CHAPTER III

RESEARCH METHODOLOGY

This chapter describes the procedures of the study in order to figure out the answer of the questions previously stated in chapter one. The discussion includes method of the research, participants, instruments, data collection, and data analysis.

3.1 Research Method

This study used quantitative method with experimental design chosen to test the hypothesis served. For that reason, this research took two classes, the first is served as control group and the second is served as experimental group. The experimental design in this study is described in the following table:

Table 3.1

Experimental Design

Sample	Pre-test	Treatment	Post-test
Experimental Group	X1e	T	X2e
Control Group	X1c	0	X2c

Notes

X1e : Students' listening scores of experimental group in pre-test

X1c : Students' listening scores of control group in pre-test

X2e : Students' listening scores of experimental group in post-test

X2c : Students' listening scores of control group in post-test

T : Treatment using Think-Pair-Square strategy

3.2 Variables

Hatch and Farhady (1982:15) stated that independent variable is the major variable which is investigated while dependent variable is the variable which is observed and measured to determine the effect of the independent variable. In this study, the students' listening comprehension was being measured with the test to determine the effect of Think-Pair-Square strategy in listening comprehension. Thus in this study, the dependent variable is the improvement of students' listening comprehension and the independent variable is the effectiveness of Think-Pair-Square strategy in improving students' listening comprehension.

3.3 Participants

The participant of this research is the second grade students of SMPN 22 Bandung. Two classes were chosen as the sample of the research; Class VIII A was taken as the experimental group, and Class VIII B was taken as the control group. The number of the sample was 79 students, 39 students for VIII A and 40 students for VIII B. However, to anticipate the absence of some students during the research, the researcher took 35 students from each class as the samples.

3.4 Data Collection

3.4.1 Instrument and Materials

The data of this study were collected by using four instruments as the following:

1) Pre-test; it was given to the control and experimental group before the treatments and it consisted of 25 multiple choice questions.
2) Post-test; it was given to the control and experimental group after the treatments and it consisted of 25 multiple choice questions.
3) Questionnaires were given only to experimental group after they finished doing post test and it consisted of 20 questions.
4) Interview was given to the English teacher of both classes and it was consisted of 10 questions.

The materials used for teaching and learning process during the treatments were taken from the existing books. The researcher selected, improved, adopted and made material available based on the syllabus from any authentic materials such as Integrated English Learning and Let's Talk.

3.4.2 Validity and Reliability Test

Brown (1988) stated that before conducting pre-test and post-test, the test items should be tried out in terms of its validity and reliability. In this research, try out was conducted on August 25, 2008. It was conducted in Class VIII C of SMPN 22 Bandung. The test consisted of 25 questions with four options for each number.

3.4.3 Pre-test

The pre-test was given to experimental and control classes after its validity and reliability has been measured. Pre-test was conducted before the treatment,

precisely on August 27, 2008 for both experimental and control group. It consisted of 25 multiple choice items with 5 revised items according to the result of item analysis. Time allocation for doing the test was 30 minutes.

3.4.4 Teaching and Learning Procedures

After the pre-test was conducted, the experimental and control group were given the treatments in period of 6 meetings. The experimental group was given Think-Pair-Square treatments while the control group was given conventional or non Think-Pair-Square treatments during the teaching and learning process.

The treatments were conducted based on the schedule presented in the Table 3.2.

Table 3.2

Topic List of Each Meeting

	Date	**Sub Topic**	**Note**
	September 8th	**Pre-Test**	Given to Experimental and control groups
1st meeting	September 10th	Friendship	Given to Experimental and control groups
2nd meeting	September 15th	Travelling	Given to Experimental and control groups
3rd meeting	October 15th	Health	Given to Experimental and control groups
4th meeting	October 20th	Teenager Life	Given to Experimental and control groups
5th meeting	October 22nd	Recreation	Given to Experimental and control groups
6th meeting	October 27th	Season	Given to Experimental and control groups
	November 4th	**Post-Test**	Given to Experimental and control groups
	November 17th	Questionnaire	Given to Experimental group
	November 17th	Interview	Given to the English teacher

The treatments had been conducted in which the teacher presented some listening comprehension assignments. The topics were chosen based on the curriculum. Due to the limited time, there were two meetings in a week. Every meeting lasted for 60 minutes. Overall, the treatments were only conducted in 6 meetings.

There are four steps in this strategy. The following are the procedures:

First of all, teacher divided the students into small groups consist of four. Then teacher had the students listened to an authentic spoken text and teacher posed a problem or asked an open-ended question to which there may be a variety of answers. Second, teacher gave the students 'think time' and directed them to think about the question individually. Third, following the 'think time' students turned to face their partner and work together, sharing ideas, discussing and clarifying. Lastly, the pair then shared their ideas with another pair. It is important that students need to be able to share their ideas in their own words and also they have to understand what their partners' ideas. To measure students' listening comprehension toward the passage, teacher gave a quiz on material at the end of the session of each meeting.

The teaching and learning procedure for the control group was carried out by using a conventional way. Teacher had the students listened to the passage and then they were asked to do the exercise based on the passage they had listened to.

3.4.5 Post-test

Post-test was given to both groups at the end of the treatments in order to find out the result of the whole treatments, to see (if any) the differences between the two groups after the treatments. The test was conducted on November 4th, 2008.

3.4.6 Questionnaire and Interview

Questionnaires were distributed to experimental class in the end of the treatments to find out how the strategy improved the students listening comprehension and to what extent it is improved. Afterwards, the interview was also given to the English teacher who accompanied the researcher along the treatments in order to get her opinion about the implementation of Think-Pair-Square strategy in improving students listening comprehension.

The questionnaire consisted of 20 open-ended questions which were in Bahasa Indonesia in order to help students express their answer more easily. After the questionnaire was given, interview was used to get the teacher's opinion about the implementation of Think-Pair-Square strategy in improving students listening comprehension. The researcher used standardized open-ended interview.

3.5 Data Analysis

3.5.1 Data Analysis on Try Out Test

a. Analyzing Difficulty Level

The procedures in determining difficulty level of each item in the try out test are as follows:

1. Arranging the data scores from the highest to the lowest score.

2. Determining the upper group and the lower group with calculating 27% of the samples.
3. Determining the item difficulty with the following formula:

$$TK = \frac{U + L}{T}$$

Notes:

TK = Difficulty level

U = Numbers of correct answers for each item in upper group

L = Numbers of correct answers for each item in lower group

T = Total samples of upper and lower group

4. Interpreting the difficulty level of each item with the following criteria:

0.00 – 0.30 = high

0.31 – 0.70 = medium

0.71 – 1.00 = low

b. Analyzing Discrimination Index

The discrimination index was measured with the following formula:

$$DP = \frac{U - L}{\frac{1}{2} T}$$

Notes:

DP = Discrimination index

U = Numbers of correct answers for each item in upper group

L = Numbers of correct answers for each item in lower group

T = Total samples of upper and lower group

Interpreting the discrimination of each item with the following criteria:

0.00 – 0.20 = poor

0.21 – 0.40 = sufficient

0.41 – 0.70 = good

0.71 – 1.00 = excellent

From 25 items given in the try-out test, 20 items were good and used for the research and 5 items were revised so they could be used for the research. Details on this are presented in Appendix 1.

c. Analyzing Validity

The instrument validity was examined by item analysis; therefore the process of calculation was named as validity index. The index validity of each item was interpreted, to determine whether the test was good or not. Product moment formula was used to calculate the validity of each item in try out test:

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

Notes

r_{xy} = Correlation coefficient between X and Y variables
X = The item tested
Y = Total scores of the sample
N = Total number of students from upper and lower group

Afterward, the index validity of each item was interpreted with the following criteria:

0.00 – 0.19 = very low

0.20 – 0.38 = low

0.40 – 0.59 = sufficient

0.60 – 0.79 = high

0.80 – 1.00 = very high

After r_{xy} value was calculated, the t value was also calculated with formula:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

Then compare the t value with t table, if t value > t table it means the item is valid and if t value < t table, the item is invalid.

All items (1-25) in the try out test were calculated using this procedure. Details on this are presented in Appendix 1.

d. Analyzing Reliability

Hatch & Farhady (1982) stated that reliability is the extent to which a test produces consistent result when administered under similar condition. To find out the reliability of the test items, Kuder Richardson 20 (KR-20) formula was used in this study. The formula is as follow:

$$r_K = \frac{K}{K-1}\left[\frac{Vt - \sum pq}{Vt}\right] \quad \text{with} \quad V_t = \frac{\Sigma X^2 - \frac{(\Sigma X)^2}{N}}{N}$$

Notes

K = number of items

p = proportion samples of correct answers of each item

q = proportion samples of wrong answers of each item

Vt = total variance

Afterward, the reliability of each item was interpreted with the following criteria:

0.00 – 0.20 = unreliable

0.21 – 0.40 = low

0.41 – 0.70 = moderate

0.71 – 0.90 = high

0.91 – 1.00 = very high

To find out the reliability, r observe was compared with r table. If r observe > r table, the test was reliable. According to the result, r observe = 0.82 was bigger than r table = 0.54 at the level of significance of 5% with df = 15. It means that the test was reliable so it could be used for the research. Details on this are presented in Appendix 1.

e. Analyzing Practicality

The test was said to be practical if it was within the researcher's means and facilities. In other words, the test should be as economical as possible in time and in cost. The test was also said practical if it could be used for anytime. From the try-out test result, the researcher concluded that the test used in this research was practical. It was proven by the fact that the samples could answer the test in certain period of time that had been determined by the researcher before.

3.5.2 Data Analysis on Pre-test and Post-test

The data from the students' scores on pre test and post test of experimental group and control group was categorized into good, moderate, and bad. The categorizing was used to find out the students' scores in comprehending their listening before and after the treatments. The categorizing of the students' scores in listening comprehension is presented in the following table:

Table 3.3

Category of Students' Listening Comprehension Scores

No	Interval	Category
1	$X \geq \overline{X}_{ideal} + 0{,}5S_{ideal}$	Good
2	$\overline{X}_{ideal} - 0{,}5S_{ideal} \leq X < \overline{X}_{ideal} + 0{,}5S_{ideal}$	Moderate
3	$X < \overline{X}_{ideal} - 0{,}5S_{ideal}$	Bad

Note

X_{ideal} = maximum score of students

$\overline{X}_{ideal} = \frac{1}{2} X_{ideal}$

$S_{ideal} = \frac{1}{3} \overline{X}_{ideal}$

(Solehudin and Rahmat, 1988:86)

Data gained from experimental and control group showed that:

$X_{ideal} = 25$

$\overline{X}_{ideal} = 12.5$

$S_{ideal} = 4$

The data gained from pre test and post test were analyzed in order to find out the differences of students' achievement in listening comprehension between the experimental and control group based on the following procedures:

a. Testing the Normal Distribution

The purpose of this test was to find out whether the data gained from pre test and post test of experimental group and control group were normal. In analyzing the data, the researcher used one-sample Kolmogorov-Smirnov test in SPSS 15.0 for Windows program.

b. Testing the Homogeneity of Variance

The purpose of this test was to find out whether the variances of pre test and post test of experimental group and control group were homogenous. In analyzing the data, the researcher used Levene test in SPSS 15.0 for Windows program.

c. Calculating t-Test

t-test was calculated to find out the comparison of two means between experimental group and control group pre test and post test. In analyzing the data, the researcher used independent t-test in SPSS 15.0 for Windows program.

d. Calculating Index Gain

Index gain was calculated to investigate the improvement of students' listening scores between pre test and post test of experimental group and control group. In addition to find out to what extent Think-Pair-Square strategy improved students' listening comprehension in the experimental group, index gain of each aspect of listening comprehension skills were calculated. The formula is as follow:

$$g = \frac{\text{post test score} - \text{pre test score}}{\text{maximum score} - \text{pre test score}}$$

(Hake in Meltzer, 2003)

Then, interpreting the index gain using the following criteria:

Index gain < 0.3 = low

0.3 < Index gain < 0.7 = medium

Index gain > 0.7 = high (Hake, 1999)

3.5.3 Data Analysis on Questionnaires and Interview

Data from questionnaires were calculated in terms of the frequency of students who answer the questions given. Combined with the result of the interview, these data revealed use of Think-Pair-Square strategy in improving students listening comprehension.

The result of questionnaires was put in percentage below.

$$P = \frac{f_o}{n} \times 100\,\%$$

Notes:

P = percentage

fo = frequency of observed

n = number of samples

In analyzing the data from questionnaires, the number of samples or respondents answering ‘yes’ and ‘no’ were counted. The answer ‘yes’ counted 1 and the answer ‘no’ counted 0. After calculating the percentage of respondents, the results and their reasons were determined in order to find out to what extent Think-Pair-Square strategy improves students listening comprehension by using the percentage criterion as follows:

Table 3.4

Criterion of Students' Response

No	Percentage (%)	Criterion
1	0	None
2	1 - 25	Small number of
3	26 - 49	Nearly half of
4	50	Half of
5	51 - 75	More than half of
6	76 - 99	Almost all of
7	100	All of

(Kuntjaraningrat in Yuliani, 2003)

Having calculated the data from questionnaires, the researcher combined it with the result of the interview. These data revealed the students and English teacher responses towards the effectiveness of Think-Pair-Square strategy.

The aims of the present study function as guidance to determine the research subjects, the data collection instrument and procedure, and data analysis. The primary data was collected by means of pre-test and post-test, while the secondary was obtained by way of questionnaire and interview which served as additional inputs to find out the effectiveness of Think-Pair-Square strategy. The findings and discussions of the present study are detailed in the following chapter.