CHAPTER III

RESEARCH METHODOLOGY

This chapter discusses about research design, population and sample, data collection contents of research instrument, the validity of the test, reliability of the test, data analysis contents of normality distribution test, homogeneity test variance and hypothesis testing.

3.1 Research design

The research design of this study uses quantitative research and it refers to experimental research design because this study is to investigate the effectiveness of using scaffolding on reading comprehension for young learners. In experimental research, it is usual to differentiate between the independent variable and the dependent measure. Dependent variable is what will be measured. It is what the researcher thinks will be affected during the experiment. While independent variable is what is varied during the experiment.

It is what the researcher thinks will affect the dependent variable. In this study, the researcher wants to know the effect of scaffolding on reading comprehension towards young learners at eighth grade in SMP Muhammadiyah 4, gresik. So that, the independent variable is scaffolding and for the dependent measure is reading comprehension.

In this research, researcher uses quasi experiment research. Quasi experiments are sometimes called natural experiments, because membership in the treatment level is determined by conditions beyond the control of the experimenter. An experiment may seem to be a true experiment, but if the subjects have not been randomly assigned to the treatment condition, the experiment is a quasi-experiment.

Because this study is quasi experiment, so the subjects involve two groups, that are experimental group and control group, but both groups are not randomly. The first step which should be done by the researcher is to give pre-test for both groups. The second is the researcher gives the treatment that is scaffolding on reading comprehension in one of groups. For giving the treatment the researcher will do for five times. The purpose of the treatment is to know the eighth graders reading comprehension after being taught by scaffolding. The last the researcher gives post-test for both groups.

The design of this research could be illustrated as follows:

Where:

Pre Test	**Free Variable**	**Post test**
E (experiment)	X	Y2(post test)
K (Control)	-	Y2(post test)

E : Experimental group

K : Control group

Y_2 : Observation 2-Post test

X : Treatment

As stated before, there are two group name experimental and control groups. The researcher gives the experimental group with the following treatment: First, the researcher divides the students in experimental, and control group. Then he gives the text to both groups. After that the researcher gives the students pre-task or pre-reading activity, explore the topic and students note down useful words and phrases.

During the scaffolding applied, the researcher asks the students to do the task in both groups, prepare to report to the class and then present reports. In the last activities analysis and practice the task. The researcher does the treatment five times with different theme of the text for experimental group. While on control group, they are not given treatment. The last, both groups are given a text and asks them to do the task.

3.2. Population and Sample

Population is a generalization area consisting of objects or subjects that have certain qualities and characteristics and it is set by researchers for study while sample is part of the number and characteristics that have been possessed by the population.

In this research, the population is taken at muhammadiyah 4 Giri junior high school. There are some reasons, why the researcher does this research there. First, the researcher has experienced to teach students there. Second, only a few researchers do research (quasi experiment) there. Last, this school is private school. It means that students are not smart all of it. So, it is interested to prove this research.

A sample is simply a subset of the population. The concept of sample arises from the ability of the researcher to test all the individuals in a given population. The sample must be representative of the population from which it was drawn and it must have good size to warrant statistical analysis.The main function of the sample is to allow the researcher to conduct the study to individuals from the population so that the results of their study can be used to derive conclusions that will apply to the entire population.

This research conducted at SMP Muhammadiyah 4 Giri. There are two classes in eight grades were VIII A and VIII B. The researcher chooses two classes as a sample because he uses quasi experiment that needs comparison. One group is experiment group that is given treatment and the other is control group. Control group is not given treatment, they are as comparison before and after applied scaffolding in experiment group. In quasi experiment, the samples are not randomly and unregulated. The research used 65 students.

3.3 Data collection

It discusses about research instrument and procedure of how to conduct this research. Before administering the tests, the researcher asks permission to the principal at the school and explains the purpose of this study. After getting his approval, the researcher have prepared pre-test. But before administering the pre-test, the researcher tried out the test to find out the validity and reliability of those items, whether it is suitable for eighth grade students. After find out the validity and reliability, the researcher conducts her research. For the first the researcher gives pre-test to find out the initial different on the both groups especially experiment group. After giving pre-test, the researcher gives the treatment for experiment group. It is conducted five times. And post-test will be administered after the researcher conducts the treatment and gives some exercise the experiment group in a period of time. It is to find out whether the learners make progress in their reading comprehension or not.

3.3.1. Research Instrument

Research instrument is an important role in doing the research. In this study the researcher uses test in collecting the data. There are two tests that are used by the researcher, those are pre-test and post-test. Pre-test will be administered before the researcher conducts the treatment and it is to find out the initial different of the both groups. And post-test will be administered after the researcher conducts the treatment to experiment group, and gives some exercise to the both groups in a period of time. It is to find out whether the experiment group makes progress in their reading

comprehension. The items of pretest and posttest are 40 items of multiple choices. Before giving pre-test and post-test, the researcher will try out to measure the validity and reliability of the test to make sure that the test valid.

3.3.1.1 Test

Test is applied to obtain the primary data about the students achievement of reading after they get the materials given during the experimental treatment. Test is a set of questions or device used to measure the skill, intelligence, ability and talent of an individual or a group. The type of test used here is achievement test. Achievement tests attempt to measure what individual has learned – his or her present level of performance.Test is a set of question, exercises or other means which are used to measure skill, knowledge, intelligence, ability, or talent of individuals or groups.

The researcher will use pre-test and post-test, the result of pre-test and post-test will be comparison. The test is multiple choices, because it is uses to measure the students reading Comprehension with consideration that it can be score easily and quickly.

3.3.1.2 Pre-test

Pre test is done by the both groups. It is conducted to know the previous ability of both groups especially on experiment group in their reading comprehension. They are asked to read the text and answered the questions followed. The items of pre-test are 20 items of multiple choices. They have limited

time to conduct it. Book and dictionary are not allowed. The questions of the pre-test are related to their English material in one semester.

3.3.1.3 Post-test

Post test is distributed to both groups to find out whether or not the students make progress in their Reading Comprehension ability. It is like pre test. Post test is also done by the both groups, control and experiment groups. The items and topic of post test are same with the items and topic given to the both groups in pre test. The difference is using vocabularies.

3.3.1.4 Try out

Before conducting pre-test and post-test, try out is done by the researcher. The purpose of try out is to know whether the reliability and validity are good or not. Try out is done to the other students that are not included in this research. The researcher conducts try out to eighth grade in same school but different period. 20 items are for pre-test try out and 20 items are for post-test tryout. Try out will be tested in SMP pongangan, while the test for pre-test and post-test will be tested in SMP 4 Giri, after the result and analysis of try out.

3.3.1.5 General Schedule of Research Implementation

NO	DATE/TIME	ACTIVITY
1	September,20TH 2013	Sending Permission Letter to School
2	September,22TH 2013	Asking Permission to School Principle
3	September,25TH 2013	Giving Pre Test to Experiment and Control Group
4	October,1TH 2013	Giving First Treatment
5	October,1TH 2013	Giving Second Treatment
6	October,3TH 2013	Giving Third Treatment
7	October,5TH 2013	Giving Fourth Treatment
8	October,10TH 2013	Giving Fifth Treatment
9	October,12TH 2013	Giving Post Test Both Group

The researcher takes fifth meeting, because it needs many times to apply the technique, whereas the classes are not ours. The researcher cannot take many meetings, it can drag feet school learning activity. Besides that, the classes have three basic competences for reading, and contains of five sub basic competences in first semester. It means that one sub basic competence needs one meeting for the researcher.

3.3.2 The Validity of test

Before conducting post test and pretest as instrument of the research, the test should be tried out in terms of its validity and reliability in order to check the validity of the test the researcher did it into two steps. Those were checking content validity and construct validity. To determine the content validity, the researcher asked the English teacher is help to check the instrument validity and also based on scores criteria. The score of multiple choices, there are 20 items and every correct answer could 5 point, totally 100 point. These criteria given to the students depend on teachers policies. whereas to define the construct validity, the researcher used the assistance of SPSS version 16.0 to compute descriptive statistics the instrument validity was examined by analyzing item was good or not. The researcher used in testing the validity in:

$$\text{r-xy} = \frac{N(\sum Xy) - (\sum X)(\sum Y)}{\sqrt{\{N\sum X^2 - (\sum X)^2\}\{\sum Y^2 - (\sum y)^2\}}}$$

Where:

rxy : the coefficient of correlation X and Y variable or validity of each item.

N : the number of students/subject participating in the test

X : the sum of X scores

Y : the sum of X scores

∑Y : the sum of total score for each student.

∑X : the sum of total score in each item.

∑XY : the sum of multiple score from each student with the total score in each

item

∑X2 : the sum of the square score in each item and,

∑Y : the sum of the total score from each student.

Each item square is determined by using these following categorizations:

<0,3	is difficult	0,7-1	is easy
03-07	is medium		

The item which had the value under 0,3 was considering as bad item, it meant that it had to be rejected. Second, the researcher conducted in *cronbach's alpha* value, the item had to be rejected.

3.3.3 The Reliability of test

The basic concept of reliability of a test is consistency of the test score. Reliability measurement supplied an instrument of how much a variance might expect under different condition. To see the consistency of the test score, the researcher tried the instrument out twice. The reliability of the test is characteristically presented by

means of reliability coefficient or the standard error of measurement. To define the reliability of the test in order to find out the stability of the test, the researcher used SPSS 16.0 with formula

$$r_{kk} = \frac{K.Sx^2 - \tilde{x}(k-\tilde{x})}{Sx^2(k-1)}$$

Where: $s = \frac{\sqrt{\sum F_\chi}}{n-1}$

$\chi = X - \tilde{x}$

K: total item that accepted

n: total students followed the test

χ:total of correct answer a student

F : total of student who got the particular score in x

Criterion;

$0.0 \leq rkk < 0.20$ is the lowest reliability

$0.20 \leq rkk < 0.40$ is the low reliability

$0.40 \leq rkk < 0.60$ is the quite reliability

$0.60 \leq rkk < 0.80$ is the high reliability

$0.80 \leq rkk < 1.00$ is the highest reliability

3.4 Data Analysis

Data analysis method is very important in a research. In conducting a research, it is a requirement to analyze the data in order to interpret the data obtained from the field. The data analysis is carrying out in order to answer the research problems with the data obtained through pre-test and post-test. The researcher analyzes the data by using Independent sample t-test. Since the samples are small and the groups are independent, the t-test for independent samples are carried out to determine whether there is any differences between experiment group and control group. The researcher used SPSS version 16 to compute descriptive statistics, descriptive statistics are conducted in order to find the effect of the treatment whether there is significant or not by using Scaffolding.

Assumptions for the Independent t-test where: (1) Independence: Observations within each sample must be independent (they don't influence each other), (2) Normal Distribution: The scores in each population must be normally distributed and (3) Homogeneity of Variance: The two populations must have equal variances (the degree to which the distributions are spread out is approximately equal). The steps of analysing the result are:

The data analysis method used in this research is t-test. T-test is used to analyze the data and to compare the mean difference of the pre-test and post-test and

this research wants to know the effectiveness of using scaffolding on reading comprehension of the Eight grade students of SMP Muhammadiyah 4 Giri in the academic year 2012/2013.

The formula is as follows:

$$t = \frac{Md}{\sqrt{\frac{\sum x^2 d}{N(N-1)}}}$$

Notes:

t : The Coefficient of the formula

Md : Mean of deviation (pre-test and pos-test)

X^d : Deviation of each subject (d – Md)

$\sum x^2 d$: The sum of squared of deviation

N : The total number of subject

Db : N-1 (degree of freedom)

(Adapted from Arikunto, 2010:125)

T-test is used to check the effect of using Scaffolding on reading comprehension of the Eight grade students of SMP Muhammadiyah 4 Giri in the academic year 2012/2013. Then, to know the degree of effectiveness of the treatments, the researcher applied the formula of DRE (Degree of Relative Effectiveness) as follows:

$$DRE = \frac{MX2 - MX1}{MX1} \text{ X } 100\%$$

Notes:

DRE = The Degree of Relative Effectiveness

M_{X1} = Mean of Pre-Test

M_{X2} = Mean of Post-Test

(Adapted from Irwani, 2010: 12)

3.4.1 Normality Distribution Test

In this study, Kolmogorov Smirnov Sample Test in SPSS version 16.0 is used to analyze the normal distribution. It is aimed to find whether or not the distributions of pre-test score in the two groups are normally distributed. In this case, the result of the normality the distribution is also used to find out whether or not the hypothesis that had been determined is accepted.

The first step in calculating the normality distribution test state that the hypothesis: H0: the score of the experimental and the control group are normally distributed. The second step in calculating the normality distribution test tried to compare the Asymp. Sign. (probability) with the level of significance for testing

The hypothesis. If the Asymp is more than the level of significance (0,05) the null hypothesis is accepted; the score are normally distributed.

The Procedure Analyze is you can press Menu, choose Nonparametric test after that you choose 1 – sample K-S.

3.4.2 Homogeneity Test of Variance

The analysis of variance, assume that variances are equal across groups or samples. For homogeneity test, the researcher uses Levene's *test* of *homogeneity in SPSS 16.0 version. The test of Levine's test, or P, defines as follow:*

$$P = \frac{(N-k)}{(k-1)} \frac{\sum_{i=1}^{k} N_i (Z_i - Z_{\cdots})^2}{\sum_{i=1}^{k} \sum_{j=1}^{N_i} (Z_{ij} - Z_i)^2}$$

Where

P is the result of the test,

*K*is the number of different groups to which the samples belong,

*N*is the total number of samples,

N_i is the number of samples in the i^{th} group,

Y_{ij} is the value of the j^{th} sample from the i^{th} group,

$$Z_{ij} = \begin{Bmatrix} |Y_{ij} - \bar{Y}_{i.}|, \bar{Y}_{i.} \text{is a mean of } i^{th} \text{ group} \\ |Y_{ij} - \tilde{Y}_{i.}|, \tilde{Y}_{i.} \text{is median of } i^{th} \text{ group} \end{Bmatrix}$$

The significance of P is tested against $F(\alpha, k-1, N-k)$ where F is a quintile of the F test distribution, with $k-1$ and $N-k$ its degrees of freedom, and α is the chosen level of significance (0.05).

To analyze the homogeneity, the researcher used SPSS (Statistical product and service solutions) version 16.00. The homogeneity assumption was checked in SPSS by Levene's test with the following procedures. The first procedure was inserting the pre test data both experimental and control groups using the data view. The second procedures were going to the analyze menu, selecting compare means, and the choosing independents sample t-test. The last procedure was interpreting the homogeneity test output, the researcher needed to see Lavene's test Column to know whether the equality of variances in the groups of scores were homogeny or not.

3.4.3. Hypothesis Testing

Independent t-test was used to finds out the significant differences between experimental and control groups. Here were steps of t-test calculation:

The first step was stating the hypothesis and setting the alpha level at 0.05 (two tailed test). In this researcher, the hypothesis used was a null hypothesis that said, "There is no significant difference on the effectiveness of Team Assisted Individualization Technique to teach reading comprehension between Experimental and control group.

The hypothesis can be formulated as follow:

H1 (null hypothesis) is $\mu 1-\mu 2= 0$ ($\mu 1=\mu 2$)

Alternatives hypothesis $\mu 1-\mu 2\neq 0$ ($\mu 1\neq\mu 2$)

H1 : Reading comprehension using Scaffolding

H2 : Reading comprehension without using Scaffolding

Hypothesis testing in this research was:

H0 : There is no significant difference on the effect of Scaffolding n technique in reading comprehension between experimental and control group.

H1 : There is significant difference on the effect of Scaffolding technique in reading comprehension between experimental and control group.

The seconds step was finding t-value using independent t-test formula and comparing the probability with the level of significance for testing the hypothesis. Determining t-critical in table t-(0.05) df, the researcher compared t-observed and t-critical. If t-obs < t- critical, the researcher should accept the null hypothesis and if t-obs < t-critical, it means the researcher can reject the null hypothesis and another word. The researcher can accept the alternatives hypothesis.

T-test was calculated to find out the comparison of two means between experimental and control group pre and post test. In analyzing the data, the researcher used independent t-test formula. The formula used in calculating t-test is:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{s_{\bar{x}_1 - \bar{x}_2}}$$

Where

$$s_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{S^2 pooled}{n_1} + \frac{S^2 pooled}{n_2}}$$

Pooled variance: the average of the two sample variances, allowing the larger sample to weight more heavily.

Formula:

$$s^2_{pooled} = \frac{(df_1)s^2{}_1 + (df_2)s^2{}_2}{df_1 + df_2} \quad \textbf{OR} \quad s^2_{pooled} = \frac{SS_1 + SS_2}{df_1 + df_2}$$

df_1=df for 1st sample; n_1-1
df_2=df for 2nd sample; n_2-1

Estimated Standard Error of the Difference

$$s_{\bar{x}_1 - \bar{x}_2} = \sqrt{\left(\frac{SS_1 + SS_2}{n_1 + n_2 - 2}\right)\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$$

Clearly, the results of the tests were subjected to the following statistical procedures. To calculate t-test, the researcher used SPSS (Statistical product ands

service solutions) version 16.00. The post test of experimental and control groups were analyzed by using SPSS version 16.00 with the following procedures. The first procedure was inserting the post test data of both experimental and control groups using the data view. The seconds procedures were going to the analyze Menu, selecting compare means, and then choosing independent sample t-test. The last procedure was interpreting t-test output, automatically it could answer to the research questions about the comparison between two groups.

In short, the primary data was collected by means of pre-test and post-test to find out the significance on the effect of Scaffolding Technique in Reading comprehension.