

THE EFFECT OF RECIPROCAL TEACHING AND GROUP INVESTIGATION TOWARD STUDENTS' CRITICAL THINKING SKILL

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ABSTRACT: *This quasi-experimental research aims to examine the differences effect of reciprocal teaching and group investigation models on students' critical thinking skills. The students of social science grade 11 of Senior High School 6 Kendari Indonesia was assigned to be the subject of this research. Student's critical thinking skill is measured using essay test (with reliability coefficient equal to 0,874). The normality of data is determined using Shapiro-Wilk test, and the homogeneity of the data is determined by the Levene test. The research hypotheses are tested by using student's t-test. The results reveal that there is any significant difference in students' critical thinking skill before and after the application of reciprocal teaching model. There is any significant difference in students' critical thinking skills before and after the application of group investigation model. The critical thinking skills of students taught by the reciprocal teaching model are better than those taught by group investigation model. Thus, if we want to improve students' critical thinking skills, especially, in economic subjects then one of the alternatives that can be used is the application of reciprocal teaching model.*

KEYWORDS: Reciprocal Teaching, Group Investigation, and Critical Thinking Skills

INTRODUCTION

Research Background

Critical thinking has an important role in improving student learning outcomes (Baker, Rudd, & Pomeroy, 2001; Noone & Hogan, 2016; Renjith Kumar & James, 2015; Song, 2016). The target of teaching critical thinking to students is to make them become active learners, and to improve their own individual characteristics (Cırık, Çolak & Kaya, 2015; Marlowe & Page, 2005; Tuncel, 2015; Ahiri, et al, 2015).

Developing critical thinking is very important in teaching and learning (Gossett & Fischer, 2005). Critical thinking leads student to carefully consider and assess information or situations that occur based on his/her knowledge, thought, and experience in exploring facts as well as drawing conclusion logically (Boonjeam et al., 2017). A student who become critical thinker shows a habit of self-confidence, contextual perspective, creativity, flexibility, curiosity, intellectual integrity, intuition, openness, persistence, and reflection (Rowles, Morgan, Burns, & Merchant, 2013).

Research on critical thinking has been conducted by various researchers in various fields of study, for example: in education field (Wals & Jickling, 2002; Pithers & Soden, 2007; Gellin & Gellin, 2013; Chairunnisa, 2016; Ahiri, et al, 2015); in language field (Rahman, Azmi, Wahab, Abdullah, & Azmi, 2016; Ordem, 2017), in techniques field (Jacob & Sam, 2008; Nazleen & Wednesday, 2013; & Dellavalle, 2016), in management field (Natale & Ricci, 2006;

Ayad, 2010); in nursing field (Khosravani, Manoochchri; and in nursery field (Memarian, 2004; Popil, 2011; Atay & Karabacak, 2012; Mahmoud, 2012).

The environment of the teaching and learning in Indonesia is still less encouraging students to think critically because teachers merely present material to students focused on concepts understanding (Hayati, Utaya, & Astina, 2016). The results of study conducted by Trend in International Mathematics and Science Study (TIMSS) reveals that the achievement of Indonesian students on Mathematics exist on ranking 46 of 51 countries with score index attained 397 (Mullis & Martin, 2016). This condition is not much different from the results of study conducted by Program for International Student Assessment (PISA) in 2015, which revealed that Indonesia existed on ranking 69 out of 76 countries (Coughlan, 2015).

Similar to other provinces in Indonesia, the problems concerning to student's critical thinking also occur in Southeast Sulawesi, as shown on Table 1. Based on the table, it is clear that Southeast Sulawesi Province occupies the third highest position of not passing the national exam with the total of students who follow the exam to about 26,039 students. The number of students who did not pass the national exam in this province was 490.

Tabel 1: The Five Lowest National Exam Result on Academic-Year of 2016/2017

Rank	Province	Number of Test Takers	Number of Failed Test Takers
1	Aceh	56.981	785
2	North Sumatera	119.315	514
3	Southeast Sulawesi	26.039	490
4	West Nusa Tenggara	46.251	460
5	North Nusa Tenggara	44.685	448

Source: Bureau of Research and Development, Ministry of Education of Republic of Indonesia (2016)

As part of Southeast Province, senior high school (SHS) students in Kendari city experience the same problem as shown on Table 2. The grade 11 of social science students have low ability in solving high-level thinking problems. The table also shows that the grade 11 of social science students have the lowest critical thinking skill compared to other high school students in this area.

Tabel 2: Critical Thinking Skill of Grade 11 of Social Science Students (in Economic Subject) in Ten Senior High Schools in Kendari City

School	Number of Student	Critical thinking skill								
		C4			C5		C6			
		Number of Test Item	Number of Student with Correct Answer		Number of Student with Correct Answer		Number of Student with Correct Answer			
	B	S	B	S	B	S	B	S		
SHS 1 Kendari	127	5	4	4	61	66	59	68	35	92
SHS 2 Kendari	74	6	4	3	57	17	51	23	27	47
SHS 3 Kendari	104	6	5	3	53	51	47	57	25	79
SHS 4 Kendari	72	5	5	3	54	18	53	19	33	39
SHS 5 Kendari	107	6	3	4	44	63	42	65	23	84
SHS 6 Kendari	133	5	4	3	56	77	39	94	26	107
SHS 7 Kendari	134	6	3	4	52	82	36	98	31	103
SHS 9 Kendari	128	5	5	3	54	74	47	81	24	104
SHS 10 Kendari	64	6	3	3	29	35	27	37	23	41

Source: Economic Teacher of Grade 11 of Senior High Schools in Kendari City

Based on these facts, it is necessary to improve students' critical thinking skills. One of the alternatives that can be applied to overcome the problem is using cooperative learning model (Nezami, Asgari, & Dinarvand, 2013). Nezami, Asgari & Dinavarda (2013) in their research revealed that students' critical thinking can be increased through the application of cooperative learning model.

The type of cooperative learning model that can be used to improve students' critical thinking is reciprocal teaching (Lestari, 2016, Palincsar & Brown, 1984; Sison, 1988; Alim, Umam & Rohim, 2015) and group investigation (Chairunnisa, 2016; Meilia & Disman, 2016). Reciprocal teaching model not only can increase students' understanding of the text (teaching materials), but it can also improves students' critical thinking skills (Yulianti, 2010; Muslimin, Indaryanti & Susanti, 2017). Reciprocal teaching is a teaching procedure designed to teach students about cognitive strategies and help students to understand teaching and learning materials (Arends, 1997).

Another teaching and learning model that can improve students' critical thinking skills is group investigation (Chairunnisa, 2016; Meilia & Disman, 2016). It is a teaching and learning model where students with different academic abilities are placed in to four or five groups. Each group is the mixture of high, moderate, and low academic ability or variations of different ethnic groups, gender, racial and social groups (Slavin, 2009). In the application, group investigation model develops high-level thinking skills, improves individual achievement through small group problem-solving tasks, develops student responsibility for teaching learning and promotes self-direction (Tan, Sharan, & Lee, 2006).

RESEARCH METHODS

This research is a quasi-experiment with non- equivalent control group design. This research was conducted at Senior High School 6 Kendari during the academic-year 2017/ 2018. The 32 students of grade 11 of social science I program were selected as experimental group 1, which was taught by reciprocal teaching model, and students of grade 11 of social science II program

were selected as experimental class 2, which was taught with group investigation model. The data were collected through an essay test (with reliability level = 0.874). Data normality was determined by Shapiro-Wilk test, and the homogeneity of data was determined by Levene test. The research hypothesis was tested using Student's t-test.

RESULTS

The Differences in Critical Thinking Skills of Students Before and After the Application of Reciprocal Teaching Models

The result of comparison test of students' critical thinking skill before and after the application of reciprocal teaching model can be seen in Table 3.

Table 3: Paired t Test Result on Students' Critical Thinking Skill

Paired Samples Test

	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pretest - Posttest	40,10438	5,70863	1,00915	42,16255	38,04620	39,741	31	,000

The result of Paired t-Test in Table 3 shows that the t-count is bigger than t-table ($39,741 > 1,694$), and this as a strong evidence of rejection of $H_0: \mu_1 = \mu_2$. This means that there is any significant difference in students' critical thinking skills before and after the application of the reciprocal teaching model. This difference can be further confirmed by the average value shown in Table 4.

Table 4: The Average of Pretest and Posttest of Students Critical Thinking Skill

Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Pretest	40,6241	32	6,97780	1,23351
Posttest	80,7284	32	6,11936	1,08176

Table 4 shows that the average of students' critical thinking skill before the teaching and learning was still low; it was 40,624. After the implementation of the reciprocal teaching model the average increased to 80,728. This means that students' critical thinking skills after teaching and learning using the reciprocal teaching model are higher than before the application of the model.

The Differences in Critical Thinking skill of Students before and After Application of Group Investigation

The result of test on students' critical thinking skill before and after the application of group investigation model can be seen in table 5.

Table 5: Paired t-Test Results on Students' Critical Thinking Skill

Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Pretest - Posttest	32,39563	4,21104	,74441	33,91387	30,87738	43,518	31	,000

Paired t-Test results in Table 5 show that the t-count coefficient is greater than the value of t-table ($43,518 > 1.694$); so there is enough evidence to reject of $H_0: \mu_1 = \mu_2$. This means that there is any significant difference in students' critical thinking skills before and after the application of group investigation model. This difference can be further confirmed by the average value as shown in Table 6.

Table 6: The Average Score of Pretest and Posttest on Students' Critical Thinking Skill

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	41,9797	32	5,54273	,97982
	Posttest	74,3753	32	4,70865	,83238

Table 6 shows that the average score on students' critical thinking skill before the teaching and learning is still low; it is 41.98. After the implementation of the model, the average score reached 74.38. This means that students' critical thinking skills after the application of group investigation model is higher than before.

The Differences in Students' Critical Thinking Skills through the Application of Reciprocal Teaching Models and the Application of Group Investigation Model

The results of students' critical thinking skill through the application of reciprocal teaching model and group investigation model can be seen in Table 7.

Tabel 7: The Result of t-Test on Students' Critical thinking skill

Group	N	Average	t-count	t-table	Sig.	Conclusion
Eksperiment 1	32	80,728				

Statistical results with independent test samples t-test in Table 7 obtained the value of Asymp Sig (2-tailed) of 0.000, which is smaller than 0.05 and the result of t_{count} is greater than t_{table} ($4.655 > 1.694$), and so that $H_0: \mu_1 = \mu_2$ is rejected. This means that there is any significant difference in students' critical thinking skills between students taught with reciprocal teaching model and those taught with group investigation.

DISCUSSION

The results of the first hypothesis testing shows that there is any significant difference in students' critical thinking skills before and after the application of reciprocal teaching model. This finding is in line with Kalpana (2014); Ensign (2016); and Lestari (2016) who conclude that reciprocal teaching model helps students understand the text and encourage their critical thinking. Palincar & Brown (1984) found that the reciprocal teaching model is effective enough to help students in the comprehension of reading materials. The students' understanding in the teaching and learning materials or problems they face will empower their critical thinking skill, especially on the ability to give argument with logical reason, ability to give interpretation to a problem, ability conduct investigation and ability to give alternative solution.

The result of the second hypothesis testing shows that there is any significance difference on students' critical thinking skill before and after the implementation of group investigation model. This finding is strengthened by the results of study conducted by Chairunnisa (2016) who conclude that group investigation model helps students improve their critical thinking skills. Group investigation provides a series of activities that facilitate students' critical thinking skills, especially opportunities to express their ideas and opportunity to ask questions. The main core of group investigation is to keep students active in doing tasks, analyzing, and evaluating their knowledge. This is done through assignments and formative tests given. In line with the result of this research, Santrock (2009) found that group investigation model can make students to think critically by giving a controversial topic that presents two sides problems for student to discuss. In addition, students also involve themselves in group organizing stage and the selection of topics to be investigated by each group.

The result of the third hypothesis testing reveals that there is any significant difference on students' critical thinking skill through the application of reciprocal teaching model and through the application of group investigation model. These findings are in line with Al-Harby (2016) who states that the reciprocal teaching model includes a series of steps that reflect the development of higher-order thinking skills in the teaching and learning process which include asking questions, clarifying, and predicting. The kinds of activity such as predicting, clarifying, summarizing, connecting, questioning, and concluding, and building ideas through discussion and constructing meaning together can promote critical thinking as well as explicit

sharing of active comprehension strategies through mutual dialogue and group discussions (McKeown, Beck, & Blake, 2009; Meyer, 2010). This reciprocal teaching learning model can activate students' roles in group discussion so they can develop reading and critical thinking skills through teaching metacognitive approaches in reading (Cooper & Cedric, 2009).

It also found that the cause of the low ability of critical thinking of students who are taught by group investigation learning model that is because teachers have dominant factors to determine the teaching and learning activities. The dominance of teachers in the teaching and learning process has made students to be less active during the process. Meanwhile, critical thinking can be achieved if the students are actively to participate in the teaching and learning process. This is consistent with the findings of Kurland (2000) who states that critical thinking skill determines students to be active in the teaching and learning process such as asking questions, answering questions and doing tasks given.

CONCLUSIONS

The results of the research show that there is any significance difference of students' critical thinking skill before and after application of reciprocal teaching model. There is any significant difference in students' critical thinking skills before and after the implementation of group investigation model. The critical thinking skills of students taught with reciprocal teaching model are higher than those taught by group investigation model. The results of this study also indicate that students' critical thinking skills will increase higher if they are taught with reciprocal teaching model. The reciprocal teaching model can improve students' critical thinking skills because this model includes a series of steps reflect the development of high-level thinking skills during the teaching and learning process, which encapsulate asking questions, clarifying and predicting. Thus, if we want to improve students' critical thinking skills (especially, in economic subjects) then one of the alternatives that can be used is the application of reciprocal teaching model.

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