

CHAPTER III

RESEARCH METHODOLOGY

This chapter is devoted to the description and account of the steps that have been taken to conduct this study. The description and account below involve: research design, variables, population and sample, hypothesis, research instrument, research procedure, trying out the Instrument, the implementation of the experiment, and the data analysis and interpretation.

3.1 Research Design

This study applied experimental design. The aim of this study was to find out whether or not the application of cooperative learning: TPS enables students to improve their reading comprehension. As stated by Sugiyono (2008: 114) that experimental design is a study which aims at finding out the influence of particular treatment and the experimental design covers quantitative data and statistical technique in analyzing the data. Therefore, the research method used in this study was quantitative with quasi experimental design since the writer faced some difficulties in employing the true experimental method because of some limitations that is the limitation of time and school regulation which did not allow the researcher to randomly sample the subject.

Hatch and farhady (1982:23-24) states that because of some limitations, it is difficult to construct a true experimental design. However, it does not mean that the researcher can abandoned the research and let it invalid. We have to reach the goal as closely as possible to meet the standards of true experimental design.

This study applied quasi experimental study of nonequivalent groups design. Hatch and Farhady (1982: 22) state that the nonequivalent groups design is often used in classroom experiments when experimental and control groups are such naturally assembled groups as intact classes which may be similar. Furthermore, this study carried out written pretest and posttest for collecting data to be analyzed, both experimental and control groups.

In this study, particular treatment was given to the experimental group in teaching students reading comprehension (news item). It was aimed at finding out the significance of TPS application in improving students' critical thinking and reading comprehension skill. Meanwhile, conventional method was applied in the control group.

Schematically, this quasi experimental study was described as follows:

$$\begin{array}{c} \underline{G1 \ T1 \ X \ T2} \\ G2 \ T1 \ T2 \end{array}$$

(Sugiyono, 2008: 116)

G1 : experimental group

G2 : control group

X : the treatment through the use of TPS that belongs to experimental group

T1 : pre-test belongs to both of experimental and control groups

T2 : post-test belongs to both of experimental and control groups

The subjects of population and samples for both experimental group and control group would be mentioned in the next sub-chapter (see 3.2)

3.1.1 Variables

Hatch and Farhady (1982) define variable as a certain attribute of a person or an object that differs each another. It has two diverse sorts of variable; they are

independent variable and dependent variable. Vockell (1983) describes independent variable as the treatment employed which is intended to produce particular outcome and dependent variable as the outcome that is looked ahead to appear after getting the treatment. This study had two variables as well; the use of cooperative learning: think-pair-share as the independent variable and reading comprehension as the dependent variable.

3.1.2 Hypothesis

According to Fraenkel and Wallen (1990: 40), "Hypothesis is a prediction of some sort regarding the possible outcomes of a study". The null hypothesis employed in this study states that the application of cooperative learning: think-pair-share is not able to improve students' reading comprehension.

3.2 Population and Samples

The population employed in this study was the students of tenth X of an Islamic boarding senior high school in Subang. There are four classes; two classes are male students and the last two are female students. Because it is a boarding school, all of students live in the dormitory 24-hours and they have equal treatment in terms of English Language Teaching. They get English lesson not only in the classroom but also out of the classroom. Every morning, they have vocabulary lesson. Besides, they also have conversation lesson once in a week.

The samples of this study were two diverse classes; they were class X1 as the experimental group and class X2 as the control group. Each class had 25 students those were 15-16 years old. Both of the classes were considered as classes that have a good presence and have equal achievement at that time.

3.3 Research Instrument

3.3.1 Teaching Material

The teaching material given to students was taken from some English textbooks; such as *English Alive Senior High School* and *Look a Head Grade X Senior High School*. The material included some news item texts. It is in line with the competence standard of X grade senior high school in number 10 that students must be able to comprehend simple written short essay and functional text in narrative, procedure, and news item forms in accessing knowledge closely to their environment. In detail, those texts involved several terms; advertisement, newspaper, newsflash, and domestic affair. The material was taught to both of the experiment and the control groups as well with different methods.

3.3.2 Pre-test and Post-test

Pre-test was administered to both of the experimental and control groups with similar test. The questions for reading comprehension test were administered in a multiple choice form (see appendix 2). Certainly, conducting pre-test was important for getting data about students' capability before receiving the treatment. Meanwhile, post-test was administered to obtain data of students' reading comprehension after receiving the treatment. Those data were beneficial for knowing the influence of TPS application in improving reading comprehension.

3.3.3 Observation List

Observation is employed toward the teacher and the students. It was employed to obtain more information about the actuating of TPS in the treatment process. The observation is made through *checklist* (✓) item. It means that the observer gives checklist (✓) mark in the column provided in the observation sheet.

3.3.4 Questionnaire

Questionnaire was administered to the students to gain the students' opinions toward the use of TPS in teaching reading. The questionnaire consist of close and open questions (9 close questions and 1 open question) which is administered to the experimental group after having given the treatments.

3.4 Research Procedure

Generally, the procedure used in the study could be explained as follows:

- organizing the material of instructions that would be taught in both experimental and control groups;
- organizing the instrument of the study, instrument test for reading comprehension in the form of multiple-choice questions, observation sheet, and teaching procedure in which TPS applied;
- trying out the instrument of the study (for reading comprehension) ;
- analyzing the data from the try-out to ensure its validity, reliability, and difficulty;
- administering pre-test for both groups to obtain the initial abilities between those two;

- giving the treatment of cooperative learning: think-pair-share technique to the experimental group;
- employing observation using the observation sheet toward the activities used think-pair-share technique in learning process;
- administering questionnaire to experimental group in getting students' opinions toward the use of TPS in teaching reading;
- administering post-test for both groups to obtain the result of the treatment;
- analyzing the data collected from pre-test, post-test, and observation;
- deriving the interpretation based on the result of the collected data analysis; and
- drawing the conclusion of the result of the study and recommending some constructive suggestion for further study.

3.5 Try-out Test

It was very important to measure the instrument's validity, reliability, and difficulty for having sufficient instrument. Therefore, before giving pre-test to the samples of the study, try out test of the instrument should be managed to obtain validity, reliability, and difficulty of the instruments.

The validity of a test is the extent to which it measures what is supposed to measure and nothing else (Heaton, 1978: 153). Reliability is defined as the extent to which a test produces consistent result when it is administered under the similar condition (Hatch and Farhady, 1982: 224). Difficulty means the level of difficulty for each item of the instrument (Arikunto, 1993: 209).

The try-out test had been employed randomly on 20th April 2011 toward 30 senior high school students grade X.

3.5.1 Validity

Validity is a matter of degree to extend the result of study as one way to measure the validity through carrying out item of instrument analysis (Hatch and Farhady, 1982: 251).

Commonly assessing validity employs Pearson product moment correlation.

The formula, as follows:

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{\{N \sum X^2 - (\sum X)^2\} \{N \sum Y^2 - (\sum Y)^2\}}}$$

Note:

r_{xy} : coefficient correlation between variable X and Y

X : item which its validity is assessed

Y : total score gained by the sample

(Arikunto, 2003: 146)

Even though, in this study SPSS 17.0 was applied to measure validity with Pearson product moment correlation type. Here is the analysis:

Table 3.1
r Coefficient Correlation (Validity)

Raw Score	Interpretation
0.000 – 0.200	Very Low
0.200 – 0.400	Low
0.400 – 0.600	Moderate
0.600 – 0.800	High
0.800 – 1.000	Very High

(Arikunto, 2007: 147)

The following table presents the result of try out validity and reliability in reading comprehension items:

Table 3.2
The Validity Test of the Reading Comprehension Items

Item Number	Raw Score	Interpretation
8, 9, 12, 18	0.000 – 0.200	Very Low
3,5,7,10,11,16,19,21,22,23	0.200 – 0.400	Low
1,2,4,6,13,14,15,20,24,25	0.400 – 0.600	Moderate
17	0.600 – 0.800	High
	0.800 – 1.000	Very High

Based on the result above (table 3.2), there were 21 items valid. Then, those appropriately became the instrument to apply in this study. The rest of 4 items (8, 9, 12, 18) were invalid, so those were not appropriate to use as the instrument. To sum up, 20 valid items attained were used in the instrument.

3.5.2 Reliability

Reliability is the extent to which the result can be regarded consistent or stable (Brown, 1990: 98). In this study, Cronbach's alpha formula in SPSS 17.0 was applied to reveal the reliability of instrument. To interpret the coefficient of reliability, the following criteria are employed:

Table 3.4
The Criteria of Reliability Test

Coefficient Reliability	Interpretation
0.00 – 0.19	Very Poor
0.20 – 0.39	Poor
0.40 – 0.59	Moderate
0.60 – 0.79	Good
0.80 – 1.00	Excellent

(Sugiono, 2001: 149)

The table below displays the result of reliability in reading items:

Table 3.5
The Reliability Test of the reading comprehension Items

Cronbach's Alpha	N of Items
.805	25

The table above presents that the reliability of the instrument measured was 0.814. In keeping with Sugiono (2001: 149), the value of alpha is considered excellent for the items. Thus, the items were appropriate to be the instrument given to learners in the study.

3.5.3 Difficulty

Another requirement that needs to be considered as excellent instrument is difficulty test. Arikunto (1993: 209) argued that difficulty test aims to get the level of difficulty for each item of the instrument. The formula employed to measure difficulty as follows:

$$P = \frac{B}{JB}$$

Note: P = index of difficulty

B = the number of students who can answer the item correctly

JB = the number of students

The following criteria are used to interpret the index of difficulty:

Table 3.7
The Criteria of Difficulty

Facility Value	Interpretation
0.000 – 0.300	Difficult
0.300 – 0.700	Moderate
0.700 – 1.000	Easy

(Arikunto, 1993: 210)

The following table presents the result of difficulty in reading comprehension items:

Table 3.8
The Difficulty Test of the Reading Comprehension Items

Item Number	Facility Value	Interpretation
3, 4,12	0.000 – 0.300	Difficult
1,2,5,7,8,10,13,15,16,17,18,19,20,21,22,23,24,25	0.300 – 0.700	Moderate
6,9,11,14	0.700 – 1.000	Easy

Based on the table above, 3 items (3, 4, 12) were categorized difficult. Meanwhile, 18 items (1,2,5,7,8,10,13,15,16,17,18,19,20,21,22,23,24,25) were considered moderate. The rest of 4 items (6, 9, 11, 14) were categorized easy. Because the items took as the instrument were only 20 items, the instrument consist of 2 difficult items (3, 4), 15 moderate items (1,2,5,7, 10, 15,16,17, 19,20,21,22,23,24,25), and 3 easy items (6, 11, 14).

3.6 The Procedure of the Instruction in Experimental Group

In the experimental group, Learning processes cover the activities which consist of TPS procedure. The procedure that was applied in the experimental group as follows:

Table 3.10. the experimental Group Procedure

Steps of TPS Technique	Activities
	I. OPENING <ul style="list-style-type: none"> • The teacher (T) opens the lesson. • T checks Students' (Ss) attendance.
Step 1 <i>Grouping</i>	<ul style="list-style-type: none"> • T facilitates the Ss to sit in a group of four • T explains the Ss about the techniques of learning through Cooperative Learning: Think-Pair-Share (TPS).
Step 2 <i>Building knowledge</i>	<ul style="list-style-type: none"> • T explains the Ss about learning objective • T conducts a perception by giving students the questions related to the topic Example: <i>What do you know about news item text?</i> <ul style="list-style-type: none"> ○ <i>What are the generic structures of news item text?</i> • T give a short explanation about the topic in order to build Ss' knowledge about the topic (through small discussion with Ss)
Step 3 <i>Thinking (As Individual)</i>	II. MAIN ACTIVITIES <ul style="list-style-type: none"> • T gives Ss the reading text (in the form of news item text) followed by some questions related to the text. • Ss read the text and answer the questions individually • Ss write their individual answer in the Ss' work sheet • T facilitates and supervises the Ss while performing this step (thinking as individual)
Step 4 <i>Pairing (pair discussion)</i>	<ul style="list-style-type: none"> • Ss sit with their pair and confirm their individual answers to their pair. • Ss discuss about the questions and find the good answers of questions with their pair. • Ss write their pair answer in the Ss' work sheet. • T facilitates and supervises the Ss while performing this step (pairing)
Step 5 <i>sharing (Group Discussion)</i>	<ul style="list-style-type: none"> • Ss sit with their group and confirm their pair answers to their group. • Ss discuss about the questions and find the good answers of questions with their group. • Ss write their group answer in the Ss' work sheet. • T facilitates and supervises the Ss while performing this step (sharing)
Step 6 <i>Group Presentation</i>	<ul style="list-style-type: none"> • T invites a representative of the group to present his group answer to whole students in the class. • Ss listen to the group presentation facilitated by T
	III. CLOSING <ul style="list-style-type: none"> • T gives Ss opportunity to reflect the previous activities related to the topic of discussion • T gives Ss opportunity to ask some questions • T informs Ss about next topic that will be learnt in the next meeting • T closes the lesson

3.7 The Procedure of Data Analysis

3.7.1 Pre-test Data Analysis

The procedure was applied to analyze pre-test data as follows:

3.7.1.1 Normality of Distribution Test

- Looking at the hypothesis

Ho : The distribution of the scores are normally distributed

- Finding out the mean \bar{X}
- Finding out Standard Deviation using the formula

$$SD = \sqrt{\sum \frac{(X - \bar{X})^2}{N - 1}}$$

- Testing the hypothesis of normal distribution as follows:

- Looking at the hypothesis
- Looking at the alpha level P 0.05
- Calculating degree of freedom by the formula:
df = (k-3), k = class interval
- Comparing the observed and critical statistics at the calculated degree freedom
- Accepting Ho, if the probability (asyp. sig 2 tailed) > 0.05

In this study, SPSS 17.0 was applied to test the normality of distribution.

3.7.1.2 The Homogeneity of Variance Test

SPSS 17.0 was used in this study to test homogeneity of variance through following steps:

- Stating the hypothesis

$$H_0 : X_a = X_b$$

The variance belonging to both of experimental and control groups in pre-test and post-test is equal.

- Setting the alpha level at 0.05
- Determining the degree of freedom

$$df_1 = n_1 - 1$$

$$df_2 = n_2 - 2$$

Note:

df1 = degree of freedom for numerator

df2 = degree of freedom for denominator

n1 = number of sample with higher variance

n2 = number of sample with lower variance

- Testing the hypothesis

If the probability > 0.05, H_0 is accepted

3.7.1.3 The Calculation of Independent Test

These steps below were applied as follows:

- Stating the hypothesis ($H_1 : X_a > X_b$)
- Setting the alpha level at 0.05 directional decision
- Finding out the mean of experimental group (\bar{X}_a) and the mean of control group (\bar{X}_b)
- Finding out Standard Deviation of differences

$$SD = \frac{\sqrt{\sum D^2 - (1/n)(\sum D)^2}}{n-1}$$

- Calculating the standard error of differences between two means using the formula:

$$S \{(\bar{X}_a) - (\bar{X}_b)\} = \sqrt{\left(\frac{S_a}{na}\right) + \left(\frac{S_b}{nb}\right)}$$

- Finding out the T using the formula

$$T = \frac{\bar{X}_a - \bar{X}_b}{S(\bar{X}_a - \bar{X}_b)}$$

- Determining of degree of freedom using the formula

$$df = (Na - 1) + (Nb - 1)$$

- Finding out the critical value for t in sig
- Comparing tobs and tcrit. If the observed statistic is less than the critical statistic, the null hypothesis should be accepted. On contrary, if the observed statistic is more than the critical statistic, the null hypothesis should be rejected.

Those whole formulas above were measured by SPSS 17.0.

3.7.2 Post-test Data Analysis

The analysis of post-test worked as well as pre-test analysis. Entire formulas were calculated using SPSS 17.0.

3.7.3 The Data Analysis of Pre-test and Post-test of each Group Using Matched t-test

These steps below were applied as follows:

- Stating the hypothesis ($H_1 : X_1 > X_2$)
- Setting the alpha level at 0.05 directional decision

- Finding out the mean of experimental group (\bar{X}_1) and the mean of control group (\bar{X}_2)
- Finding out Standard Deviation of differences

$$SD = \frac{\sqrt{\sum D^2 - (1/n)(\sum D)^2}}{n-1}$$

- Calculating the standard error of differences between two means using the formula:

$$S_D = \frac{S_D}{\sqrt{n}}$$

- Finding out the T using the formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_D}$$

- Finding out the critical value for t in sig
- Comparing t_{obs} and t_{crit} . If the observed statistic is less than the critical statistic, the null hypothesis should be accepted. On contrary, if the observed statistic is more than the critical statistic, the null hypothesis should be rejected.

Those whole formulas above were measured by SPSS 17.0.

3.7.4. The Data Analysis of Observation

To describe the implementation level of the model (TPS model), teacher's role, and students' activity in the experimental class, the study requires observation to collect the data. Bailey mentioned (cited in Susanto 2001) that there are two kinds of observation: a structured observation and an

structured observation. In a structured observation the researcher counts the frequency with which certain activities under studying occur or certain things are said, while in an unstructured observation, the researcher merely observes and makes notes whatever occurs in the classroom along process of teaching and learning.

The study adopted the type of a structured observation, since the researcher observed by using observation list with checklist system (yes or no answers). Then, the interpretation of data was drawn from the frequency of observers' answer. The formula of percentage can be described as follows:

$$P = \frac{F \times 100}{N}$$

N

Note:

P = percentage of implementation level

F = frequency

N = response

100 = constant

Tabel 3.11

The criteria of percentage category of implementation the model

No	Percentage of Implementation of The model (%)	Criteria
1.	0,0 – 24,5	Very Low
2.	25,0 – 37,5	Low
3.	37,6 – 62,5	Moderate
4.	62,6 – 87,5	Good
5.	87,6 – 100	Very Good

(Mulyadi in Nuh, 2007)

3.7.5. The Data Analysis of Questionnaire

The formula of percentage was applied to analyze the questionnaire data. Therefore, the interpretation of data was drawn from the frequency of students' answer. The formula of percentage can be described as follows:

$$P = \frac{F}{N} \times 100$$

Note:

P = percentage

F = frequency

N = response

100 = constant

(Ningrat, 2000: 33)

The criteria of percentage category are:

1% - 25% = a small number of students

26% - 49% = nearly half of students

50% = half of students

51% - 75% = more than half of students

76% - 99% = almost all of students

100% = all of students