CHAPTER III
RESEARCH METHODOLOGY

Chapter three presents the methodology in conducting the research. This chapter provides four main parts of the investigation: research design, data collection technique, research procedures, and data analysis technique.

3. 1 Research Design

The research employed quantitative method in the form of quasi experimental design in order to collect the data. According to Sugiyono (2009, p. 77), the quasi experimental design is a study which is aimed at discovering the influence of particular treatment. This design covers quantitative data and statistical technique in analyzing the data. Furthermore, the quasi experimental design attempts to fulfill standards of the true experimental design as closely as possible (Hatch & Farhady, 1982, pp. 23-24. Schematically, the quasi-experimental design can be drawn as follows:

Table 3.1
The Schematic of The Quasi-experimental Design

Group	Pre-test	Treatment	Post-test
Experimental	O_1	X	O_2
Control	O_3	-	O_4

Note:
- X represents the exposure of a group to an experimental variable
- O refers to the process of observation or measurement (Campbell & Stanley, 1963, p.13)

A variable is termed as an attribute of an object which varies from object to object. In research, variables can be classified as dependent and independent variables. The independent variable is the variable which is selected, manipulated, and measured by the researcher, while the dependent variable is the variable

which a researcher observes to determine the effect of the independent variable (Hatch & Farhady, 1982, pp. 13-15). The independent variable of the research is Think-Pair-Share Technique and the dependent variable is the reading scores.

3. 1. 1   Hypothesis

Hypothesis is defined as a prediction about the result of research. It can be the direction of the expected relationship between two or more variables. There are two types of hypothesis, namely null hypothesis and alternative hypothesis. The null hypothesis (H_o) states that there is no difference between the outcome of experimental and control group. The alternative hypothesis (H_1) tries opposite the hypothesis null (Hatch & Farhady, 1982, pp. 3-4). Therefore, the hypotheses of the research are as follow:

- H_o = The use of Think-Pair-Share technique does not develop the students' reading skills.
- H_1 = The use of Think-Pair-Share technique develops the students' reading skills.

Acceptance of null hypothesis is based on the result of independent t-test and dependent test that is gained from the scores of pre-test and post-test in experiment and control group. If the result from each test is similar or higher than critical value of α=0.05, thus the null hypothesis (H_o) is rejected which means that the use of Think-Pair-Share technique develops the students' reading skills. In contrast, if the result is less than critical value of α=0.05, the null hypothesis (H_o) is accepted which means that the use of Think-Pair-Share technique does not develop the students' reading skills.

3. 2   Data Collection

3. 3. 1   Population and Sample

Population, as defined by Best & Khan (1995, p. 13), is any group of people that have one or more characteristics in common that become the researcher's interest, while samples are a small part of a population selected for observation

and analysis. Since quasi-experimental design does not contain random selection of subjects, the sample of the research was chosen purposively, based on the same number of students and absence of significant difference between scores of the two groups. The difference was determined by independent t-test from pre-test scores.

The population involved in the research was eighth grade students from one of Junior High Schools in Bandung, whereas the samples were two classes, namely VIII-E as the experimental group and VIII-F as the control group.

3. 3. 2   Research Instrument

Research instruments are tools used in the research for obtaining relevant data to research's project and there are many alternatives from which to choose (Wilkinson & Birmingham, 2003, p. 3). The data were collected to answer research questions of the research. There were five research instruments utilized in the research, namely pilot-test, pre-test, post-test, observation checklist and questionnaire. From those instruments, the data collections were analyzed to determine whether or not Think-Pair-Share technique develops the students' reading skills.

The pilot-test was employed in other classes of experimental and control group. The test was intended to examine the validity, reliability and difficulty of the items that would administer in experimental and control group.

The pre-test was conducted in experimental and control group before giving the treatment in order to measure students' initial ability of reading recount texts. On the other hand, the post-test was conducted in both groups at the end of the treatment in order to find out whether or not there is an improvement on students' ability of reading recount texts.

While the treatment was being applied in the experimental group, there was observer who observed the researcher as the teacher in the classroom using observation checklist. The observation checklist was aimed at making notes whatever occurred in the classroom along the process of teaching and learning activities.

After the post-test conducted, the questionnaire was administered only in experimental group. It was distributed to all students. The questionnaire was aimed at finding out students' responses toward Think-Pair-Share technique applied in the classroom. This instrument was constructed in checklist type based on Likert scale. There were twelve statements in the questionnaire in which each statement was created in positive sentences and negative sentences so the respondents can response the questionnaire seriously and consistently. Therefore, the respondents' tendency to answer in certain column in checklist type can be reduced. The advantages of checklist type are the respondents always read each instrument item and the answer, easy to be constructed, easy to analyze the data, and having interesting visualization. The data gained from the Likert scale are interval data (Sugiyono, 2009, pp. 93-96).

3. 3 Research Procedures

Generally, the research procedures are:

1. Organizing the Teaching Procedures

The researcher had roles as the teacher and facilitator for both experimental and control group. There were two steps in teaching procedure. The first step was preparing appropriate materials for the teaching and learning processes during the treatment. The materials were about recount text. The second step was organizing teaching procedure in experimental and control group. The teaching procedure in experimental group employed Think-Pair-Share technique and in control group employed the conventional method.

2. Organizing the Research Instrument

Organizing the research instruments include creating the test item for both pre-test and post-test, piloting the pre-test and post-test and making observation checklist and constructing statements for questionnaire.

3. Testing the Validity and Reliability of the Pre-test and Post-test through the Pilot Test

The pre-test and post-test were tested to find out whether or not the items had possessed the validity and reliability. In addition, it was intended to see the

difficulty index of items. The test items were pilot-tested to students in eighth grader at the same school. The students were participants who did not participate in experimental and control group. They were the students from other classes. The pilot test was conducted in two classes on 28th and 30th August 2013.

4. Administering Pre-test to Experimental and Control Group

Pre-test in experimental and control group was conducted before applying the treatment in order to reveal the students' initial ability of reading recount texts.

5. Conducting the Treatment

The Think-Pair-Share technique was conducted in the experimental group, in the other hand the conventional method was carried out in the control group. Even though the methods were different, the learning materials and context were approximately similar, as can be seen in the following teaching schedule:

Table 3.2
The Schematic of Teaching Schedule

Day/ Date	Activities	
	Experimental Group	**Control Group**
Wed/28th March 2013 and Friday/30th March 3013 *(Pilot test)*	-	
2nd September 2013	Pre-test	-
4th September 2013	-	Pre-test
9th September 2013	Vacation (Generic Structure)	-
10th September 2013	Unexpected Experience (Main Idea)	Vacation (Generic Structure)
11th September 2013	-	Unexpected Experience (Main Idea)
16th September 2013	Visited A Place (Pronoun)	-
17th September 2013	Weekend (Simple Past)	Visited A Place (Pronoun)
18th September 2013	-	Weekend (Simple Past)

23rd September 2013	(Past Continuous)	-
24th September 2013	Review	(Past Continuous)
25th September 2013	-	Review
30th September 2013	Post-test	-
1st October 2013	-	Post-test

6. Administering Observation Checklist

    Observation checklist was employed toward the teacher and the students in experimental group. It was intended to be a proof that Think-Pair-Share technique was conducted effectively. The observer in the research was a school teacher or a student teacher.

7. Administering Post-test to Experimental and Control Group

    After the treatment was applied in the classroom, post-test was conducted to both experimental and control group at the end of the program in order to investigate the use of Think-Pair-Share technique in helping students develop reading skills.

8. Conducting Questionnaire

    The questionnaire was constructed based on Likert scale. It was aimed discovering students' responses toward Think-Pair-Share technique applied in the classroom. It was consisted of twelve questions. This questionnaire asked respondents to tick one area on the rating scale based on their opinion.

3. 4 Data Analysis

3. 4. 1 Scoring Technique

According to (Arikunto, 2012, p. 187), there are two types of formula in processing the score for multiple choice test, those are with minus system and without minus system. The research only used the formula without minus system in order to avoid the negative score. The formula was proposed as follows:

$$S = R$$

S=Obtain score

R=Right answer

3. 4. 2 The Validity Test of the Pilot-test

The research employed content validity for validity testing. According to (Sugiyono, 2009, pp. 129-134), content validity can be made by comparing the contents of the draft with the instruments that have been set. The Pearson product-moment correlation formula was employed to find the validity. The formula was proposed as follows:

$$r = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}}$$

X= score item which its validity is assessed

Y= total score gained by the sample

r= Pearson product-moment correlation coefficient

N= number of respondent

(Kranzler & Moursund, 1999, p. 56)

The data was calculated using Anates V4. After correlation coefficient (r) value was calculated, the obtained value was gained, and then it was compared to $r_{critical}$. If $r_{obtained} \geq r_{critical}$, it means that the item is valid, and if the $r_{obtained} \leq r_{critical}$, it means that the item is not valid.

3. 4. 3 The Reliability Test of the Pilot-test

According to Hatch and Farhady (1982, p. 244), reliability was used to see the consistency of the result in a test when it is administered under similar conditions. Split-half method was employed in the research for testing the reliability. This method uses Spearman-Brown formula that is defined as follows:

$$r_{11} = \frac{2r_{1/2 1/2}}{\left(1 + r_{1/2 1/2}\right)}$$

r_{11} = Coefficient Correlation of Reliability

$r_{1/2\,1/2}$ = Correlation between X (odd items) and Y (even items)

(Arikunto, 2012, pp. 106-110)

The research used AnatesV4 to process this test. After the coefficient was obtained, then it was interpreted based on the following categorization:

Table 3.3
Category of Coefficient Correlation of Reliability

Coefficient Correlation	Interpretation
0.0 – 0.20	Low
0.20 – 0.40	Moderate
0.40 – 0.70	High
0.70 – 1.00	Very High

3. 4. 4   The Difficulty Index

Arikunto (2012, pp. 222-225) stated that the difficulty index is an assumption that a good item should not be too difficult or too easy. To measure the degree of difficulty, the research used AnatesV4 to process this test. The formula was used to find the difficulty index as follows:

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

P = difficulty index

B = number of students who answer the item correctly

JS = number of students

3. 4. 5   Data Analysis on Pre-test and Post-test

3. 4. 5. 1   The Normal Distribution Test

The Kolmogorov-Smirnov test was used to investigate the normal distribution of the set of data. The test compares the scores in the sample to a

normally distributed set of scores with the same mean and standard deviation (Field, 2009, p. 144). It was employed through SPSS 20 for Windows.

There were three steps in conducting the Kolmogorov-Smirnov test, they are stating the hypotheses and setting the alpha level, analyzing the groups' scores using the Kolmogorov-Smirnov formula through SPSS 20, and interpreting the output data. The first step, the alpha level set is at 0.05 (two-tailed test) and the hypotheses are as follow:

- H_0 = the score of the experimental and the control group are normally distributed
- H_A = the score of the experimental and the control group are not normally distributed

Then, the data were analyzed by using the Kolmogorov-Smirnov formula through SPSS 20. Finally, the output data were interpreted by this way: if the result is non-significant ($p < 0.05$) it means that the distribution of the sample is significantly different from normal distribution (probably normal) and the null hypothesis is rejected. If the result is significant ($p > 0.05$) then the distribution is approaching the normal distribution and the null hypothesis is accepted (Field, 2009, p. 139)

3. 4. 5. 2   The Homogeneity of Variance Test

The Levene's test was used in the research to examine the homogeneity of variance of the scores. The Levene's test checks the null hypothesis that the variances in the groups are equal. It means that the difference between the variances is zero (Field, 2009, p. 150). The test was employed through SPSS 20 for Windows.

There were three steeps in conducting the Levene's test. They are stating the hypothesis and setting the alpha level; analyzing the scores using Levene's test through SPSS 20; and interpreting the output data. The first step, the alpha level

set is at 0.05 (α = 0.05) and it is the maximum error points that can be tolerated. The hypotheses are as follow:

- H_0 = the variances of the control and experimental group are homogenous.
- H_A = the variances of both groups are not homogenous.

Then, the data were analyzed by using the Levene's formula through SPSS 20. Finally, the output data were interpreted by this way: if the result of the test is interpreted to be significant at $p \le 0.05$ and it means that the null hypothesis is rejected and the variances are significantly difference. In contrast, the result is interpreted to be non-significant if $p > 0.05$ and it is concluded that the null hypothesis is accepted and the variances are approximately equal (Field, 2009, p. 150)

3. 4. 5. 3   Independent t-test

The independent group t-test is employed to analyze a relevant relationship between the independent variable (treatment) and the dependent variable (response) that is measured on experimental and control group. The test is focused on determining whether or not there is a significant difference between the experimental and control groups' means on dependent variable (Coolidge F. L., 2000, p. 141). There were three steps in conducting the independent group t-test: (1) stating the hypothesis and setting the alpha level; (2) analyzing the groups' scores using the independent group t-test in SPSS 20 for Windows which results in the t value or t_{obt}; (3) comparing the t_{obt} with the level of significance for testing the hypothesis. The first step, the alpha level was set at 0.05 (two-tailed test) and the hypotheses are as follow:

• H_o = the two samples are from the same population; there is no significant difference between the two samples.

• H_A = the two samples are from the same population; there is a significant difference between the two samples.

Then, the data were analyzed by using the independent group t-test formula through SPSS 20 for Windows. The third step is comparing the result with the significance level. If the result ≥ 0.05, the null hypothesis (H_o) is rejected which means there is a significant difference of mean between experimental and control group. In contrast, if the result < 0.05, the null hypothesis (H_o) is accepted which means that there is a no significant difference of mean between experimental and control group.

3. 4. 5. 4   Dependent Test

The dependent test is aimed at comparing the scores of the experimental group on pre-test and post-test. The test is focused on determining whether or not there is a significant difference between the pre-test and post-test scores before and after the treatment. There were three steps in conducting the dependent test: (1) stating the hypothesis and setting the alpha level; (2) analyzing the groups' scores using the dependent test in SPSS 20 for Windows which results in the t value or t_{obt}; (3) comparing the t_{obt} with the level of significance for testing the hypothesis. The first step, the alpha level was set at 0.05 (two-tailed test) and the hypotheses are as follow:

• H_o = There is no significant difference between the pre-test and post-test scores before and after the treatment.

• H_A = There is a significant difference between the pre-test and post-test scores before and after the treatment.

Then, the data were analyzed by using the dependent test formula through SPSS 20 for Windows. The third step is comparing the result with the significance level. If the result ≥ 0.05, the null hypothesis (H_o) is rejected which means there is a significant difference between the pre-test and post-test scores. In contrast, if the result < 0.05, the null hypothesis (H_o) is accepted which means there is no significant difference between the pre-test and post-test scores before and after the treatment.

3. 4. 5. 5   The Calculation of Effect Size

The effect size is used to find out how far independent variable affects the dependent variable (Coolidge F. L., 2000, p. 151). In other words, effect size is how well the treatment works. In order to calculate the effect size in independent t-test, a correlation coefficient of effect size can be derived. The formula was proposed as follows:

$$r = \sqrt{\frac{t^2}{t^2 + df}}$$

r   = effect size

t   = the independent t-test value

df = degree of freedom (N1+N2-2)

After calculating the effect size, its value is compared and analyzed by using the table's scale. The correlation coefficient of effect size is always positive and range from 0 to 1.00. The scale is as follows:

Table 3.4
The Scale of Effect Size

Effect Size	r value
Small	0.100
Medium	0.243
Large	0.371

(Coolidge F. L., 2000, p. 151)

3. 4. 6   Data Analysis on Observation Checklist

In order to explain the implementation level of the Think-Pair-Share Technique, teacher's roles, and students' activities in the experimental class, the research administers observation to collect the data.

The research employed the percentile formula to analyze the observation checklist data. Then, the data were interpreted based on the frequency of

observer's observation. Based on Hatch and Farhady (1982, p. 46), the percentile formula is formulated as follows:

$$P = 100 \text{ X } \frac{F}{N}$$

P = Percentile

F = Frequency of observer's observation

N = Sum of Activities

3. 4. 7 Data Analysis on Questionnaire

Based on the explanation in research procedure, the questionnaire was the last step in the research to collect the data. The questionnaire was constructed by using Likerts scale. Sugiyono (2009, pp. 93-96) noted that Likerts scale is used to measure someone or group of people attitudes, opinions, and their perceptions related to social phenomenon.

The research also used the percentile formula to analyze the questionnaire data. Then, the data were interpreted based on the frequency of students' answer. Based on Hatch and Farhady (1982, p. 46), the percentile formula is formulated as follows:

$$P = 100 \text{ X } \frac{F}{N}$$

P = Percentile

F = Frequency of students' answer

N = Respondent