constant change in behavior that occurs because of practice and experience. Learning is a process in individuals who interact with the environment to get changes in their behavior (Mustaqim, 2001). Learning is a change in behavior that can be observed through the connection between stimulus and response according to a mechanistic principle. Learning outcomes are the acquisition of student learning processes in accordance with teaching goals (ends are being attained). Learning outcomes are often used as a

measure to find out how far someone has mastered the material that has been taught. To actualize the learning outcomes, a series of measurements is needed using a good evaluation tool and fulfilling the requirements (Purwanto, 2009).

B. The Nature of understanding concepts

One of the objectives of teaching science, especially biology in junior high schools and other levels is so that students understand biological concepts so that they can solve problems both in everyday life and technology in a selected way (Nuryani, 2005). abstraction which describes the same characteristics, characters or attributes from a group of objects from a fact, whether it is a process, event, object or phenomenon that distinguishes from other groups "(Wibowo, 2008).

According to Rosser as quoted by Dahar (1996) in his book states that the concept is an abstraction representing a class of objects, events, activities or relationships, which has the same attribute. Whereas according to Zacks and Tversky as quoted by Santrock argues that concepts are categories that classify objects, events, and characteristics based on a general property. The concept represents a number of objects that have the same characteristics and are expressed in the form of a word or language.

C. Assignment method

The word method comes from Greek (Greek), namely "Metha" means through and "Hodos" means the way or way. So etymologically the method has an understanding as a way or path that continues to be passed (Ibrahim, 2003). Methods are ways that can be used to implement strategies (Vienna, 2008). Learning by using the assignment method means that the teacher gives a specific task so that students carry out learning activities. With the assignment, students will play an active role in their teaching and learning activities because students have a wider opportunity to use their knowledge in completing assignments given by the teacher, this assignment method can develop students' independence, stimulate more learning, foster discipline and feeling responsibility in finding and processing the information themselves (Nuryani, 2006).

D. Concept maps

The use of concept maps is an approach to teaching basically a means of interaction between teachers and students in teaching and learning activities. Approaches that are not in accordance with the nature of the material and the purpose of teaching can result in students being less enthusiastic so they are lazy to take lessons and are less effective. So that learning does not saturate and complicate the concept map one approach that can help students understand the understanding of the lesson/concept.

Ausubel an educational psychologist, emphasizes and advises teachers to transfer learning

material to their students by utilizing learning through meaningfulness, each conceptual learning is to express meaningful relationships between concepts in the form of proportions (Martinis, 2009). According to Dahar "Map Concept is used to express meaningful relationships between concepts in the form of proportions. Proportions are two or more concepts that are connected by words in a semantic unit. Concept maps provide concrete visual assistance to help organize information before the information is learned (Trianto, 2010).

E. Types of concept maps

There are four types of concept maps, namely the event chain, network tree, cycle concept map, and the spider concept map.

a. Chain of events

Map of the chain of events concept can be used to give a sequence of events, steps in a procedure, or stages in a process, for example in conducting experiments.

b. Network tree

The main ideas are made in rectangles, while some other words are connected by connecting lines. Words on the connecting line provide a connection between concepts. When constructing a network tree, first write down the topic and list the main concepts related to the topic. Register and start by placing ideas or concepts in an arrangement starting from general to specific concepts.

c. Map of the concept of spiders

The spider concept map can be used to solve devoting opinions. In solving devoting opinions, ideas come from a central idea. So that there can be a large number of mixed ideas.

Hypothesis

Assignment of concept maps can improve student understanding, increasing students' understanding of improving student learning outcomes package on circulatory system material.

Methods

This study uses the concept map assignment method. Method for assigning concept maps. The stages are carried out such as preliminary activities, cycle activities I and II. Then analyze the data in the qualitative and quantitative analysis. For qualitative analysis, the concept map values are as follows:

$$\text{Value of mapconceptual} = \frac{\text{score value map concept} \times 100}{\text{comparación puntuación}}$$

Quantitative Analysis

$$\text{Indeks N-Gain} = \frac{\text{Final test score} - \text{initial test score}}{\text{Maximum score} - \text{initial test score}}$$

Normality test and Wilcoxon test. The Wilcoxon test or marked ranking test is a nonparametric test. Wilcoxon test as a substitute for t-test if the data does not meet the t-test requirements (Rusfendi, 1998).

Results and Discussion

Based on the results of the calculation in terms of the number of meaningful propositions in 10 students, the ability to make valid propositions (PS) in each student reached 43.7-100% with an average of 64.62%. In terms of the number of valid hierarchies that were significant for 10 students, the ability to make valid hierarchies (HS) in each student reached 50-75% with an average of 55%. The total value of the cycle I concept map of 10 students obtained the largest value, namely 16 found in students number 6 and 10 and the smallest value that is 9 is found in student number 2 so that the overall ability of students in making concept maps reaches 55-80%.

a. Student learning outcomes

Understanding of student's concepts is seen from the results of the pretest and posttest in the first cycle regarding the subconcepts of the blood component, blood function and the tools in the circulatory system. Understanding of concepts based on pretest and posttest can be seen in the table below:

Table 1.1. Recapitulation of Pretest and Posttest Results of Cycle I Students

Students	Siklus I		N-Gain
	Pretest Value	Post test value	
Average	40.9	67.8	0.51
SD	3.83	4.48	0.15

The table above shows the results of the students' pretest and posttest with the results representing the mean and standard intersections in cycle I. These results will make a difference in the second cycle.

b. Reflection

Based on reflection in cycle I are as follows:

1. Learning activities using concept maps can help students understand the material delivered.
2. Students look enthusiastic about participating in learning but not all students understand and are enthusiastic when learning takes place.
3. When working on assignments many students still see and rely on other groups while in groups.
4. While making concept maps there are still many students who are confused and have not included contact sentences between one and the other.
5. Concept maps make it easy for teachers to deliver material without having to write paragraphs but do not reduce the content of the concept.

Based on student learning outcomes and reflections carried out, actions were taken to improve the next cycle, namely: increased interest and motivation for Table 1.2. Results of Concept Maps of Cycle II Students

Based on table 1.2 in terms of the number of meaningful propositions in 10 students, the ability to make valid propositions (PS) in each student reaches 60-100% with an average of 75%. The number of smallest propositions is 12, which is made by students no 4. While the largest number of propositions are 16 and 18 made by students no. 6 and 6,8,9 and 2,10. In terms of the number of valid hierarchies that were significant for 10 students, the ability to make valid hierarchies (HS) in each student reached 50- 87.5% with an average of 80%. The total value of the first cycle concept map of the 10 students obtained the largest value, namely 27 found in students no. 10 and the smallest value that is 19 is found in student number 4, so that the overall ability of students to make concept maps reaches 63.3-90% and the average obtained is 88.7%.

c. Student learning outcomes

Understanding student's concepts are seen from the results of the pretest and posttest in cycle II regarding the sub-concepts of blood components, blood functions and tools in the circulatory system. Understanding based on the pretest and posttest can be seen in table 1.3. below this.student learning, interest and motivation carried out such as adding ice breaking before learning, given a description of the material through video and pictures on the circulatory system. From the differences in treatment, students are expected to be more courageous in answering questions or in submitting their ideas so as to improve learning outcomes through concept maps.

d. Decision

Based on the results of the reflection of the first cycle, the decision was obtained that the learning outcomes of understanding the concept of the first cycle had not met the indicators of the success of the action analysis, therefore a follow-up study was carried out to the second cycle.

Cycle I

a. Results of Student Concept Maps

In learning in cycle II, students experienced an increase in making concept maps visible from what students made. The total results of the concept map valid hierarchies in each student reached 50-87.5% with the average of 80%. The total value from 10 students of the concept map first cycle obtained the largest value, namely 27 found in student no. 10 as the highest value while 19 was the lowest value found in student no. 4, so that the overall ability of the students to make concept maps reached 63.3-90% and the average obtained was 88.7%..

b. Student learning outcomes

Understanding of student's concepts can be seen from the results of the pretest and posttest in cycle II regarding the sub-concepts of blood components, blood functions and tools in the circulatory system.

Understanding based on the pretest and posttest can be seen in table 1.3. below. student learning, interest and motivation were carried out with the addition of *ice breaking* before learning and giving a description of the material through video and pictures on circulatory system. From the differences of treatment, students are expected to be more courageous in answering questions or in submitting their ideas so as to improve learning outcomes through concept maps.

c. Decision

Based on the results of the reflection of the first cycle, the decision was obtained that the learning

outcomes of understanding the concept of the first cycle had not met the indicators of the success of the action analysis, therefore a follow-up study was carried out to the second cycle.

Cycle II

a. Results of Student Concept Maps

In learning in cycle II, students experienced an increase in making concept maps visible from what students made. The total results of concept map.

Table 1.2 Result of Student Concept Maps

Student Code	Concept Maps									
	Sum									
	PS (20)	%	HS (8)	%	KS (2)	%	C (0)	%	Total (30)	%
S1	15	75	5	62.5	2	0	0	0	22	73.3
S2	18	90	4	50	2	0	0	0	24	80.0
S3	15	75	6	75	2	0	0	0	23	76.7
S4	12	60	5	62.5	2	0	0	0	19	63.3
S5	14	70	6	75	1	0	0	0	21	70.0
S6	16	80	5	62.5	2	0	0	0	23	76.7
S7	14	70	4	50	1	0	0	0	19	63.4
S8	16	80	5	62.5	2	0	0	0	23	76.7
S9	16	80	6	75	1	0	0	0	23	76.7
S10	18	90	7	87.5	2	0	0	0	27	90.0
Average		75		80		0		0		88.7

Based on table 1.2 in term of the number of meaningful propositions in 10 students, the ability to make valid propositions (PS) in each student reached 60-100% with the average of 75%. The smallest number of propositions was 12 achieved by student no 4. While the largest numbers of propositions were 16 and 18 achieved by students no. 6 and no. 6,8,9 and 2,10. In term of the number of valid hierarchies that were significant for 10 students, the ability to make valid hierarchies (HS) in each student reached 50-87.5% with the average of 80%. The total value of the first cycle concept map of the 10 students obtained the largest value, namely 27 found in students no. 10 and 19 found in student number 4 as the smallest values, so that the total number of student ability to make concept maps reached 63.3-90% and the average obtained was 88.7%.

b. Student learning outcomes

Understanding of students' concepts can be seen from the results of the pretest and posttest in cycle II regarding the sub-concepts of blood components, blood functions and tools in the circulatory system. Understanding based on the pretest and posttest can be seen in table 1.3. below this :

Table 1.3. Recapitulation of Pretest and Posttest Results of Student in Cycle II

Students	Siklus II		
N-Gain			
Pretest Value	Post test Value		
Averages	51.4	84.6	0.68
SD	10.28	6.10	014

c. Reflection

Based on reflection in cycle I are as follows:

- 1) Learning that occurred in the second cycle has increased from cycle I regarding the condition of students and student learning outcomes.
- 2) Students no longer relied on each other when working on assignments.
- 3) Students could make concept maps better than previous meetings.
- 4) Students did not feel more difficult in making concept maps
- 5) Students still looked enthusiastic in participating the learning.

d. Decision

Testing Analysis Requirements

1. Normality Test

The normality test used was the Liliefors test. In the normality test the value of L_o ($L_{\text{measurement}}$) was calculated then compared with L_{table} . If $L_{\text{measurement}} < L_{\text{table}}$ so it can be concluded that the data is not normally distributed.

Table 1.4. Normality Test Results With Liliefors Test

A	N	Lo ($L_{\text{measurement}}$)		L_{table}	Conclusion
		N-Gain Siklus I	N-Gain Siklus II		
0.05	10	0.194081	0.12500	0.04146	Data is not normally distributed

2. Wilcoxon Test

In this study the Wilcoxon test was employed because the data were not normally distributed. The results of the Wilcoxon test showed significant differences in N-Gain in the first and second cycle. The calculation results of the Wilcoxon test can be seen in the following table.

Table 1.5. Wilcoxon Test

N_{Subject}	$J_{\text{measurement}}$	J_{table}	Information
10	55	59	H_a Accepted

The calculation on H_o refused $J_{\text{measurement}} > J_{\text{table}}$, then $55 > 59$ so that H_o is rejected means there are significant differences between N-Gain Cycle I and cycle II

Based on this study, science learning using the concept map method can improve student's understanding. It can be seen from the observation sheet of teaching and learning activities, sheets of student learning activities, and the increase of the acquisition of student learning outcomes in each cycle. This study was conducted in 2 cycles with 4 meetings in each cycle. Science learning by using concept maps in the first cycle was not as expected. Student learning activities in cycle I were not maximal however teaching and learning activities run well, there were still students who spoke and joked during the learning process. Students still relied on friends and only certain students were actively involved in doing the assignments given by the teacher. This shows that students are not ready to take part in classroom

Learning activities. Many students still have difficulty in understanding the concept of the circulatory system. After the implementation of learning by using concept maps, students were easier to understand the concept so that the student's grades

increased but students are still there who have not been actively involved in the task.

This can be seen from the findings of the research in the first cycle regarding the making of concept maps, the total value from 10 students of the concept map first cycle obtained the largest value, 80 was the highest while 55 was the smallest value, so that the overall ability of students to make concept maps reached 50-80% with the average of 64.2%. The average value of the pretest achieved by students was 40.9 while the average of posttest was 67.8 with N-Gain of 0.51 which is in the medium category. These results indicate that the value of students has not reached the expected of standard with 100% learning completeness, so it is necessary to do the second cycle.

Learning in cycle II was carried out in accordance with the improvement of cycle I. In cycle II students began to get used to using concept maps. So that students were able to make a good concept map that is able to compile a concept map hierarchically, provide conjunctions between concepts and can provide examples. The total value from 10 students of the second cycle concept map obtained the largest value of 90 while the smallest value was 63.3, so that the overall ability of students in making concept maps reached, 63.3-90% with an average of 88.7%.

The increase value above can be seen from the results of the pretest and posttest in the second cycle. the average pretest value was 51.4 while the posttest average value was 84.6 with N-Gain of 0.68 which is included in the medium category. From these results indicate that in the second cycle there has been a significant increase in student's understanding and learning outcomes in the concept of the circulatory system.

Increasing understanding of concepts and student learning outcomes from cycle I to cycle II shows that concept maps can be used as an alternative in delivering subject matter and reducing student learning methods that are still rote and can help to guide students. In conveying material without having to write paragraphs but does not break down the content of the concept. This will make it easier for package students to receive and understand the material delivered. This is in accordance with the results of previous studies which reported that there was a significant influence on the learning outcomes.

Conclusion

Learning using concept maps can improve student learning outcomes especially the concept of the circulatory system. This can be seen from the average value of N-Gain in the first cycle of 0.47 categorized as medium category and an increase in the second cycle with the average N-Gain of 0.68 categorized as medium category.

Suggestion

The use of concept maps to improve student learning outcomes is important in other subjects by adding indicators to their implementation.

communities, NGOs, Ministry of Education and Culture, Media (RRI), Universities to support the establishment of Community Reading Parks, PAUD, Non Formal Schools (Packages and training).

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Daily activities at the assignment are Teaching at Diniyah Ta'miliyah Madrasah AL-Barakah, providing additional learning clinics for kindergarten, elementary, and junior high school students who need preparation for high school entry and preparation for National Exams, data collection activities for students dropping out of elementary, junior high, and high school. coordinating the establishment of RW.08 PAUD with PKK Leaders. Coordination with Community Leaders preparing for the establishment of Urban Schools in the form of Non Formal PKBM (School Packages: Compulsory and Special Curricula according to community needs), doing synergy with Karangtaruna RW and the kelurahan level in monthly youth and recitation activities. Following the activities of majelis ta'lim, elderly mothers and mothers. Synergize with