

CHAPTER III

RESEARCH METHODOLOGY

In this chapter, the researcher would like to present about research methodology. This chapter consists of research design, population and sample, data collection, validity and reliability and data analysis.

3.1. Research Design

The research design of this study uses experimental research design because this study is to investigate the effect of using information gap activities on students reading comprehension for junior high school. In experimental research, it is usual to differentiate between independent variable and dependent variable. Independent variable is what is varied during the experiment. It is will be measured. It is what the researcher thinks will be affected during the experiment. In this study, researcher wants to know the effect of information gap activities on students reading comprehension at eighth grade in MTSN Lamongan. So that, the independent variable is information gap activities and for dependent variable is reading comprehension.

Focus of this study is in the result that was gotten by the score of students' test. In this design, there are two groups which are used to conduct this study. They were experimental group and control group. The researcher chooses the experimental group is VIII C and control group is VIII E. Both of the two groups were given a pre-test to know their reading comprehension. Then the experimental group (VIII C) was given a treatment by use information gap activities in reading comprehension. The treatment Information gap of activities was given four times to VIII C. The control group was taught without using information gap activities

but Conventional method as like in the MTSN Lamongan does usually. And for the last step, both of the two groups were given a post-test to measure whether or not using information gap activities can be effective to teach reading comprehension for eighth grade of junior high school.

Based on Ary and Friends (2001: 306), the design of the research can be illustrated as follows:

Group	Pre-test	Treatment	Post-test
E	Y ₁	X	Y ₂
C	Y ₁	-	Y ₂

Table 3.1. Research Design

Where:

E : the experimental group in this case is VIII C

C : the control group in this case is VIII E

Y₁ : Pre-test in VIII C and VIII E

X : With treatment of information gap activities is VIII C

- : Without treatment of information gap activities is VIII E

Y₂ : Post-test in VIII C and VIII E

3.2. Population and Sample

Population is the area in when you are trying to get information. According to Burns (1990:62) Population is the all group of students or objects or event that all have one characteristics one scope and must be defined specially and not ambiguously. The population of this study consists of the first semester eighth grade students of MTSN Lamongan in academic year 2016/2017 which consisted of 192 students with 6 classes.

The researcher chooses MTSN Lamongan because this school never used Information Gap Activities before. That was known by the researcher interview with English teacher in MTSN Lamongan.

The researcher used experimental research design because the school did not allow doing randomization procedure. Sample is the part of population that you are really wanted to survey. McMilan and Schumacher (1984:32) said that sample is a group of subjects had chosen from the population. Because the population was large, so the researcher uses cluster sampling technique to take the sample.

The experimental group is VIII C which consisted of 32 students, 18 female and 14 male. While the control group was class VIII E with 32 students, 16 Female and 16 male. So the total number of students as sample was 64 students. The sample have similar characteristic from their ability in the Eighth class activity, so the sample is homogeneity.

3.3. Data Collection

Data collection consists of research instruments, validity and reliability, in which the researcher explains bellow:

3.3.1. Research Instrument

Research is an important role in doing the research. In this study the researcher uses test in collecting the data. There are three tests that are used by the researcher, those are try out, pre-test, post-test and readability test. Pre-test will be given by the researcher for both experimental group and control group. It is to know the students ability in reading comprehension before they get the treatments and also to find the homogeneous both of group. Whereas, post-test will be given for both experimental group and control group after the researcher conducts the treatments only in experimental group. The score of post-test will show the

effect of information gap activities on students reading comprehension. The researcher designed of pre-test different from post-test but the tests are still equal in the term of topics and items. The researcher designed reading test by herself from the internet.

Pre-test and post-test, selection of tests adapted with the syllabus of MTS eighth grade in the first semester are descriptive text and Recount text. The items of pre-test and post-test are 20 items of multiple choices. The test can be elaborated as follows:

3.3.1.1. Try Out

Try-out test was conducted before pre-test and post-test. The purpose of tryout test are that to get the validity and reliability of the test that is going to be used and also to know the appropriate test items for the students. The tryout test was tested to the students who are not given the treatment and the post-test but have same characteristics as the students who was given the treatment

In this study the try out was conducted at eighth grade VIII D for tryout Pre- test and VIII B for tryout Post-testat MTSN Lamongan. This class consists of 32 students and the number of the test items was 25 questions in the form of multiple choices.

The result of the validity and reliability was from the 25 items tryout pre-test and tryout post-test the researcher had 20 items was accepted and 5 items was rejected and 21 items accepted and 4 items was rejected

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3.3.1.2. Pre-test

Pre-test is conducted before given the treatment for the experimental group. Pre-test is done by the experimental and control group. The purposed of the pre-test is to know the previous ability 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 do it. Book and dictionary are not allowed. The questions of the pre-test are about descriptive text and Recount text.

3.3.1.3. Post-test

It is like pre-test. Post-test is also done by the experimental and control group. The procedure of the post-test has same procedure with the pre-test, but this post-test was conducted after giving the all treatment to experimental group only. It is to measure the result of the treatment. It is success or not. The items and topic of post-test are different with the items and topic given to the experimental and control group in pre-test.

3.3.1.4. Readability Test

Flesch Reading Ease Formula is considered as one of the oldest and most accurate readability formulas. *Rudolph Flesch*, an author, writing consultant, and a supporter of the Plain English Movement, developed this formula in 1948. According to Holandyah (2013, p. 180), readability test is done to know what level of reading texts to appropriate level of students' class in comprehending the reading text.

Readability is used to know the quality of written language that makes it easy to read and understand. In this study, the researcher has given the students reading texts. The writer has checked the readability test of the text using readability test online found in <http://www.readabilityFormula.com>. The categories of the texts are put in the description of readability table including text title, kind of the text statistics: number of sentence, words per sentence, character per word, flesh per ease score and text level. The result of readability test was described in table.

The Result of Readability Test

3.3.1.4.1 Table the result of readability test (Descriptive text)

Descriptive Text							
Selected text	Words	Syllables	Word Per sentence	FRE score	Text level	Estimated reading Grade	Reader's age
Butterfly	252	399	22	66.3	Standard/average	8 th grade	12-14 years
Magelang	135	222	10	61.5	Standard/average	8 th grade	12-14 years
Ancol Beach Garden	104	164	15	63.2	Fairly easy	8 th grade	12-14 years
Kediri	159	258	13	53.5	Fairly difficult	8 th grade	12-14 years

3.3.1.4.2 Table the result of readability test (Recount text)

Recount Text							
Selected text	Words	Syllables	Word Per sentence	FRE score	Text level	Estimated reading Grade	Reader's age
Holiday in Pasir Kencana Beach	204	289	10	76.6	Fairly easy	8 th grade	12-14 years

Experience met with taufik hidayat	186	228	14	57.4	Fairly difficult	8 th grade	12-14 years
My amazing vacation	135	222	14	61.5	Standard/average	8 th grade	12-14 years
Wonderful adventure in my life	370	579	28	62.9	Standard/average	8 th grade	12-14 years

3.4. Validity and Reliability

3.4.1. Validity

Before conducting pre-test and post-test, the researcher must measure the validity of the text. In this study the researcher used content validity and construct validity for measuring the validity of the test.

Ary (2010) explained that content validity is not in numeric form but it determines the items are appropriate with curriculum, syllabus and course book. For testing content validity, the researcher looked out English syllabus of the eighth grade MTSN Lamongan especially in the 1st semester. If the test items appropriate with curriculum syllabus and course book, it can be said that the test has content validity. For brief explanation of Content Validity analysis, it was added in Appendix.

Not only content validity, but also the researcher used construct validity for checking validity of test items by giving try out to the different class of sample for analyzing items of the test which one is valid or not valid. Then, the researcher checked them using SPSS statistics 16.00 for descriptive statistic and use Cronbach' Alpha as correlation as coefficient.

The researcher used Cronbach' Alpha because the result of data is more accurate. This is the formula for testing validity of the test using correlation product moment:

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

After finding the value of r_{xy} , we can determine the validity of the test by looking at Guilford (1956) criteria :

0.80 – 1.00	: Very high Validity
0.60 – 0.79	: High Validity
0.40 – 0.59	: Intermediate Validity
0.20 – 0.39	: Low Validity
0.00 – 0.19	: Very Low Validity
< 0.00	: Invalid

By SPSS statistic 16.0, the steps for determining validity of the test are:

1. Open SPSS 16.0 program
2. Choose File, New data
3. Input the data in the data view
4. For counting the test validity, click analyze menu, scale, reliability analysis.
5. Click statistic, give checklist in descriptive box, checklist item, scale and scale if item deleted, on inter item checklist correlation and click continue and then click OK.
6. The result of validity will appear in the output.

For knowing the test is valid or not, we must compare it with r-table on $DF = N - 2$ and probability 0.05. In this study, total of students in each classes are 32 students. So, r table the value of DF which totally consisted of 32 students ($(32) - 2 = 30$). R table on DF 30 Probability 0.05 is 0.3494. If validity of each items is higher than 0.349, the test item is valid, but if validity of each items is less than 0.349, the test item is not valid. For brief table of r-table, it was added in Appendix.

For researcher distributed 25 items for pre-test and 25 items for post-test. After calculating the results of the try out using SPSS 16.00, the researcher found that there were 20 valid items and 5 invalid items in pre-test. Then, for the post test there were 25 valid items and 4 invalid. Because of the items for pre-test and post-test was different. So, both of pre-test and post-test consist of 20 items.

These are the result of construct validity for pre-test and post-test:

Table 3.4.1.1 Pre-Test Construct Validity

ITEM	TOTAL SCORE	ITEM	TOTAL SCORE
1	0.430	14	0.195
2	0.547	15	0.185
3	0.472	16	0.450
4	0.533	17	0.402
5	0.461	18	0.118
6	0.449	19	0.359
7	0.477	20	0.341
8	0.594	21	0.477
9	0.205	22	0.465
10	0.436	23	0.668
11	0.351	24	0.437
12	0.523	25	0.461
13	0.541		

Table 3.4.1.2 Post- Test Construct Validity

ITEM	TOTAL SCORE	ITEM	TOTAL SCORE
1	0.440	14	0.167
2	0.511	15	0.394
3	0.450	16	0.444
4	0.524	17	0.409
5	0.542	18	0.093
6	0.580	19	0.392
7	0.426	20	0.450
8	0.566	21	0.386
9	0.141	22	0.578
10	0.459	23	0.497
11	0.326	24	0.400
12	0.569	25	0.467
13	0.570		

From those tables above, there are 2 kinds of tables. Pre-test and post-test, the researcher calculated validity of 25 items. For brief result of pre-test and post-test validity in SPSS 16.00, it is shown in Appendix .

3.4.2. Reliability

In this study, the researcher used Cronbach's Alpha for measuring reliability of the test. The formula of Cronbach's Alpha is :

$$r = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum Si^2}{St^2} \right)$$

Where:

r : Cronbach's Alpha coefficient

k : total of test items
 $\sum Si^2$: total of test variance
 St^2 : total variance

After knowing Cronbach's Alpha coefficient, we must consider in this

Guilford (1956) :

<0.20 : Very Low Reliability
0.20 – 0.39 : Low Reliability
0.40 – 0.59 : Intermediate Reliability
0.60 – 0.79 : High Reliability
0.80 – 1.00 : Very High Reliability

In SPSS 16.00, there are some procedures in measuring reliability of

the test such as:

1. Open SPSS 16.00 program
2. Choose File, New Data
3. Input the data in the data view
4. Click analyze, click scale and click reliability analyze
5. It will appear dialogue box named reliability analysis. Input all variables in items box then choose alpha in the model
6. Click OK

If Cronbach's Alpha value > r-table, the test items are reliable but if

Cronbach Alpha Value < r-table, the test items are not reliable.

Based on the result of try out for pre-test and post-test, the researcher found that both of pre-test and posy-test were reliable. It was showed from the result of test items' reliability in SPSS 16.00. The reliability of 25 items in pre-test was very high reliability because Cronbach's Alfa Value was higher than r-table that was 0.867. Then, reliability of 25 items in post-test was very high reliability because Cronbach's Alfa value was higher than r-table that was 0.870.

These are table of reliability for pre-test and post-test:

Table 3.4.2.1 Pre-test Reliability

Reliability Statistics	
Cronbach's Alpha	N of Items
.867	25

Table 3.4.2.2 Post-test Reliability

Reliability Statistics	
Cronbach's Alpha	N of Items
.870	25

In reliability analysis, the researcher only showed 2 kinds of tables.

In reliability the researcher only checked the items which have been valid.

So, there is no second phase in this reliability analysis. For the result of pre-test and post-test reliability in SPSS 16.00, it was shown in Appendix.

3.5. Data Analysis

The next step after getting the data is data analysis. Data analysis method is very important in a research. Data analysis is a requirement to analyze the data in order to interpret the data obtained from the field. It is carrying out in order to answer the research problems with the data obtained through pre-test and post-test. The researcher used quantitative data analysis by using statistical method. This method is used to find out the significant different on the students' achievement before and after being taught by Information Gap Activities. The researcher analysis the data by using Independent sample t-test. 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 Information gap activities.

Arikunto (2010:278) classified the data analysis method into three parts are: Preparation, Tabulation and Making Conclusion. 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. T-test is used to find out the difference of those score between experimental and control group if they are significant difference or not.

3.5.1. Normality Distribution Test

Normality tests is used to determine whether a data set is well-modeled by a normal distribution or not, or to compute how likely an underlying random variable is to be normally distributed. Normality test is intended to show that the sample data come from a normally distributed population. To know the normality, the researcher uses *kolmogorov-smirnov test* with SPSS. If the results are significant, then the null hypothesis of no difference between the observed data distribution and a normal distribution is rejected. If the value is more than the level of significance (0,05) the null hypothesis is accepted; the score are normally distributed.

The result of calculating the normal distribution showed that the probability of the experimental group was 0.283 and the control group was 0.377. It means the result is higher than the level of significance 0.05 ($p > 0.05$). These results showed that the scores of the experimental and the control group were normally distributed. (See the Appendix).

3.5.2. Homogeneity Test

The researcher used one Levene's test of homogeneity test in SPSS version 16.0. The purpose of this test was to find out whether the variance

of pre-test and post-test of experimental and control group are homogeneous.

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

Where:

P : the result of the test,

K : the number of different groups to which the samples belong,

N : the total number of samples,

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

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

$$Z_{ij} : \begin{cases} |Y_{ij} - \bar{Y}_i|, \bar{Y}_i \text{ is a mean of } i^{\text{th}} \text{ group} \\ |Y_{ij} - \tilde{Y}_i|, \tilde{Y}_i \text{ is median of } i^{\text{th}} \text{ group} \end{cases}$$

The significance of P is tested against F (α , $k - 1$, $N - k$) 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.

After the researcher got the data of from experimental group and control group pre-test. In the output, the average score of the experimental group with group 1 was 62.187 and the average score of control group with group 2 was 65.625.

The result showed that the score of experimental group and control group was homogeneous. The result of the probability (sig) of homogeneity of variance test was 0.593. it indicated that the variances of pre-test scores in both groups were homogenous or equal. The result of Homogeneity test in independent sample t-test (See the Appendix)

3.5.3. Hypothesis Testing

Independent t-test was used to find out the significant difference of using information gap activities between experimental group and control group. The steps of t-test calculation are:

1. Test the hypothesis of the research and the setting α (alpha) level at 0.05 (2-tailed) tests. The hypothesis in this research could be formulated as follow:

H_0 : There is no significant effect on using Information Gap Activity on students reading comprehension at eighth grade in MTSN Lamongan.

H_1 : There is significant effect on using Information Gap Activity on students reading comprehension at eighth grade in MTSN Lamongan.

2. Find t-value using Independent – Sample T-test and compare the probability with the level of significance for testing the hypothesis.

After the scores compute in SPSS 16.00 versions. Then see the output

of independent – sample t-test and interpret the output that if sig. (2-tailed) > α (0.05), the researcher should accept the H_0 , but if sig (2-tailed) < α (0.05), the researcher can be rejected the H_0 , it means H_1 is accepted.

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

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

Where:

T : t value

X_1 : average group 1 (experimental groups)

X_2 : average group 2 (control groups)

S : standard error of the two groups

$\mu_1 - \mu_2$ is always defaults to 0

Where:

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

$S_{x_1-x_2}$: standard error of two groups

S^2_{pooled} : variants of the two groups

n_1 : number of sample group 1

n_2 : number of sample group 2

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

Formula:

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

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

Estimated Standard Error of the Difference

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

In calculating t-test, the researcher used SPSS 16.00. The steps in analyzing the data of post-test for both experimental and control group were:

1. Input the data of post-test in SPSS program between experimental and control group.
2. Click Analyze, choose Compare Mean, and choose Independent Sample T-test. In Independent Sample T-test, input the score variable into Test Variable column, and group variable Grouping Variable column.
3. Click Define Group, choose group 1 (for experimental) and group 2 (for control) then click OK.
4. The result of Independent Sampel t-test will appear in the output.