

CHAPTER III

METHOD OF INVESTIGATION

This chapter discusses about sources of data, research design, research setting, population and sample of research, variables and indicators of research, methods of data collection, and methods of data analysis.

A. Research Design

This research is quantitative in nature, because the result of the students' achievement in pre-test and post-test will be expressed in the language of mathematic, evaluated consequently and also interpreted by appropriate statistical procedures. In this term, quantitative data refers to the use of T-test.

Experimental Research is an attempt by the researcher to maintain control over all factors that may affect the result of an experiment. In doing this research, the researcher attempts to determine or predict what may occur. An experimental research involved two groups: experimental group and control group. The experimental group received a new treatment while control group received a conventional teaching. According to Nunan, experiment is designed to collect data in such a way that threats to the reliability and validity of the research are ministered.¹

Referring to this research, the experimental and control group were consisting of eight grade of MTs N 01 Semarang. The experimental group received a new treatment by using miming game while the control group was taught conventionally. This research used pre-test and post-test to measure both groups changes in the period before and after receiving a treatment.

The design of the experiment described as follows:²

Experimental : $O_1 \times O_2$

Control : $O_3 \times O_4$

¹David Nunan, *Research Method in Language Learning*, (Cambridge: Cambridge University Press, 1992), p. 47

²Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*, (Jakarta: RinekaCipta, 2010), p.125

Table 3.1
Design of research

Group	Pre-Test	Treatment	Post Test
Experimental Group	0 ₁	X	0 ₂
Control Group	0 ₃	Y	0 ₄

Where:

E = experimental group

C = control group

0₁ = pre-test for experimental group

0₂ = post-test for experimental group

0₃ = pre-test for control group

0₄ = post-test for control group

X = taught using *Miming Game*

Y = taught using conventional method

Based on the pattern above, the subjects of research were classified into an experimental group (top line) and a control group (bottom line). The quality of subjects was first checked by pre-testing them (0₁ and 0₃). Then the experimental treatment (taught by using miming game) was applied to the experimental group. This treatment was symbolized as “X” while the control group was taught using conventional method. This treatment was symbolized as “Y”. The test was held in the form of written. Then, the results of post-test (0₂ and 0₄) were computed statistically.

B. Research Setting

1. Subject and Place of the Research

This research was conducted at MTs N 01 Semarang which is located at Ketileng Raya Street Semarang. The subject of this study is the eighth grade students of MTs N 01 Semarang in the academic year of 2014/2015.

2. Time of the Research

This research was conducted from 13th to October 25th 2014 on the first semester in the academic year 2014/2015, counted since the proposal is submitted until the end of the research.

Table 3.2
Schedule of the research

No.	Activity	Month/ Date			
		October			
		14 th	16 th	18 th	20 th
1.	Try-Out Class	√			
2.	Experimental Class				
	a. Pre-Test		√		
	b. Treatment		√	√	
	c. Post-Test				√
3.	Control Class				
	a. Pre-Test		√		
	b. Explaining		√	√	
	c. Post-Test				√

C. Source of Data

The research was conducted in MTs N 01 Semarang in the academic year of 2014/2015.

1. Population

Population is one thing essential in the research, so the people who want to conduct the research, they need population to be observed.

According to David Nunan, "Population is all cases, situations or individuals who share one or more characteristic."³ Population is overall subject of research.⁴

³David Nunan, *Research Methods in Language Learning*, p. 231.

Based on the explanation above, the researcher decided to conduct this research in MTs N 01 Semarang in the academic year of 2014/2015. This experimental research was done at the second grades of that school which has ten classes and each class has thirty four students. The researcher took two classes of second grade which was divided into experimental and control class.

2. Sample and Sampling Technique

Sample is a small group of total population which can representative all the population. According to Suharsimi Arikunto, “Sample is a group of individual which is taken from a given population.”⁵ Sample is part of population which has same characteristics.

The researcher used cluster random sampling in choosing the sample, because it is one of the techniques that all individual of population may have the same opportunity and have been choose as the sample.⁶ The researcher took two classes, VIII B and VIII D as the sample. Each class has 34 students. The two classes were given the same material but with different way. Class VIII D as the experimental class was taught by using miming game and class VIII B as control class was taught without using miming game.

D. Variables and Indicators of Research

Every research requires variable since it roles is the fundamental elements to support the study. The existences of variable determine the outcome of the research itself. In quantitative research, where variable are central and knowing the right variable ought to base on its appropriate definition

According to David Nunan, “variable is a property or characteristic which may differ from individual to individual or from group to group. A

⁴Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*, (Jakarta: Rineka Cipta, 2010), p. 173

⁵Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*, p. 174

⁶Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*, p. 177

great deal of research is carried out in order to identify or test the strength of relationships between variables”⁷

1. Independent variable (X)

Sugiyono said that independent variable can be called *stimulus*, *predictor*, or *antecedent*.⁸ Independent variable is variable which has the influence or the cause of change or make the existence of dependent variable. So, the independent variable in this research is the use of *miming game in teaching learning process*, and the indicators are:

- a. The students are able to mime the verb on the activity cards bravely.
- b. The students find out some words in present continuous tense form.
- c. The students are able remind the words in the form of present continuous tense.

2. Dependent variable (Y)

Dependent variable is variable which is influenced or became effect of the independent variable.⁹ Dependent variable in this study is students’ understanding on present continuous. The researcher can measure it based on students’ score from the test, and the indicators are:

- a. Explaining the construction of the sentences of present continuous tense.
- b. Explaining the use of present continuous tense.
- c. Making sentences of present continuous tense.

E. Technique of The Data Collection

The researcher carried out three activities to gain the data containing pretest, treatment for the experimental group and post-test. The researcher developed the instrument of research and administered it to the students to collect the data.

⁷David Nunan, *Research Method in Language Learning*, p.232

⁸Sugiyono, *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif dan R & D)*, (Bandung: Alfabeta, 2009), p.39

⁹ Sugiyono, *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif dan R & D)*, p.39

1. Test

Test is used to assess and measure students' achievement; mainly the cognitive side related to the students' mastery on learning as an aim of education and teaching.¹⁰ Suharsimi Arikunto defines test as "a set of questions or exercises also another instruments which is used to measure a skill, intelligence, ability, or aptitude from individual or group."¹¹ Test is a question which is used to measure competence, knowledge, intelligence, and ability of talent which is possessed by individual or group to collect data. The instrument of the test in this research is subjective test. By using subjective test, it can measure how students' mastery on the material (present continuous).

The researcher gathered the data by analyzing the test based on the material of present continuous tense. The researcher will give the test twice (pre-test and post-test) in both experimental and controlled class. The researcher will give a test that consists of multiple choice test and essay test.

a. Pre-Test

The teacher gave pre-test to experimental and control class in same way before the teacher explains material by using miming game (for experimental group). It was given before the experiment was run.

b. Post-Test

Post-test was given to the experimental class and the control class. The test was given in order to know students' understanding and score on present continuous after they are taught by using miming game (experiment class) and without using miming game (control class).

The score of students' achievement can be calculated by using this following formula:

¹⁰Nana Sudjana, *Penilaian Proses Hasil Belajar*, (Bandung: PT Remaja Rosdakarya, 1999), 6th Ed., p. 35.

¹¹ Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*, p.193

$$\text{Score} = \frac{\text{The number of right answer}}{\text{The number of questions}} \times 100\%$$

2. Documentation

Besides data from result of the test, the documentation is needed to help the researcher run the research. According to Arikunto, the documentation method is used to look for the data concerning matters or the variable that took the form of the note, transcript, book, newspaper, magazine, inscription, notes of a meeting, agenda, etc.¹²

The researcher used the documents related to the object of research such as students' name list, the number of students, and English subject schedule.

F. Technique of Data Analysis

The data analysis method which is used in this research is quantitative analysis. Quantitative is concerned with the amount or number.

1. Try-Out Test Instrument

Try out test analysis is mean to get the validity, reliability, index of difficulty and discriminating power. The tryout was given to VIII E of the students of MTs N 01 Semarang. The answer sheets were collected in order to be scored after finishing the test. From 40 items test of tryout, some items were chosen as the instrument of the test. The choosing of the instrument had been done by considering: validity, reliability, the degree of test difficulty and discriminating power as follows:

a. Validity Test

The validity is an important quality of any test. It is a condition in which a test can measure what is supposed to be measured. According to Arikunto, "a test is valid if it measures what it purpose to

¹² Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*, p.201

be measured".¹³ The validity of an item can be known by doing item analysis. It is counted using product – moment correlation formula:

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

Where:

- r_{xy} : the coefficients of correlation between X and Y
- N : the total of subject of experiment
- X : the score of each component of test
- Y : the total score of correct answers
- $\sum X$: the sum of score of X item
- $\sum Y$: the sum of score of Y item
- $\sum X^2$: the sum of the square score in each component of test
- $\sum Y^2$: the sum square of total score from each student in the group

Calculation result of r_{xy} is compared with r_{table} of product moment by 5% degree of significance. If r_{xy} is higher than r_{table} , the item of question is valid.¹⁴

b. Reliability Test

Heaton said that reliability is a necessary characteristic of any good test: for it to be valid at all, a test must first be reliable as a measuring instrument.¹⁵ Reliability refers to the consistency of test scores. Besides having high validity, a good test should have high reliability too.

Alpha formula is used to know reliability of test is K - R. 20.¹⁶

¹³ Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*, p.211

¹⁴ Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan* (Jakarta: Bumi Aksara, 2007) 7th Ed, p. 78.

¹⁵ J.B Heaton, *Writing English Language Tests* (London: Longman, 1975), p. 162

¹⁶ Sugiyono, *Metode Penelitian Kuantitatif Kualitatif dan R&D*, (Bandung: Alfa Beta, 2008), p. 132.

$$r_{11} = \left(\frac{n}{n-1} \right) \left(\frac{S - \sum pq}{S^2} \right)$$

Where:

- r_{11} : The reliability coefficient of items
- n : The number of item in the test
- P : The proportion of students who give the right answer
- Q : The proportion of students who give the wrong answer
- S^2 : The standard deviation of the test

Calculation result of r_{11} is compared with r_{table} of product moment by 5% degree of significance. If r_{11} is higher than r_{table} , the item of question is reliable.

c. Index of Difficulty

According to Arikunto, good question is not very easy and is not very difficult. The easy question will not stimulate the students to heighten their power in solve problem. Conversely, the difficult question will make the students be giving easily up and have not spirit try to solve that problem on the question. Because they think that the question is beyond the reach of their brain.¹⁷ Formula for degree of test difficulty is:

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

Where:

- P : index of difficulty.
- B : the number of students who has right answer.
- JS : the total number of students.

¹⁷ Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan*, p. 207.

The index of difficulty level can be classified as follows:¹⁸

$P = 0,00 \leq p \leq 0,30$ Difficult question

$P = 0,30 \leq p \leq 0,70$ Sufficient

$P = 0,70 \leq p \leq 1,00$ Easy

d. Discriminating Power

The discriminating power is a measure of the effectiveness of a whole test. According to Suharsimi, item of discriminating power tells how well the item performs in separating the better students from the poorer students. If the good students tend to do well on an item and the poor students do badly on the same item, then the item is a good one because it distinguishes the good students from the bad students.¹⁹ The higher and low values of discriminating power are the more effective the test will be. The researcher used the formula to calculate the index of discriminating power as follow:

$$D = \frac{BA}{JA} - \frac{BB}{JB}$$

Where:

D : discrimination index.

JA : member of student in upper group.

JB : member of student in low group.

BA : member of students in upper group who answer the item correctly.

BB : member of students in low group who answer the item correctly.

The criteria of determining the index of discriminating are below:²⁰

$D = 0.00 - 0.20$: Poor

$D = 0.21 - 0.40$: Satisfactory

¹⁸Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan*, p. 210.

¹⁹Suharsimi Arikunto, *Dasar-DasarEvaluasi Pendidikan*, p. 213.

²⁰ Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan*, p. 218.

D = 0.41 – 0.70 : Good

D = 0.71 – 1.00 : Excellent

2. Pre-Requisite Test

The researcher examined the normality and homogeneity test of the data before determine the statistical analysis technique used. The researcher used *pre-test* score to get the normality and homogeneity.

Pre-test was given before the treatments. The researcher determines the statistically analysis technique whether both groups have normal distribution. If the data have normal and homogeny distribution, the treatment and teaching can be conducted to both classes.

a. Normality Test

Normality test was used to know the normality of the data that is going to be analyzed whether both groups have normal distribution or not. The normality test with Chi-square is done to find out the distribution data. Step by step Chi-square test is as follows:

1) Determine the range (R); the largest data reduced the smallest.

2) Determine the many class interval (K) with formula:

$$K = 1 + (3, 3) \log n$$

3) Determine the length of the class, using the formula:

$$P = \frac{\text{range}}{\text{number of class}}$$

4) Make a frequency distribution table

5) Determines the class boundaries (bc) of each class interval

6) Calculating the average Xi (\bar{X}), with the formula:

$$\bar{X} = \frac{\sum f_i x_i}{\sum f_i}$$

7) Calculate variants, with the formula:

$$S = \sqrt{\frac{\sum f_i (x_i - \bar{x})^2}{n-1}}$$

8) Calculate the value of Z, with the formula:

$$Z = \frac{x - \bar{x}}{s}$$

x : limit class

\bar{x} : average

S : standard deviation

9) Define the wide area of each interval

10) Calculate the frequency expository (Ei), with formula:

Ei = n x wide area with the n number of sample

11) Make a list of the frequency of observation (Oi), with the frequency expository as follows:

Class	Bc	Z	P	L	Ei	Oi	$\frac{O_i - E_i}{E_i}$
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12) Calculate the chi-square (X^2), with the formula:

$$X^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$$

13) Determine dk = k-3, where k is the number of class intervals and $\alpha = 5\%$

14) Determining the value of X^2 table

15) Determining the distribution normality with test criteria:

If $X^2_{count} > X^2_{table}$ so the data is not normal distribution and the other way if the $X^2_{count} < X^2_{table}$ so the data is normal distribution.²¹

b. Homogeneity Test

Homogeneity test was meant to get the assumption that sample of research came from a same condition or homogenous. It is used to know whether experiment class and control class, that are taken from population have same variant or not.

²¹ Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*, p.363

The steps are follows:

- 1) Calculate variants both classes (experimental and control classes), with the formula:

$$S_1^2 = \frac{\sum(x - \bar{x})^2}{n_1 - 1} \text{ And } S_2^2 = \frac{\sum(x - \bar{x})^2}{n_2 - 1}$$

- 2) Determine $F = \frac{Vb}{Vk}$

Where:

Vb : Bigger Varian

Vk : Smaller Varian

Determine dk = (n₁ - 1) : (n₂ - 1)

- 3) Determine F_{table} with $\alpha = 5\%$
- 4) Determining the distribution homogeneity with test criteria:
If $F_{count} > F_{table}$, the data is not homogeneous and the other way if the $F_{count} < F_{table}$, the data is homogeneous.²²

c. Test of the Average

Test of the average was used to examine average whether experiment group and control group have been decided having different average.²³

T-test is used to analyze the data of this research. A t-test would be the measure you would use to compare the mean scores of the two groups.

If $\sigma_1^2 = \sigma_2^2$ (has same variant), the formula is:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

²² Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*, p.367

²³Anas Sudijono, *Pengantar Statistik Pendidikan* (Jakarta: PT. Raja GrafindoPersada, 1995) 6th Ed., p. 264

With

$$S = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

Where:

\bar{X}_1 : The mean score of the experimental group

\bar{X}_2 : The mean of the control group

n_1 : The number of experiment group

n_2 : The number of control group

S_1^2 : The standard deviation of experiment group

S_2^2 : The standard deviation of control group

S : The standard deviation of both groups

If $\sigma_1^2 \neq \sigma_2^2$ (has no same variant) the formula is:

$$t^l = \frac{\bar{X} - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

The hypotheses are:

$H_0 = \mu_1 = \mu_2$

$H_a = \mu_1 \neq \mu_2$

μ_1 : average data of experiment group

μ_2 : average data of control group

If $t_{count} > t_{table}$ so H_0 is rejected and there is no difference of average value from both of groups. Moreover, the other way if the $t_{count} < t_{table}$ so H_0 is accepted and there is significant difference of average value from both of groups.²⁴

3. Post Test

Post-test was held after all treatments were conducted. This test was used to measure students' achievement after they were given

²⁴Anas Sudijono, *Pengantar Statistik Pendidikan* (Jakarta: PT. Raja GrafindoPersada, 1995) 6th Ed., p.270

treatments and explanations. The result of test was analyzed statistically. There are types of post-test, as follow:

a. Normality Test

Steps normality second step is the same as the normality test on the initial data.

b. Homogeneity Test

Steps homogeneity second step is the same as the homogeneity test on the initial data.

c. Test Average (Right-hand Test)

This test proposed that hypothesis test in average similarity with the right test as the steps right-hand test the initial data.