

CHAPTER III

RESEARCH METHOD

In this chapter, the researcher presents nine topics dealing with research methods. It focuses on the method that is used in conducting the research. It covers research design; population, sample, and sampling; research variables; data and data source; research instrument; validity and reliability testing; normality and homogeneity testing; data collection method; and data analysis.

A. Research Design

Research design is a strategy or way to arrange the setting of the research in order to get the valid data. In this research, the researcher used experimental research. The researcher manipulated the independent variables by setting up a treatment to be applied into the experimental group. The independent variable was using hot potatoes quiz, while the dependent variable was the students' grammar achievement in simple present tense. Therefore, the treatment applied in this research was using hot potatoes quiz in teaching grammar focused on simple present tense.

According to Gay *et al* (2011: 318), there are two major classes of experimental designs: single-variable designs, which involve one independent variable (which is manipulated), and factorial designs, which involve two or more independent variables (at least one of which is manipulated). This research

involved only one independent variable, therefore it was included into single-variable designs. Single-variable designs itself are classified into pre-experimental, true-experimental, and quasi-experimental designs.

The type of experimental design used in this research was pre-experimental design classified into one-group pretest-posttest design. It was because it only had one group as both the control and experimental groups. The experimental group is the group that is undergoing the ‘treatment’ or stimulus, and the control group which is unaffected by the stimulus (Litosseliti *et al*, 2010: 59). Therefore, in the one-group pretest- posttest design, a single group was observed not only after being given by a treatment, but also before. The experimental group would be conducted by using pretest before treatment and posttest for the result of treatment as instrument to collecting data.

According to Ary *et al* (2009: 304), the test illustration of one- group pretest-posttest design can be seen at table 3.1.

Table 3.1 The Test Illustration of One Group Pretest and Posttest Design

Pre-test	Independent variable	Post-test
Y_1	X	Y_2

X : hot potatoes quiz

Y_1 : students’ grammar achievement before being taught by using hot potatoes quiz

Y_2 : students' grammar achievement after being taught by using hot potatoes quiz

The procedures of the pre-experimental research with one-group pretest-posttest design in this research were described as follows:

1. Administering a pretest (Y_1) which purposed to measure students' grammar achievement before given a treatment.
2. Applying an experimental treatment that was using hot potatoes quiz (X) to teach grammar focused on simple present tense.
3. Administering a posttest (Y_2) which purposed to measure students' grammar achievement after given a treatment.

In this research, the researcher used experimental research with quantitative approach. The researcher wanted to know the effectiveness of using hot potatoes quiz towards students' grammar achievement in simple present tense at the seventh grade of MTs Al-Huda Bandung Tulungagung. The effectiveness was known after finding out the significant difference between the students' grammar scores before and after being taught by using hot potatoes quiz. The significant difference was found out by comparing the pretest and posttest scores.

B. Population, Sample, and Sampling

Population, sample, and sampling are very essential in this research, because without them, this research cannot be conducted.

1. Population

According to Ary *et al* (2009: 148), population is all members of well-defined class of people, events, or objects. In shorts, population is all subjects that are being studied. The population in this research was all students at the seventh grade of MTs Al-Huda Bandung Tulungagung. At MTs Al-Huda Bandung Tulungagung, the seventh grade had seven classes that was named by VII A up to VII G. Each class had different number of students. VII A class had 25 students, VII B class had 34 students, VII C class had 33 students, VII D class had 32 students, VII E class had 31 students, VII F class had 31 students, and VII G class had 32 students. The total number of the seven grade students of MTs Al-Huda Bandung Tulungagung were 218 students and the researcher included all of them as the population.

2. Sample

From the population above, the researcher did not include all of them in conducting the research because of the limitation of time and energy. Therefore, she involved a smaller population to participate in this research that was called as sample. According to Gay *et al* (2011: 123), sample is the individual selected comprise. It is a subset of population selected to participate in the study. The selection of a sample is a very important step in conducting a research study because it is hoped that the sample can be as the representative of the population.

In this research, the sample was a group of students consisted of 33 students in VII C class of MTs Al-Huda Bandung Tulungagung. The group of sample was as the control and experimental groups.

3. Sampling

To take a sample from a certain population, there was a process called sampling. According to Gay *et al* (2011: 123), sampling is the process of selecting a number of individuals for a study in such a way that the individuals represent the larger group from which they were selected. In shorts, sampling is the process of taking sample.

This research used non-probability sampling classified into purposive sampling as the process of taking sample. In purposive sampling- also referred to as judgment sampling- sample elements judged to be typical, or representative, are chosen from the population (Ary *et al*, 2009: 156). It means that the sample should be as the representative of the population and suitable to the purpose of this research. After conducting a purposive sampling as a process of taking sample, the researcher finally decided to choose VII C class consisted of 33 students as the sample by considering some factors:

1. VII C class was assumed to be homogeneous by the recommendation of an English teacher that handled the seventh grade students of MTs Al-Huda Bandung Tulungagung.

2. Based on the interview with the teacher, in order to apply the experimental treatment, the samples had not to be too good and too bad in their English achievement, especially in their grammar achievement. It was intended to reduce the extraneous variable that might appear since the design of this research was pre-experimental research design. VII A class was superior class that consisted of students with a good English achievement. Furthermore, it was not permitted to be used as a sample of a research. Therefore, the researcher had a chance to choose VII B up to VII G. They were regular classes. Among the regular classes, VII B- VII D were better in English rather than the other classes. However, the difficulty of grammar often appeared in VII C. Therefore, the researcher decided to choose VII C as the most representative one.

C. Research Variables

A variable is a construct or a characteristic that can take on different values or scores (Ary *et al*, 2009: 37). It is the characteristic or attribute of an individual, group, educational system, or the environment that is of interest in a research study. There were two kinds of variables in this research, independent variable and dependent variable.

1. Independent Variable

Independent variable is a variable which influences another variable. In this research, the independent variable was hot potatoes quiz.

2. Dependent Variable

Dependent variable is a variable which is influenced by another variable.

In this research, the dependent variable was the students' grammar achievement in simple present tense.

D. Data and Data Source

According to Arikunto (2010: 172), data is written facts or notes gotten by the researcher that will be organized in research activity. The data can be in the form of facts or numbers. In a research, the role of data is very important since it is used to answer the research problems.

The success of this research was totally determined by the significant different scores before and after being taught by using hot potatoes quiz and the significant difference was got by comparing the pretest and posttest scores. It was seen that the students' grammar scores in the pretest and posttest were the main data of this research. The data of this research were the students' grammar scores in pretest and posttest, therefore they were in the form of numbers.

A data can be taken from any data sources. A data source is subject from where the data can be taken (Arikunto, 2010: 172). In this research, the researcher used primary data source since the data was taken directly from the tests administered by the researcher to the sample in the form of the students' grammar scores in pretest and posttest.

E. Research Instrument

Research instrument is an instrument used to measure nature and social phenomena observed. This research used a test as a way to get the data. According to Ary *et al* (2009: 201), test is a set of stimuli presented to individual in order to elicit responses on the basis of which a numerical score can be assigned. The type of test used in this research was achievement test. Achievement test is used to measure what individuals have learned (Ary *et al*, 2009: 201). The purpose of this kind of test is to establish how successful individual students, group of students, or the courses themselves have been in achieving objectives. It means that the test has to represent the structure or skill that will be tested. It also has to be appropriate to the grade of the students that will be tested.

In constructing tests to be used to test the students in pretest and posttest, the researcher had looked at the module that was used by the seventh grade students of MTs Al-Huda Bandung Tulungagung at the second semester. Furthermore, the researcher had also consulted the tests to an English teacher that handled the seventh grade of MTs Al-Huda Bandung Tulungagung, especially VII C class. She told that the tests had represented the structure that would be tested, that was grammar focused on simple present tense. According to her, the tests were also suitable used for the seventh grade students of junior high school, especially at MTs Al-Huda Bandung Tulungagung. After getting the agreement of teacher and before conducting the real pretest and posttest, the researcher tried out the tests to twelve students to know the reliability of instruments. After conducting the try out

and getting the reliability of the tests, the researcher used the tests to test the sample in the form of pretest and posttest.

As stated previously, there were two types of tests in this research, they were pretest and posttest. Both of the tests were used to measure the students' grammar achievement in simple present tense at the seventh grade of MTs Al-Huda Bandung Tulungagung. They were made with the similar difficulty. The tests consisted of 30 questions in the form of simple completion with the inflection form. Simple completion items consisted of a sentence form which a grammatical element had been removed. In simple completion with the inflection form, a word of a sentence was removed and the sentence which the word was removed had provided the base form of the word. Therefore, the students had to change the word based on the context of the sentence. The researcher allocated 40 minutes in conducting the tests.

However, the researcher did not conduct the tests at the same time. The pretest was conducted at the first meeting of the research. It was done on Friday, May 9th, 2014. It was conducted to measure students' grammar achievement in simple present tense before an experimental treatment, that was using hot potatoes quiz to teach grammar, was being conducted. After conducting a pretest, the researcher administered a treatment process by manipulating the independent variable to the dependent variable, that was using hot potatoes quiz to teach grammar focused on simple present tense. After getting the treatment process, the students were given a test again to observe the effect of the manipulation on the dependent variable. It was done to measure their grammar understanding after being taught by using hot

potatoes quiz. The test was called as posttest. It was conducted on Monday, May 26th, 2014. After conducting the pretest and posttest, next the researcher compared both of the scores to find out the significant difference on the students' grammar achievement before and after being taught by using hot potatoes quiz.

The scoring for both the pretest and posttest was done with the same way. Since the form of tests was objective tests, there was only one correct answer for each item. Therefore, the scoring guide for the tests was formulated as follows:

$$\text{Score} = (\text{number of correct items} \times 3) + 10$$

F. Validity and Reliability Testing

This research used tests as instruments of collecting data. These tests were intended to measure the students' grammar understanding. Therefore, the researcher should make a good test that can really measure the students' grammar understanding. A good test has to fulfill the standardized of a good test itself. There are some aspects to make a test to be good, those are: validity and reliability.

1. Validity

Validity refers to the extent to which an instrument measured what it claimed to measure (Ary *et al*, 2009: 225). It means that the test will be valid when it measures what is supposed to measure. To ensure whether the test has a good validity, the researcher used construct validity, content validity, and face validity.

a) Construct Validity

Brown (2004: 25) in Isnawati (2012: 29) mentioned that a construct is any theory, hypothesis, or model that attempts to explain observed phenomena in our universe of perception. Therefore, construct validity is the capable of measuring certain specific characteristics appropriate to the theory of language behavior and learning.

By basing on the theories above, in this research, the researcher created the tests based on the material which was suitable for the students at the seventh grade of Islamic junior high school. Next, the researcher asked the students to answer questions in the form of simple completion with the inflection form based simple present tense to measure the students' grammar achievement. It fulfills the construct of grammar test, therefore the tests are valid in term of construct validity.

b) Content Validity

According to Brown (2004) in Isnawati (2012: 27), a test is said to have content validity if its contents constitutes a representative sample of the language skills, structures, etc. being tested. The test will also have content validity if it includes a proper sample of the structure or content which is relevant with the purpose of the test. Content validity is sometimes called curriculum validity. The test will be valid if the objectives of the test do not outside from the curriculum objectives that have been set by educational policy.

In this case, the researcher learnt the curriculum setting to know what students had to be able to master at the second semester of the seventh grade of Islamic junior high school. The researcher found that the students should be able to master around two genres: descriptive and procedure. Both of the genres needed simple present tense to be mastered. It was used by the researcher to select grammar in the form of simple present tense. Next, the form of the tests were simple completion with inflection form based simple present tense. It fulfills the content of grammar test, therefore the tests are valid in term of content validity.

c) Face Validity

According to Brown (2004) in Isnawati (2012: 27), a test is said to have face validity if it looks as if it measures what it is supposed to measure. In face validity, we look at a glance whether the test measures the ability what is supposed to measure.

In this research, the tests were expected to measure the students' grammar achievement based simple present tense. Therefore, the tests were in the form of simple completion with the inflection form based simple present tense. The researcher ensured the face validity by consulting the tests to an English teacher that handled the seventh grade of MTs Al-Huda Bandung Tulungagung.

2. Reliability

Reliability refers to our measure repeatedly delivering the same (or near same) results. Ideally, if we use the same measure with the same people under the same

conditions, our measure should give us the same result (Litosseliti *et al*, 2010: 55).

It can be said that a reliable test is consistent and dependable.

To know the reliability of instruments used in this research, the researcher had tried them out before conducting them into the pretest and posttest. The tests were administered to twelve students. After getting the data, the researcher analyzed them by using SPSS 16.0. The result of the analysis of reliability can be seen in table 3.2 and 3.3.

Table 3.2 The Result of Reliability in Pretest

Reliability Statistics	
Cronbach's Alpha ^a	N of Items
.803	30

The table 3.2 shows that in number of items 30, the reliability of Cronbach's Alpha is 0.803.

Table 3.3 The Result of Reliability in Posttest

Reliability Statistics	
Cronbach's Alpha ^a	N of Items
.856	30

The table 3.3 shows that in number of items 30, the reliability of Cronbach's Alpha is 0.856.

According to Triton in Sujianto (2009: 97), the value of Cronbach's alpha can be interpreted in table 3.4.

Table 3.4 Cronbach's Alpha Interpretation Based on Triton

Cronbach's alpha	Interpretation
0.00 – 0.20	Less reliable
0.21 – 0.40	Rather reliable
0.41 – 0.60	Quite reliable
0.61 – 0.80	Reliable
0.81 – 1.00	Very reliable

Based on the table 3.2, it can be known that the reliability of pretest is 0.803. It is rounded up into 0.800. 0.80 belongs to reliable, it means that the instrument of pretest is reliable. Next, based on the table 3.3, the reliability of posttest is 0.856. It is higher than 0.81 and lower than 1.00 ($0.81 < 0.856 < 1.00$). It means that the instrument of posttest is very reliable. By basing on the interpretation above, it can be concluded that the instruments in this research fulfill the reliability.

G. Normality and Homogeneity Testing

1. Normality Testing

Normality testing is needed to find out whether the data is in normal distribution or not. The normality of data is important because the data can be considered to represent the population when it is in normal distribution (Priyatno, 2012: 33). Therefore, the researcher intended to test the normality of the data by using SPSS 16.0 with One-Sample Kolmogorov-Smirnov method. The normality testing was done towards the pretest and posttest scores. The data for testing normality can be seen in appendix 1.

The hypotheses for testing normality are:

- a. H_0 : Data is in normal distribution
- b. H_a : Data is not in normal distribution

The hypotheses for normality testing say that the data is in normal distribution if H_0 is accepted and on the contrary, the data is not in normal distribution if H_a is accepted. The H_0 is rejected when the significance value is lower than 0.05 ($\alpha = 5\%$), while H_0 is accepted when the significance value is higher than 0.05 ($\alpha = 5\%$). The result analysis for normality testing can be seen as follows.

- a. Testing data for pretest score by using SPSS 16.0

Table 3.5 The Result of Pretest in Normality Testing

One-Sample Kolmogorov-Smirnov Test		Pretest
N		33
Normal Parameters ^a	Mean	65.91
	Std. Deviation	10.915
Most Extreme Differences	Absolute	.115
	Positive	.115
	Negative	-.114
Kolmogorov-Smirnov Z		.660
Asymp. Sig. (2-tailed)		.777
a. Test distribution is Normal.		

From table 3.5, it can be known that the significance value of pretest is 0.777.

- b. Testing data for posttest score by using SPSS 16.0

Table 3.6 The Result of Posttest in Normality Testing

One-Sample Kolmogorov-Smirnov Test		Posttest
N		33

Normal Parameters ^a	Mean	75.55
	Std. Deviation	10.476
Most Extreme Differences	Absolute	.126
	Positive	.126
	Negative	-.125
Kolmogorov-Smirnov Z		.724
Asymp. Sig. (2-tailed)		.672
a. Test distribution is Normal.		

From table 3.6, it can be known that the significance value of posttest is 0.672.

Based on the output of One-Sample Kolmogorov-Smirnov Test in SPSS 16.0 at table 3.5 and 3.6 above, it is known that the significance value from pretest is 0.777 and from the posttest is 0.672. As stated previously, the hypotheses for normality testing say that the data is in normal distribution if H_0 is accepted and on the contrary, the data is not in normal distribution if H_a is accepted. In this case, the H_0 is rejected when the significance value is lower than 0.05 ($\alpha = 5\%$), while H_0 is accepted when the significance value is higher than 0.05 ($\alpha = 5\%$). Based on the data above, the significance value of pretest is 0.777 and it is higher than 0.05 ($0.777 > 0.05$). It means that H_0 is accepted and H_a is rejected. It can be interpreted that the data is in normal distribution. Next, the significance value of posttest is 0.672 and it is higher than 0.05 ($0.672 > 0.05$). It means that H_0 is accepted and H_a is rejected. It can be interpreted that the data is in normal distribution. From the interpretations above, it can be concluded that the instruments in this research are in normal distribution.

2. Homogeneity Testing

Homogeneity testing is intended to know whether the variance of data is homogeneous or not. In this case, the researcher wants to find out the variance score of the sample. The procedure used to test the variance of homogeneity is by determining F_{\max} value. In homogeneity testing, F_{value} (empiric) should be lower than F_{table} (theoretic). In order to get F_{\max} value, the data of students' scores in pretest and posttest are analyzed in appendix 2. Below is the result analysis of homogeneity testing.

$$\begin{aligned} SD_1^2 &= \frac{\sum X_1^2}{N_1} - (\bar{X}_1)^2 \\ &= \frac{147165}{33} - 4344.008 \\ &= 4459.55 - 4344.008 \\ &= 115.542 \end{aligned}$$

$$\begin{aligned} SD_2^2 &= \frac{\sum X_2^2}{N_2} - (\bar{X}_2)^2 \\ &= \frac{191847}{33} - 5707.116 \\ &= 5813.55 - 5707.116 \\ &= 106.434 \end{aligned}$$

$$F_{\max} = \frac{s_{\max}}{s_{\min}} \quad SD_1^2 = 115.542, \quad SD_2^2 = 106.434$$

$$= \frac{106.434}{115.542}$$

$$= 0.92$$

$$df_1 = N - 1 = 33 - 1 - 32$$

$$df_2 = N - 1 = 33 - 1 = 32$$

From the result above, we can know that the df_1 and df_2 is 32. To get the F_{table} , we can see the F_{table} in number 30 and the result of F_{table} in significant level 5% is 1.84. The calculation above shows that F_{max} is 0.92. As stated earlier, the homogeneity testing is fulfilled if the calculation of F_{max} is lower than F_{table} . The calculation that is resulted based on this research shows that F_{max} is lower than F_{table} ($0.92 < 1.84$). It means that the homogeneity is fulfilled. It can be concluded that the variance values in the class of sample based on the pretest and posttest scores are homogeneous.

H. Data Collection Method

Data collection method is a systematical and standard procedure used to collect data that is needed. The data in this research was collected by administering tests in the form of written tests. The tests were conducted in twice meetings, the first was as pretest, which was done before the experimental treatment was given, and the second was as posttest, which was done after the experimental treatment was given. This research only had one group of sample, therefore both pretest and posttest were conducted at the group. Next, both the

scores of pretest and posttest were compared to find out the significant difference before and after being taught by using hot potatoes quiz.

The technique of collecting data in this research was conducted as follows.

1. Pretest

Pretest refers to a test which is given to the subjects to measure their ability before a treatment process is being conducted. In this research, the pretest was done at the first meeting of this research. It was given to the students to know their basic competence related to their grammar achievement in simple present tense. It was also to know their basic knowledge before the researcher applied a treatment process to manipulate the independent variable to the dependent variable, that was using hot potatoes quiz in teaching grammar.

In this research, the grammar chosen was simple present tense. The researcher chose simple present tense since the students often made mistakes in doing simple present tense. They were still confused to use *to be* “*is, am, or are*” for a certain subject. Even, they added the *to be* into a sentence that contains verb. They also became flustered in determining whether they had to add article *s/es* or not. Next, they also sometimes added *-ing* after the verb. Furthermore, based on the curriculum of the second semester, simple present tense was a kind of grammar that should be mastered by the students at the seventh grade of Islamic junior high school.

The pretest was administered into the group of sample. It was conducted on Friday, May 9th, 2014. The pretest consisted of 30 questions of simple completion

with the inflection form. Simple completion items consisted of a sentence form which a grammatical element had been removed. In simple completion with the inflection form, a word of a sentence was removed and the sentence which the word was removed had provided the base form of the word. Therefore, the students had to change the word based on the context of the sentence. The pretest was in the form of objective test in which there was only one correct answer for each item. Therefore, the scoring guide for pretest was formulated follows:

$$\text{Score} = (\text{number of correct items} \times 3) + 10$$

The researcher allocated 40 minutes for conducting the pretest. This pretest produced numerical scores that could be used to identify, classify, or evaluate by the researcher.

2. Treatment

After conducting a pretest, the researcher conducted a treatment process. It is a process in which the researcher set up a condition to manipulate the independent variable into the dependent variable. In this research, the independent variable was using hot potatoes quiz and the dependent variable was the students' grammar achievement in simple present tense. Therefore, in this treatment, the researcher applied the use of hot potatoes quiz in teaching grammar.

In this research, the researcher focused the grammar on simple present tense because the students often made mistakes in doing simple present tense. Furthermore, based on the curriculum at the second semester, simple present tense should be mastered by the students at the seventh grade of Islamic junior high school.

This treatment was conducted in twice meetings; those were at the second and third meetings of the research. It was done on Thursday, May 22nd, 2014 and Friday, 23nd, 2014. At the first meeting, that was on Thursday, May 22nd, 2014, the treatment was done for about 80 minutes. At the first treatment, the researcher first introduced about what hot potatoes quiz was and how to use the quiz. The treatment was done in computer laboratory since the quiz had to be done by using computers and connected them to Internet. To simplify the explanation of the materials, the researcher used LCD to convey the materials.

There are six programs in hot potatoes software, those are JQuiz, JMix, JCross, JMatch, JCloze, and The Masher. In this research, the researcher used JQuiz in the form of short answers. After introducing the quiz to the students, the researcher let them to try it in front of their friends. It was purposed in order to the students could try the quiz before they were let to do it in computers by themselves. The other students who did not try to do the quiz in front of the class might also help their friends who came in front of the class. It was done continuously. After let the students to try the quiz, the researcher asked the students to try the quiz in computers by themselves. The researcher would not correct the students' mistakes directly, meanwhile she let them to realize their mistakes by themselves. She had given feedbacks for both the correct and incorrect answers in the quiz, therefore when the students made a mistake to answer the quiz, they would realize the mistake directly after looking at the feedback and continuously answer the question with the correct one.

Because of the renovation, the computers provided in MTs Al-Huda Bandung Tulungagung were just 12 computers, whereas the total students in VII C class were 33 students. To overcome this problem, the researcher divided the students into 12, agree with the sum of computers. Therefore, each computer was placed by 2 to 3 students. Although one computer was placed by 2 to 3 students, the researcher asked the students to do the quiz one by one. Therefore, when one student did the quiz, the others let him or her to do it by himself or herself, and then the others would do the quiz after he or she finished to do it. The activity went on continuously and if there was still time and all students at one computer had done the quiz, the student at the first turn might did the quiz again.

On the following day, the researcher conducted the second treatment. It was done on Friday, May 23rd, 2014. It was done for 60 minutes. At the second treatment, the activity done was similar to the first treatment. At this treatment, the students were asked to do hot potatoes quiz in computers by themselves.

3. Posttest

Posttest refers to a test which is given to the subjects to measure their ability after a treatment process is being conducted. The posttest was done by the researcher at the fourth meeting or the last meeting of the research. The posttest was given to the students to know their grammar scores after the treatment was being conducted. The grammar chosen was simple present tense.

The posttest was administered into the group of sample consisting 33 students at the VII C class. It was conducted on Sunday, May 26th, 2014. The posttest

consisted of 30 questions of simple completion with the inflection form. The posttest was in the form of objective test in which there was only one correct answer for each item. The scoring guide for posttest was formulated as follows.

$$\text{Score} = (\text{number of correct items} \times 3) + 10$$

The researcher allocated 40 minutes for conducting the posttest. This posttest produced numerical scores that can be used to identify, classify, or evaluate by the researcher.

I. Method of Data Analysis

Method of data analysis is the way the researcher analyzes the data. In this research, the data was analyzed by using quantitative data analysis that was by using statistical technique. It was to find out the significant difference on the students' grammar achievement in simple present tense before and after being taught by using hot potatoes quiz. In this research, the data gathered from field was numeric data in the form of students' scores. Next, it was analyzed by using statistical technique. The data analysis in this research used *t*-test. According to Gay *et al* (2011: 436), *t*-test is used to determine whether two means are significantly different at a selected probability level. The procedure analysis of data used both descriptive and inferential statistics.

1. Descriptive Statistics

The researcher determined the descriptive statistics, such as mean, median, mode, standard deviation, and standard error of mean. The data analysis presented below:

a. Mean

Mean is the average score. The formula of mean is:

$$Mx_1 = \frac{(\sum fX_1)}{N} \qquad Mx_2 = \frac{(\sum fX_2)}{N}$$

Notes:

Mx_1 = the mean of the variable X_1

Mx_2 = the mean of the variable X_2

$\sum fX_1$ = the multiply between the score of variable X_1 and the frequency in each score

$\sum fX_2$ = the multiply between the score of variable X_2 and the frequency in each score

N = number of cases

b. Median

Median is the central score. The formula of median is:

$$\text{Median} = \text{Rall} + \left(\frac{\frac{1}{2}N - fkb}{f} \right)$$

Notes:

- N : Number of Cases
- $Rall$: Real Apparent Lower Limit
- f : Frequency
- $fk b$: Frequency lower limit under the mean score class

c. Mode

Mode is the most frequently occurring data.

d. Standard Deviation

The formula of standard deviation is as follows.

$$SD_x = \sqrt{\frac{fx^2}{N}} \qquad SD_y = \sqrt{\frac{fy^2}{N}}$$

Notes:

N = number of cases

SD_x = standard deviation of variable X

SD_y = standard deviation of variable Y

$\sqrt{fx^2}$ = the total number of deviation variable X after having square process

$\sqrt{fy^2}$ = the total number of deviation variable Y after having square process

e. Standard Error of Mean

The formulation of standard error of mean is as follows.

$$SE_{M1} = \sqrt{\frac{SD_1}{N_1-1}} \quad SE_{M2} = \sqrt{\frac{SD_2}{N_2-1}}$$

Notes:

SE_{M1} = standard error of mean of variable 1

SE_{M2} = standard error of mean of variable 2

SD_1 = standard deviation of variable 1

SD_2 = standard deviation of variable 2

N = number of cases

2. Inferential Statistics

After finding out the mean, medium, modus, standard deviation, and standard error of mean, the researcher used t –test formula. It was to know the significant differences of the students grammar understanding before and after being taught by using hot potatoes quiz. The formulation of t –test is as follows.

$$t_0 = \frac{M_1 - M_2}{SE_{M1-M2}}$$

Notes:

t_0 = t –score/ t –statistic

M_1 = mean of pretest

M_2 = mean of posttest

SE_{M1-M2} = standard error of mean of difference

In this research, the researcher analyzed the value of t –test by using paired sample t –test through SPSS 16.0.