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Effect of Roundtable Learning Model on MathematicsAchievement Viewed from The Student Cognitive Style

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ABSTRACT

This study was conducted to determine the effect of roundtable learning model and cognitive style on mathematics achievement. This research was quasi experimental research with factorial design 1 x 2. The sample of research consists of 88 students. The data in the research was two ways analysis of variance with unequal cells, with the 5% level of significance. The results of the research were as follow: (1) Students who have field independent cognitive style have better mathematics achievement than student who has the field dependent cognitive style: (2) In roundtable model, students who have field independent cognitive style have better mathematics achievement than students who have the field dependent cognitive style.

INTRODUCTION

Mathematics is one of science that plays an important role to grow the ability to think logically, systematically and critically in students. Therefore, the need for math teachers to continuously improve the learning process in the classroom in order to support the speed and accuracy of students' way of thinking. Mathematic education experts are also continuing to update and develop research to find solutions to how mathematical learning is perceived by most students to be a fun and challenging lesson.

The process of teaching and learning activities in the classroom depends on the learning models used by teachers. Learning model is the basis of practice used by the designer of learning as a guide in planning lesson in class to reach certain learning goal. Thus, each learning activity should be designed seriously so that it can be a systemically

organized objective activity and can meet the needs of each student so that students are more motivated and have a high interest in learning mathematics and can improve students' mathematics achievement.

There are many learning models that can be used in mathematics learning. One of the learning model that is expected to improve mathematics learning achievement is cooperative learning model. Cooperative learning is the learning of constructivist theory. This learning comes from the concept that students will more easily find and understand difficult concepts if they are discussions with each other. Students regularly work in groups to help each other solve problems in learning (Trianto, 2014). According to Brunner, students are said to learn if students actively build new knowledge based on experience or knowledge already owned by students (Trianto, 2014). Individuals who do the learning process must take the learning experience and try to find the meaning of the experience. Learning model which include on cooperative learning is a roundtable learning model.

Student learning activity in the classroom is also suspected depending on how the characteristics of students in receiving learning and how students intersect with teachers and friends during the learning process takes place. Each student has their own preferred way of composing what they sees, memorizes and thinks about. The differences between students who settled in how to organize and manage information provided by teachers and learning experiences are known as cognitive styles. Cognitive style is an important variable that affects students' choices in academics, continued academic development, how students learn as well as, how students and teachers interact in the classroom. The cognitive style can be conceptualized as an attitude, choice or strategy that stably determines the typical ways people receive, remember, think and solve problems (Slameto 2013: 160-161). According to Witkin, Moore, Goodenough and Cox (1977), cognitive styles that have been studied extensively are field dependent and field independent.

Based on previous exposure to the formulation of the problem in this research are as follows: (1) Which has better mathematics achievement between studens who have field independent cognitive style or students who have field dependent cognitive style:. (2) In roundtable learning model, which students have better mathematics achievement between students who have field independent cognitive style or students who have field dependent cognitive style?

METHODS

This research is a quasi experimental research with 1 x 2 factorial design and have two variable. Learning model and cognitive style as variable independent and achievement learning students in the subject of the equation straight line as veriable dependent. Research population was all students of the eight grader of junior high school in Karanganyar Regency in academic year 2016/2017. Research Sample taken by stratified cluster random sampling technique. The sample are SMPN 1 Mojogedang as high academic school, SMPN 3 Kebakkramat as middle academic school and SMPN 2 Jumapolo as low academic school. Grouping schools is used data results of national examination in academic year 2014/2015. Accumulation method data covered by 3 method: (1) documentation is used to get ability early data mathematics students; (2) test method is used to get data of mathematic achievement students; (3) Group Embedded Figures Test (GEFT) is used to knowing cognitive style of students. GEFT

instrument contains three sections with 25 complex figures from which participants are asked to identify eight simple forms (labeled A to H). Section one of the GEFT includes seven complex figures, and sections two and three include nine complex figures each. GEFT have reliability coefficient of 0.82 (Witkin, Oltman, Karp and Raskin, 1971; Salmani dan Nodoushan, 2007). Ranked field dependent student as those with scores of 0-9. The students with scores 10 to 18 were ranked as field dependent (Brenner, 1997).

In this research before analysis of variance, prerequisite test first used normality test by Liliefors, homogeneity test by F test. For hypothesis testing by two ways analysis of variance with unequal cells (Budiyono, 2015).

RESULTS AND DISCUSSION

The final sample consisted of 88 respondents. 22 respondents have FI cognitive style and 66 respondent have FD cognitive style. Descriptive data roundtable model in each cognitive can be seen in Table 1.

Table 1. Descriptive data roundtable model in each cognitive

Learning Model		**Cognitive Style**	
		FI	**FD**
Roundtable	N	22	66
	X_{Max}	80	64
	X_{Min}	44	20
	X (Mean)	60,0000	41,0303
	S	8,9016	9,8808

Table 1 shows that students who have FI cognitive style get mean score better than students who have FD cognitive style. Students who have FI cognitive style get 60,00 mean score, while students who have FD cognitive style get 41,03 mean score.

Prerequisite test result conclude that all samples from the population has a normal distribution and have same various. In prerequisite test result has fulfilled to do analysis variance. The analysis of variance result mathematics achievement students were as follows.

1. Normality Test For Mathematics Achievement

Normally test used to find out whether the data of samples from population is normally distributed. In this research, normally test by Lilliefors because because this research used singular data frequency distribution. The result of normally test with significance level of 5% can be seen in Table 2.

Table 2. The result of normality test of mathematics achievement

Group	L_{obs}	L_{table}	**Conclusion**
Roundtable	0,0849	0,0944	Normal
FI	0,1734	0,1889	Normal
FD	0,0870	0,1091	Normal

Table 2 show that for each samples Ltab > Lobs so that decisions taken is H0 accept, it means each samples from population is normally distribution.

2. Homogeneity Test For Mathematics Achievement

Homogeneity test is used to find out whether the data of samples have same variance or not. In this reseach, samples must have same variance. To know samples have same variance, researcher can used homogeneity test by Bartllet method. The result of homogeneity test with significance level of 5% as follows.

Table 3. The result of homogeneity test of mathematics achievement

Groups		X^2_{obs}	$X^2_{(0,05;k-1)}$	Decisions	Conclusion
Cognitive Style	2	0,3306	3,841	H_0 accepted	Population of Homogeneity Variance

Based on table 3 visible X^2obs < X^2table, so that we can conclusion that data ofsamples have same variance or homogeneity.

3. Analysis Test of Two Two Ways Analysis Of Variance With Unequal Cells

Table 4. Summary Analysis Test of Two Ways Analysis of Variance with Unequal Cells

Source	Sum of Squares	Degree of freedom	Mean squares	F_{obs}	F_{table}	Decision Test
Cognitive Style	5937,5152	1	5937,5152	63,7491	3,95	H_0 Rejected
Error	8009,9394	86	132,1863	-	-	-
Total	13947,4545	87	-	-	-	-

Table 4 show that Fobs = 63,7491 > F0,05;1;86 = 3,95, so that Fobs ∈ Critical Region, in this case H0 be rejected. It means that there are different mathematics achievement between students who have FI cognitive style and students with have FD cognitive style. Cognive style just have two value so that to know which students have better mathematics achievement between students who have FI cognitive style and students with have FD cognitive style enough see marginal average. For marginal average can be seen on Table 5.

Table 5. The Marginal Average of Achievement Learning Mathematics

Learning Model	Marginal Average Cognitive Style	
	FI	FD
Roundtable	60,0000	41,0303

Table 5 show that students who have FI cognitive style get marginal average score bigger than students who have FD cognitive style. Students who have FI cognitive style get 60,00 marginal average score , while students who have FD cognitive style get 41,03 marginal average score. It mean that students who have cognitive style FI have better mathematics achievement than students who have the cognitive style FD. To conclude the second hypothesis it`s enough related to the first hypothesis that students who have cognitive style FI have better mathematics achievement than students who have the cognitive style FD. Based on the first hypothesis can be in roundtable learning model, students who have cognitive style FI have better mathematics achievement than students who have the cognitive style.

CONCLUSION

Based on the results of research and discussion before it can be concluded include: (1) Students who have cognitive style FI have better mathematics achievement than students who have the cognitive style FD. (2) In roundtable learning model, students who have cognitive style FI have better mathematics achievement than students who have the cognitive style FD.

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