The Implementation of Cooperative Learning Model For Critical Thinking Skills in the History Subject at SMA Pekanbaru

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Abstract

In the approach to learning, teachers must be able to create an active, creative, effective, and fun learing. One of the learning approaches that can be used to create this active, creative, effective and fun learning in a group is cooperative learning. Jigsaw was particularly selected from various types of cooperative learning. It was because it is used by researchers in science education, and less popular in social science education. Jigsaw arouse students' attitudes to learning, including in the History subject. Jigsaw that is one ofthe types of cooperative learning models that encourages students to be active and help each others in mastering the subject matter to achieve maximum performance. The aim of the study was to see the different models of cooperative learning on students' critical thinking skills in the History subject. The method used was by using the test statistics with analysis using Excel for Windows. To determine whether there is any differences, tests of paired data (Student's t-test) were comducted. If there are no significant differences between the dependent variable for the pre-test, it will be used followed by ANOVA in the post test. The results showed that there is a difference between the type of cooperative learning model jigsaw with traditional learning in the study on the critical thinking skills of students in the History subject.

Keywords: cooperative learning, history education, critical thinking skills

INTRODUCTION

Widja (1991) stated that students have a lot of complaints about the teaching of History, both substantive and methodological. Substantively, learning materials for History in elementary school (SD), middle school (SMP), high school (SMA) have a lot of repetitions and boring.

Learning History is methodologically too much revolving around the development which is far away from the environment inside the students and their groups. Supardan (2004) suggested that it is fair when students, as in many ways the history of Indonesia is being taught today, talks much about certain people, and is not perceived as something meaningful that can be internalized by the students.

In line with Wiyanarti (2003), History learning is considered boring and less meaningful among students within the meaning of their everyday life. Asmahani (2004) adds another problem that many teaching approaches are unpleasant, like the use of oral presentations and teacher-centered teaching.

Isjoni (1998) states that in the teaching of history a History teacher is very boring, and students' attitudes toward the subjects are low. Results of Isjoni's study (2000) showed that students' attitudes toward the subjects of history is less interesting, because teachers are not able to provide learning experience with critical thinking skills to students.

In his study, Atmadinata (2005) stated that at this moment the History teaching is still not satisfactory, because the History teacher disclose only dry facts, and events such as the order of the year alone, and generate less social skills of individuals within the group. Hassan (1996) stated that teachers tend to focus more on pursuing learning outcomes rather than processes. Similiarly, Ibraheem (1997) argues that teaching and learning in school is exams oriented, not to the learning process. In addition, Khoo Kay Kim (1997) stated that the subjects are trapped under unattractive and boring teaching approach. This is one of the reasons why History subject does not really get students' interests at schools.

Low students' learning outcomes for History learning were due to the teachers do not really touch the formation of attitudes and critical thinking of students (Sutarjo 2000). Hartini (2006) stated students learning achievement in the History subject also depends on the teachers' teaching methods.

Furthermore, Dokolamo (2006) states some unhappy facts of a history lesson, they are: (a) the History subject only contains facts, names, and events of the past, (b) a boring subject, (c) there is no contribution to society, for discussing the past, (d) learning is based on textbooks, (e) It does not have critical thinking skills learning, (f) the teachers use traditional teaching methods.

The traditional learning in the History class was also reported by Rashid (1989) who found the learning of History to be less effective and produce students who are not creative, critical and innovative. The History teachers are just telling stories or convey information, whereas students only receive, record and memorize the information provided.

Yuzar (2006) also reports that many teachers are still accustomed to lecturing teaching model. As a result, students were not interested in the lessons. Students become bored, because they are not actively involved. Rashid (1987) also suggested that history teachers should play a

role as historians educate and guide students in finding the precise facts and correct the public response to the fact that history is a boring subject. Therefore, it is natural for teachers to examine current methods of teaching and learning that allows students to learn actively.

Jamil (2003) states students should be given the opportunity and encouraged to actively involve themselves in the process of teaching and learning history through the activity of debates, discussions, field studies and makes interpretation of something historical events. History teachers need to be constantly creative and innovative when implementing learning. They need to equip themselves with the knowledge and skills regarding pedagogical methods and techniques of teaching history. Among the methods that can be used is a cooperative learning. Cooperative learning methods have long been implemented, but this method is rarely used by teachers in Indonesia.

Cooperative learning model departs from the premise that by doing things together it will provide a broader learning opportunities and a conducive atmosphere to the students to acquire, develop the knowledge, attitudes, values and social skills, including collaboration skills that are useful to society.

Johnson (1993) stated that through cooperative learning teachers can train students to have social skills, improve academic skills and the ability to think critically, to form a relationship of friendship, to learn from a variety of sources of information, to learn by using manners, improve less commendable attitude towards school, to learn how to reduce poor behavior, and help students to respect the opinions of others.

Shounara (2003) states that cooperative learning is an alternative that can grow and develop critical thinking abilities. This approach can also instill positive values and attitudes and practice social skills of students, so that the students can develop their capabilities to the fullest point.

Eggen and Kauchac (1988) stated that the cooperative learning is a group of learning strategies that engage students to work together in a small group to achieve certain goals. Santi (2001: 6) states that the purpose of forming a small group is to increase the participation of students, preparing students to possess leadership and experience in making group decisions, and also provide an opportunity to work and learn together with students of different cultures, customs and different abilities. Shwalb (1995) stated that cooperative learning can enhance students' relationships in some diversity in cooperative learning class. Therefore, it must be a method of education that benefits all of society in addressing the relationship between a majority and minority groups.

Slavin (1995) furter explored that there are three main concepts that characterize cooperative learning: group awards, individual accountability and equal opportunity. Group award is like an incentive given to students who have been showing activity and creativity in groups. Individual accountability is the result of students learning which is influenced by the ability of the students themselves. Individual students have two responsibilities, working and understanding the

lesson material, both for her learning outcomes and learning outcomes of the group. Each individual in the group are required to jointly responsible for their more successful learning.

Shounara (2003) showed that cooperative learning can improve learning significant and positive effect on students' skills to be able to think critically in history. Cooperation of students in the group provides a variety of experiences to students; they had many opportunities to speak, make choices, and generally develop good study habits.In line with the opinion of Aronson & Patnoe (1997); Walker & Crogan (1998) mentions that one of the most effective techniques in cooperative learning is the type of cooperative learning model - Jigsaw. This type is more visible in the cooperation and interdependence among students.

Jigsaw as one of cooperative learning models was also introduced by Eliot Aronson and his colleagues (Aronson, Blaney, Stephan, Sikes, and Snapp, Aronson, Bridgeman & Geffner, 1978). Through cooperative learning strategies, each students will become an expert in a particular field. According to Aronson version, in practice the students were divided into several groups. Each group member is given a job to do a part of the study material. The students from each group are having the same tasks together form a group of experts. Because these groups of experts do their work, the students will become experts in their fields that have been defined and learn how to do the tasks they have been assigned as well. The members of the expert group then work together to decide how to teach their newly acquired knowledge to other members of the research groups of origin. As soon as the expert groups have completed their tasks, the students return to their study group. Each student then explained his or her findings to members of their group. Wedman (2006) stated that the study group is more directed at the values: 1) interaction orally to understand new information, 2) the role of the students who asked the organization to explain and clarify the new information, and 3) social experiences that facilitate the understanding and development of the individual.

This type of cooperative learning (jigsaw) is designed to enhance students' sense of responsibility towards their own learning and also to learning of their friends. The students do not only learn the materials given, but they must also be ready to present and teach the materials to the other group members. Thus, students will be interdependent with each other. They must work together cooperatively to study the assigned material "(Lie 1994).

Cooperative learning can shape students 'critical thinking ability and can arouse students' social skills. The students' critical thinking skills, students' attitudes, and social skills are variables to be measured through questionnaires and interviews. The impact of these variables will be measured in terms of the level of students' learning outcomes in the subjects of History.The cooperative learning may also establish a pattern of critical thinking among students and to form social skills among groups of the students. Together they can solve many problems in History learning.

Keefe (1987) asserts that teachers should learn about the differences among students, each student has the skills of critical thinking and self-learning. The concept of students as individuals who differ in attitude and critical thinking skills are the basis of this study and linked to learning outcomes in the subjects of History.

The purpose of this study is to investigate the implementation of the Jigsaw type of cooperative learning by students, to know the type of learning outcomes of the jigsaw cooperative learning, to identify what kinds of critical thinking skills and diversity of students who learned using Jigsaw with traditional learning models.

The problem of this study is to what extent has the Jigsaw cooperative learning been implemented by students; to what extent are the learning outcomes using the Jigsaw; and to what extent are the differences in terms of students' critical thinking after using the Jigsaw with traditional learning model at SMAN 2 and SMAN 4 Pekanbaru.

THEORITICAL FRAMEWORK

Critical thinking refers to the ability of reasoning to solve problems in a cooperative learning. Both of these capabilities reflect the skills and attitude of someone who thinks critically in the stall degrees. Critical thinking is measured by observation and questionnaires.

Critical thinking is the total score, which is measured through a questionnaire behavior of students on the findings to reveal, draw conclusions, think of other ways with the characteristics: (1) dared to put forward ideas, (2) can be concluded, (3) analyze the ideas of others (4) develop problems, (5) think of another way to solve the problem and (6) the speed of thought.

Critical thinking is defined as the intellectual abilities: the ability to analyze, synthesize, and evaluate Bloom (in Hassan, 1996). In relation with the development of critical thinking, Lailasari (1997) states that "in the process of learning, the development of critical thinking skills is more engaging students as thinkers from a study". The role of teachers in developing critical thinking skills is that teachers must give students the chance to express opinions or ask questions. As a facilitator, the teachers must be able to act as a resource to explain the benefits of critical thinking. Teachers as a motivator means that teachers always maintain their self-esteem when students ask and answer questions so that students do not feel attacked or intimidated.

RESEARCH METHODOLOGY

The population of this study were high school students of Pekanbaru from schools with similar accreditation from the government that is accredited by "B" on the Grade 11 of Applied Social Sciences (IPS). Thi History subject takes one semester. The samples of this study consisted of students of SMA 2 and SMA 4 Pekanbaru. SMA 2 consists of four high school classes and 4 consists of three classes. Determination between the experimental and control classes was conducted by using statistical analysis (the Bartlet) to examine test of homogeneity of variance of each class. From each school two classes ere taken as the experimental class and the control class.

The study involved 151 students in grade 11 in social studies consisting of 67 males (44.37%) and 84 females (55.63%). In terms of the number of students attending study groups, traditional groups consist of 72 people, 28 males (38.89%) and 44 females (61.11%). Then the group with a jigsaw of the cooperative learning model was 79 students with details of 39 men (49.36%) and 40 females (50.64%).

Questionnaire to measure students' critical thinking about this History subject contains 15 items. The instrument covers aspects of students' bravery to express ity opinion on the subjects of history, ability to make a conclusion in the study of History, analyze other people's ideas, develop a problem, think of another way to solve the problem, and speed of thinking.

Questionnaire about students' courage to express opinions on the subjects of history contains two positive items: 1 positive item and 1 negative item. Questionnaire about the ability to make a conclusion in the study containing 3 items: 1 positive and 2 negative items. Questionnaire to analyze the opinion of a friend in the subjects of history contains two items: 2 positive-shaped items. Questionnaire on the ability to develop problems in the subjects of history contains two items: 1 positive item and 1 negative. Questionnaire about think of another way to solve the problem contains 3 items: 2 positive and 1 negative items. Questionnaire about the speed of thought contains 3 items: 2 positive and 1 negative items.

Each statement has a rating of five-point Likert scale. The students were given the option of either choosing "strongly disagree", "disagree", "doubtful", "agree" or "strongly agree". For positive items, "strongly disagree" was given a score of 1, "disagree" was given a score of 2, "definitely not" given a score of 3, "agree" was given a score of 4 and "strongly agree" was given a score of 5. Scores for negative items are otherwise. The same items used for the pre-test and post-test.

Table 1.

Indicators		Positive Items		Negative Items	
1.	Courage to express ideas	1	1	1	2
2.	Ability to make a conculusion	2	3, 4	1	5
3.	Analysing others' ideas	2	6, 7	0	-
4.	Developing problems	1	8	1	9
5.	Thinking of other ways to solve problems	2	10, 11	1	12
6	Speed of thought	2	13, 14	1	15

Data were collected through the following techniques:

Deep Observation (Spradly in Sonhaji 1994). In-depth interviews were conducted to obtain data that relates to the validity of the results of observations. Tests of learning achievement through pre and post tests were run before and after the cooperative learning. A questionnaire was distributed to find out how the students' critical thinking skills. Video recording was done as a complement to the importance of data analysis and documentation of cooperative learning activity taking place during the experiment. Teachers' notes were taken into account as a material consideration and comparison of the collection and analysis of data. All data obtained from the testing tools either in pre and post tests were coded and analyzed using Excel for Windows.

To determine whether there is any difference, tests of paired data (Student's t-test) were conducted. If there are no significant differences between the dependent variable for the pre-test, it will be followed by ANCOVA for the post-test.

RESULTS AND DISCUSSION

Valdity of the Instruments

To demonstrate the validity of the research instruments used in this study, Cronbach alpha coefficient validity analysis was conducted to determine the internal consistency index of the instruments. For the students' critical thinking skills, coefficient alpha was 0.80. Thus, the validity of the research instrument is more than 0.70, a level which is acceptable (Nunnally 1978). According to Worthen et al. (1999), the validity coefficients as low as 0:50 may be acceptable if the test is used to make decisions about the group.

Descriptive statistics of pre-test and post test

Table 2 shows the mean scores and standard deviations (S.D) for pre and post test of critical thinking skills in cooperative and traditional groups .

Tabel 2. Mean Scores of Pre-Test and Post-Test of Dependent Variables

Variables	Pre Test		Post Test	
	Coperative	Traditional	Coperative	Traditional
Students' Critical Thinking Skills				
Mean	43.79	43,89	54.93	43.79
Modus	44	40	54	42
Median	44	44	55	43
Max	57	56	62	55
Min	29	30	46	34
S.d	5.42	4,20	2.94	4.44
The Average Composite	43.84		49.62	
S.d Composite	4.87		3.73	

Table 2 shows the total scores of pre-test of the learning outcome of critical thinking skills variable lowest score; the lowest score was 29 and the highest was 57, an overall average of 43.84 (Ss.D = 4.87) based on 16 item statements. Next, post-test score results to learn the skills (to think critically) with the lowest score was 34 and the highest 62, an overall average of 49.62 (Ss.D = 3.73), based on 16 item statement.

Pre-test Analysis

Before the data were analysed, it is necessary to determine the homogenous variance of each variable. The Fisher test (Test F) was used to make it on.

These results showed that there was no difference in variance between traditional and cooperative learning group for independent variables during the pre-test. This means that all independent variables in the initial study have equality; there is no difference between the groups of cooperative learning and traditional learning groups in terms of these variables. To test the normality of the data of pre-test, Chi Square test was performed for each variable. The criterion is if the Chi Square test on $\alpha = 0.05$ **is** smaller than chi-square table then the data is normal. With degrees of freedom (V = k-3).

The results show that the variables of critical thinking skills obtained $\chi^2_{hasil\ kiraan} = 4.76 < \chi^2_{kritikal}\ (3) = 7.81$ then the data of the co-operative group is normal. For the traditional group $\chi^2_{hasil\ kiraan} = 6{,}81 < \chi^2_{kritikal}\ (3) = 7.81$ then the data of the traditional group is normal. These results indicate it meets the normality requirements of the five variables.

Analysis of Post Test Homogeneity

In order to analyze the post-test data, it is necessary to determine the homogeneity of variance of each variable. It is analyzed to find whether there is any difference between the group of cooperative model of jigsaw with traditional groups. To do it, Fisher test (Test F) was conducted on $\alpha = 0.05$.

The variable of students' critical thinking skills $F_{hitung} = 0.44$, F_{tabel} is $F(71,78) = 1.45$ showed that there is no difference between groups of students in critical thinking skills variable.

These results showed that there is no difference in variance between groups of students for the variables of cooperative and traditional post-tests. This means that at the end of the study that the variables have equality; there is no distinction between cooperative groups and traditional groups.

Analysis of Post Test Normality

To test the normality of the post test data, the Chi Square test was performed for each variable. The criterion is if the result of Chi Square $\alpha = 0.05$ is smaller than khi kuadrat kritikal then the data is normal. With derees of freedon (V=k-3).

Results of spin count shows the variables obtained from critical thinking skills $\chi^2_{hasil\ kiraan}$ = 6.91 < $\chi^2_{kritikal}$ (3) = 7.81, then the data of the co-operative group is normal. While for traditional group $\chi^2_{hasil\ kiraan}$ = 4.29 < $\chi^2_{kritikal}$ (3) = 7.81, the the data of the traditiona group is normal.

These results indicate that the data meet the requirements of normality of variables.

Analysis of variables at SMAN 2 and SMAN 4 Pekanbaru

1. Analysis of Variables for Students SMAN 2 Pekanbaru

Table 3 shows that 34 groups of the students of SMAN 2 Pekanbaru use traditional learning and 39 students use the type cooperative learning. From this group, it is obtained that the lowest score of the variable of students' critical thinking is 46 and the highest score is 62, the overall average score is 54.98 (sd = 2.96). The lowest score for the variable of students' history learning is 65 and the highest score of 100, and the overall average is 86.61 (Ss.D = 8.42).

As for the traditional variables of students' critical thinking, the lowest score is 34, the highest is 55, and the average score is 44.79 (Ss.D = 4.69). For variables of Histroy learning achievement, the lowest score is 50, the highest is 90, and the average score is 73.52 (Ss.D = 11.38).

Table 3. Post Test Results of Students SMAN 2 Pekanbaru For Leaning Variables

Variables	Cooperative	Traditional	Total
Students' Critical Thinking			
Average	54,98	44,79	49,89
Min	46	34	
Max	62	55	
S.d	2,96	4,69	3,83

The t-test was conducted to see the results to determine whether there is any difference between the groups of students with the Cooperative learning of jigsaw compared with the group of students using traditional learning. The T-test shows that the critical thinking variables have a significant effect, with t = 2,765> t = 2.326, then H0a rejected. Thus, the H0 showed a significant effect.

In order to analyze the post-test data, it is necessary to determine the homogeneity of variance of each of the variables. This is necessary to find out the difference between the value of the type cooperative learning jigsaw with traditional groups in SMAN 2 Pekanbaru. The Fisher test (Test F) was then conducted. It is found out that the variable of critical thinking of students is F = 0.398, F table is F (38,33) = 1.76 . This data showed that there was no difference between the critical thinking variable in the groups of students. In other words, these results showed no difference in variance between cooperative learning and traditional post-test for dependent variables. This also means that at the end of the study the dependent variables have equality - no distinction between cooperative learning and traditional methods

To test the normality of post-test data in table 4.13, the Chi Square test was performed for each variable. The criterion is that if the Chi Square test is smaller than chi-square table, then the data is normal, with degrees of freedom (V = k-3). The results obtained for the variables of critical thinking is χ^2_{hitung} = 3,67 < χ^2_{tabel} (3) = 7,81, the form of cooperative learning data is normal. While traditional methods χ^2_{hitung} = 3,86 < χ^2_{tabel} (3) = 7,81 then the data of traditional method is normal. These results indicate that they meet the requirements of normality of variables.

2. Analysis of Variables for Students of SMAN 4 Pekanbaru

This analysis is to show the average score of test of students' critical thinking skills between cooperative learning and traditional methods. For cooperative learning, the lowest score is 46 and the highest score is 62, the overall average is 54.89 (Ss.D = 2.95). For the variable of students' history learning, the lowest score is 75 and the highest score is 100, and the overall average is 86 (Ss.D = 7.44).

As for the traditional, for variables of students' critical thinking, the lowest score is 36, the highest score is 52, with overall average is 42.68 (Ss.D = 3.93). For the variables of learning History achievement, the lowest score is 65, the highest is 90, and the average is 80.07 (Ss.D = 6.57).

Table 4. Pre and Post Test results of Students' Cooperative Learning Jigsaw Variable

Variables	Pre	Post	Overall Average
Students' Critical Thinking			
Average	43,78	54,92	49,35
Min	29	46	

Max	57	62	
S.d	5,42	2,94	4,18

T-test was performed to determine whether there is any difference between the groups of students with the cooperative learning of jigsaw compared with the group of students using traditional learning in students of SMAN 4 Pekanbaru. The T-test on critical thinking skills variables showed a significant effect, t = 2.58> t = 2.326, then H0b was rejected. Thus from the H0, it showed a significant effect.

From the post-test data analysis it is necessary to determine the homogeneity of the variance of each of the variables. The analysis was conducted to find out the difference between the value of the type cooperative learning jigsaw with traditional groups in SMAN 4 Pekanbaru. The Fisher test (Test F) was then conducted. The variable of students' critical thinking is F = 0.565, Ftabel is F (39,37) = 1.71. This showed that there is no difference between groups of students critical thinking variables. These results showed no difference in variance between cooperative learning and traditional methods of the variables of standardised post-test. This means that at the end of the study all the dependent variables have equality - no distinction between cooperative learning and traditional methods.

To test the normality of post test data, the Chi Square test was performed for each variable. The criterion is if the Chi Square test is a smaller than chi-square table, the data is normal, with degrees of freedom (V = k-3). The results obtained for the variables of critical thinking is χ^2_{hitung} = 2,16 < χ^2_{tabel} (3) = 7,81, so the data from cooperative learning is normal. For the traditional learning χ^2_{hitung} = 5,37 < χ^2_{tabel} (3) = 7,81, so the traditional data is normal. These results indicate that the data meet the requirements of normality of variables.

Analysis of Variables to Determine Differences of Pre and Post Treatment for Group of Students Using Jigsaw Cooperative Learning

In terms of pre and post treatment of student groups using different types of jigsaw learning, it is obained that the lowest score for variables of critical thinking in the pre test is 29, the highest is 57, an average is 43.79 (SD = 5.42). While the lowest value for the post test is 46, the highest is 62, and the average score is 54.93 (sd = 2.94). This shows that there is an increase in terms of testing the implementation of cooperative learning of jigsaw in pre and post.

Table 5. Variables to Determine the Differences of Pre and Post Group of Students Using Jigsaw Cooperative Learning Model Type

Variables	Pre	Post	Total
Students' Critical Thinking			
Average	43,79	54,93	49,36
Min	29	46	
Max	57	62	
S.d	5,42	2,94	4,18

Tabel 5 shows the results to determine if there is any differences between pre and post in the viariable of students' critical thinking. A t-test was conducted for this purpose, $\alpha = 0{,}01$. The t-test on critical thinking skills variables showed a significant effect, t_{hitung}=17,74> t_{tabel}=2,326, then $H_0$4c is rejected. This means that the students' critical thinking skill sows a significant effect.

Table 6. Result of Test Analysis T- Paired Test to Know the Difference betweem Pre And Post Test for Students Using Jigsaw Cooperative Learning Model Type

Variables	**t_{hit}**	**t_{tabel} at $\alpha = 0{,}01$**	**Result of H_0**
Students' critical thinking	17,74	2,326	rejected

To analyze pre and post test data, it is necessary to determine the homogeneity of the variance of each of the variables between the pre and post scores on the cooperative learning of Jigsaw type. To do it the Fisher test (Test F) was conducted on $\alpha = 0{,}05$. Variable of students' critical thinking is F_{hitung} = 0,542, F_{tabel} that is F (78,78) = 1,45 show that there is no difference between students in the students' critical thinking skill variable. This means that at the end of the study the variables of students' critical thinking skills have some degrees of equality, ie there is no difference between pre and post.

Hyphotheses Testing

Hypotheses were tested using statistical data. Each hypothesis is presented, followed by a discussion of the results.

H_0 : There were no differences in the mean scores of History subject taught by the cooperative learning of Jigsaw type and traditional types in the critical thinking skill variable.

Through statistical analysis, it was found that there were significant differences t between students of cooperative learning and traditional methods. Thus, the null hypothesis JO3 is rejected. Results of the study. show that there are significant differences between the groups, cooperative and traditional methods in the variables of critical thinking.

H_0a : There were no significant differences in the mean scores of critical thinking among students taught using cooperative learning model of jigsaw type with students taught using traditional methods in SMAN 2 Pekanbaru.

Through statistical analysis, it was found that there were no significant differences between students who learned using cooperative learning of jigsaw with those using traditional methods at SMAN 2 Pekanbaru. Thus, the null H03 hypothesis is rejected. The results showed that there were significant differences between cooperative learning and traditional methods in terms of the critical thinking variables.

H_0b : There were no significant differences in the mean scores of critical thinking among students taught using cooperative learning model of jigsaw type with students taught using traditional methods in SMAN 4 Pekanbaru.

Through statistical analysis, it was found that there were no significant differences between students who learned using cooperative learning of jigsaw with those using traditional methods at SMAN 4 Pekanbaru. Thus, the null H03 hypothesis is rejected. The results showed that there were significant differences between cooperative learning and traditional methods in terms of the critical thinking variables.

H_0c : There were no significant differences in the mean scores of critical thinking in pre and post among students taught using cooperative learning model of jigsaw type with students taught using traditional methods.

Through statistical analysis, it was found that there were differences in terms of pre and post test scores of students using cooperative learning of Jigsaw

H_0d : There were no significant differences in the mean scores of pre and post test in the critical thinking variable among students taught using cooperative learning model of jigsaw type at SMAN 2 Pekanbaru.

Through statistical analysis, it was found that there were significant differences in the mean scores of pre and post test in the critical thinking variable among students taught using cooperative learning model of jigsaw type at SMAN 2 Pekanbaru.

H_0e : There were no significant differences in the mean scores of pre and post test in the critical thinking variable among students taught using cooperative learning model of jigsaw type at SMAN 4 Pekanbaru.

Through statistical analysis, it was found that there were significant differences in the mean scores of pre and post test in the critical thinking variable among students taught using cooperative learning model of jigsaw type at SMAN 4 Pekanbaru.

Table 4.13 indicates that the cooperative group's average score of post-test (54.93) is higher than the average score of pre-test (43.79). Thre is an increase of 14.11. For the traditional group, the post-test average score (43.79) is lower than the pre-test (43.89) but decreased 0.1. This indicates that an increase in the co-operative group is better than the increase in the traditional groups. There is a significant difference in the average score of the cooperative learning group in pre and post test (t-test). But for the traditional group, there was no difference in the average between pre-test and post-test. This shows the level of achievement of the cooperative group's critical thinking skills variables of students increased after cooperative learning of jigsaw. The t-test results for the third hypothesis mentioned above is shown in the following table.

Table 4.13. T-test results on the difference average scores between pre-test and post-test for the Cooperative Group and Traditional Group on Variable of stundents' critical thinking skills

Subject		N	Average	Sp	$t_{hasil\ kiraan}$	Degree of Freedom	$t_{kritikal}$ $\alpha = 0.01$	Decision
Cooperative Group	Pre-Test	79	43.79	5.42	3.25	78	2.326	signifikan
	Post Tesy	79	54.93	2.94				
Traditional Group	Ujian Pra	72	43.89	4.20	0.21	71	2.326	Tidak Signifikan
	Ujian Pos	72	43.79	4.44				

Table 4.14, shows that the average scores of cooperative group pre-test (43.90) are slightly higher than the average scores of the traditional group (43.89), with the difference of 0.10. Then, the post-test results showed the average of cooperative groups (43.89)is higher than the average of the traditional group (43.79), with a difference of 0.1. This shows that the cooperative group is slightly

better than the traditional group after the cooperative learning was given. However, the t-test results in table 4.14 show that the pre-test between the cooperative and the traditional group has no difference, but in the post-test, there are significant differences. Therefore, the third null hypothesis is accepted, because the results showed no significant difference between students' critical thinking skills taught using cooperative learning of jigsaw with students taught by traditional learning.

Table 4.14. The results of T-test on the differences between the average scores of Cooperative Group and Traditional Group in both pre-test and post test on students' critical thinking skills variables

Subjects		N	Average	Sp	$T_{results}$	Degress of Freedom	$t_{critical}$ $\alpha = 0.01$	Results
Pre-Test	Cooperative Group	79	43.90	5.42	2.02	149	2.326	not significant
	Traditional Group	72	43.89	4.20				
Post-Test	Cooperative Group	79	43.89	2.94	2.41	149	2.326	significant
	Traditional Group	72	43.79	4.44				

CONCLUSION

Based on the results of this study, it can be concluded that (1) There is no difference in scores on the History subject taught by using cooperative learning model of Jigsaw type compared with the traditional model of critical thinking skills of students. Null Hypothesis (Ho) is rejected; (2) There is no difference in terms of critical thinking skills among students in cooperative groups and traditional groups in SMAN 2 Pekanbaru. Hol null hypothesis is rejected. The results showed that there are significant differences between variables of the cooperative group and traditional group in terms of critical thinking skills; (3) There is no difference in terms of critical thinking skills among students in cooperative groups and traditional groups in SMAN 4 Pekanbaru. Hoa hypothesis is rejected. The results showed that there are significant differences between variables of cooperative groups and traditional groups in terms of critical thinking skills; (4) There is no difference of variables of critical thinking skills in pre and post-test between students using

cooperative of jigsaw type group and traditional group. Through statistical analysis, it is found that there is a significant difference in pre and post between students from the cooperative group of the jigsaw and traditional groups. The hypothesis is accepted; (5) There is no difference in variables of critical thinking skills to students of pre and post cooperative group compared to students using jigsaw type of traditional groups in SMAN 2 Pekanbaru. The hypothesis is accepted; (6) There is no difference of variables of critical thinking skills to students of pre and post cooperative group students using the type of jigsaw in SMAN 4 Pekanbaru. The hypothesis is accepted.

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