

CHAPTER III

METHODS OF INVESTIGATION

This chapter discusses sources of data, subject and setting of research, research design, research variable, instruments, and procedures of experimentation, scoring technique, and method of data analysis.

A. RESEARCH DESIGN

Research design plays an important role in a research because the quality of research greatly depends on the design. In this research, the writer uses the form of quantitative approach to analyze the data. According to Michael J Wallace, “*Quantitative is broadly used to describe what can be counted or measured and can therefore be considered objective*”.¹

Quantitative approach stresses the analysis to the numerical data that was processed by statistical method.² It explains the result of pre-test and post-test.

1. Experimental Research

Experimental research is one of the most powerful research methodologies that researchers can use. Of many types of research that might be used, the experiment is the best way to establish cause-and-effect relationships among variables. Yet experiments are not always easy to conduct.³

An experimental research involved two groups: experimental group and control group. The experimental and control group are consisting of eleven grade students of MAN Negeri Kendal. An experimental group received a new treatment while control group received a usual treatment. According to Nunan, experiment is designed to collect

¹Michael J Wallace, *Action Research for Language Teacher*, (Cambridge: Cambridge University Press, 1998), p. 38.

²M. Burhan Bungin, *Metodologi Penelitian Kuantitatif: Komunikasi, Ekonomi dan Kebijakan Publik Serta Ilmu-ilmu Sosial Lainnya*, (Jakarta: Kencana, 2006), p.50.

³Jack R. Fraenkle, Norman E. Wallen, *How to Design and Evaluate Research in Education*, (New York: The McGraw-Hill Companies, 2006) 6th Ed, p. 267

data in such a way that threats to the reliability and validity of the research are minimized.⁴ This study used pre-test and post-test.

The design of the experiment could be described as follows:

$$\begin{array}{c} E 01 X 02 \\ \hline C 03 Y 04 \end{array}$$

Adopted from Arikunto.⁵

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 = treatment by using *Jigsaw*

Y = treatment without using *Jigsaw*

From the design above, subjects of research were grouped 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 *Jigsaw*) was applied to the experimental group, while the control group was taught without *Jigsaw*. The test was held in the form of conversation. The results of post-test (02 and 04) were then computed statistically.

⁴David Nunan, *Research Method in Language Learning*, (Cambridge: Cambridge University Press, 1992), p. 47.

⁵Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*, (Jakarta: PT Rineka Cipta, 2006), p. 86.

2. The Activities of Experimental Group

a) Pre-test

Pre-test was given before the treatments. First, the writer came to the class. Then, he explained to the students what they had to do. Finally, he distributed the instruments and asked them to do the test.

b) Activities in Experimental Group

There were some activities in experimental group (Class XI IPS-1) as follows:

No	Activities	Time Allotment
1	1) Teacher explains about definition of narrative text and generic structure of narrative text, and then gives example of narrative text. 2) Teacher asks students to make eight groups to apply <i>Jigsaw</i> technique then they gave narrative text to identify generic structure of narrative text. (Under teacher controlled).	3x45'
2	1) Teacher explains about language features of narrative and the examples in the text. 2) Teacher asks students to make eight groups to apply <i>Jigsaw</i> technique then they gave narrative text to identify language features of narrative text. (Under teacher controlled).	3x45'

c) Post-test

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

3. The Activities of Control Group

a) Pre-test

Pre-test was given before the treatment. First, the writer came to the class. Then, he explained to the students what they had to do. Finally, he distributed the instruments and asked them to do the test.

b) Activities for control group

There were some activities in control group (class XI IPS-2) as follows:

No	Activities	Time Allotment
1	1) Teacher explains about definition of narrative and generic structure of narrative text. 2) Teacher gives some narrative texts to students to identify the generic structure of narrative individually and look for the difficult words. 3) Teacher invites students to write down their result in the white-board.	3x45'
2	1) Teacher explains the language features of narrative text. 2) Teacher gives some narrative texts to students to identify the generic structure of narrative individually and look for the difficult words. 3) Teacher invites students to write down their result in the white board.	3x45'

c) Post-test

Post-test was held after all treatments were conducted. This test was used to measure students' ability after they were given treatments. The result of test was analyzed statistically.

B. SUBJECT OF THE RESEARCH

MAN Kendal located in Kompleks Islamic Center Bugangin Kendal is purposively selected as the research setting because of two major reasons. Firstly, its location is reachable for researcher to conduct the research. The second reason why it is selected to be the research setting is its students' variety. They are from different regions in Central Java those are Kendal, Batang, Pekalongan, Semarang, and etc. Therefore, there are great possibility of students' heterogeneity of intelligences and competences, social background and students' characteristics. The location of MAN Kendal is in two pieces, those are north and south part.

1. Population

Population is all of the research of subject.⁶ The population in this research is all students of grade eleventh of MAN Kendal in academic year of 2010/2011. The number of the entire students is 387. The population of the research was distributed as follow:

- a. Class XI-IPA 1 with the number of 40 students.
- b. Class XI-IPA 2 with the number of 39 students.
- c. Class XI-IPA 3 with the number of 35 students.
- d. Class XI-IPA 4 with the number of 34 students.
- e. Class XI-IPA 5 with the number of 40 students.
- f. Class XI-IPS 1 with the number of 43 students.
- g. Class XI-IPS 2 with the number of 43 students.
- h. Class XI-IPS 3 with the number of 43 students.
- i. Class XI-IPS 4 with the number of 42 students.
- j. Class XI-Language with the number of 28 students.

⁶Suharsimi Arikunto, *Op cit*, p.130.

2. Sample

Sample is some of chosen population using certain procedure so that can be expected to represent its population. Sampling is the process done to choose and take sample correctly from population so that it can be used as valid representative to the population.⁷

In selecting the sample, the writer used random sampling. Arikunto state if the population is more than 100 persons, the writer may take 10-15% or 20-25% or more from population.⁸ Therefore, the writer take 20,5% out of 389 students as the sample from this study or equal 80 students.

The research is an experimental research, so the researcher needs to take two classes that will be an experimental and control class as the sample from ten classes of the population. To determine the two classes, the researcher used purposive sampling technique. This technique was done by taking the subject/sample which is not based on strata, random or area but it is based on the consideration of a certain purpose.⁹ The consideration that the researcher tried to complete in preliminary research was the sample that will be chosen has to be homogeny, so that the research will be a good and valid research. Because we know that something that can be compared is something that has the similar characteristic. The researcher took class XI IPS-1 and XI IPS-2, because based on the result of the summative test of the first semester, these two classes gained similar average achievements and considered as homogeneous class. Each class consisted of 43 students. Students in class XI IPS-1 was taught by using *Jigsaw* technique and considered as experimental group. While students in class XI IPS-2 was taught without using *Jigsaw* technique and considered as control group.

⁷Sugiarto, et al., *Teknik Sampling*, (Jakarta: Gramedia Pustaka Utama, 2003), p.4.

⁸Suharsimi Arikunto, *Op cit*, p.134.

⁹*Ibid.*, p. 139

C. RESEARCH VARIABLE

According to Fred D. Kerlinger as cited by Arikunto, that all experiments have one fundamental idea behind them; to test the effect of one or more independent variables on a dependent variable (it is possible to have more than one dependent variable in experiments).¹⁰

This research, that used *Jigsaw* as technique in teaching reading narrative text, had two variables. Those variables were:

1. The Independent Variable

Independent variable is the variable that the experimenter changes within a defined range; it is the variable in whose effect the experimenter is interested.¹¹ The independent variable of this research was the use of *Jigsaw* in teaching reading narrative text.

2. The Dependent Variable

Dependent variable is variable that measures the influence of the independent variable.¹² The dependent variable of this study was the students' achievement in the written test score in reading narrative text.

D. TIME AND SETTING

This research was conducted on the second semester in the academic year of 2010/2011 for about 1 month beginning from January up to February 2011. It was conducted in MAN Kendal, which was located in Kompleks Islamic Center Bugangin Kendal.

E. METHOD OF DATA COLLECTION AND ANALYSIS

1. Source of Data

The data of this research were gathered from the written test of students' in pre-test and post-test through '*Jigsaw* technique in teaching reading narrative text' and the documentation of students' previous summative test score.

¹⁰Suharsimi Arikunto, *op.cit.*, p. 119.

¹¹Larry B. Christensen, *Experimental Methodology*, (Massachusetts:University of South Alabama,2001), 8th Ed, p. 145.

¹²*Ibid.*, p. ¹⁴⁵

2. Success Indicators

The indicators of reading teaching learning are as follow:

- a. The improvement of students' reading skill through the use of '*Jigsaw* technique'.
- b. Students' reading achievement with the minimum standard of score (KKM) 6,5.

3. Methods of Collecting Data

1. Test

Test is a set of questions and exercises used to measure the achievement or capacity of the individual or group.¹³ In order to discover how students are thinking and using the target language (English). The researcher was conduct written test in *Jigsaw* technique. The form of the test was written test which is used to measure skill, intelegent, knowledge, or ability that are owned by individually or personality. The writer analyzed the result of the test and gave score. The test will be conducted to both control class and experimental class which consist of 43 students of control class and 43 students of experiment class before and after the treatment.

Test is used to measure the person's competence and to achieve the objective. The data was collected by giving written test. Written test was conducted twice, there are pre-test and post-test.

This technique is applied by researcher to know the students' achievments that have done in learning English, especially in teaching narrative text on the reading class.

2. Documentation

Another data is needed to help the researcher run the research. In addition to do that, data will be collected through documentation of the students' previous examination score from the school. It will be used to validate the sample.

¹³Addision Wesley Longman, *Teaching by Principle: An Interactive Approach to Language Pedagogy*, (New York : A Person Education Company, 2001), 2nd Ed, p.384.

Documentation of students' written test recording is used to evaluate students' reading skill.

3. Observation

It refers to the activity of giving total concern to research object of the sense. In this research, the concern of research focused on the students' observable behaviour pertaining to their understanding on reading narrative text. It used to know the condition of class and the obstacles appeared during teaching learning process and it also used to saw students' difficulties, problems and understanding about material given.

4. Method of Data Analysis

There are three kinds of test that will be held in experimental research, they are pre-requisite test, try-out test, and hypothesis test. So there must be three process of analyzing the data collected from test.

1. Pre-requisite Test

Before the writer determines the sample, the writer should conduct a homogeneity test by choosing 2 classes with cluster random sampling. This test conducted to determine whether the data are homogenous or not. After conducted the test, data analysis was carried out to find out the homogeneity of the sample. It was meant to check if the research result met the requirement of good research or not.

It was meant to get the assumption that sample of research came from a same condition or homogenous. The writer used the formula as follows:

$$F = \frac{\textit{Biggest Variance}}{\textit{Smallest Variance}}$$

Cited from Sugiono.¹⁴

¹⁴Sugiyono, *Statistika Untuk Penelitian*, (Bandung: Alfabeta, 2007), p. 140.

2. Try out Test

According to Mouly in Tiowati, a try out test is necessary since the result will be used to make sure that the measuring instrument has such characteristics as validity and reliability.¹⁵ The instrument to be tried out was the composition test. The result of test was used to find out the validity and reliability.

1. Validity

Heaton states that validity is the extent to which it measures what is supposed to measure and nothing else.¹⁶ The result was consulted to critical score for r-product moment. If the obtained coefficient of correlation was higher than the critical score for r-product moment, it meant that a paragraph was valid at 5% alpha level significance.

To calculate the validity, the writer used the formula as follows:

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

Cited from Arikunto.¹⁷

Where:

r_{xy} = the correlation of the scores on two halves of the test

N = the number of the students in each group

X = the score of each component of speaking scoring

Y = the sum of all dialogue's score

$\sum X$ = the sum of total X score in each group

$\sum Y$ = the sum of total score from each student

¹⁵Husni Mubarak, *The Effectiveness of Animated Film as Media in the Teaching of Narrative Writing (An Experimental Research at the Tenth Grade Students of MA Futuhiyyah 2 Demak in 2009/2010 Academic Year)*. (Semarang: IAIN WALISONGO, 2009), p. 32.

¹⁶J. B. Heaton, *Writing English Language Test*, (London: Longman, 1975), p. 153.

¹⁷Suharsimi Arikunto, *op.cit.*, p. 170.

$\sum XY$ = the sum of multiple score from each student with the total score

$\sum X^2$ = the sum of the square score in each component of reading

$\sum Y^2$ = the sum of all dialogue's score square

2. Reliability

Reliability refers to the stability or the consistency of the test scores. Heaton states 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.¹⁸ In this study, the reliability of the test was measured by comparing the obtained score with r-score product moment. Thus, if the obtained score was higher than the table r-score, it could be said that the test was reliable.

To calculate the reliability of the test, the writer used the formula as follows:

$$r_{11} = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum \sigma_{b^2}}{\sigma_t^2} \right)$$

Cited from Arikunto.¹⁹

Where:

r_{11} = index reliability

k = number of items

$\sum \sigma_{b^2}$ = items variance

σ_t = total variance

To find out the variance of each item, the formula was:

¹⁸J. B. Heaton, *op.cit.*, p.155.

¹⁹Suharsimi Arikunto, *op.cit.*, p. 196.

$$\sigma_b^2 = \frac{\sum X^2 - \frac{(\sum X)^2}{N}}{N}$$

To find out the total variance, the formula was:

$$\sigma_t^2 = \frac{\sum Y^2 - \frac{(Y)^2}{N}}{N}$$

3. Item Analysis

After scoring the try-out test, item analysis was carried out to find out the effectiveness of the items. It was meant to check whether each item met the requirement of good test item or not. Item analysis discussed two main things:

1) Difficulty Level

Heaton states that “*the index of difficulty of an item simply shows how easy or difficult the particular item proved in the test*”.²⁰ If a teacher knows deeply about item difficulty in making a test, he can make his test easy, medium, or difficult.

To know the item difficulty, the writer used the formula:

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

Where:

P = index of difficulty

B = the number of students who answer an item correctly

JS = the total number of students

²⁰J. B. Heaton, *op.cit.*, p.172.

The index of difficulty level can be classified as follows:

$0.00 \leq P < 0.30$ is difficult

$0.30 \leq P < 0.70$ is medium

$0.70 \leq P < 1.00$ is easy

Cited from Sukestiyarno and Wardono.²¹

2) Discriminating Power

Item of discrimination 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. Heaton states, "The discrimination index of an item indicated the extent to which the item discriminated between the testee, separating the more able testee from the less able. The index of discriminating power told us if students who perform well on the whole test tended to do well or badly on each item in the test."²²

To calculate the index of discriminating power, the writer used the formula:

$$D = \frac{B_A}{J_A} - \frac{B_B}{J_B} = P_A - P_B$$

Taken from Arikunto.²³

Where:

J_A = Number of all students in the upper group

J_B = Number of all students in the lower group

B_A = Number of students in the upper group who answered the item correctly

²¹Sukestiyarno and Wardono, *Statistika*, (Semarang: UNNES Press, 2009), p. 63..

²²J. B. Heaton, *op.cit.*, p.173.

²³Suharsimi Arikunto, *Dasar-dasar Evaluasi Pendidikan*, (Jakarta: PT. Bumi Aksara, 2002), p. 213.

B_B = Number of students in the lower group who answered the item correctly

P_A = The proportion of the upper group who answered the item correctly

P_B = The proportion of the upper group who answered the item correctly

The criteria of determining the index of discriminating are below:

D = 0.00 – 0.20 : Poor

D = 0.21 – 0.40 : Satisfactory

D = 0.41 – 0.70 : Good

D = 0.71 – 1.00 : Excellent

3. Hypothesis Test

Firstly, the test was done in both groups, experimental and control group. Secondly, the result of the test was scored by using analytic scale. Thirdly, the means score of the two groups were determined. Finally, the two means were compared by applying t-test formula. T-test was used to differentiate if the students' result of students' reading skill in narrative text by using *Jigsaw* and without using *Jigsaw* was significant or not.

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

Where:

$$s = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

Cited from Sudjana.²⁴

²⁴Sudjana, *Op.Cit.*, p. 239.

Where:

\bar{x}_1 = the mean score of the experimental group

\bar{x}_2 = the mean score of control group

n_1 = the number of the experimental group

n_2 = the number of the control group

s = standard deviation

s^2 = variance

If the obtained score was higher than t-table score by using 5% alpha of significance, H_0 was rejected. It meant that H_a was accepted: "There was a significant difference in reading achievement between the experimental and control group."