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Improving Students Learning Outcomes Through Mind Map in Human Reproductive System Topic in Natural Science Learning

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ABSTRACT

Natural science learning on the topic of the human reproductive system still gets a low score. That is due to the lack of use of learning media. The purpose of this study is to improve student learning outcomes through the use of mind maps in the topic of the human reproductive system. The research method used was classroom action research with the stages of pre-cycle, cycle 1, and cycle 2. The study was conducted in July 2019 and carried out at State Junior High School 1 South Tambun, Bekasi, Indonesia. The results showed that student learning outcomes increased from pre-cycle to cycle 1 (0.50) and from cycle 1 to cycle 2 (0.59) with a moderate gain score category. Whereas the pre-nuclear until cycle 2 (0.79) has a high gain score category. The use of mind maps is very useful because the reproductive system has many concepts that must be made simple. The conclusion is the use of mind maps can improve student learning outcomes on the topic of the human reproductive system.

1. INTRODUCTION

Natural science learning is growing with the various challenges that exist. The 21st century requires students to be able to analyze problems. These problems can be analyzed if students have the correct understanding. The topics discussed in natural science learning such as the environment, humans, animals, and plants require a good understanding of the concept (Coley & Tanner, 2015; Karaarslan & Teksöz, 2016; Leong, Mohd Said, Shahrill, & Perera, 2016). One indicator of learning success can be measured from student learning outcomes. Student learning outcomes are relatively low in natural science learning (Ichsan, Sigit, Miarsyah, Azrai, & Heryanti, 2019; Wicaksono, Minarti, & Roshayanti, 2018). Even for topics that are considered simple, sometimes students still do not have high scores in natural science learning.

Abilities such as higher-order thinking skills (HOTS) are needed in natural science learning. The challenges of the 21st-century cause students to have abilities that are more than memorizing, but must have HOTS (Garcia, 2015; Saido, Siraj, DeWitt, & Al-Amedy, 2018; Vidergor & Krupnik-Gottlieb, 2015; Yeung, 2015; Lubis *et al.*,2019). However, to reach the HOTS level, students must first increase their understanding as measured by learning outcomes. Usually, students will have difficulty understanding complex topics such as the organ system in humans, for example, the human reproductive system.

On this topic, students are required to be able to understand and apply various concepts. Students usually have difficulty in understanding it, so we need the help of a learning medium. In this context, mind map media is an alternative to be used. The characteristics of mind map media that are easy to use and practical have the potential to improve student learning outcomes on the topic of the reproductive system. The use of mind maps is also suitable for applying concepts to difficult learning topics (Daghistan, 2016; Polat, Yavuz, & Tunc, 2017).

The teacher as a facilitator in learning must be able to solve problems in the classroom (Agustini, 2019; Ariyanto *et al.*, 2019) One of them is through classroom action research. Using classroom action research to solve problems is an effective way to improve student competency in a relatively short amount of time (Ichsan & Mulyani, 2018; Khoiriyah & Husamah, 2018; Widiana & Jampel, 2016). That is because teachers do not need to develop media tools or models first. Based on the problems that have been explained above, the purpose of this study is to improve student learning outcomes using mind maps on the topic of the reproductive system.

2. METHODS

This research was conducted in July 2019 at Junior High School 1 South Tambun, Bekasi, Indonesia. The method used is classroom action research. The sample used consisted of 36 students at 9th grade. In this study consisted of pre-cycle, cycle 1 and cycle 2. First, giving the test results of learning outcomes at the pre-cycle stage. In cycle 1, the initial stage of planning is carried out by preparing a learning plan and determining the treatment that will be given. At this stage, it was decided that the treatment used mind map media. Then the treatment is carried out and observation and reflection are carried out. In cycle 2 the same is done. At the evaluation stage, the measurement of student learning outcomes is measured. Learning outcomes are calculated using the formula gain score below. The results of the calculation of the gain score indicate whether or not the increase occurred. The greater the gain score indicates that the increase is significant. The category of a gain score can be seen in table 1.

Table 1. Category for Gain Scores

Gain Score	Category
g ≥ 0,7	High
0,7 > g ≥ 0,3	Moderate
g < 0,3	Low

$$\text{Gain Score} = \frac{\text{Average score Cycle 2} - \text{Average Score Cycle1}}{100 - \text{Average Score Cycle 1}}$$

Figure 1. Gain Score

3. RESULTS AND DISCUSSION

The results of this classroom action research show that the score of learning outcomes in the topic of the reproductive system has increased. This can be seen from the average score that is getting bigger in table 2. Besides that, the interpretation of the gain score in table 3 also shows that there is an increase in the moderate and high categories. The graph also shows that the increase occurred.

Table 2. Average Score of Student Learning Outcomes for Each Cycle

Step	Average Score
Pre-Cycle	20.56
Cycle 1	60.42
Cycle 2	83.89

Table 3. Results of Interpretation of Gain Scores for Each Cycle

Step	Gain Score	Category
Pre cycle – cycle 1	0.50	Moderate
Cycle 1 – cycle 2	0.59	Moderate
Pre cycle – cycle 2	0.79	High

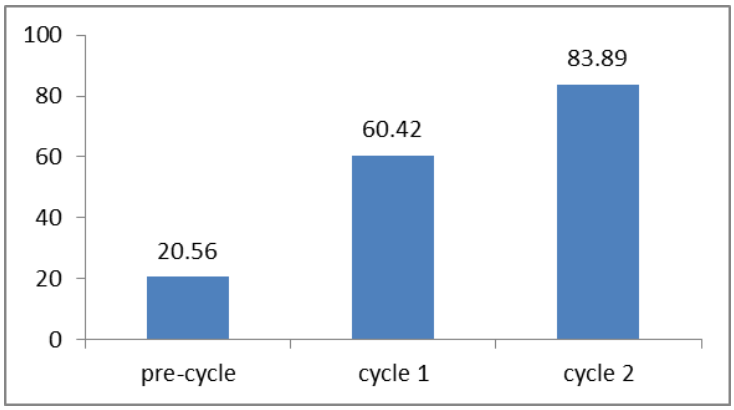

Figure 2. Average Student Learning Outcomes

Improved student learning outcomes are caused by the use of mind maps. That is because mind map is a media that can unite concepts so that they are easy to understand (Chang, Chiu, & Huang, 2018; Ihlebæk & Larsson, 2018; Polat *et al.*, 2017; Ramdhani & Muhammadiyah, 2015; Widiana & Jampel, 2016). In this context, the topic of the

reproductive system has a high level of conceptual complexity. So the use of mind map media will make students easily understand the topic of the reproductive system.

In this topic there are some difficult concepts such as mitosis and meiosis cell division. The concept between meiosis and mitosis is often confused because it is similar. This is a difficulty for students to understand cell division. The use of this mind map makes the difference between mitosis and meiosis clearly visible. And the link between the two concepts is clearly seen. This is important because students often experience misconceptions in natural science learning (Djanette & Fouad, 2014; Ichsan, Dewi, Hermawati, & Iriani, 2018; Keleş & Kefeli, 2010).

The use of mind maps is also useful for students in understanding the topic of reproductive organs in humans and their functions. On this topic often students do not understand because of the many Latin languages. The use of mind maps in the discussion of reproductive topics is very helpful for teachers in explaining various concepts. In mind map usage can be seen in the image below. In addition to learning outcomes, many things need to be improved on students. For example, to improve Higher Order Thinking Skills (HOTS) which are still low in students at Junior High School 1 South Tambun who have been studied previously (Ichsan, Hasanah, Aini, Ristanto, & Miarsyah, 2019; Ichsan, Sigit, & Miarsyah, 2019, 2019, 2019). That is because natural science learning in schools is still dominant using the teacher center approach. The teacher center approach and tools that are not based on HOTS are very difficult to improve learning outcomes, moreover to improve HOTS in accordance with the results of research that has been done previously at Junior High School 1 South Tambun (Ichsan, Iriani, & Hermawati, 2018; Ichsan, Iriani, Hermawati, & Dewi, 2019; Ichsan, Sigit, & Miarsyah, 2018). That is because, in natural science learning, students are required to be able to analyze problems not only memorize existing concepts.

Good natural science learning must also be accompanied by an increase in student behavior. Not only learning outcomes but must also be able to change student behavior for the better after natural science learning (Gardeli et al., 2017; Krettenauer, 2017). This change is considered quite difficult because of the limitations of the existing media in schools. This also becomes the basis for the continued development of learning media and evaluation tools that are more contextual for students (Charoencha, Phuseeorn, & Phengsawat, 2015; Kartikaningtyas, Kusmayadi, & Riyadi, 2018).

4. CONCLUSION

Based on the results of this study concluded that mind map learning media can improve student learning outcomes on the topic of the human reproductive system. The gain score is moderate and high. This is because mind maps can help students in learning that requires a lot of understanding of concepts. The recommendation of this study is to further develop learning tools to improve learning outcomes.

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