CHAPTER IV

RESULT AND DISCUSSION

This chapter presents the result of the research which is intended to answer the problems of the study that are mentioned in the first chapter. In this chapter will explain students' participations during STAD being applied, students' achievement after STAD being applied and the influence of STAD on students' achievement.

These result and data analysis are arranged based on data from research in VII A class of SMPN 36 Surabaya. This research held on May 20th – 28th 2009. In this study, researcher became a teacher. In order to observed students' participation during the application of STAD, researcher was helped by her friend as an observer.

A. Result

1. Descriptive Data Analysis

Descriptive data analysis is used to analyze the result of observation data; that is students' participation during STAD being applied data. In order to collect data about students' participation during the application of STAD, researcher took sample. Researcher took 9 students randomly from 37 students of VII A class. The 9 students represented different level of academics.

To know clearly those participations, researcher described in this following explanations.

digilib.uinsby.ac.id digilib.uinsby.ac.id digilib.uinsby.ac.id digilib.uinsby.ac.id digilib.uinsby.ac.id digilib.uinsby.ac.id

40

In the first meeting, teacher told the aim of learning and the method of reaching the aim. Because STAD never be applied before, it needed much time to tell and explain the rule.

In that meeting, there was class presentation. Teacher gave and explained material which was related to what students would discuss. Before giving a material, teacher encouraged the students by relating the topics with their daily life.

The next step was team work. The students within their team mates did a work sheet in order to comprehend the material. It was a peer –tutoring, which the upper level student (academically) helped their team mates to master the material. All members of the team mate had responsibility to help one another.

The result of observation data in the first meeting can be seen in the following table.

Table 4.1
Students' participation during STAD being applied in the first meeting

No	Students' Participation	Percentage (100%)	Total
1	Relevant participations		80%
	a. pay attention to the teacher	19,33%	
	b. discuss or asking with their friends	20,67%	
	c. discuss or asking with teacher	16%	
	d. understanding and doing the work sheet	24%	
	e. doing the quiz individually	-	
2	Irrelevant Participation		20%
	a. talking outside the topic of discussion	7,33%	
	b. cheating	6,67%	

	c. exiting the class without any permission	6%	
		100%	100%

Table 4.1 shows that Students' participation during STAD being applied in the first meeting. It shows the average relevant students' participation is 80%. The most dominant participation is doing the worksheet with their team mates. Students tend to learn more the material that need more discussion with their team mates. So, they used their time to discuss the material and the worksheet.

The second one is discussion or asking with the other friends, with average students' participation score 20,67%. It means during the application, observed students did the worksheet together within their team mates. They read and understood the material, after that did the task in the worksheet together. It is very important in cooperative learning method because it needed more discussion to master the material and solved the problems.

The third dominant students' participation is paying attention and listening teacher's explanation, with average students' participation score 16 %. It was the first time they applied cooperative learning - STAD. So that, they needed more time to understand the rule that was explained by the teacher.

The forth dominant students' participation is discussing and asking the teacher. It is 19,33%. Students were less asking or discussing with teacher because they had to pay attention to the teacher's explanation.

For irrelevant students' participation is only 20%. Because of in that meeting, the nine observed students tend to pay attention to the teacher and do the task. It can be known when the students do the worksheet with their team mates, discuss or ask their friends, pay attention to the teacher's explanation about the rule. It also can be seen that the students pay attention and listen to their team mates when discussion. However, there are two students who still talk outside the topic. They are also joking outside the topic of discussion.

Based on table 4.1, it can be seen that the average total of relevant students' participation is 80% and irrelevant students' participation is 20%. Because the total average of relevant student participation is 80%, it indicates that students' participation during STAD being applied in the first meeting is active.

In the second meeting, students continue the steps of the first cycle. After doing worksheet in the previous meeting, students did quiz individually to make sure that they had mastered the material. In this step, they were not allowed to help one another as doing work sheet.

After doing the quiz, students within their team mates counted their personal progress score. Then, all of the members' score were calculated.

Every team members gave a score to their team. A team who got a high score

would get reward.

The result of observation data in the second meeting can be seen in the

following table.

Table 4.2
Students' participation during STAD being applied in the second
meeting

No	Students' Participation	Percentage (100%)	Total
1	Relevant participations		78,9%
	a. pay attention to the teacher	19,04%	
	b. discuss or asking with their friends	19,73%	
	c. discuss or asking with teacher	19,73%	
	d. understanding and doing the work sheet	-	
	e. doing the quiz individually	20,40%	
2	Irrelevant Participation		21,11%
	a. talking outside the topic of discussion	7,49%	
	b. cheating	7,49%	
	c.exiting the class without any permission	6,12%	
		100%	100%

Table 4.2 shows that Students' participation during STAD being

applied in the second meeting. It shows the average relevant students'

participation is 78,9%. The most dominant participation is doing the quiz (for

evaluation) individually. It is very important for the application of STAD

because it is used for material evaluation. Beside that they had already known

that they must do the quiz individually.

The second dominant students' participation is discussing and asking

the teacher with the average relevant students' participation 19,73%. In this

second meeting, they were more asking the teacher than the first meeting that is 16%. It was because they need more teacher's explanation about how to do scoring based on the result of quiz.

Discussing and asking their friend is the third dominant students' participation which is 19,73%. In that meeting, they needed to analyze their quiz score and progress point. The students' analyzed the score with their team mates. They discussed each other to make a good analyzing. That score was important for team rewarding in the last cycle.

The forth dominant students' participation is listening and paying attention to the teacher. It has 19,04% participation. They still listen and pay attention to the teacher. It decreases than before. It is caused that they have already know the rule of application of STAD so, it did not need to give more explaination.

For irrelevant students' participation are only 21,08%. There were two students who still talked outside the topic. Sometimes, they also joked each another.

Based on table 4.2, it can be known that the average total of relevant students' participation is 78,9% and irrelevant students' participation is 21,08%. Because the average totals of relevant student participation is 78,9%, it indicates that students' participation during the application of STAD is active enough.

The result of observation data in the third meeting can be seen in the following table.

Table 4.3
Students' participation during STAD being applied in the third meeting

No	Students' Participation	Percentage (100%)	Total
1	Relevant participations		84,24%
	a. pay attention to the teacher	13,59%	
	b. discuss or asking with their friends	17,40%	
	c. discuss or asking with teacher	16,30%	
	d. understanding and doing the work sheet	19,56%	
	e. doing the quiz individually	17,40%	
2	Irrelevant Participation		15,76%
	a. talking outside the topic of discussion	5,43%	
	b. cheating	5,43%	
	c. exiting the class without any permission	4,90%	
		100%	100%

Table 4.3 shows that students' participation during STAD being applied in the third meeting. It shows the average relevant students' participation is 84,24%%. And the most dominant participation is doing the worksheet with their team mates. It is 19,56%. Students tended to learn more the material that need more discussion with their team mates. So, they used their time to discuss the material and the worksheet.

The second dominant students' participation is doing the quiz (for evaluation) individually with the average relevant students' participation 17,40%. In that meeting, they did the quiz individually as well as they know.

Discussing and asking their friend is the third dominant students' participation which is 17,40%. Because they have already known the rule, the third meeting was one cycle of the application of STAD that consists of both doing worksheet and quiz. In that meeting, they also needed to do a worksheet within their team mates and analyzed their quiz score and progress point. The students' analyzed the score with their team mates. They discussed each other to make a good analyzing. That score was important for team rewarding in the last cycle.

The forth dominant students' participation is listening and paying attention to the teacher. It has 13,59%. They still listened and paid attention to the teacher. But it decreased than before. It was caused that they more active discuss within their team mates.

For irrelevant students' participation is only 15,76%. There were two students who still talked outside the topic and one student who cheated his friend's work.

Based on table 4.3 it can be seen that the average total of relevant students' participation is 84,24% and irrelevant students' participation is 15,76%. It shows that students' participation during STAD being applied in the third meeting is active.

As what have been explained before, this study consist of two cycles. The first cycle conducted in the first and second meeting, whether the second cycle was conducted in the third cycle.

For taking general result, researcher compares the two cycles in this following table and explanation.

Table 4.4
Students' participation percentage during the application of Cooperative learning type STAD

No	Students' Participation	Percentage (%)		Average	Total average
		I	II		
1	*Relevant participations*				81,85
	a. Paying attention to the teacher	19,18	13,59	16,39	
	b. Discuss or asking with their friends	20,2	17,4	18,8	
	c. Discuss or asking with teacher	17,87	16,3	17,08	
	d. Understanding and doing the work sheet	12	19,56	15,78	
	e. Doing the quiz individually	10,2	17,4	13,8	
2	*Irrelevant Participation*				18,15
	a. Talking outside the topic of discussion	7,41	5,43	6,42	
	b. Cheating	7,08	5,43	6,25	
	c. Exiting the class without any permission	6,06 -	4,9	5,48	

I : the percentage of students' participation of the first cycle of the application of STAD which is in the first and second meeting.
II : the percentage of students' participation of the second cycle of the application of STAD which is in the third meeting.

Table 4.4 shows that students' relevant participation during the application of STAD in the first cycle and second cycle has average 81,85%. And the most dominant students' participation is "Discuss or asking with their

friends" with average 18,8%. They were not used to ask the teacher when they had not understood the material or the rule. They were still shy to ask to the observer. They preferred to ask to their friends. It is also proved, when they worked in their team works. They discussed each others to make sure that they have mastered the material.

Students' relevant participation, "Paying attention to the teacher" decreases, from 19,18% to 13,59% with average 16,39%. It is caused STAD is something new for the students. They never applied that before. So, in the first cycle, they paid more attention to the teacher's explanation.

The first cycle students' relevant participation, "Discuss or asking with their friends" is higher then the second cycle, from 20,2% to 17,4% with average 18,8% . In the first meeting several observed students still feel shy to ask the teacher because who becomes the teacher is the researcher.

However, it does not mean that there is no one who has bravery to ask the teacher. It is proved from students' relevant participation, "Discuss or asking with teacher" is 17,87% in the first cycle and 16,3% in the second cycle with average 17,08%. In the second cycle they had already known before. So, the participation, asking the teacher about the rule decreased. But, they still asked the teacher about the material that they did not understand.

Students' participation, "Understanding and doing the work sheet" increases, that is from 12% to 19,56% with average 15,78%. In the first cycle, there was still a student that cheated another team and talked out side the

topic. But, generally, they tried to do the worksheet as well as they can. In the second cycle, it ran better. They realized that they must do the best for their team.

Students' participation, "Doing the quiz individually" has 10.2% in the first cycle and 17.4% in the second cycle with average 13,8%. In the second cycle, cheating when doing the quiz decreases, because in the first cycle they were not confident with their own answer.

Students' participation, "Talking outside the topic of discussion" is 7,41% in the first cycle and 5,43% in the second cycle with average 6,42%. In the second cycle, the observed students could minimize talking outside the topics, because they had to focus on the discussion.

Students' irrelevant participation, "Cheating" decreases from the first cycle to the second cycle, from 7,08% to 5,43% with average 6,25%. It is because they had realized that they had to do the quiz individually.

Students' irrelevant participation, "Exiting the class without any permission" decreases from the first cycle to the second cycle, from 6,06% to 4,9% with average 5,48%.

Based on table 4.4, it can be known that the average total of relevant students' participation is 81,85% and irrelevant students' participation is 18,15%. The general average of relevant student' participation is higher than the general average of irrelevant student' participation with 81,85%. It shows that students' participation during the application of STAD is active. So, it can

be seen that students' participation during the application of Student Teams –
Achievement Divisions is active

2. Students' achievement after the application

The research subjects are 37 students. Before the application of
Student Teams – Achievement Divisions, students were given a test that
called pre-test. It was used to know the students' achievement treatment. In
the final material that used the application of Student Teams – Achievement
Divisions, students were given a test that called post-test. It was used to know
the students' achievement after treatment. The result of pre-test and post-test
can be seen in the following table.

Table 4.5

The result of pre-test and post-test

NO ABSENT	PRE-TEST	POST-TEST	D	NOTE
1	75	75	0	Stagnant
2	75	75	0	Stagnant
3	80	95	15	Increase
4	85	95	10	Increase
5	100	100	0	Stagnant
6	80	95	15	Increase
7	80	90	10	Increase
8	70	75	5	Increase
9	95	95	0	Stagnant
10	90	80	-10	Decrease
11	75	80	5	Increase
12	85	75	-10	Decrease
13	90	90	0	Stagnant
14	95	100	5	Increase
15	80	85	5	Increase
16	90	90	0	Stagnant

17	90	90	0	Stagnant
18	85	80	-5	Decrease
19	90	95	5	Increase
20	70	80	10	Increase
21	90	95	5	Increase
22	90	80	-10	Decrease
23	80	85	5	Increase
24	85	85	0	Stagnant
25	85	90	5	Increase
26	80	90	10	Increase
27	100	100	0	Stagnant
28	80	90	10	Increase
29	75	85	10	Increase
30	75	85	10	Increase
31	80	95	15	Increase
32	90	95	5	Increase
33	100	100	0	Stagnant
34	70	85	15	Increase
35	80	90	10	Increase
36	85	90	5	Increase
37	100	90	-10	Decrease

Note

D   : Deviation between post-test and pre-test

Table 4.4 shows that 22 students show improvement in their post-test score. Five students decrease in their post-test score and 10 students stagnant in their post-test score. It means that 22 students have mastered the material better than before the application of STAD. Five students have not mastered the material well, so that their post-test score decreases. Ten students have the same score in post-test and pre-test. It indicates that they can master the material well although without using cooperative learning. Based on the table above, it can be seen that students' achievement before the application of STAD increases.

There are improvement score on students' pre-test and post-test score shows that Student Teams - Achievement Divisions can be used to increase students' achievement.

3. Statistical Data Analysis

Post-test score data is analyzed by using statistical test. It aims to know whether the hypothesis is accepted or rejected. Here, researcher uses paired sample t-test to know whether any significance difference before and after treatment. But, before researcher does paired sample t-test, researcher does normality test as the requirement to do that. These are the following steps:

a. Normality test

1) Make a frequency distribution list

Steps that are used to make a frequency distribution list as follow:

a) Decide range (r)

The way to decide the range is by subtracting the biggest data (100) and the smallest data (75). And the result is 25.

b) Decide the number of the class (k)

$$
\begin{aligned}
\text{Number of the class (k)} \quad &= 1 + 3{,}3 \log n \\
&= 1 + 3{,}3 \log 37 \\
&= 1 + (3{,}3 \times 1{,}5682) \\
&= 1 + 5{,}1750 \\
&= 6{,}175 \text{ (lower rounding)}
\end{aligned}
$$

The number of the class that took to make a frequency distribution list is 6 classes.

c) Decide the long of the class (p)

Deciding the long of the class by using pattern:

Long of the class (p) $= \dfrac{r}{k}$

Here, researcher rounded the result up. So, long of the class are 5.

Table 4.6

Frequency distribution list

Score	x_i	f_i	$(x_i)^2$	$f_i x_i$	$f_i(x_i)^2$
75 - 79	77	4	5929	308	23716
80 – 84	82	5	6724	410	33620
85 – 89	87	6	7569	522	45414
90 – 94	92	10	8464	920	84640
95 – 99	97	8	9409	776	75272
100 – 104	102	4	10404	408	41616
Total		37		3344	304278

2) Count average ($\bar{x}$)

The next step is counting average ($\bar{x}$) by dividing $\Sigma f_i x_i$ and Σf_i from the table above. And the result is 90.37.

3) Count standard deviation (s)

The next step is counting standard deviation (s). it can be known by using pattern:

$$s^2 = \frac{n\Sigma f_i(x_i)^2 - (\Sigma f_i x_i)^2}{n-(n-1)}$$

and the result is = 7,55.

Table 4.7
Expectation Frequency

Class limit	Z	L	E_i	O_i	χ^2
74,5	-2,101986				
		0,0585	2,1645	4	0,1457
79,5	-1,439735				
		0,1442	5,3354	5	0,0210
84,5	-0,777483				
		0,2356	8,7172	6	0,8469
89,5	-0,115231				
		0,1616	5,9792	10	2,70384
94,5	0,547019				
		0,1795	6,6415	8	0,2778
99,5	1,209271				
		0,0844	3,1228	4	0,2464
104,5	1,871523				
Total					4,2417

4) Decide hypothesis

H_0 : Sample is from population that has normal distribution

H_1 : Sample is from population that does not have distribution

5) Decide Significance level (α =0,05)

6) Count Chi – square

$$\chi^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}$$

$$= 4.24$$

7) Look for the value of $\chi^2_{(1-\alpha)(k-3)}$

$$\chi^2_{(1-\alpha)(k-3)} = \chi^2_{0.95(3)} = 7.81$$

8) Decide test criteria

H_0 accepted if $\chi^2 < \chi^2_{(1-\alpha)(3)}$

H_0 rejected if $\chi^2 \geq \chi^2_{(1-\alpha)(3)}$

9) Make conclusion

From result above with significance level 5% is got $x^2_{hitung} = 4.24$ and $x^2_{tabel} = 7.81$. $\chi_{hitung}^2 < \chi^2_{(1-\alpha)(3)}$. So, H_0 is accepted. It means that the sample is from normal distribution.

b. Sample paired t-test

Table 4.8
The result of pre-test and post-test

NO ABSENT	PRE-TEST	POST-TEST	D	NOTE
1	75	75	0	Stagnant
2	75	75	0	Stagnant
3	80	95	15	Increase
4	85	95	10	Increase
5	100	100	0	Stagnant
6	80	95	15	Increase
7	80	90	10	Increase
8	70	75	5	Increase
9	95	95	0	Stagnant
10	90	80	-10	Decrease
11	75	80	5	Increase
12	85	75	-10	Decrease
13	90	90	0	Stagnant
14	95	100	5	Increase
15	80	85	5	Increase
16	90	90	0	Stagnant
17	90	90	0	Stagnant

18	85	80	-5	Decrease
19	90	95	5	Increase
20	70	80	10	Increase
21	90	95	5	Increase
22	90	80	-10	Decrease
23	80	85	5	Increase
24	85	85	0	Stagnant
25	85	90	5	Increase
26	80	90	10	Increase
27	100	100	0	Stagnant
28	80	90	10	Increase
29	75	85	10	Increase
30	75	85	10	Increase
31	80	95	15	Increase
32	90	95	5	Increase
33	100	100	0	Stagnant
34	70	85	15	Increase
35	80	90	10	Increase
36	85	90	5	Increase
37	100	90	-10	Decrease

1) Decide hypothesis

H_0 : there is not an influence of STAD on students' achievement

H_1 : there is an influence of STAD on students' achievement

2) Decide significance level. α = 5% = 0,05

3) $\overline{D} = \sum_{i=1}^{n} n_1$

$$= \frac{0 + 0 + 15 + ... + (-10)}{37}$$

$$= \frac{145}{37}$$

$$= 3,91$$

$$S_{\overline{D}} = \sqrt{\frac{\sum_{i=1}^{n}(D_1 - \overline{D})^2}{n-1}}$$

$$= \sqrt{\frac{(0-3,91)^2 + (0-3,91)^2 + ... + (-10-3.91)^2}{37-1}}$$

$$= \sqrt{\frac{1806,46}{36}}$$

$$= 2,23$$

$$t_{hitung} = \frac{\overline{D}}{S_D/\sqrt{n}}$$

$$= \frac{3,91}{2,23/\sqrt{37}}$$

$$= 10,86$$

$$t_{\frac{0,05}{2}}; 36 \quad = t_{0,025}; 36 \quad = 2,02$$

$$t_{hitung} > t_{tabel}$$

From result above with significance level 5% is got t_{hitung} = 10,86 and

t_{tabel} = 2,02. so, H_0 is rejected. It means that students' achievement before

treatment is not same with after treatment.

Pre-test and post-test data are analyzed by using parametric test because the data is score. It is used in order to know the influence of the application of STAD to the students' achievement.

a. Normality test

Normality test is used to know whether the two samples are from population that has normal distribution or not. Based on the result, it is got x^2_{hitung} = 4.64 and x^2_{tabel} = 7.81 with significance level 5% or 0,05. It means that $\chi_{hitung}^2 < \chi^2_{(1-\alpha)(3)}$. So, null hypothesis that is offered that sample is not from normal distribution is rejected. In the other word, sample is from normal distribution.

b. Sample paired t-test

Sample paired t-test is used to know whether there is an influence on students' achievement after the application of STAD. It analyses the students' post-test score. Based on the result, it is got t_{hitung} = 10,86 and t_{tabel} = 2,02 with significance level 5% or 0,05. It means that $t_{hitung} > t_{tabel}$. So, null hypothesis that is offered that there is no significance influence is rejected. In the other word, there is a significance influence of the application of STAD.

B. Discussion

Cooperative learning method type STAD is one of learning strategy that demands students become active for having discussion or solving the problem which is in the work sheet. Of course, in cooperative learning students are guided to solve the problem by them selves by discussion within their team mates. Team

working is also used to make sure that all members have mastered the material that given by the teacher. That is why every team members must be active on discussing.

The students' activeness in learning process is in line with the theory that bases this cooperative learning that is motivational theory. As well as what have been stated in the second chapter that motivational perspective on cooperative learning focuses on the reward or goal structures[1], it is proved that students interest and enthusiasm decreases in the second cycle. They are encouraged by the "rewarding" step that is give a reward to team that has high score. Goal structures those are *cooperative; competitive* and *individualistic* can be seen in the study. For example, *cooperative* can be seen when each students' goal oriented to the others' goal attainment; *competitive* can be seen when each students effort to frustrate others' goal oriented and *individualistic* can be seen when each students doing the quiz with average students' participation score 13,8% where they have their own goal oriented.

Students participations during the learning process focuses in team work to develop cognitive skill which are skill to think. It is useful to build a new knowledge or make perfect the previous knowledge.

Based on the observation during the application of STAD, it can be seen that the students' participation are active with relevant students' participation

---

[1] Robert E. Slavin, *Cooperative Leaarning Theory, Research and practice*, (Massachussetts: Allyn & Bacon, 1995), 2nd edition, p.2

score 81,85%. In the other hand, students' irrelevant participation is 18,85%. It is caused there were still several observed students who were still talking outside the topics and joking for awhile while doing worksheet. According to the observer, they should be a funny person. However, after joking and talking outside the topics, they discussed with their team mates again.

It means that it proves cognitive theory that stated by Piaget (about learning adjustment: assimilation and accommodation)[2] which students learn through being active on learning process.

The Vygotsky theory that learning precedes development as stated by Duven[3] means that students can think and solve problem without any help from another people. It is proved when students doing the worksheet within their team mates.

This study also proves the Vygotsky theory which is "scaffolding". It is proved by the students' participation of "discussing or asking with their friends (team mates)" is high with 18,8% and "understanding and doing the work sheet within their team mates" is 15,78%.

The general result of students' participation indicates that cooperative learning can change teaching and learning process that is teacher centered to student centered.

---

[2] Alan Pitchard, *Way of learning– Learning Theories and Learning Styles in The Classroom*, (New York: David Fulton Publishers, 2005), p. 25
[3] Thomas Fetsco and John Mc Clure, *Educational Psychology – An Integrated Approach to Classroom Decisions*, (Boston: Pearson Education, Inc, 2005), p.134

From post-test score data that have been analyzed by using t-test (sample paired t-test), it is proved there is a significance difference between students' achievement before and after the application of STAD. Based on the result of post-test score that has been analyzed by using sample paired t-test, it gets t_{hitung} = 10,86 and t_{tabel} = 2,02 with significance level 5% or 0,05. It means that t_{hitung} > t_{tabel}. So, null hypothesis that is offered that there is no significance influence is rejected. In the other word, cooperative learning type STAD has a significance influence on improving students' achievement.