Research Article

Improving Students' Learning Result Using Numbered Heads Together Model

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ABSTRACT

This study aimed to determine the increase in student cognitive learning outcomes within material of occupational health and safety at the laboratory by implementing the Numbered Heads Together model, as well as obtains the students' perspective toward the implementation of the model. This research was conducted with a quasi-experimental method through one group pretest-posttest design conducted at University of Samudra. Data collection was done by pretest and posttest to find the escalation in cognitive learning outcomes, as well as a questionnaire to determine student responses to the numbered heads together learning model. The average value of N-gain cognitive learning outcomes was 0.51, which was categorized as moderate category; it meant that in general, there was an increase in cognitive learning outcomes of students. Descriptively, students also gave a positive response toward implementation of the Numbered Heads Together model, so it can be concluded that learning with the Numbered Heads Together Model can improve student cognitive learning outcomes.

1. INTRODUCTION

Learning process is one of the most influencing factors in the education unit. All changes, problems and challenges that arise in the world of education must be able to be faced with an open attitude and creative thinking; therefore, education is significant for humans to help develop their potencies. An active interaction between students and educators is needed in the teaching and learning process (Widiawati et al., 2014). The interaction makes the learning process more meaningful.Thus, the objectives of learning can be achieved as maximum as possible.

The interaction between educators and students also occurs at the tertiary level, namely between lecturers and students. Successful learning is demonstrated by the mastery of lecture material by students with a level of mastery of the concept of the material usually expressed by value (Fransisca, 2019). Slavin (2011) states that by using mutual discussion and collaboration with friends and interdependence, in the structure of tasks, goals and prizes, will ease students understanding concepts that are classified as difficult. The purpose of education in learning can be achieved in one way, namely the application of effective learning models. Learning models that are considered effective to be applied in the learning process

are cooperative models, one of which is the numbered heads together. Jacobsen (2009) states that the Numbered Head Together (NHT) is a learning model that involves more students in discussions to understand the material in a lesson and evaluates the extent of students' understanding of the material. This model can be applied to all subjects and for all levels of students. In this learning model, students are grouped into learning groups consisting of students who work together in a learning activity. Every student in one group is expected to be able to work together and take responsibility both to themselves and the group.

Some previous studies mentioned that, the NHT type of cooperative learning model affected critical thinking skills with an effect size index of 0.7 with a percentage of 76% better than conventional learning (Wati and Fatimah, 2016). The NHT learning model also has an effect on the ability to remember students by 24.03% higher than conventional learning (Nursyamsi and Corebima, 2016). In addition, the average student learning outcomes using the NHT model is greater than the use of the TPS model (Rahayu and Suningsih, 2018). Laboratory Basic Engineering course is one of the basic courses that must be attended by first semester students with a total weight of

two SKS. One of the material taught is Occupational Health and Safety in the Laboratory.

Based on the results of preliminary observations on the previous material, information was obtained that there were several obstacles in which many of the students were less motivated so that they had difficulty understanding the learning of Basic Laboratory Techniques, which resulted in low learning outcomes. Therefore, efforts are needed to make changes and improvements to learning strategies that can lead students to want to be actively involved in learning activities. The change chosen in this study was the application of the Numbered Head Together learning model.

2. MATERIALS AND METHODS

This study was done as a quasi-experimental research. The design used in this study was one group pretest posttest design (Fraenkel *et al.*, 2012). This research consists of three stages, namely: (1) giving a test at the beginning of learning (pretest); (2) the implementation of learning with the model numbered heads together; and (3) giving tests at the end of learning (posttest).

This study was conducted in the Department of Biology Education at Samudra University. It was done during the teaching of health and safety material within the course of Technics in Laboratory during the academic year of 2015/2016.

2.1 Data Collection

The samples in this study were 21 students who took Laboratory Engineering courses in the 2015/2016 academic year. Data were collected using test and non-test instruments. Improved student cognitive learning outcomes were measured using a test instrument in the form of a pretest and posttest. Student responses toward learning using the numbered heads together model were collected using a non-test instrument in the form of a questionnaire sheet.

2.2 Data Analysis

The research data in the form of pretest and posttest values were analyzed by calculating the normalized gain (N-gain). According to Fraenkel (2012) the increase that occurs after learning is carried out can be calculated with the following formula:

$$g = \frac{posttests\ score - pretest\ scone}{mximum\ score - initial\ score\ (pretest)}$$

The responses toward questionnaires were analyzed using descriptive technic as a triangulation toward the result of statistical data.

3. RESULTS AND DISCUSSION

3.1 Statistical Data Analysis

The score for pretest and posttest was described on Table 1, the N-gain was in table 2 and students' responses was in table 3.

Table 1.Score for Pretest and Posttest

Statistical Parameter	Pretest	Posttest
Number of Students	21	21
Lowest Score	75	95
Highest Score	25	60
Average	46.16	74.52

Table 2. N-gain for Learning Result

Statistical Parameter	N-Gain for Learning Result
Number of Students	21
Lowest Score	0.89
Highest Score	0.20
Average	0.51

Table 3.Analysis of Students' Responses toward Numbered Head Together

Responses	Number of Responses	Score	Percentage (%)
Highly agree	47	188	15.69
Agree	192	576	45.00
Disagree	81	162	12.65
Highly disagree	0	0	0

3.2 Discussion

The initial state of the sample is measured by being given a pretest, then given a numbered heads together learning, and then given a posttest. The average value of student cognitive learning outcomes at the time of the pretest is 46.19 then an increase in the value at the posttest is 74.52 can be seen based on Table. This is consistent with the

opinion of Mulyana et al. (2016) which said that learning outcomes increased by 89.65% after the application of the NHT model. The similar result was also obtained by Wijayantiet.al (2017), which indicated improvement toward learning by implementing NHT.

Increased student cognitive learning outcomes achieved can be determined by the calculation of N-gain. Based on Table.2 obtained the highest N-gain value is 0.89 and the lowest is 0.20. The results of the average N-gain is 0.51 included in the medium category. This means that in general there is an increase in student cognitive learning outcomes after learning about occupational health and safety material in the laboratory with the numbered heads together model. This is consistent with the opinion of Ernawati (2015) who said that learning outcomes in the Biochemistry course and student activities in learning have increased after the use of the numbered heads together model. And Sulfiani (2016), also said that there was an increase in student learning outcomes after the application of the cooperative learning model numbered heads together.

Based on the analysis of the questionnaire responses of students in Table 3, a percentage calculation was made of each response. The questionnaire sheet consisted of 16 statement items that were filled out by 21 students, based on the results of the analysis obtained answers that strongly agree as much as 15.69%, agree as much as 45.00%, disagree as much as 12.65%. The percentage of all questionnaire answers obtained was 73.34%, so that it was included in the agreed criteria and it was generally concluded that the students agreed if the numbered heads together learning model was applied.

4. CONCLUSION

Based on the results of research and discussion it can be concluded that learning laboratory techniques with the implementation of the numbered heads together model can improve student cognitive learning outcomes, and overall the implementation of the numbered heads together model gets a positive response from students.

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