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The Influence of *Conceptual Understanding Procedures* (CuPs) Learning Model with (The Use Of) Bio-Quartet Cards

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Abstract

This study aimed to describe the influence of *Conceptual Understanding Procedures* (CUPs) learning model with the use of bio-quartet cards on the seventh-grade students' learning interest and outcomes on Energy material at SMP N 17 Tegal. The study employed *Quasi-Experimental*; *Nonrandomized Control Group Pretest and Posttest Design*. The population of the study was all the seventh-grade students from 8 classes in the academic year 2017/2018. The sample was taken by using *purposive sampling technique*, obtaining two classes as the subject of this study. VII G as the control group was taught using *discovery learning* model and VII H as the experimental group was given a CUPs learning model with the use of bio-quartet cards. The result of this study showed N-gain of students' learning outcomes of the experimental group was 0.33 and that of the control group was 0.24. Control group learning interest was stagnant, on the other hand, experimental group learning interest improved at 3% on "very interest" category. Students' learning interest and outcomes of both groups were not significantly different. The correlation test results of the two variables clearly showed that students' learning interest and outcomes do not relate significantly, both the experimental group and the control group.

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INTRODUCTION

Learning models being charged in Permendikbud No. 13 of 2014 and Permendikbud No. 22 of 2016 is learning models which accentuate activity and creativity, inspiring, fun and initiative, student-centered, authentic, contextual, and meaningful to the students' daily life (Kemendikbud, 2017). Another cooperative learning model which is identical with science learning (process) is Conceptual Understanding Procedures (CUPs). Mariana and Wandi (2009) stated that CUPs is constructivism learning process which has three stages of learning; namely individual learning (self-study), group learning, and class discussion. CUPs learning model emphasizes the conceptual understanding process of the students. The advantages of CUPs learning model are that teacher can be easier to control the students and students know well what concept they have to master. Using games, puzzles, and other activities that are inviting and carry their own intrinsic motivation is another way teachers make lessons interesting for students (Arends, 2012). Concept recognition is done by playing using bio-quartet cards media at the group learning stage so that the learning situation becomes fun. Thus, the excellence of this model, in addition to students being able to understand concepts that can improve learning outcomes, in learning, students are also motivated and interested in learning more because it is done by playing.

Game-based learning is a learning process using the game, whether it is in the form of a video game or conventional game, which is educating. When designing a game of education, we should consider not only the entertaining aspects but also the instructional efficiency (Linek, 2011).

Yuniar (2013) and Narstyodewi (2015) had proved on their research that CUPs learning model could improve learning outcomes, cognitive abilities, and science process skills of secondary school students. Similar research was also conducted by Sukaesih and Sutrisno (2017), then, they concluded that CUPs learning model had a positive effect on students' critical thinking skills on protist material in high school. The CUPs learning model emphasizes understanding concepts that are perceived as difficult and carried out cooperatively so that this model can improve students' communication skills (Purnami, 2018).

From the results of an interview with science teachers at SMP Negeri 17 Tegal, the students' learning outcomes are not optimal yet, more than 50% of students did not achieve the KKM score. The challenge of teaching science is how to trigger students' interest in learning. The teacher has applied a discovery learning model, however, this model has some obstacles since the number of students is quite large in each class.

Based on the problems described, the purposes of this study were (1) to describe the influence of CUPs learning model assisted by bio-quartet cards on secondary school students' interest in learning energy material (2) to describe the influence of CUPs learning model assisted by bio-quartet cards on secondary school students' learning outcomes on energy material.

Through this study, it is expected to prove McKittrick's theory (1999) which says that CUPs learning model was able to provide conceptual understanding to students and increase students' learning outcomes. In addition, this study is also expected to provide information about the application of CUPs learning model to students' interests and learning outcomes, and therefore, it can be an alternative solution for teachers to overcome problems in the classroom.

RESEARCH METHOD

This research was held on October – November 2017 at SMP Negeri 17 Tegal. By using purposive sampling, students' of VII G and VII H in the academic year 2016/2017 and also one of the science teachers were chosen as the subject of the study. This was an experimental study focused on using *Quasi-Experimental Nonrandomized control group pretest-posttest design* (Ary *et al*, 2010). The instruments of the study were a questionnaire on students' learning interest, essay tests on energy as a system in life, and observation sheets on the implementation of CUPs learning model. The data were taken by doing observation, test, and giving questionnaires to the subject of the research. The data were analyzed statistically by testing the normality and homogeneity, calculating the t-value of the significant difference between the two means of experimental and control groups' learning outcomes, the normalized gain score (N-gain), and the correlation between two variables of the research.

RESULTS AND DISCUSSION

Students' learning interest of both control and experimental groups were categorized as high and very high. The scores of students' interest both in control and experimental groups were presented in Figure 1.

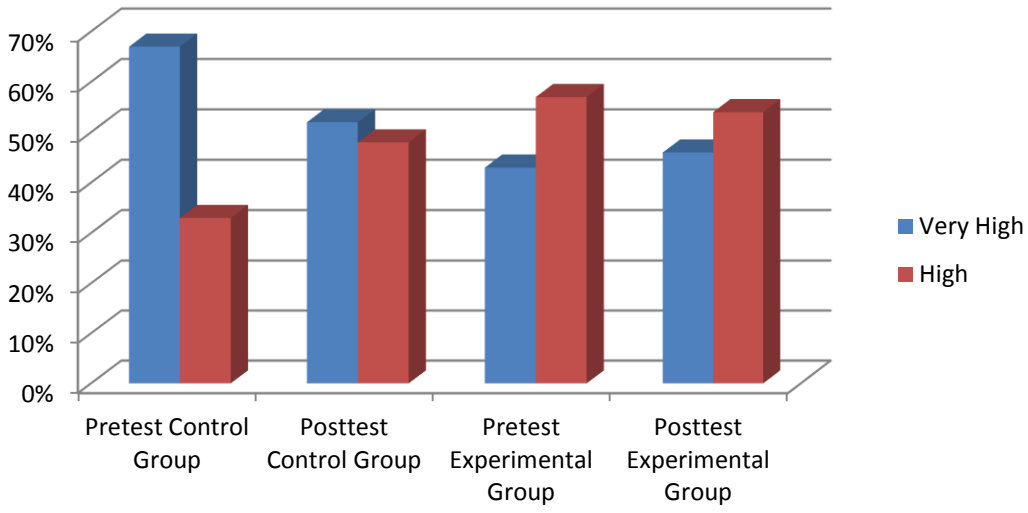

Figure 1 Percentage of students' interest in control dan experimental groups

The use of bio-quartet cards in combination with CUPs learning model for the experimental group aimed to create a conducive learning atmosphere, so as to increase the students' learning interest in the experimental group. Learning method using games is one way to make learning become so interesting, by paying attention to the process of mastering concepts, that can improve students' learning outcomes (Arends, 2012). The students' interest both in control and experimental groups were not significantly different. Aritonang (2008) in his study stated that there were four factors that influenced students' interests, namely the way teachers teach (teaching method), teacher's character, the atmosphere of the classroom and learning facilities being used. In this case, the learning facility was bio-quartet cards in which,

according to students, it was too difficult to play and the card media was no longer attractive for students who live in the current digital game era. This was suspected to be a factor that led to an insignificant increase in learning interest in this study.

The recapitulation of students' learning outcomes both in control and experimental groups was presented in the following graph.

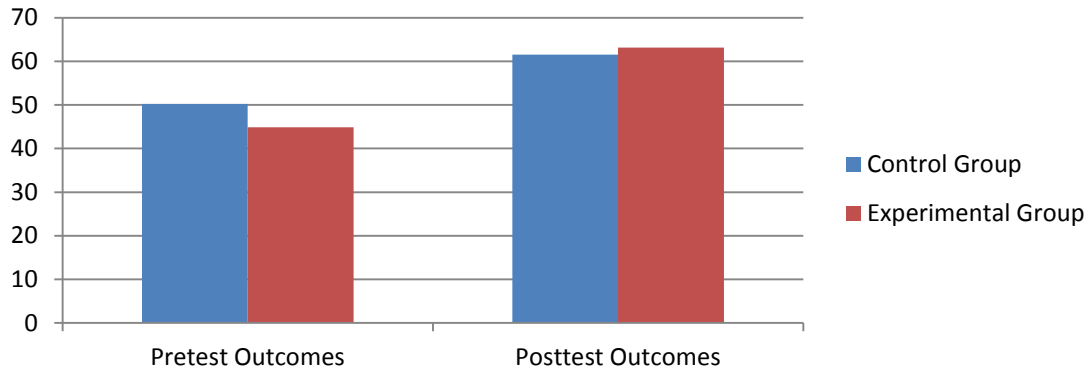

Figure 2 Recapitulation of students' pretest and posttest scores

Based on the result presented in Figure 1, it can be seen that the mean score of the experimental group increased higher than the control groups. It was proved by the N-Gain value of learning improvement in the experimental group was higher than that in the control group. Data of N-Gain value were presented in Table 1.

Table 1 N-Gain of Students' Learning Outcomes

Group	Mean score		N-Gain	Criteria
	Pretest	*Posttest*		
Control	50,22	61,56	0,24	Low
Experimental	44,85	63,21	0,33	Medium

The improvement of learning outcomes of the control group was low, while the improvement of learning outcomes of the experimental group was classified as medium. The result of t-test showed no significant differences between the learning outcomes of both control and experimental groups. The t-test results were shown in Table 2.

Table 2 t-test result of students' learning outcomes on the *posttest*

Group	Mean	N	Sig	p	Criteria
Control	61,56	27	0,612	0,05	No significant difference
Experimental	63,21	28			

Data on learning interest scores and student learning outcomes in the control and experimental groups were analyzed using correlation tests to determine how much the influence between the two research variables. The result of the correlation test were shown in Table 3.

Table 3 The result of the correlation analysis between students' learning interest and outcomes

Variable	Group	R	R^2	F
Learning interest and outcomes	Control	0,167	0.028	0,395
	Experimental	0.323	0,104	0,101

The CUPs model conducted in the experimental group had been observed for six meetings. The results of the implementation of CUPs learning model with the use of bio-quartet cards were presented in Table 4.

Table 4 The result of the analysis of the implementation of CUPs learning model

No.	Activity	Implementation	
		Percentage	Criteria
1.	Teacher conveyed learning objectives and motivated the students	100%	Very Good
2.	Students were enthusiastic, motivated to take part in learning	83,33%	Very Good
3.	The teacher provided information about a concept that would be studied	83,33%	Very Good
4.	Students knew what they had to do independently	66,67%	Good
5.	The teacher gave individual assignments to students.	100%	Very Good
6.	Students performed independent tasks	83,33%	Very Good
7.	The teacher divided students into groups of 3-4	100%	Very Good
8.	Students gathered and worked together with their own groups	66,67%	Good
9.	The teacher facilitated while monitoring class discussions	100%	Very Good
10.	Students presented the results of group discussions, and then discussed again in front of the class.	83,33%	Very Good

The result of the correlation coefficient (F) in the control and experimental groups was greater than 0.05. This meant that the correlation between students' learning interest and outcomes in both the control and experimental groups was not significantly related. R^2 value showed that the influence between students' learning interest and outcomes in the control class was only 2.8%, whereas in the experimental group was 10.4%. In other words, the influence of interest toward students' learning outcomes in the experimental groups was only 10.4%, while the rest was influenced by other variables.

The improvement of students' learning outcomes in the experimental group that had been treated with CUPs learning model assisted by bio-quartet cards is classified as medium. This is not in line with Waren's (2012) research which stated that learning with games could improve students' communication skills. This might happen because not all students play an active role in any group activities carried out when the teaching and learning took place in the experimental group as shown in Table 4 so that students could not achieve their maximum scores at the time of the evaluation process.

Another factor that influences the achievement of learning outcomes in the experimental group is the ignorance of students in carrying out individual tasks given. Some students were still confused about the tasks that had to be completed individually, even though it had been run for six meetings so that the group discussions were not optimal (Table 4). The quality of the learning process had not fully run optimal, although all stages of the CUPs learning model were well implemented. The practicum activities which were originally listed in the RPP could not be carried out due to limited facilities and infrastructure. The practicum

was then replaced by a digital experimental simulation. The quality of the less optimal learning process is thought to result in an increase of the learning outcomes of the experimental group as moderate.

CONCLUSION

Based on the research that has been carried out, it can be concluded that CUPs learning model assisted by bio-quartet cards does not influence the students' learning interest on energy material at SMP Negeri 17 Tegal. The lack of optimal of the class management process and too deep material provided on the cards are thought to be the factors that drive the CUPs learning model assisted by the bio-quartet cards to be no effect.

The CUPs learning model assisted by bio-quartet cards does not affect the students' learning outcomes on energy material at SMP Negeri 17 Tegal. The students' learning interest and outcomes do not have a significant correlation. This is because not all students carry out the CUPs learning process well. Practicum cannot be implemented due to limited facilities and infrastructure.

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